



AVICHI COLLEGE OF ARTS AND SCIENCE

(A Co-Educational Institution Affiliated to the University of Madras)

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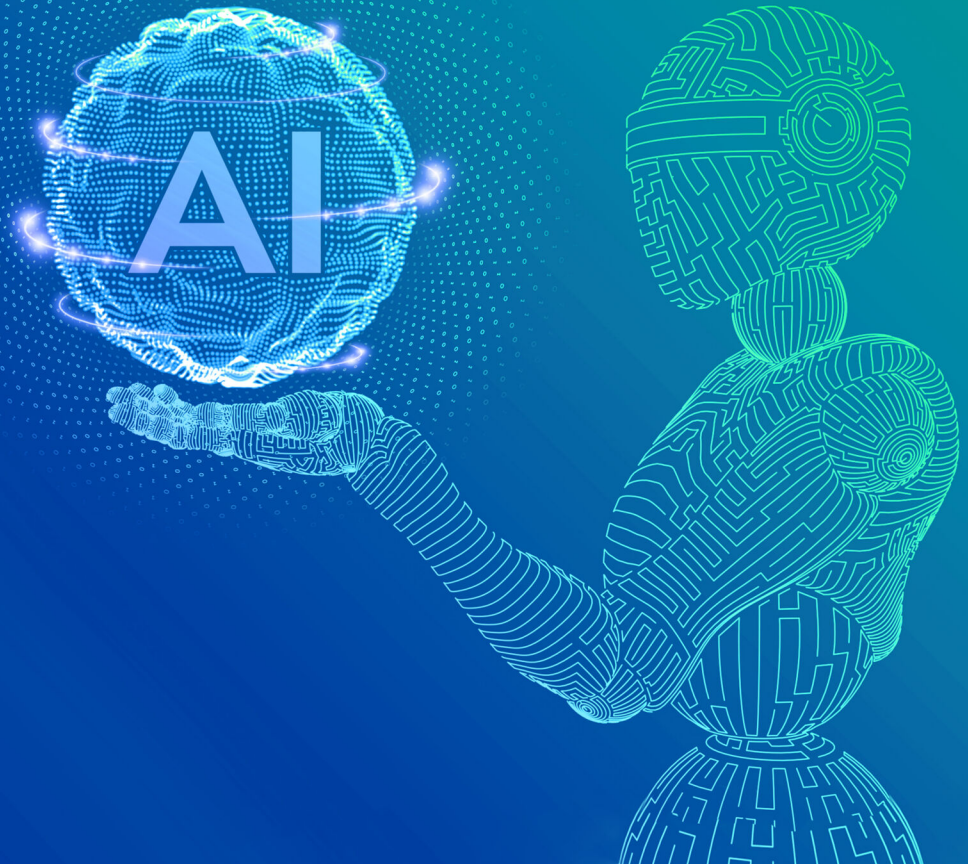


International

AI Conclave

02nd February 2024

DEEP TECH IN DIGITAL TRANSFORMATION





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PROCEEDINGS OF INTERNATIONAL AI CONCLAVE DEEP TECH IN DIGITAL TRANSFORMATION

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02nd FEBRUARY 2024

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PREFACE

The AI Conclave is a dynamic gathering of industry leaders, researchers, and enthusiasts exploring the latest advancements and future trends in artificial intelligence. This conclave fosters collaboration, featuring keynote speakers, panel discussions, and interactive sessions. Participants delve into topics such as Fintech, Legal, Healthcare, Media and Cybersecurity sharing insights that shape the evolving landscape. Discussions centre on harnessing innovation, addressing ethical considerations, and navigating regulatory landscapes. The conclave catalyses cross-industry insights, promoting responsible AI deployment. By fostering collaboration, knowledge exchange, and addressing challenges, the AI Conclave propels the collective journey towards a future where AI contributes positively to societal progress while aligning with ethical, legal, and regulatory frameworks.

Foreword by the Chief Patron



AVM K SHANMUGAM
Secretary and Correspondent

Excellent academic instruction passionately supports students' holistic growth. The goal is to generate awareness about advancement in technology and automation through AI, while complying the ideal inputs for the individual. The International AI Conclave -2024 offers the best opportunity to strengthen and improve technical abilities. The generation X nurtures themselves in AI tools, which will undoubtedly become the necessity of the digital era. This conclave broadens the perspective of research scholars and students. The discussions and outcomes would eventually create a norm among Arts and Science Colleges. I'd like to thank Mr. N. Ramkumar and Mr. M. Balasubramaniam for influencing their ideas and inspiring workforce for propelling this conclave forward. I wholeheartedly, convey my best wishes to the Principal, Staff and students for taking an initiative in conducting this International AI Conclave- 2024.

Foreword by the Patron



DR. N BHUMA
Principal

I would like to express my gratitude to our distinguished Secretary, Mr. AVM. K. Shanmugam, for his vision in foreseeing this global gathering AI Conclave-2024. Artificial Intelligence tool is distinctive and is rapidly growing popular as an approach for technological upgrades. Panel discussions on Gen AI and Digital Transformation, case studies, Ted Talks for entrepreneurs, and deep tech for start-ups are all featured. The AI Conclave-2024 attributes successful concepts from prominent speakers and entrepreneurs from various academic and industrial backgrounds. The sprawling response from academics and business professionals has wrapped up over a hundred articles urging us to hold additional forums of this kind in the future. My heartfelt congratulations to every individual staff and students for their unrelenting dedication in crafting such an amazing conclave. I take pleasure in appreciating the organising Committee, Editorial board and other committee members for their enthusiastic contribution in bringing papers from various domain and making the AI Conclave-2024 an eye opening platform for academicians.

Foreword by the Conclave Chair



Mr. N. RAMKUMAR
Conclave Chair
Director, IT WARE LLC. Dubai, UAE,
Professor of Practice, Avichi College of Arts and Science.

Artificial Intelligence with the powerful next generation Generative AI is now becoming an integral part of our current daily life pattern be it consumers or the corporate world as the Digital transformation era continues to progress leaps and bounds with every passing day.

The objective of the AI Conclave -2024 to be held on 2nd Feb 2024 under the auspices of the Avichi College from the illustrious AVM group of Educational institutions is to provide an awareness on the above basic questions and dive deep into Fintech, Medical, Legal, Cyber Security and Media Domains. This will increase the visibility for the students with such great opportunity to listen and interact with speakers and subject matter experts. They are AI ready even as they pursue their academic ambitions and add value as future stakeholders in the domains, they choose to move forward be it Data Science, ML Programmers or Business Analysts.

As one of the founder member Mentors of the college from the day it started, very happy to note the progress the college has made on the technology front and commend the college Management and its dedicated team for coming up with such an innovative idea to conduct this international AI conclave on such a grand scale. I am sure the students, budding unicorn entrepreneurs and prospective employers would find this conclave to be a stepping stone to pursue their AI Dreams

Foreword by the Conclave Chair



Mr. M. BALASUBRAMANIAM
Conclave Chair
CEO, StarInfinity Inc.
Co-Founder Kenverse

AI blends in with all of the Conclave-2024 subthemes. Robust cybersecurity, data-driven Fintech initiatives, automated content creation, and faster developments in healthcare are all made possible by insights. Working together promotes responsible AI, having a focus on morality and following the law. The Conclave-2024 emphasizes the necessity of cross-sectoral communication to tackle problems as a group. Modern technologies, such as machine learning and artificial intelligence, strengthen industry-academia cooperation. This conclave presents the implications of digital transformation in various sectors I would like to acknowledge the Management, Principal and Staff members for contributing to a significant stride in setting up a digital transformation ecosystem.

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Upshot of Artificial Intelligence - Devolved Device on Customer Immersion in the Banking Sector

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ABSTRACT: This research study investigates how artificial intelligence technology in the banking sector is impacting the overall consumer experience. The focus is on how consumers' personal digital transformation has influenced the evolution of digital banking, and how this will further impact consumer expectations and experiences. This research investigates how banks are using artificial intelligence virtual agents such as chatbots to transform the way consumers use banking services. The study found that digital transformation has increased consumer expectations from banks. Banks are using virtual agents to revolutionize customer service delivery, but customers aren't leveraging virtual agents as much as expected. The results showed that neobanks have not been able to operate with the expected momentum due to consumer knowledge gaps caused by banks' lack of promotion of customer information.

KEYWORDS: Artificial Intelligence (AI), Chatbots, Customer Experience (CX), Customer Relationship Management (CRM), FinTech, Neobanks, Virtual Agent (VA)

I. INTRODUCTION

The introduction of artificial intelligence (AI) has the potential to revolutionize the way businesses interact with their customers. The emergence of digitization throughout the economy provides insight into the evolution of Neobanking. Neo banks have brought about a shift in the banking industry that closes the gap between the services provided by traditional banks and the changing demands of consumers in the digital age.

The customer's viewpoint and the societal acceptance of Neo Banking are crucial for the system's further development. The pandemic scenario encouraged residents to use Neo banking since it offered contactless access to banking services and convenience. Therefore, the goal of the current study is to learn more about how customers view the Neo banking system and the importance and constraints of Neo banks in the digital era.

Banking is changing rapidly. Products and services produced and built for disruptive technologies are increasingly in the hands of end customers, and the way banks operate is changing in terms of customer convenience, transparency, pricing and customer service. As customer behaviour and expectations change, so do business and operating models.

All parts of the banking value chain - what consumers can use and expect when it comes to banking services - are now available to non-banking service providers thanks to their technological capabilities and agile and lean business model. In these models, banking services to retail and small and medium-sized enterprises (SMEs) are provided primarily through the Internet or another electronic channel, rather than physical branches.

These non-bank service providers are called new banks, and they challenge the status quo of traditional banks by offering both more affordable models and exceptional customer-centric service and experiences. Unlike traditional banks, new banks are not constrained by legacy systems, tightly integrated value chains, complex management structures and high regulatory requirements. Although the new banks do not yet have their own banking licenses in India, they use partners to provide banking licensing services.

Ease of opening and managing accounts, seamless payments, wire and money transfer solutions,



and alternative credit scoring methods are features that appeal to micro and small businesses and unbanked or unbanked customers such as freelancers and labor economy workers. New banks provided these segments with access to financial services and products that were either not readily available or had high fees and strict contracts..

II.RESEARCH OBJECTIVES

- To cram the customer insight towards the Neo-banking system.
- To explore the consumers' usage of neo-banking and experiences.
- To scrutinize the awareness and interest in neo banks in Chennai
- To find out how well are neo banks is acknowledged by Chennai consumers.

III.RESEARCH METHODOLOGY

To upgrade practicality and accessibility, an electronic questionnaire was used to guide the study. Electronic questionnaires were used to collect survey data to increase coverage and facilitate response. Data was collected via the SoGoSurvey website. Online surveys now provide direct access to population samples by distributing survey links via email and social media platforms.

The purpose of the study was to determine participants' responses. The survey consisted of 15 questions. One of the questions was designed to identify the age range of the respondents and participant population. The remaining questions were organized and clearly focused on topics related to the three different research objectives. Most of the surveys included open-ended questions to avoid ambiguity and ensure consensus from the survey results. Conversely, some questions gave participants the opportunity to express their opinions.

IV.REVIEW OF LITERATURE

Evans, 2019, AI technologies supported by data analytics are increasingly embraced by companies as a response to sustained margin pressures, shorter strategy cycles, and increased expectations from customers..

Jaiswal (2022) proposed changing the way firms interact with their customers, with the potential to achieve better customer-brand relationships.

Agarwal (2020) The article covered how the financial sector is developing swiftly. With the use of the case study of e-KYC and UIDIA, they have distinguished between digital banks and Neo banks. They have emphasised some of Neo Bank's advantages as well as its drawbacks and shortcomings. To describe the Neo banking structure, how they deliver end-to-end service, as well as the benefits and drawbacks of Neo banks, the author has leaned on this article.

Maras, 2020, AI technology can personalise services and product recommendations by processing customer's past purchases and preferences. This has repercussions for a variety of industries, such as beauty brands, to efficiently create personalized styles and product suggestions.

List of Neo banks in India

Instantpay	Freo	Mahila Money	RazorpayX	OCareNeo
Jupiter	Kotak 811	Revolut	Fi Money	ZikZuk
Niyo	Open	Digibank	Finin	Akudo
Monzo	N26	Walrus club	wise	Chqbook
Paytm Bank	Uni Card	Zolve	Mool	Piggy neobank



IV. DATAANALYSIS

Table 1 - The count of respondents who use their banks Chatbots according to their age

Age	Percentage
18-25	15
26-35	37
36-45	27
46 and above	21
Total	100
Source: Primary Data	

Interpretation: Customers primarily use the bank's digital services. Conversely, the statistics information shows that customers of all ages are using apps more frequently, not just the assumed younger consumers but also the different age groups.

Artificial Intelligence Technologies in Banking

The next set of inquiries of the study explores the elements of artificial intelligence in the banking sector, specifically AI-powered virtual assistants, also known as chatbots.

Table No - 02 - How often do customers visit a physical bank office?

Statements	Percentage
once a week	02
monthly once	56
once in three months	15
once in six months	17
yearly once	10
Total	100
Source: Primary Data	

Interpretation: It shows that 56% of the customers visits monthly one, with 17% once in six month, and the least is 02% once a week.

Table No – 03 Consumers' favoured means of communication

Component	1	2	3	4
Banking App	.725			
Chatbot on the banks website	.695			
Virtual visit to the bank				.590
Telephone	.717			

Interpretation: it can be concluded that banking App and telephone play a predominant role in influencing the customer's communication. The attractive features of the chatbots are also an important factor that expedites the for one of the modes of communication than virtual visit.

Table No. 04 Total Variance Explained- find out how well are neo banks is acknowledged by Chennai consumers.

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.875	42.936	42.936	4.183	18.186	18.186
2	1.404	6.106	49.042	3.401	14.789	32.975
3	1.151	5.005	54.046	3.331	14.484	47.459
4	1.053	4.578	58.625	2.568	11.166	58.625
5	.938	4.080	62.705			
6	.900	3.915	66.619			
7	.820	3.567	70.187			



8	.732	3.183	73.370			
9	.661	2.874	76.244			
10	.591	2.571	78.815			

From the above table it is found that the 23 variables are reduced into 4 major factors with Eigen values 4.183, 3.401, 3.331 and 2.568 are statistically significant. The 4 major factors also possess significant individual values 18.186, 14.789, 14.484, and 11.166 with total cumulative variance 58.625. This clearly indicates the very existence of 4 major factors with their respective variable loadings as expressed in the table.

Table No 05 Reliability statistics			
Variables	Cronbach's alpha	No. of items	Internal consistency
Performance expectancy	0.786	4	Acceptable
Effort expectancy	0.711	4	Acceptable
Social Influence	0.873	4	Good
Risk	0.908	4	Excellent
Perceived complexity	0.847	4	Good
Technological Anxiety	0.843	4	Good
Behavioural Intention	0.851	4	Good

Cronbach's alpha measures internal consistency. It further assesses how closely related a set of items are with each other. It checks the inter item reliability of each variable. As reported in above Table 5, all the items show a relatively high degree of consistency. A reliability coefficient of 0.70 or higher is considered acceptable in most social science research (Hair et al., 2016).

Table No 6 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.733
Bartlett's Test of Sphericity	Approx. Chi-Square	1740.728
	Df	378
	Sig.	0.000

Interpretation: It was observed that the Kaiser-Meyer-Olkin measure of sampling adequacy, the KMO value, was 0.733, which was more than the recommended value of 0.6 for sample adequacy. Bartlett's test of sphericity was also significant at 0.000, which is below the p value <0001. The KMO statistic varies between 0 and 1 and a value ≥ 0.5 is acceptable (Kaiser, 1970). Bartlett's Test of Sphericity rejects the null hypothesis at a value lower than 0.05 significance level (Snedecor and Cochran, 1989).

Table No – 07 ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	174.277	6	29.046	6.729	.000 ^b
1	Residual	435.973	101	4.317		
	Total	610.250	107			

a. Dependent Variable: BI

b. Predictors: (Constant)

Analysis of variance (ANOVA) is constructed for determining whether three or more sample means were drawn from the population with equal means. It is used to check variation in responses between samples so that it can be ascertained if there exists considerable difference in behavior intention. The F test indicates that there is a significant difference in the mean responses given for samples collected. If the value of the F test is below 0.05, then there is evidence to reject the H_0 in favor of H_a . The above model explains that the model so framed is acceptable and significant, as the value in significance column is below 0.05.



V. EXPLORATORY FACTOR ANALYSIS

Table No – 08 Total Variance Explained

Element	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative	Total	% of Variance	Cumulative %
1	5.806	20.737	20.737	5.806	20.737	20.737	4.397	15.704	15.704
2	4.713	16.833	37.570	4.713	16.833	37.570	3.050	10.894	26.599
3	2.556	9.129	46.700	2.556	9.129	46.700	2.961	10.574	37.172
4	2.141	7.645	54.345	2.141	7.645	54.345	2.815	10.052	47.225
5	1.923	6.868	61.212	1.923	6.868	61.212	2.807	10.024	57.248
6	1.679	5.996	67.208	1.679	5.996	67.208	2.201	7.860	65.108
7	1.180	4.213	71.422	1.180	4.213	71.422	1.768	6.314	71.422
8	.852	3.045	74.467						
9	.724	2.587	77.053						

Factor analysis is used to understand the range of factors that have a strong influence on the behavioral intention of bankers to use AI technology. In the study, there are seven variables considered: performance expectancy, effort expectancy, and social influence are considered as influencers towards behavioral intention to use AI.

Risk, technological anxiety, and perceived complexity are considered inhibitors towards behavioral intention to use AI in banking. Behavioral intention to use AI is considered a dependent variable. Influencers and inhibitors jointly explain 71.422% of variance in the behavior intention to use.

The initial Eigen value of the seven factors is greater than 1, and the factor loading is more than 0.5. Hence, Table 5 shows how these seven factors explain the overall variance. The total cumulative percentage of the extracted factors is more than 50%, i.e., 71.422%, which is good for the sample size of 108 respondents. Eigen values have been taken together with the principal component, respectively.

Table No - 09			
CUSTOMERS PERCEPTION TOWARDS NEO BANKING SYSTEM	Correlation coefficient (r)	Coefficient of determination %	P Value
Customers Satisfied with the Services Offered by Neo Banking System	.137	1.8	.052
Preference of Neo Banking Over Traditional Banking	.231	5.3	.001
Customers Agree-Ness Regarding Safety of Neo Banking System	.148	2.1	.038
Customers Awareness, Usage, and Adoption Level of Neo Banking System	.573	32.8	.001
Save time by using neobanks.	.149	2.5	.024
Managing the finances efficiently by using the services of neobanks.	.210	4.4	.003
By using the services of neobanks, it will lower bank fees.	.527	27.7	.000
Planning to use neobank services.	.397	15.7	.000
Uses neobank services regularly in the future.	.272	7.3	.000
It intend to recommend neobank services to my friends and acquaintances.	.231	5.3	.001

VI. EY FINDINGS

Neobanks have revolutionized the financial industry by offering a more agile and digitized banking experience. Customer service has become a fundamental pillar for the success of these digital banks, as their



business model relies on digital interaction with users. Through the use of advanced technology and effective communication, Neobanks can provide quality customer service, boosting trust and loyalty among their users in this new era of digital banking.

The outcome of the study appear that most Chennai shoppers are not mindful of Neobanks, or in case they are, their information of the subject is exceptionally restricted. Intrigued and believe in Neobanks change a parcel among respondents, but in common, it can be watched that Chennai customers are potential clients for Neobanks and the creator accepts that digitalization and innovative improvement will contribute to the acknowledgment and appropriation of Neobanks in Chennai.

REFERENCES

1. Alameda, Teresa. 2020. DATA, AI AND FINANCIAL INCLUSION: THE FUTURE OF GLOBAL
2. BANKING—Responsible Finance Forum, Responsible Finance ForumBBVA 2020. Available online: <https://responsiblefinanceforum.org/data-ai-financial-inclusion-future-global-banking/> (accessed on 12 May 2020). An Editorial with 52 Researchers. 1994. Mainstream Science on Intelligence. pp. 13–23. Available online: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.366.7808&rep=rep1&type=pdf> (accessed on 19May 2020).
3. Beck, Thorsten, Asli Demirgüç-Kunt, and Patrick Honohan. 2009. Access to financial services: Measurement, impact, and policies. *World Bank Research Observer* 24: 119–45. [CrossRef]
4. Beck, Thorsten, Haki Pamuk, Ravindra Ramrattan, and Burak R. Uras. 2018. Payment instruments, finance and development. *Journal of Development Economics* 133: 162–86. Available online: <https://www.sciencedirect.com/science/article/pii/S0304387818300075> (accessed on 14 May 2020). [CrossRef]
5. Burns, Scott. 2018. M-Pesa and the “Market-Led” Approach to Financial Inclusion. *Economic Affairs* 38: 406–21. [CrossRef]
6. Chatterjee, Prabirendra, and Sudipta Sarangi. 2006. The Economics of Microfinance. *Southern Economic Journal* 73:259. [CrossRef]
7. Demirguc-Kunt, Asli, Leora Klapper, Saniya Ansar, and Aditya Jagati. 2017. Making It Easier to Apply for a Bank Account A Study of the Indian Market. Available online: <https://elibrary.worldbank.org/doi/abs/10.1596/1813-9450-8205> (accessed on 12 May 2020).
8. Dubus, Antoine, and Leo Van Hove. 2017. M-PESA and Financial Inclusion in Kenya: Of Paying Comes Saving?
9. Available online: <https://hal.archives-ouvertes.fr/hal-01591200> (accessed on 14 May 2020).
10. rank, Morgan R. 2019. The Evolution of AI Research and the Study of Its Social Implications. MIT MEDIA LAB 2019. Available online: <https://medium.com/mit-media-lab/the-evolution-of-ai-research-and-the-study-of-its-social-implications-4a9598b3d7db> (accessed on 25 May 2020).
11. Global Partnership For Financial Inclusion. 2016. G20 High-Level Principles for Digital Financial Inclusion. Global Partnership for Financial Inclusion, 3–23. Available online: <https://www.gpfi.org/sites/gpfi/files/documents/G20> (accessed on 12 May 2020).
12. Gomber, Peter, Jascha-Alexander Koch, and Michael Siering. 2017. Digital Finance and FinTech: Current research and future research directions. *Journal of Business Economics* 87: 537–80. [CrossRef]
13. Karlan, Dean, and Jonathan Morduch. 2010. Access to finance. In *Handbook of Development Economics*. Amsterdam: Elsevier, vol. 5, pp. 4703–84. [CrossRef]
14. Kaya, Devrimi, and Paul Pronobis. 2016. The benefits of structured data across the information supply chain: Initial evidence on XBRL adoption and loan contracting of private firms. *Journal of Accounting and Public Policy* 35: 417–36. [CrossRef]
15. Killeen, Alyse, and Rosanna Chan. 2018. Global Financial Institutions 2.0. In *Handbook of Blockchain, Digital Finance, and Inclusion*. Amsterdam: Elsevier Inc., pp. 213–42. [CrossRef]
16. Lopes, Jorge, and José Luís Pereira. 2019b. Blockchain technologies: Opportunities in healthcare. In *Advances in Intelligent Systems and Computing*. Cham: Springer, pp. 435–42. [CrossRef]
17. Loufield, Ethan, Dennis Ferenzy, and Tess Johnson. 2018. Accelerating Financial Inclusion with New Data. The Mainstreaming Financial Inclusion: Best Practices Series. pp. 1–30. Available online: <https://medium.com/nest->



- ideas/accelerating-financial-inclusion-with-blockchain-6eb658fbfb0e (accessed on 12 May 2020).
18. Mamoshina, Polina, Lucy Ojomoko, Yury Yanovich, Alex Ostrovski, Alex Botezatu, Pavel Prikhodko, Eugene Izumchenko, Alexander Aliper, Konstantin Romantsov, and Alexander Zhebrak. 2018. Converging blockchain and next-generation artificial intelligence technologies to decentralize and accelerate biomedical research and healthcare. *Oncotarget* 9: 5665–90. [CrossRef] [PubMed]
 19. Matsebula, Velenkosini, and Derek Yu. 2017. Financial Inclusion in South Africa: A NIDS Data Analysis of Household Access and the Usage of Financial Services and Products. Cape Town: Department of Economics, University of the Western Cape, pp. 1–21.
 20. Osah, Olam, and Michael Kyobe. 2017. Predicting user continuance intention towards M-pesa in Kenya. *African Journal of Economic and Management Studies* 8: 36–50. [CrossRef]
 21. Ozili, Peterson K. 2018. Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review* 18: 329–40. [CrossRef]
 22. Park, Cyn-Young, and Rogelio Mercado. 2015. Financial Inclusion, Poverty, and Income Inequality in Developing Asia. *SSRN Electronic Journal*. [CrossRef]
 23. Park, Cyn-Young, and Rogelio Mercado. 2018. Financial inclusion, poverty, and income inequality. *Singapore Economic Review* 63: 185–206. [CrossRef]
 24. The World Bank. 2020. Digital Financial Inclusion. Available online: <https://www.worldbank.org/en/topic/financialinclusion/publication/digital-financial-inclusion> (accessed on 12 May 2020).
 25. Van Hove, Leo, and Antoine Dubus. 2019. M-PESA and financial inclusion in Kenya: Of paying comes saving? *Sustainability* 11: 568. [CrossRef]



Exploring the Impact of Artificial Intelligence on the Indian Entertainment Landscape

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ABSTRACT: Artificial Intelligence (AI) is becoming an important part of our daily lives, and it is expected to be more integrated into ordinary lives in the upcoming years. Even in the media and entertainment industry infusion of AI has set the stage for a remarkable change. Artificial intelligence (AI) has had a multifaceted impact on the Indian entertainment sector, with a focus on music, art, and general entertainment. This emerging technology has become a catalyst for the media and entertainment sector, which is leading to remarkable investments in pursuit of satisfying ever-growing viewer demands. AI technologies have the potential to enhance content creation and media consumption experiences.

This study examines emerging patterns in the usage of AI in the Indian entertainment sector by employing a qualitative methodology of content analysis. It also focuses on the qualitative aspects of how AI is perceived, adopted, and integrated into creative processes. The study contributes to the broader field of mass communication and media research by conducting a non-technical examination of AI's impact on creativity, artistic expression, and industrial practices in the contemporary entertainment industry in India.

Predicting AI's pivotal role in the Indian media and entertainment industry is necessary for the production companies to develop a future strategic vision. This research provides content producers, industry experts, and policymakers with a sophisticated grasp of the problems and opportunities presented by the convergence of AI and media in the Indian entertainment sector.

KEYWORDS: Artificial Intelligence, Media, Entertainment, AI Convergence

INTRODUCTION

With the speedy hike in the progress of the internet and information systems, digital makeover is a matter of concern among all businesses across the world. In such scenarios, the media and entertainment industries have always been in front for accepting such technologies. The key concern which is making these media and entertainment industries invest their interest is the need to reduce the costs of operating in an increasingly competitive landscape. Even whenever we develop any new technology, the main aim behind the update or development is to make the specific process easy, more accurate, faster, or cheaper. In some cases, such developments can perform such tasks which were not possible earlier. Digitization focuses on creating, controlling, and integrating a well-structured operating model which redefines the different functions to interact with different purposes.

Artificial Intelligence is a very rich and diverse field which is applicable in a wider industry spectrum which includes automobiles, telecom, healthcare, entertainment, banking sectors, insurance & credit cards, apparel, media, durable goods, and even tourism (Meena et al., 2020). This emerging tech focuses on bringing down costs and more flexibility for the organization. It also aims to learn from the experiences and trim their behaviour and processing based on those learnings. The influence of Artificial Intelligence in the entertainment industry is multifaceted, ushering into new possibilities and challenges. From visual art techniques to music, video editing to script writing, AI is reshaping the way content is created, curated, consumed, and experienced. The dynamic nature of this technology is acting as a catalyst in the significant transformations in the media and entertainment sector which is leading to prompting investments as the industry stakeholders seek to satiate the ever-growing demand of consumers.



In terms of viewer satisfaction, AI technologies are offering unprecedented potential to enhance content creation and media consumption experiences. It includes personalized recommendations on streaming platforms for the creation of music compositions as per the listener's choices.

REVIEW OF LITERATURE

Artificial Intelligence is a next-level revolution in any industry, but revolutionizing the media and entertainment industry the most currently. Creativity in the Cambridge Dictionary is defined as 'the ability to generate original and unusual ideas, or to make something better or imaginary.' There are many fields in parallel which are getting influenced by this technology such as movie production, video games, VFX & SFX, AR (Augmented Reality), sports broadcasting, writing articles for businesses, movie marketing etc. Media experts have recognized that this technology will improve efficiency by automating numerous tasks by proposing a competitive benefit to the stakeholders. This emerging technology has developed an opportunity for entertainers to understand and use the tech in a proper way to cater engaging content to audiences. AI will also help production houses make informed decisions about marketing and advertising by investigating the previous data sets available in the open domain (Chan-Olmsted, 2019).

There are numerous three levels where AI is getting used in the media and entertainment sector- (1) at the creation level, (2) at the production level, and (3) at the consumption level. AI tools are being used very creatively at all these stages and are proving relevant and useful for a wide range of media and creative applications which are being used for music creation, images and videos, engineering video games, writing codes for development, and possibly many others too. Even these tools are being used to cater for the audience their personalized content to maximize their user experience (Amato et al., 2019). Research on the collaboration between humans and AI in creative processes is gaining prominence. Such works investigate how artists and creators perceive and adopt AI tools in their workflows. Their study sheds light on the dynamic relationship between human intuition and AI-generated suggestions, emphasizing the collaborative potential that contributes to artistic innovation and expression (Anantrasirichai & Bull, 2021).

Indian media and entertainment industry grow by 14% till 2021, with advertising revenue anticipated to augment at a CAGR of 15.3% at the same time. The speedy rush in the consumption of digital content is transforming this industry at a very fast pace. It is giving this industry an idea to re-look their business ideas, models, and strategies. The transformative impact of AI on the Indian media and entertainment industry is evident in the discussions on industry trends and investments (Amato et al., 2019). According to a report by FICCI and EY (2021), AI technologies are driving substantial investments in the sector. The report highlights how media companies are leveraging AI for content creation, distribution, and audience analytics. The literature also emphasizes the importance of predictive analysis in developing a strategic vision for the future of the Indian media and entertainment industry. Research by Dutta and Sinha (2018) discusses the need for production companies to anticipate AI's pivotal role and align their strategies accordingly (Nautiyal et al., 2023). The study underscores the significance of foresight in navigating the evolving landscape shaped by the integration of AI in media and entertainment.

Forecasts and predictions regarding AI's role in the Indian film industry have been the focus of scholarly attention. Studies have analysed the industry trends and predict a significant rise in the use of AI for scriptwriting, visual effects, and audience analytics. Their study emphasizes the necessity for film production companies to embrace AI-driven technologies to stay competitive in an increasingly digitized landscape (Anantrasirichai & Bull, 2021). AI in the Indian media and entertainment industry is a rich tapestry of insights, ranging from technological advancements to cultural innovations, ethical considerations, and predictions for the future.

OBJECTIVES

1. To explore the adaptation of AI across different film industries within India.
2. To find the ethical considerations and concerns related to AI in the entertainment sector.
3. To analyse the industry responses and stakeholder perspectives on the use of AI in film production.

METHODOLOGY

The study employs a qualitative case study analysis method to obtain an in-depth knowledge of the complex and context-specific dynamics of AI integration in the Indian Film and Entertainment Industry, providing for a more sophisticated understanding of industry methods, challenges, and creative outcomes. Four distinct cases from



the Indian Film Diaspora were selected for the case study analysis. Analysis of secondary data sources (e.g., online news articles, blogs, official records) of information on AI usage in the film industry is being used. Samples for the study incorporated a mix of mainstream films from various Indian languages including Hindi, Tamil and Malayalam. The criteria for selection included the innovative usage of AI technologies, critical acclaim, and representation of diverse genres and languages.

Case I: De-ageing in films using AI - Weapon Movie (Tamil)

The Tamil movie 'Weapon' which is anticipated to release on November 2024 is a sci-fi thriller starring Sathyaraj as a Superhuman and is directed by Guhan Senniappan. The movie uses Artificial Intelligence to de-age the main actor for a flashback sequence rather than going with the conservative method of using a similar-looking younger actor for the role. AI's role in de-ageing actors in films employs deep learning algorithms, such as Generative Adversarial Networks, to identify facial traits and mimic the increase and decrease in the ageing process. Digitally de-ageing actors are applied mostly during post-production stages to preserve consistency in character looks and allow showing narratives in different periods. 'Weapon' has a 2-minute AI sequence for which the team has used open-source software with an AI plug-in to create 3D images.

According to Guhan, the usage of AI for a particular sequence has reduced the time taken for shooting and editing the sequence to a considerable amount and has also given a variety of choices in the ambience and backgrounds to choose from which would have not been possible in the physical setting. While Hollywood movies have been using this technology for ages in movies such as Marvel and DC comics adaptations, Mission Impossible series etc, Weapon is claimed to be the first attempt in Indian cinema.

Case II: Sequel script writing using AI - 'Masoom 2' (Hindi)

'Masoom' is a 1983 hit Bollywood movie directed by veteran director Shekhar Kapur. Recently the director revealed his experience in experimenting with the AI chatbot Chat GPT to create a sequel of the movie. For the prompt of crafting a storyline for 'Masoom 2 - The Next Generation' chat GPT has delivered impressive results showing the capability of the technology in generating content and replacing scriptwriters in future. Masoom (1983) depicts the story of a couple Devendra Kumar Malhotra aka DK (Naseeruddin Shah) and Bhavana (Supriya Pathak) and their illegitimate son Rahul (Jugal Hansraj). The AI-generated plotline of the sequel depicted Rahul reconciling with his father's rejection and ultimately forgiving him. Despite being packed with complex human emotions and relationships, the chatbot was able to analyse all the text materials about the movie available online and deliver a result in 30 seconds as per the director.

Even though the director reassures that AI can't replace human scriptwriters in the near future as it lacks a better understanding of human emotions as well as the broad spectrum of human creativity the possibility of which cannot be dismissed. AI integrates natural language processing and machine learning technologies to analyse original writings, expand stories, insert new characters, and maintain consistency effortlessly.

Case III: India's first Artificial Intelligence-based film - Monica: Oru AI Story (Malayalam)

'Monica: Oru AI Story' is an upcoming Malayalam movie directed by E M Ashraf, featuring the story of an Artificial General Intelligence (AGI), which is a human-like AI robot played by Aparna Mulberry. AGI robots are still a concept with a theoretical definition. AGI robots are expected to replicate diverse human cognitive capabilities in software. They are expected to act spontaneously in unexpected situations like human beings. Thus, the character AGI, named Monica, is expected to symbolise a futuristic vision with human-like capabilities. The film not just only portrays an AI robot in real real-life setting but also combines cutting-edge technology and artificial intelligence to deliver an unparalleled cinematic experience.

As per the makers, the film has been recognised by India's official AI-related website, Indiaai.gov.in, which serves as a forum for documenting major milestones in the country's AI development even before its official release.

Case IV: Film creation entirely using AI - Maharaja in Denims (Hindi)

'Maharaja in Denims' is the film adaptation of Khushwant Singh's 2014 historical novel of the same name. The film plot revolves around a teenager based in Chandigarh named Hari, who identifies himself as the reincarnation of the great ruler of Punjab, Maharaja Ranjit Singh. This film is set to create a benchmark in the Indian entertainment sector by being the first feature-length film entirely made with AI technologies, that is, with no sets, actors, or even cameras.

CONCLUSION

The impact of AI on the Indian entertainment sector, notably film has contributed to pathbreaking changes in the way films are being made as well as perceived by the audience and filmmakers. Three major observations



emerged during the analysis of these cases and the reactions of the filmmakers involved. Firstly, the economic implications of AI adoption, that is, almost all the filmmakers agree on the cost-effectiveness of using AI technology in filmmaking. For instance, in case IV, if the film was to be made without AI, the estimated budget would have been around US\$6 million, but AI brought in a significant reduction. Filmmakers also highlights that AI interventions reduce the time requirements for shooting and editing to a large extent. Secondly, the a need for developing genre-specific AI applications, different types of AI applications should be developed for different movie genres according to individual needs, as Sci-fi movies will need more special effects whereas a rom-com will need AI with a higher emotional quotient to assist scriptwriting. Even if not used fully, the suggestions of AI can be used to enhance the scriptwriting process along with reducing the time consumption required for the process. Lastly, ethical issues while using AI for creative purposes like scriptwriting, songwriting etc. The fact that overuse of AI in such creative domains may significantly reduce the manpower required for the same which in turn reduces job opportunities. Even when AI is used for de-ageing actors digitally, although it gives character consistency, that replaces a human actor who could have reprised the role otherwise. The Indian film industry, unlike the Western world, has remained positive towards the inclusion of AI in filmmaking. Almost all the regional language Film industries are using AI for innovative filmmaking and not just bollywood which contributes to diverse cultural representation. But there needs to be a perfect balance between the rate of this inclusion and the existence of human creativity.

REFERENCES

1. Amato, G., Behrmann, M., Bimbot, F., Caramiaux, B., Falchi, F., García, A., Geurts, J., Gibert, J., Gravier, G., Holken, H., Koenitz, H., Lefèbvre, S., Liutkus, A., Lotte, F., Perkis, A., Redondo, R., Turrin, E., Viéville, T., & Vincent, E. (2019). AI in the media and creative industries. *arXiv (Cornell University)*. <https://doi.org/10.48550/arxiv.1905.04175>
2. Anantrasirichai, N., & Bull, D. (2021). Artificial intelligence in the creative industries: a review. *Artificial Intelligence Review*, 55(1), 589–656. <https://doi.org/10.1007/s10462-021-10039-7>
3. Bogue, R. (2022). The role of robots in entertainment. *Industrial Robot-an International Journal*, 49(4), 667–671. <https://doi.org/10.1108/ir-02-2022-0054>
4. Chandler, S. (2020, January 10). Hollywood is using artificial intelligence to pick its next blockbuster. *Forbes*. <https://www.forbes.com/sites/simonchandler/2020/01/10/hollywood-is-using-artificial-intelligence-to-pick-its-next-blockbuster/?sh=5eefe34775a5>
5. Chan-Olmsted, S. M. (2019). A review of artificial intelligence adoptions in the media industry. *International Journal on Media Management*, 21(3–4), 193–215. <https://doi.org/10.1080/14241277.2019.1695619>
6. Das, S., & Gochhait, S. (2021). *Digital Entertainment*. Palgrave Macmillan. <https://doi.org/10.1007/978-981-15-9724-4>
7. Express News Service. (2020, July 23). City-based author Khushwant Singh's book Maharaja In Denims to be made into film. *The Indian Express*. <https://indianexpress.com/article/cities/chandigarh/khushwant-singh-maharaja-in-denims-film-6519601/>
8. Ghosh, B. (2023, October 19). The Malayalam Film Industry is Making a one-of-a-kind Story Based on Artificial General Intelligence. *Analytics Drift*. <https://analyticsdrift.com/the-malayalam-film-industry-is-making-a-one-of-a-kind-story-based-on-artificial-general-intelligence/>
9. India's first AI-based movie, Monica: An AI Story, is to hit cinemas soon. (n.d.). INDIAai. <https://indiaai.gov.in/news/india-s-first-ai-based-movie-monica-an-ai-story-is-to-hit-cinemas-soon>
10. Kar, A. K., Varsha, P. S., & Rajan, S. (2023). Unravelling the impact of Generative Artificial intelligence (GAI) in Industrial Applications: A review of scientific and Grey literature. *Global Journal of Flexible Systems Management*, 24(4), 659–689. <https://doi.org/10.1007/s40171-023-00356-x>
11. Lippell, H. (2016). Big data in the media and entertainment sectors. In *Springer eBooks* (pp. 245–259). https://doi.org/10.1007/978-3-319-21569-3_14
12. Meena, R. (2020, January 10). *Artificial Intelligence: a digital transformation tool in entertainment and media industry*. Our Heritage - Our Heritage. <https://archives.ourheritagejournal.com/index.php/oh/article/view/1314>
13. Nautiyal, R., Jha, R. S., Kathuria, S., Chanti, Y., Rathor, N., & Gupta, M. (2023). Intersection of Artificial Intelligence (AI) in Entertainment Sector. *IEEE Xplore*. <https://doi.org/10.1109/icosec58147.2023.10275976>
14. Online, E. (2023, September 1). Shekhar Kapur experiments with AI: Director asks ChatGPT to write “Masoom 2” script, gets amazed by its ‘i. *The Economic Times*. <https://economictimes.indiatimes.com/magazines/panache/shekhar-kapur-experiments-with-ai-director-asks-chatgpt-to-write-masoom-2-script-gets-amazed-by-its-intuitive-response/articleshow/103285880.cms?from=mdr>



15. Rajendran, G. (2023, August 1). *Flashback with a twist: Team 'Weapon' employs AI to de-age Sathyaraj*. The Hindu. <https://www.thehindu.com/entertainment/movies/flashback-with-a-twist-team-weapon-employs-ai-to-de-age-sathyaraj/article67145219.ece>
16. Sarkar, S., & Sarkar, S. (2024, January 15). Does AI-produced film 'Maharaja in Denims' mark a shift in Indian cinema? *South China Morning Post*. <https://www.scmp.com/week-asia/lifestyle-culture/article/3248487/does-ai-generated-film-maharaja-denims-mark-shift-indian-cinema>
17. Shah, B. D. (2023, December 18). Bollywood: How AI may affect India's vast film industry. *BBC News*. <https://www.bbc.com/news/world-asia-india-67657873>
18. Suganth, M. (2023, July 30). Kollywood film team uses AI to create young Sathyaraj. *The Times of India*. <https://timesofindia.indiatimes.com/entertainment/tamil/movies/news/kollywood-film-team-uses-ai-to-create-young-sathyaraj/articleshow/102250707.cms?from=mdr>



Analysis of Procedural Content Generation and Non-Player Character Behaviour in AI Games

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ABSTRACT: This research paper delves into the revolutionary influence of artificial intelligence (AI) on the gaming world. This study shows the use of sophisticated algorithms for dynamically adjusting game balance and difficulty. In addition, it also focuses on AI's wide-ranging impact, including non-player character (NPC) behaviour, procedural content generation, and tailor-made gaming experiences. The proposed work involves an analysis of case studies from some of the most notable games. The results of this study showcase the transformative impact of AI in heightening the authenticity, involvement, and flexibility of games. It sheds light on AI's potential to completely transform game creation and enhance user engagement, highlighting its revolutionary influence. Furthermore, the importance of ethical considerations and regulatory structures are emphasized as crucial elements in the ongoing development of AI in gaming. By providing insights into both the practical applications and wide-reaching implications of AI, this research offers a comprehensive comprehension of AI's multifaceted role in shaping the future of the gaming landscape.

KEYWORDS: Gaming, Artificial Intelligence, Non-Player Behavior

I. INTRODUCTION

Modern gaming is evolving dramatically due to the development of Procedural Content Generation and Non-player characters with the assistance of Artificial Intelligence. Video games are changing dynamically now that intelligent procedural algorithms that create materials on the fly are integrated into them. Players need more immersive, interactive, and captivating experiences which are now fulfilled with the help of AI-driven NPCs. No more scripted dialogues or repetition is used it's all about unique experiences that the gamers demand which is possible due to AI. The ever-evolving Gaming industry is highly influenced by the powers of AI to provide the best experience to the users.

II. PCG AND AI

Procedural content Generation (PCG) in games is computer-assisted generation of content such as levels, landscapes, items, rules, and quests. PCG is not a game mechanic it is a tool. The game builds entirely original content for the players to use. The content is generated randomly by the computer rather than being handcrafted/built by humans. It aims to provide more unique experiences for players identifying their level of skill and improvement[1]. The combination of artificial intelligence and PCG has led developers to create systems that learn from the player's behavior and adapt to the game world in response[2]. This has the potential to create immersive and responsive gaming experiences that react and evolve based on how the players play the game[3]. In the game industry, PCG is most often used

Fig. 1. for:

- World Generation
- 3D Assets
- Animations
- Looting System
- Narrative

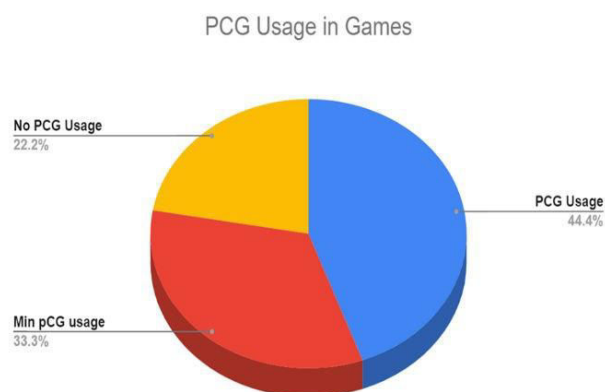


Fig. 1. PCG usage in games [11]

III. IMPACT OF AI ON NPC BEHAVIOUR

Non-player Characters (NPC) in games are characters that are not controlled by the players like quest givers, companions that offer hints to puzzles, merchants, enemies, etc.[4]. They are usually controlled by the game master or referee rather than any other player. Players are fond of NPCs as they tend to have their own stories with the NPCs that they interact with. Earlier NPCs used to be pre-determined scripts with repetitive actions making them extremely repetitive and unrealistic. AI has affected the development of these NPCs in various aspects. NPCs that are AI-driven are more interactive, enjoyable, and realistic[5]. The characters remember and respond to past actions, and interactions adding realism to the virtual world. The NPCs have the potential to learn and adapt to the evolving environments and go about their daily life with their own stories symbolizing individuality and uniqueness which also makes the player feel engaged. This level of interaction and customization adds a new layer of immersion for players[6]. The usage of NPCs with generative AI has rapidly increased **Fig.2**

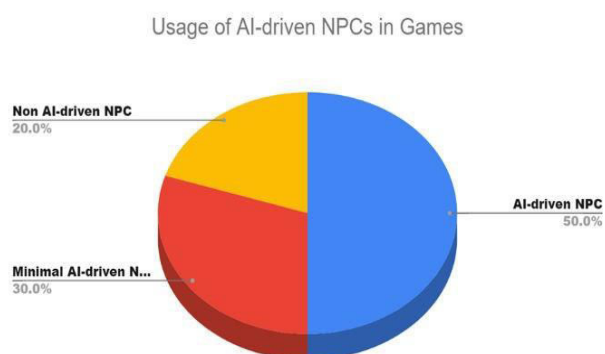


Fig. 2. Usage of AI-driven NPCs in games[11]

IV. CASE STUDY ON TOP 5 GAMES THAT USE AI FOR NPC AND PCG

AI has just begun evolving in the ever-changing gaming industry. It has had its most impact on NPCs and PCG parts of the games. Most of the games are yet to adapt to AI and its features which has left them stagnant in the gaming industry with very few players. AI is the new reality of gaming this can be seen in the top five games that are at their best in AI-driven PCG and NPCs. The following charts **Fig. 3.** show how the games have grown after implementing AI even though they had a rough start at the beginning. Games like No Man's Sky and Minecraft have some of the best PCGs in the industry. They are mostly AI-generated and have the best user experience with a vast variety of environments and smart procedural algorithms. Red Dead Redemption 2 and Deus Ex: Mankind Divided are known for their interactive and powerful NPCs that hold the power to elevate the game and implement realism in the virtual world. These AI NPCs have their own life and stories that depict individuality and uniqueness. Dungeon Village is a game that is very versatile and has mastered both fields making it one of the most powerful games despite being new in the gaming industry launched in 2022.



A. NO MAN'S SKY

No Man's Sky is an action-adventure survival game developed by Hello Games. This game had a very rough launch at the beginning due to repetitive NPC interactions and limited procedural variety. Even now their NPC behavior and interactions are limited and are not much AI-driven, but they drastically improve their PCG. It has evolved from a bland world generation to create dynamic, diverse, and interesting planets and biomes. The developers have implemented AI algorithms to enhance the procedural algorithms. No Man's Sky takes the crown for sheer scale and variety. The procedurally generated galaxies, planets, and biomes are practically infinite with each planet having unique flora and fauna and amazingly crafted landscapes, unexpected discoveries around every corner are truly a sense of wonder how unmatched this AI-driven PCG is.

B. MINECRAFT

Minecraft is a game from blocks that we can transform into whatever we can imagine. Minecraft's blocky charm and its undeniable creative charm were always endearing but in its early days, its NPC behavior and world generation lacked depth. Over time using AI, updates like villager professions, improved trade mechanisms, and more dynamic world events have been refined. The simplicity of its PCG empowers players to unleash their creativity as it offers endless possibilities for exploration and construction, whether it is building towering monuments or carving intricate underground cities

C. REDDEAD REDEMPTION 2

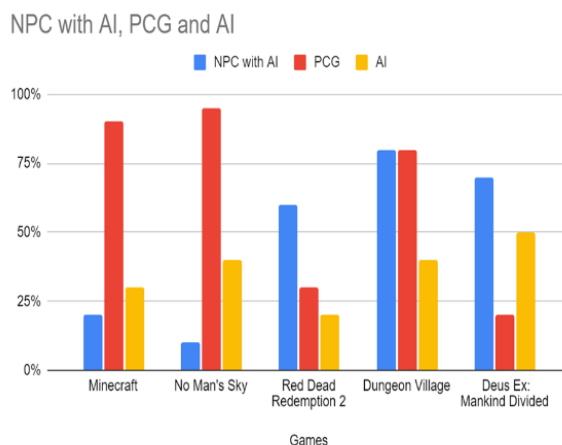
Rockstar's Wild West epic boasts some of the most immersive, interactive, and believable NPCs in gaming. The open world is populated with dynamic crowds who go about their daily lives with their personas, react authentically to your actions and even remember your past interactions with them. You can strike up conversations with anyone, witness random acts of kindness or violence, and even engage in side quests that emerge organically from these emergent AI behaviors. Red Dead Redemption 2 has truly set a high bar for world-building and NPC interactions.

D. DEUS EX: MANKIND DIVIDED

This dystopian sci-fi RPG excels at creating morally complex NPCs with strong opinions and agendas. However, its procedural generation is enjoyed by only some. The AI shines brightly in its ability to adapt to your choices and playstyle. NPCs remember your past actions and interactions, react differently based on your augmentations, and even offer unique solutions to problems based on their own experiences and beliefs. Deus Ex: Mankind Divided has intelligent and thought-provoking NPC interactions with the help of AI. It challenges you to think critically about your choices and their impact on the world around you.

E. DUNGEON VILLAGE

Dungeon Village boasts a compelling blend of dungeon management and RPG elements, with its procedural content generation and AI-driven NPCs playing a crucial role in the gameplay experience. The exploration feels fresh with unpredictable corridors, traps and enemy ambushes with its AI-driven PCG. AI-powered NPCs ensure evolving relationships, adaptive event triggers, and villagers with dynamic needs and behaviors. Villagers and adventurers possess distinct personalities leading to emergent situations and unexpected interactions. Dungeon Village is one of the very few games that have the best AI-driven PCG and NPC.



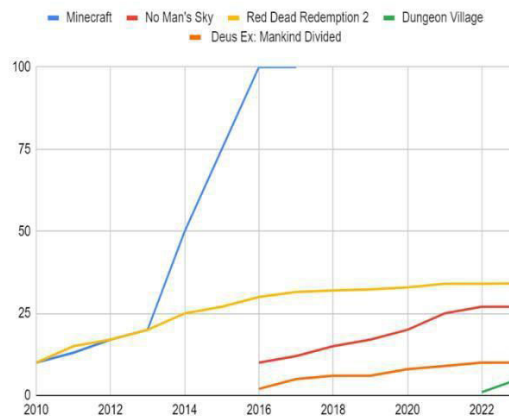


Fig. 3. NPCs with AI, PCG and AI in the top five games and their growth scale [10][11][12]

V. CHALLENGES AND LIMITATIONS OF PCG AND NPC BEHAVIOUR IN AI GAMES

Procedural Content Generation (PCG) and Non-Player Character (NPC) behavior are critical elements in AI games, but both technologies face distinct challenges and limitations. Recognizing these challenges is essential for developers to create truly engaging and immersive experiences.

A. CHALLENGES OF PCG

- Lack of control and predictability: PCG offers variety and replayability, but it can also lead to unenjoyable and unpredictable experiences. Games may generate content that feels illogical, or unbalanced, disappointing players[7].
- Maintaining quality and coherence: Ensuring consistently high-quality content across a vast array of possibilities is a major challenge. Therefore, the developers are focused on creating smarter algorithms that maintain the level of coherence and quality in the procedurally generated content[7].
- Maintaining Balance: One of the greatest challenges is balancing randomness and control. Since it is randomly generated by the computer it might turn into chaos rather than creating unique experiences.
- High Development costs: Development of robust PCG is not cost efficient it needs significant expertise and resources. Building tools, algorithms, and testing can be resource-intensive[8].

B. LIMITATIONS OF NPC BEHAVIOUR

Limited decision-making and behavior: Traditional AI models might struggle to respond dynamically to player actions and changing environments. This limits the potential for emerging gameplay and meaningful interactions[7].

- Difficulty balancing challenge and engagement: Player satisfaction is the most important factor in the growth of a game but this can only be achieved with a balanced NPC behavior. NPCs that are too difficult are frustrating and NPCs that are too easy are uninteresting.
 - Ethical considerations: ethical considerations are raised when implementing AI that manipulates player emotions and exploits their behavior. Balancing player autonomy and engaging and interactive gameplay needs careful consideration[6].
- THE FUTURE OF PCG AND NPCs WITH AI:-Looking ahead, the future of the gaming industry is fun and interactive all thanks to the power and implementation of AI[9]. The future of NPCs and PCG with Generative AI is promising. As technology advances the NPCs will become more interactive, adaptive, and realistic. AI algorithms will become more sophisticated, enabling NPCs to understand and respond to a wider range of inputs from players that will create individuality among the characters. The PCG with Generative AI will become very realistic with the infinite universe that tailors to the user experience[7]. The days of scripted dialogue and fixed behavioral patterns will be replaced with NPCs that can think, learn, and evolve in real time, creating truly realistic virtual worlds

VI. CONCLUSION

The introduction of Artificial Intelligence (AI), Procedural Content Generation (PCG), and Non-Player Character (NPC) behaviour has started a new era of gaming. They are not just technological innovations but artistic mediums that breathe life into pixels and code. NPCs with memories, personalities, and the ability to



adapt reflect the evolution in the gaming industry. It not only reacts to our choices but also challenges our intellect, evokes emotions, and fosters a sense of connection. Looking forward, the prospects are exhilarating. The evolving landscape promises not just realistic NPCs and diverse PCG, but an infusion of creativity and dynamism that defines traditional boundaries. As we embark on this journey into the territories of AI-powered gaming, let us embrace the transformative potential it holds, It crafts truly unforgettable and deeply human gaming experiences. The future envisions NPCs that thinks, learns, and grows alongside players, erasing the lines between real and virtual. The next level of gaming awaits, inviting players to explore, discover, and be captivated by the boundless possibilities that AI has unfurled upon the gaming landscape.

REFERENCES

- [1] Togelius, J., Shaker, N., Nelson, M. J., & Cook, M. (2011, July). AI for Procedural Content Generation in Games. In International Conference on Discovery Science (pp. 172-182). Springer, Berlin, Heidelberg
- [2] Beckham, C., & Pal, C. (2017). A step towards procedural terrain generation with GANs. *ArXiv*. /abs/1707.03383
- [3] Mateas, M. (2017, July 19). Procedural Content Generation in Games: A Survey of the State of the Art. arXiv preprint arXiv:1707.03383.
- [4] Usmani, H. (2023, September 26). AI Game Generators: Unleashing the Future of Gaming in 2023. Medium.
- [5] Takahashi, D. (2023, October 26). The Future of AI in Games. VentureBeat.
- [6] Shao, K., Tang, Z., Zhu, Y., Li, N., & Zhao, D. (2019). A Survey of Deep Reinforcement Learning in Video Games. *ArXiv*. /abs/1912.10944
- [7] Generative AI is Shaping the Future of NPCs: Here's How. (n.d.). Retrieved from Dasha.ai: <https://dasha.ai/en-us/blog/generative-ai-is-shaping-the-future-of-npcs-heres-how#:~:text=Looking%20ahead%2C%20the%20future%20of,wider%20range%20of%20player%20inputs.> B. Rieder, *Engines of Order: A Mechanology of Algorithmic Techniques*. Amsterdam, Netherlands: Amsterdam Univ. Press, 2020.
- [8] Game Developer Magazine. (2023, February 16). Game Developer Quality of Life Survey.
- [9] Tang, Z. (2023). Reinforcement Learning in Digital Games: An Exploration of AI in Gaming..
- [10] Newzoo. (2023, October). Global Game Tech Report.
- [11] Unity Technologies. (2022, March 22). AI for Games.
- [12] Unreal Engine. (2023, October 26). State of Unreal



Teaching English to the second language learners with the application of AI

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ABSTRACT: The ancient method of Gurukul learning has been replaced in the nowadays traditional classroom method. In the current milieu the method is more flexible with the virtual classroom using artificial intelligence(AI). Teachers explore AI tools to facilitate critical thinking in the students. The millennial kids are digital naïve and the digital revolution has made them excel in their academics as compared to that of bookish learning experience. Technology has embraced automation in every field. A decade ago no one would have thought of virtual classrooms but during the pandemic the teachers and students have adapted to the online classes. Teaching English as a second language to the undergraduate students poses a challenge as they are trained in their regional language in the initial stage. The smart classroom using AI will give them an immersive learning experience. The students can develop their skills and gain mastery in the English language.

KEY WORDS: synchronous, conventional, blended, register, artificial intelligence

I.TRADITIONAL VS VIRTUAL CLASSROOM

The essence of knowledge has to be incorporated to the student who comes with a quest for learning. Due to the fast growing technology the mundane learning has been converted as E -learning. The difficulty of carrying textbooks to the classes has been replaced by laptops, tab and other digital resources. The conventional learning tools are easily accessible but for diversified learning it is essential to be on par with the current trend. In India, it is difficult to meet the expectations as the rural and urban learning environment faces the threat of language barrier. The urban ambience introduces the technology to the inquisitive learners but the affordability of such devices create hurdle and challenge to the teachers and the students.

II.TEACHING ENGLISH AS SECOND LANGUAGE

Teaching English as a second language in the traditional classroom is a herculean task for the teacher. They have to be bilingual as the student has been exposed more to the regional language. The translation method followed in the teaching scenario couldn't bridge the void. The distortion occurs here and so learning of English Language becomes a barrier to many of them whether they are arts or professional students. The fascination for learning English and enriching their spoken skills is still a dream for many of the students, scholars and teachers. The accent and dialect of each one is different and easily identified as to which states he or she belongs. The stressed syllable in a word has particular intonation to their mother tongue and hence raises a concern.

For E.g. Office -Of'-fice is the correct one but a person whose mother tongue is more stressed then they pronounce it as OO'-ffice which is uncommon according to the stressed word.

LSRW Skills is a basic skill to be learnt by the students, sometimes they can do two skills together, as Listening and speaking, or Reading and writing. The soft skills training to the second year students on body language and interview skills boosts confidence to face the interview in the final semester. The class presentation on the given topic has to be done by the student and hence the platform to converse in English or practice is mandatory. The majority targeted mass after the school or college would enroll in the centers for learning spoken English which is only fifty percent successful. Unless the student is interested and motivated to learn, no zero hours plan will work out. In the traditional classroom the teacher teaches all these skills performing the role of soft skills instructor too. Peer learning is possible as the active student will tell others to learn and try the same. The empathy of teachers can also be seen with the slow learners as giving them an easy task to make them feel comfortable. The class students should be conscious in the classroom as it is very important for the active learning and maintain eye contact and observe the voice modulation by the teacher. The appreciation by the teacher in this environment holds a value and



gives confidence to the learner. These practices are more easy and advantageous to the students in the regular classroom and also in the virtual classroom using AI tools.

III. VIRTUAL LEARNING CLASSROOM USING AI

On the other hand, the mediated communication or the technology enabled virtual learning has come to existence. How to make it in a classroom is the discussion of this paper. The study of VLE and the application of AI has come to practice in many universities around the world a decade ago. But the practical approach to this has come out only at the time of emergency during Pandemic. All the teaching fraternity has to collaborate to initiate and self-direct the features of learning and implement the cross-cultural skills as it is the necessity of the day. VLE is an online platform where the teaching process happens through the internet, as Google classrooms or Zoom app or Cisco WebEx classes. Many universities and colleges have a curriculum design where the involvement of virtual learning classes and the time frame is more relaxed and can be utilized for the part-time learners. The assignment submission or PPT is a more common method used for submission for schools and colleges or sending home works through WhatsApp, is on the trend.

A clarion call to the technology enabled classroom activity, the smart phones and android phones has become handy. As a teacher of English, taking online classes for students was a different experience. It requires the knowledge of available apps and its participatory teaching methods. There are lots of apps which are user friendly and at the same time should be productive and accountable to the students. The 21st century skill has been defined as information and media literacy to set standards for assessing the professional development of students. The web based technology has already been used for entertainment or communication or social networking and the creative mind of the pedagogy has to reframe the available resources to facilitate the student learning in the technology – mediated classroom. The shift in this learning environment has made the teacher to search, to demonstrate and to plan their respective classes to validate information to students.

IV. BLENDED OR FLIPPED CLASSROOM

Synchronous communication, i.e., purely online classes during this lockdown has given a new mode to virtual learning such as the Zoom app used widely by the academicians was truly a gifted one to students. This study aid is popular as it includes interactive sessions and using AI instant feedback was possible. Also the Google classroom serves the purpose to reach students providing a classroom environment. Asynchronous learning method, i.e. Online and offline classes where the lecture videos of the English subject have been uploaded and the students can submit assignments based on that. Hence it is recommended to use the Blended Learning method or the Flipped Classroom method. This method is beneficial to students who have slow pace in learning and the faculty can give individual attention to the students. It helps the student to apply their new knowledge and it is a new pedagogical approach. The advanced Bloom's Taxonomy has to be designed by the course teacher in collaboration with peer teachers for the better learning outcomes.

After a brief analysis of Virtual Learning Classrooms in a Blended Classroom design and the so-called advantages, the current study is about how to teach English to Second Language learners. The willingness to learn English from the student will be different as he/she may be from Commerce or Science or professional stream. To classify, we can specify them as Second Language learners and it is also a part of the curriculum to learn English as Part- II Language. The students are more casual compared to that of their chosen major subjects. They feel it as a difficult task to learn English, though they have been trained to learn from their schooling days. Moreover, they find it difficult to cope up with the design as they have to understand, apply and create unlike to remember and write down. All the rote learning becomes extinct after coming to college and the faculty has to come out with the strategy. The two skills, Reading and Writing are essential for any student to become eligible for writing the examination whereas, Listening and Speaking skills will enrich them in a holistic development. All the four basic skills have to be equally given importance by the learners.

A general guideline has to be followed for bringing Clarity and Concision in writing English.

- 1) Use verbs
- 2) Use active voice
- 3) Avoid redundancy/repetition
- 4) Avoid clichés



As a part of writing English, these user-friendly tips can be followed to make the learners understand.

Common Transitions

Giving Examples, For example, For instance, an example of this, to illustrate.

Sequence Summary

First, second(ly), third(ly), Finally, Lastly.

Adding information - Furthermore, Moreover, In addition to.

Focusing information - In conclusion, In summary, To conclude, To summarize, On the whole, Nonetheless, Nevertheless, Still Indeed.

V.CONCEPT OF LEARNING ENGLISH IN THE VIRTUAL CLASSROOM USING AI

These transition words help the bilingual students to practice English and correct their linguistic errors. The conundrums to reach the target language have to be set with a yardstick and plan for the workbook activity were given in the traditional classroom. In the virtual classroom, the structure to explore the English language is having more time and hence does their work at leisure. The concept of learning at homestead is a challenge for the teacher and the learner. The academicians have to equip with the new environment, an AI environment.

VI.APPLICATION OF SECOND LANGUAGE LEARNING

Fairly enough, most of the teachers find it difficult to adjust and accommodate their students in this virtual classroom. The difficulties faced initially were network connectivity issues, lack of attendance, poor retention and the traditional classroom space. The increased awareness made the students understand the situation and they started attending the classes on the stipulated hours. The second language English learners were taught the prose, poetry and short story with slides. The prepared materials are converted with feeding algorithms for an effective learning process. The teachers delivering the 40-minute lecture to each classroom may face exhaustion. The effectiveness in one class cannot be in the next class. The AI tools play the AV aid and after watching the students can discuss as the same can also be replayed for better understanding. The same can be uploaded in YouTube and the link has been sent to the students to watch and learn later. To assess their learning ability, the MCQ's, Quizzes or Quill board can be used for the active learning. The outcome initially was moderate as many of the students were reluctant and most of the students were not comfortable as they were trained in face-to-face communication.

VII.LEARNING OUTCOMES OF AI

The Zoom classroom was effective but the interactive learning was restricted as many students found it difficult to communicate. The teacher after examining has found that the personal response of the student was based on the home atmosphere and transformation of learning in the virtual classroom has to be linear. The assessing of spoken skills was distracted as many cues of responding were not properly practiced. In the arrangement of making, they learn the nuances of English and to pronounce with proper accent in the classroom the video clip of the drama or One Act Play was shown. This encouraged the students to dramatize the same, which was successful with the peer groups and naturally many innovative ideas based on technology infused AI to facilitate critical thinking and teaching to the students.

Teaching English through screening of particular scenes in popular movies attracted the students and gave confidence, for example; **Pygmalion**- a play by Bernard Shaw made into a movie that has helped in learning the basics of phonetics. The Bollywood films, **English Vinglish**, **Angerezi Medium** reassures that age is not a barrier to learning a language particularly learning English. The students watch and receive with enthusiasm and put an effort to speak in English. Teaching through movies is a shift in technology for the teaching and learning process.

VIII.CONCLUSION

All this technique is possible in a blended classroom and was determined by their use of English in the particular context which influences the choice of register, vocabulary and grammar. The students are first trained with the guidance of the teacher and then asked to independently focus on the learning and then to self-direct themselves in mastering the language. The teacher can prepare online course development ensuring the preparation of E-content, video lecture, online discussion, self-assessment test or quizzes. To make them punctual to the online classes and



active participation throughout, an online gaming contest can be conducted using the AI app and tools that adds realism to their experiences. This instigates everyone in the class to try on their own as it is their own personal space activating their internet hypermedia. There is an active classroom in the AI classroom which is strictly based on the purveyor's learning ability.

REFERENCES

1. Hamilton Miranda “Autonomy and Foreign Language Learning in a Virtual Learning Environment.” (Advances in Digital Language Learning and Teaching). A&C Black,13-Jun- 2013-Language Arts & Disciplines-256 pages.
2. 21G.222 Expository Writing for Bilingual Students Fall 2002,; <http://ocw.mit.edu/terms>.
3. 21G.223 / 21G.224 Listening, Speaking, and Pronunciation Fall 2004,; <http://ocw.mit.edu/terms>.
4. <https://www.edweek.org/teaching-learning/what-teachers-should-know-before-using-ai-with-english-learners/2023/10>
5. <https://www.jcreview.com/admin/Uploads/Files/6246f982c09b80.02771892.pdf>



Effect of Artificial Intelligence on Service Quality Dimension of Corporate Hospitals in Chennai City

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ABSTRACT: Investigate patient's perceptions on quality and service in order to better understand how the usage of artificial intelligence (AI) may impact performance and engagement in hospitals. The service quality of corporate hospitals to the patients with Artificial Intelligence is studied by the researcher. Develop programs that mimic the thoughts and actions of biological organisms in order to imbue robots with natural intelligence. Service quality provided to the customers by the business operators are able to identify problem quickly, improve their service and better assess client expectation.

KEYWORDS: AI, Service quality, Patients, Hospitals

INTRODUCTION

Artificial intelligence (AI), machine learning (ML), cloud-based analytics systems, and gathered "big data" organized into informative dashboards could be the key to increasing worker productivity. Decisions on the distribution of resources, performance evaluation, and workplace enhancement can be made using data on employee productivity and behavior that has been analyzed and anticipated. These solutions have brought about changes in the way employees work.

Sid Bhambhani is the CEO of Waterloo, Ontario, Canada-based Summatti, a software firm. Technology is used by the company to raise worker performance. One way to do this is to keep an eye on the regular phone, chat, or email exchanges between customer service and relationship representatives in a contact center and their clients.

The stigma associated with it being Big Brother-esque, he said, has long since vanished because conversations in these kinds of situations are routinely videotaped for quality control purposes. Trust in the gadget has also increased as a result of the platform's regular disclosure of how AI is being used to monitor the agents' performance.

According to Bhambhani, "We work with organisations that are using the insights they gain from the real-time analytics of the customer/agent conversations to provide in-time coaching tips on improving their performance, highlighting areas of strength, and looking for coaching opportunities to grow an agent's skill set." This demonstrates that when technology is used with the right goals in mind, it doesn't have to be obtrusive and may really enhance and broaden one's skill set.

Mitch Collier is Vice President of Product Management at Stay Well in Portland, Oregon. The organization studies people's behavior patterns to improve wellness. The company works with partners in electronic health records to include patient education materials into clinical workflows so that patients can access them at the time of care. It strongly believes that education is the first step toward leading a better life. "We're able to prescribe patient care based on input from providers by leveraging AI-engineered tools and predictive search," he clarified. "This allows doctors to provide reliable, easily comprehensible patient education for improved treatment adherence." Physicians assert that this integration saves them time and provides them with additional resources to meet patient needs.

REVIEW OF LITERATURE

The Wijayati group (2022) This article aims to investigate employees' perceptions of banks and service-oriented organizations in order to better understand how the usage of artificial intelligence (AI) may impact performance and engagement at work in fast changing contexts. The results demonstrate that AI greatly raises workplace engagement and worker performance. The effects of AI on employee productivity and engagement are mitigated in part by positive change management. According to the findings of Ahmed Muayad Younus et al. (2022), artificial intelligence has a statistically significant effect on employment.



Performance is determined only by factors. The findings also indicated that gender, years of experience, and educational background all had statistically significant effects on job performance. In order to support the broad adoption of business, the implementation science community will need to give the challenges brought up in this study a lot of attention in the years to come. The goal of Aljaber (2020) was to determine how artificial intelligence might impact Jordanian SMEs' accounting systems' efficacy. Based on a random sample of 128 SMEs and a population of sixteen SMEs, the results indicated that the use of artificial intelligence affected how well Jordanian SMEs' accounting systems performed.

Among the recommendations made by the study were that Jordanian bank management assist expert systems in learning from knowledge bases that are stored in the systems in various areas that support the capabilities of higher management, and that the bank needs to enhance its use of artificial intelligence to boost productivity. Ramdani et al. attempted to modify an individual job performance measure with strong psychometric properties (2019).

The study participants were selected by targeted sampling approaches, with the university faculty serving as the target population. The total number of participants in this study was 303. The Individual Work Performance Measure boasts a comprehensive methodology along with exceptional psychometric features. The data was examined using a procedure known as descriptive analysis. The new Individual Work Performance Scale (IWP) possesses strong psychometric properties because of its high coefficient of reliability, fit model of the structure it constructs, and external and structural validity requirements. Because of this, it is strongly recommended—especially in an academic setting—to utilize the most recent version of the IWP when evaluating an employee's overall work performance.

Job performance, according to Muda et al. (2014), is the ability of employees to carry out the tasks and duties required to the organization's goals and responsibilities in accordance with laws and organizational decrees. These are particular to each job and its duties, and they are ultimately achieved by effectively and efficiently integrating and grouping together the organization's objectives. Additionally, consider how long the task will take to complete. Job performance is important to organizations since no organizational level or component inside a firm is a reflection of the abilities and motivations of heads and leaders, and vice versa.

ARTIFICIAL INTELLIGENCE

Advances in computer science and related software have surpassed advances in other sciences during the last 20 years. Modern technology known as "artificial intelligence" is one of the most significant and recent advancements in software. AI is a field of computer science that focuses on building intelligent devices and software that have human-like behavior and communication, according to Kamble and Shah (2018). It's "a term that is frequently used to refer to a branch of science that aims to equip students with the ability to perform functions such as reasoning, planning, learning, and perception."

AI seeks to enhance rather than replace human abilities by creating connections between individuals, computers, knowledge, and the physical world as well as between complicated applications and people. Its capabilities include data mining, product design, manufacturing, scheduling, and data distribution and retrieval throughout work. Because they lack human emotion, present systems are an extension of human experiences rather than a replacement for them. AI systems, on the other hand, rely on human knowledge and experiences when picking logical models (Shaw et al., 2019).

AI's objective

Create intelligent programs for expert systems that can understand, explain, validate, and provide end users with information.

Develop programs that mimic the thoughts and actions of biological organisms in order to imbue robots with natural intelligence.

AI's constituent parts

I. Acquiring Knowledge

When it comes to artificial intelligence, there are many different learning approaches that are available. Trial and error is the best way to find the easiest of them. Before a game, for example, a computer program that solves chess problems might make random moves. The device should archive each answer together with the destination so that it will remember the response the next time the machine finds the same destination. Recalling simple items is known as rotational learning.

When there is an issue, generalization is more challenging. The practice of applying previous knowledge to similar situations in the present is known as generalization. On the other hand, because it is accustomed to similar



verbs, a generalizing system will pick up on the "added" rule and be able to form the past tense of jumping. For example, until jumping is supplied to it, a system that understands the past tense of common English verbs cannot produce the past tense of a phrase like jumping.

ii. Thinking

The objective is to reach the right conclusions on the case. Assumptions are either deductive or inductive. As in, "Fred needs to be at the museum or the café." Since he's not in the café, the museum must be where he is. As you can see from the above, this type of injury was formerly caused by failing. The main distinction between the two types of reasoning is that, in inductive reasoning, the claim is fully verified by the hypothesis, but in deductive reasoning, the truth of the premise ensures the truth of the conclusion. Research often uses inductive inference, which creates preliminary models to describe and predict possible behavior after evidence is gathered. When aberrant data are found, the model is revised.

iii. Solving Problems

The process of systematically searching through a variety of workable steps to achieve any predefined objective or result can be summed up as AI issue solving. Various approaches to issue resolution are employed for both particular and broad objectives. A specially adjusted approach is customized for a specific issue and leverages the unique conditions that the issue is embedded in.

iv. Sensation

When we see, the world is represented by a multitude of real and imagined sensory inputs, and our unique, sophisticated cognitive process separates the image into discrete elements. Complicating research is the fact that an object might appear differently depending on how it is viewed, where and how intensely light is present in the scene, and how the object contrasts with its surroundings. Signs with historical significance are referred to as *lingo*. Under such circumstances, language ought not to be limited to spoken words. For example, several cultures have their own language for travel signs that signal danger ahead.

Hospital

A hospital is a geographical location where services for maintaining health are offered. A location where people seeking medical treatment can have their needs and goals met. Hospitals' marketing strategies focused on the quality of medical and professional services they provided, since they were initially established as charitable foundations to care for the sick and impoverished.

Provision of services

A service is an action or a potential action that is given by one person to another; it is essentially immaterial and has no bearing on ownership. A service's quality may be connected to an intangible or tangible product.

Calibre (Quality)

The standard by which something is judged in relation to other items of a similar kind indicates how excellent it is.

Quality of Service

Due to the high level of customer service, business owners are better equipped to recognize issues early on, enhance their offerings, and gauge what their clients expect. According to Business Dictionary.com. Service provider must provide outstanding, successful, and efficient services to win over customers.

Functions of Artificial Intelligence in Hospitals Service Quality

With the help of big data analytics, artificial intelligence, and cloud computing, the health care department is currently undergoing a digital revolution. Today, the majority of hospitals use bots or artificial intelligence. The management of Hospitals Service Quality can benefit greatly from artificial intelligence.

- Businesses can attain superior outcomes by utilizing digital technology in the service quality in hospitals. An organization's chat bot system is essential to its service quality.
- AI technology expedites the screening process by eliminating the need for service quality, Software instruments It's common for Amy and Clara to arrange meetings and interviews.
- Businesses may reduce the administrative burden on their service quality by utilizing automation and artificial intelligence. AI technology increases an Hospital's service quality efficiency and aids in problem-solving.
- Researchers investigated if employing AI to expedite service quality evaluation procedures would be feasible.
- Artificial Intelligence is employed to verify the absence of corporate partiality. Hospital's service quality should select staff members based on their skills and qualifications.



- AI would increase the Hospital's service quality efficiency. The application of diverse robotic processes has boosted quality efficiency. Among these responsibilities include data entry Hospital's service quality systems, categorization, sorting, and information gathering.
- The use of computers and other technologies would improve. Computers and other technology are used in many businesses to swiftly and easily collect feedback and statistics. The main benefits of Microsoft 365 for staff members are time and cost savings. automating the process of evaluating Hospital's service quality.

AI in Hospital's service quality

- Lessen the workload for the hospital's management team.
- Choose the good service quality to the patients.
- AI can forecast rates of patients.
- It is capable of overcoming service limitations and quality as such.
- The various departments of hospitals will manage the quality.
- AI using hospitals can get precise findings.
- It will increase patients services with the best quality.
- It will aid in reducing bias in decision-making.

Challenges of AI in Hospitals Service Quality departments

The Service Quality of a modern hospitals makes extensive use of AI. The majority of the time, workers finds it challenging to adopt and use emerging AI technologies and skills. Because it drastically alters people's thinking, AI would play a significant role in the sector. In order to handle AI systems, the Hospitals Service Quality will need to hire the suitable person. Another limitation on service quality is the need to make daily decisions since, if Hospitals were unable to make key decisions, Hospitals would lose its patients and service.

AI-powered Hospitals Service Quality management

Artificial intelligence is now being used by hospitals to monitor quality generally and conduct service reviews specifically. To improve the hospital and get ready for the future during the pandemic, it has become more crucial to uncover efficiencies using innovations like AI and make the correct data-driven decisions. Data collection is continuous and automated in a quality service approach powered by artificial intelligence. The Service Quality can therefore be on going. AI examines a central library of data from earlier patients reviews and from numerous sources in addition to the data that has been gathered. As a result, judgmental blunders are eliminated, and the quality assessment gains greater significance.

Using AI in Service Quality

The following benefits can be achieved by using AI in performance reviews:

1.No human errors

During a typical Service Quality , the hospitals are tasked with providing the patients with feedback that could make or break their careers. The hospitals have a lot of work to do, including grading quality, finding appropriate service programmes, comprehending patients' contributions, giving feedback on service, creating future goals, and more. It can be demanding for organisations to handle all of this for a quality service, which increases the risk of mistakes including waiting time, drawing conclusions from insufficient information, and favouritism. Service quality with AI is entirely data-driven. It doesn't have any preferences of its own. It gathers data from various sources, removing the possibility of data errors. Hence, AI can assist hospitals in giving quality service to patients and based on the unbiased feedback.

2. Projections based on more comprehensive data

The limited data and performance indicators listed in the evaluation form are the foundation of traditional service quality. AI-powered performance reviews sift through enormous quantities of data to produce projections that take into account the service quality development and patients history in addition to the review's findings. This is essential for assessing an quality service and determining the most suitable goals.

3. Continuous assessment and real-time analysis

There are several benefits to switching from periodic patients assessments to ongoing reviews. The organisation becomes agile and flexible as a result of the ability to continuously enhance service and make quality corrections. With AI, you have the ability to continuously collect data from a variety of sources, such as calendars, patients written correspondence, and other sources. As a result, the system can provide hospitals with immediate feedback and real-time insights into the quality of specific services. Also, it reduces the time required for hospitals to recollect facts and confirm them with reliable sources before a quality service provision.



4. Better hospitals

AI enables hospitals to double-check their decisions and ensure the accuracy of the feedback they give. It will aid hospitals in developing and provide a larger range of facts and information about the patients they are evaluating. Hospitals are compelled to rely on both their own assessment of a quality performance and that of the patients in traditional reviews. Simply said, there is more data available for analysis with patients reviews enabled by AI. This can also help hospitals provide feedback more effectively because they can use specific metrics to back up their positive comments about quality or to show them exactly where they can do better in terms of output and service.

5. Service to Patients

AI may conduct regular intelligent surveys as part of the continuous patients review and collect feedback in real-time; it can also provide the services with individualised insights based on those surveys.

This will facilitate improved communication between hospitals and patients and provide a more accurate picture of the daily successes and difficulties that affect both individuals and the hospitals as a whole.

An organization can better understand its patients' wants and goals by reading online patient reviews [2020]. The evaluations that arise from the analysis of online reviews form the foundation for analyzing the expectations of patients within the healthcare sector. Another recent study examined consumer sentiment, which might have contained arguments for or against. It was completed using the two most popular Nave Bayes Text Categorization techniques: Multinomial Nave Bayes Classification and Multivariate Bernoulli Nave Bayes Classification [2021].

The management of the hospital should focus heavily on resolving patient concerns and raising patient satisfaction. The hospital service is quite basic and does not often step up to provide the less fortunate with more helpful assistance. (Devkota, M., and Neupane, R. (2017))

Motivate the front desk employees, understand the issues and expectations of the patients through ongoing feedback, and take appropriate action based on the feedback received. setting clear, well-defined goals for service quality in order to satisfy the requirements and expectations of patients. (Ashok Thiakarajan, Krishnaraj, and Sindhuja, 2015). Functional and technical quality are not the same as service quality. The accuracy of diagnoses and processes is known as technical quality in health maintenance, while the method by which wellness maintenance is delivered is referred to as functional quality. (Gronroos, 1990)

The standard of care provided by private hospitals is the main cause for worry. With some people choosing outpatient and inpatient care, the private sector has emerged as the dominant one (Sambasivan, E. Vennilaashree, S 2018).

The global atmosphere was greatly influenced by the environment of the corporate hospital. The hospitals should put in place adequate technological and managerial support, together with first-rate facilities (Thangaraj, B. Chandrasekar, R-2016).

Hospitals should place a strong emphasis on offering patients timely, high-quality medical care as well as compassion and consideration for their needs and preferences, as well as a warm welcome and stimulating conversation.

To create a positive image in patients, hospitals should improve the service quality provided and focus on having competitive advantages, such as: quality service, reliability, speed of response, and safety (Omar Durrah -2016)

The favorable influence of service quality constructs such as empathy, tangible assurance, punctuality, and responsiveness is observed in private hospitals. Better medical treatment is being provided by private hospitals. (Jayasreekrishna and Sharmila, 2013)

The aim is to enhance the operational effectiveness of healthcare facilities by developing a methodical oversight system and keeping an eye on its operations. The establishment of a research and development department by healthcare facilities to assess patient expectations and needs (Sumathi, K., 2012).

Hospitals need to increase patient commitment and satisfaction. One of the objectives for hospitals' and medical institutions' strategic development should be patient loyalty. There should be an improvement in the standard of care. Professionalization of hospital administration is necessary (Douglas Bruce Lowrie, Douglas BruceLowrie, 2015).

Different perspectives on service quality are held by regulators, policy makers, healthcare professionals, patients, and patients' families. In addition to providing high-quality care, the hospital must emphasize the significance of feedback as a key component of its operational plan (Pillai, K. R. and Alpikakumari-2016)

Owing to advancements in technology, creativity, and medical care, patients' perceptions of the quality of healthcare services have changed over time. Hospitals need to monitor patient impression over time and coordinate their marketing and product initiatives with the results of these most recent polls. (Patcharin Wongrukmit, Jens Jörn Dahlgaard, and Natcha Thawesaengskulthai, 2015)

The hospital management should continue to uphold its dedication to providing patients with faster medical attention, greater attention to their concerns, more consistent handling of their complaints, and special



consideration for their care. (Al-Damen, Rula (2017)

The hospital's job is to determine which areas, as seen by the patients, require improvement. From the perspective of quality enhancement, modern equipment should be upgraded, patient care should be provided promptly, and interpersonal interactions and communication should be improved. (Zarei, Asghar, 2012)

The expectations and views of the patient customers were not aligned. The degree of patient expectations is not met by the quality of the customer services. (Sharma, Vivek (2013)

Hospitals must follow specific standard operating procedures to raise the caliber of care and increase patient satisfaction. The government hospitals should pay attention to suggestions for improving the service quality aspects. Amole Bilqis Bolanle (2015).

The study's objectives

1. To verify the components of the service quality dimension in Chennai's corporate hospitals.
2. To determine how patient service quality affects AI.

Hypothesis

1. there is no connection between corporate hospitals' service quality dimension and the clean environment element.
2. There is no connection between corporate hospitals' service quality dimension and the responsibility factor.
3. There is no connection between corporate hospitals' service quality dimension and reliability component.
4. There is no connection between the corporate hospitals' service quality dimension and the empathy assurance element.
5. There is no connection between corporate hospitals' service quality dimension and the aspect that builds confidence.
6. There is no connection between corporate hospitals' service quality dimension and the staff-patient interaction element.
7. There is no connection between corporate hospitals' service quality dimension and the pain management element.
8. There is no connection between corporate hospitals' cost factor and their service quality dimension.

METHODOLOGY

These research projects use primary as well as secondary data sources. In corporate hospitals, patience is the focus of primary data. To obtain their answers, the investigator employed a methodical questionnaire. There are three points in it. primarily the patient's demographic data, hospital information, and the eight service quality dimensions.

Following an examination of both domestic and foreign literature, the researcher came up with the following dimensions of service quality. Specifically, cost, cleanliness, relationship management, assurance, empathy, and confidence-building. The factors in these domains are highlighted on a 5-point Likert scale, ranging from strongly agreed to strongly disagreed.

Data Gathering

Using the convenience sample method, the researcher chose five corporate hospitals in Chennai city for the study. The hospitals are Fortis Hospital, MGM Health Care, Apollo Hospital, Vijaya Hospital, SRM Hospital, and MIOT Hospital. The researcher is able to gather 50 responses each facility, for a total of 250. To process the data, the researcher employed the following statistical instruments:

1. Investigative Factor Evaluation
2. Analysis of Confirmatory Factors

Analysis and observation: Using both univariate and multivariate structural methods, the researcher thoroughly examined the primary data in this section. The segment eight components were identified by the use of exploratory factor analysis on 40 variables related to the service quality dimension. Specifically, cost, cleanliness, relationship management, assurance, empathy, and confidence-building. For them to have the qualification factor formation, their cumulative variance must be greater than 40%.

Following this analysis, the researcher intended to use confirmatory factor analysis to further extract the variables. In this instance, the eight elements derived from factor analysis together constitute the unobserved variable, or service quality. The eight criteria are referred to as structured factors because they have an average score.

In this framed work, the question of whether these eight elements implied the corporate hospital's service quality quickly arises. In order to verify the validity of eight factors related to the implications of service quality, confirmatory factor analysis is carried out. The factor is validated by taking into account the fit indices listed below.



Following the validation of the eight service quality dimensions of corporate hospitals, the researcher employed structural equation modeling and linear multiple regression analysis to assess the customer's demographic background and its impact on the corresponding service quality dimension.

Interpretation and Conversation (Analysis and Discussion)

Eight characteristics of corporate hospitals' service quality were brought about by the use of confirmatory and exploratory factor analyses. Specifically: 1. Clean Environment 2. Accountability; 3. Dependability; 4. Compassion 5. Building self-confidence; 6. Relationships between patients and staff; 7. Pain management; and 8. Cost. These eight criteria for corporate hospital service quality are based on the following Cron batch alpha values.

S. No	Dimension	Cron batch Value	P-Value
1	Clean Environment	.765	.000
2	Responsibility	.845	.000
3	Reliability	.822	.000
4	Empathy	.901	.000
5	Confidence Building	.911	.000
6.	Patient and Staff Relationship	.778	.000
7	Pain Management	.904	.000
8.	Cost	.899	.000

It is clear from the above table that exploratory factor analysis is used to determine the factor. possess high batch alpha values for cron individual dependability. All eight of these elements for the corporate hospital's service quality dimension were gathered from a very trustworthy source, but they still require appropriate validation. The confirmatory factor analysis is used to carry out the validation. which used the eight elements related to the service quality dimension and confirmed them. Each dimension's overall average scores for a few of the indicated variables are taken into account. These cumulative average values turn into continuously observable components that can be explained by the independent variable's power. In this instance, the researcher took into account an unobserved factor's service quality dimension. Currently, the goal of the confirmatory factor analysis was to reconcile the observed component with the unobserved one. One is indicated by the confirmatory factor analysis with the best result. the measure of each of the eight service quality dimension components' exploratory power.

The following table used d to fit indices, their values and benchmark

S No	Fit indices	Value	Bench mark
1	Chi square	.2.474	Insignificant
2	Probability	0.514	> 0.05
3	Goodness of fit	0.971	> 0.9
4	Comparative fit indices	0.970	> 0.9
5	Normal fit indices	0.965	> 0.9
6	Root means square error of approximation	0.08	< = 0.08

It can be determined from the preceding table that every fit index satisfies the benchmark values. The correlation value between the first detected component (clean environment), 2. Accountability; 3. Dependability; 4. Compassion 5. Building self-confidence; 6. Relationships between patients and staff; 7. Pain management; 8. Cost and the unobserved component of the corporate hospital's service quality dimension.

It has been confirmed that each of these eight aspects has a strong explanatory power when it comes to explaining the corporate hospital's service quality. As a result, the eight hypotheses the researcher put out are rejected.

RESULTS AND DISCUSSION (FINDINGS AND DISCUSSIONS)

The empirical research indicates that corporate hospitals in Chennai City need to prioritize the service quality dimension. The patients in these institutions firmly believed that the eight aspects of reliability are necessary to



meet their needs while employing AI. The study concludes that corporate hospitals in Chennai employ artificial intelligence (AI) in a cost-effective manner while also prioritizing patient relationship management and other beneficial characteristics. Additionally, the corporate hospital offers that patient the greatest services at a reasonable cost. These medical facilities are well-equipped with AI to handle the needs of sick patients.

The positive interactions between patients, paramedical personnel, nurses, and doctors are made possible by AI, and this improves both the business's reputation and profitability.

CONCLUSION

The purpose of this study was to determine how artificial intelligence impacts the caliber of services. According to this study, the influence of AI on quality is substantial and can be used to determine service quality on its own. If the implementation science community hopes to contribute to the health care industry's widespread adoption, the challenges brought up in this research will need to receive a lot of attention in the years to come. Technical capabilities are being acquired by hospitals at an increasing rate. As a result, machines can help by closely monitoring it and offering the support required for improvement.

REFERENCES

1. Ahmed Muayad Younus, Najeeb Zaidan & Duaa shakir Mahmood (2022). The Effect of Artificial Intelligence on Job Performance in China's Small and Medium-Sized Enterprises (SMEs). *Spanish Journal of Innovation and Integrity*, 7, 112-128.
2. Aljaber, G. M. O. (2020). The Impact of Artificial Intelligence (AI) on the Efficiency of Accounting Systems in Jordanian Banks. MA Thesis, Department of Accounting, Middle East University, Jordan.
3. Kamble, R., & Deepali, S. (2018). Applications of Artificial Intelligence in Human Life. *International Journal of Research – Granthaalayah*, 6(6).
4. Muda, I., Rafiki, A., & Harahap, M. R. (2014). Factors Influencing Employees' Performance: A Study on the Islamic Banks in Islamic Science University of Malaysia, *International Journal of Business and Social Science*, 5(2), 73–81.
5. Ramdani, Z., Marliani, R., & Rahman, A. A. (2019). The individual work performance scale: A psychometric study and its application for employee performance. *Humanities & Social Sciences Reviews*, 7(5), 405-414.
6. Sayidy (2018). The impact of artificial intelligence technologies on Hospitals Service Quality and employment. *Electronic magazine money and business*, <https://www.sayidy.net/article/102131>
7. Shaw, J., Rudzicz, F., Jamieson, T., & Goldfarb, A. (2019). Artificial intelligence and the implementation challenge. *Journal of Medical Internet Research*, 21(7), e13659.
8. Wijayati, D.T., Rahman, Z., Fahrullah, A., Rahman, M.F.W., Arifah, I.D.C. & Kautsar, A. (2022). A study of artificial intelligence on employee performance and work engagement: the moderating role of change leadership. *International Journal of Manpower*, 43(2), 486-512.
9. Ashok Thiakarajan, A, Sindhuja, Krishnaraj (2015)- Service Quality in Hospitals at Chennai -Int. J. Pharm SCI. Rev. Res., 34 (1), September – October 2015; Article No. 38, Pages: 238-242
10. Abbas Rahimi Froushani, Asghar Zarei, Mohammad Arab. Arash Rashidian, and Mahmoud Ghazi Tabatabaei-2012- Service quality of private hospitals: The Iranian Patients' perspective- *BMC Health Services Research* – <http://doi.org/10.1186/1472-6963-12-31>Zraei et al; licensee BioMed Central Ltd
11. Bilqis Bolanle Amole, Emmanuel Olateju Oyatoye, Owolabi Lateef Kuye – 2015- determinants of patient satisfaction on service quality dimensions in the Nigeria Teaching Hospitals - EMI, Vol. 7, Issue 3
12. Douglas Bruce Lowrie, Douglas Bruce Lowrie, Ying-ChuZhu, Xing-HuaWu, MayilaShayit, Qiong-ZhenTan- 2015 - Evaluating patients' perception of service quality at hospitals in nine Chinese cities by the use of the Serv Qual scale - *Asian Pacific Journal of Tropical Bio medicine*-Volume 5, Issue 6, June 2015,Page 497-504
13. Gronroos, C. (1990)-Service Management and Marketing: Managing the Moments of Truth in Service Competition. Lexington Books, Lexington.
14. Natcha Thawesaengskulthai, Patcharin Wongrukmit and Jens Jörn Dahlgaard-2015- Hospital service quality measurement models: patients from Asia, Europe, Australia and America, *Total quality management and business excellence* (Online), (26), 9-10, 1029-1041
15. Pillai. k. R. and Alpikakumari-2016- Patient's perception of service, quality of Hospital - *International Journal of Management and Applied Science*,Volume-2, Issue-5



16. Ramesh Neupane and Manju Devkota (2017) Evaluation of the impacts of service quality dimensions of patient / customer satisfaction -Int. J. Soc. Sc. Manage. Vol. 4, Issue-3: 165-176 DOI: 10.3126/ ijssm. v4i3. 17520
17. Rula Al-Damen1-2017- Health Care Service Quality and Its Impact on Patient Satisfaction - International Journal of Business and Management; Vol. 12, No. 9
18. Sambasivan, E. Vanilla Shree, S. A study of patient perceptions of service quality and satisfaction in health care and hospital services in Chennai city -International Journal of Pure and Applied Mathematics. Volume 119 No. 7, 2018, 1011-1026
19. Sharmila. A. S and Jayasreekrishna -2013- Has the service quality in private corporate hospitals meet the patient expectation- A Study about hospital quality in Chennai - Asia Pacific Journal of Marketing & Management Review Vol.2 (1)
20. Sumathi kumaraswamy- 2012- Service Quality in Health Care Centers: An Empirical Study -International Journal of Business and Social Science Vol. 3 No. 16 [Special Issue]
21. Thangaraj, B. Chandrasekar, R. – 2016. A study on patient's perception towards service quality of corporate hospitals in Coimbatore district -International Journal of Applied Research 2016; 2 (3): 189-194
22. Vivek Sharma-2013- Measuring Service Quality in Private Hospitals in Indore City- Global Journal of Management and Business Studies-Volume 3,Number 8 pp.917-922
23. Omar Durrah, Kamaal Allil, and Ahmad Taha Kahwaji (2015) - Impact of service quality dimensions on hospital image: The mediating role of patient satisfactions- International Journal of Applied Business and Economic Research 13(9): 6937-6951
24. P. Padma *et al.*, Guest satisfaction & dissatisfaction in luxury hotels: an application of big data, Int J Hosp Manag, (2020)
25. A. Kumar *et al.*, A comprehensive study on the role of advanced technologies in 5g based smart hospital, Alex Eng J, (2021)



A Study on Talent Management Practices and Organizational Performance of Automobile Companies in Chennai

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ABSTRACT: Talent management practices are practices or methods which are applied to attract, identify, develop, engage, train and retain talented employees (Ayub, 2017) who are possessing higher degree of talents and competencies (Cheese et al 2017) that they are significantly contributing to image and exclusive values of business organizations (Kehinde, 2012). Talent management practices are highly useful for implementing innovative and advanced practices and methods, enhancing innovative thinking and modern ways to approach various problems and analytical and managerial competencies and also improving quality standards of organizations and employees (Moayed and Vaseghi, 2016).

I. INTRODUCTION

Besides, management practices associated with talent are increasing performance of employees and organizations and improving competitiveness and reputation of organizations (Thunnissen and Buttiens, 2017). The survival, success and sustainability of organizations are mainly depending on talented employees and all kind of organizations are facing a problem of retaining talented employees with them. In order to hold them, all organizations are using various strategies, practices and programmes and they are related with performance of employees and organizations (Ganga et al 2016). Further, talent management practices are also improving engagement and retention of employees in the organizations (Isfahani and Boustani, 2014).

The automobile companies have large networks with a lot of suppliers and customers and witness efficient performance. By intensifying the relationship with quality management, value chain and sources of business, automobile companies have vast scope for attaining higher and sustainable growth. The automobile companies may attain economies of scale thereby enhancing their competitiveness and performance by adopting best talent management practices and they are also improving satisfaction of all stakeholders of automobile companies. Therefore, it is important to study talent management practices and organizational performance of automobile companies.

II. REVIEW OF RELATED LITERATURE

Aina and Atan (2020) indicated that practices related to management of talent, career development, learning activities and policies associated with retention had significant and positive influence on performance of organizations.

Yuniati et al (2021) found that talent management practices were significantly and positively influencing performance of organizations and engagement of employees had mediating among them.

Kravariti et al (2022) concluded that talent management practices were positively and significantly related with performance of employees and organizations and support of line managers and organization had contributed to enhance performance of employees.

III. OBJECTIVES OF THE STUDY

- i) To study talent management practices in automobile companies.
- ii) To find difference between talent management practices in automobile companies and socio-economic status of employees.
- iii) To ascertain relation between talent management practices and organizational performance of automobile companies.



IV. METHODOLOGY

The current study is carried out in Chennai. Employees working in automobile companies are selected by adopting random sampling technique. Data are collected from 300 employees of automobile companies by using questionnaire method. Socio-economic status of employees of automobile companies is studied by percentage analysis. Mean and standard deviation are calculated to study talent management practices in automobile companies. ANOVA and t-tests are employed to examine difference between talent management practices in automobile companies and socio-economic status of employees. Correlation analysis is adopted to ascertain relation between talent management practices and organizational performance of automobile companies.

V. RESULTS

5.1. SOCIO-ECONOMIC STATUS OF EMPLOYEES OF AUTOMOBILE COMPANIES

The socio-economic status of employees of automobile companies is shown in Table-1. The results explicate that 67.33% of them are falling in male category, whereas, 32.67% of them are falling in female category, 36.00% of them are belonging to age group between 31 and 35 years, whereas, 14.00% of them are belonging to age group between 36 and 40 years, 45.00% of them are B.E. holders, whereas, 24.67% of them are M.E. holders, 37.33% of them are pertaining to working experience of 5 – 8 years, whereas, 15.00% of them are pertaining to working experience of above 12 years and 33.33% of them are getting salary of Rs.35,001 – Rs.45,000 per month, whereas, 14.67% of them are getting salary of more than Rs.45,000 per month.

Table-1. Socio-Economic Status of Employees of Automobile Companies

Socio-Economic Status of Employees	Frequency (n = 300)	Percentage
Gender		
Male	202	67.33
Female	98	32.67
Age Group		
21 – 25 Years	61	20.33
26– 30 Years	89	29.67
31 – 35 Years	108	36.00
36 – 40 Years	42	14.00
Education		
Diploma	91	30.33
B.E.	135	45.00
M.E.	74	24.67
Working Experience		
Below 4 Years	95	31.67
5 – 8 Years	112	37.33
9 – 12 Years	48	16.00
Above 12 Years	45	15.00
Monthly Salary		
Less than Rs.25,000	63	21.00
Rs.25,001 – Rs.35,000	93	31.00
Rs.35,001 – Rs.45,000	100	33.33
More than Rs.45,000	44	14.67



5.2. TALENT MANAGEMENT PRACTICES IN AUTOMOBILE COMPANIES

The talent management practices in automobile companies are shown in Table-2.

Table-2. Talent Management Practices in Automobile Companies

Talent Management Practices in Automobile Companies	Mean	Standard Deviation
My company provides pleasurable work environment to me	3.98	0.88
My company offers attractive compensation to me	3.37	1.02
My company gives adequate resources to perform my work	3.88	0.89
My company provides flexible working shifts to me	3.82	0.96
My company allows me to share my ideas and views freely	3.30	1.04
My company arranges advanced trainings to me	3.75	0.80
My company appreciates my work through rewards	3.68	0.98
My company adopts efficient appraisal method for assessing my performance	3.92	0.87
My company provides feedback to me about my performance	3.80	1.04
My company recognizes my feelings and sentiments very well	3.35	0.97

The employees working in automobile companies have agreed with their company provides pleasurable work environment to them, their company gives adequate resources to perform their work, their company provides flexible working shifts to them, their company arranges advanced trainings to them, their company appreciates their work through rewards, their company adopts efficient appraisal method for assessing their performance and their company provides feedback to them about their performance, while, they have neutral with their company offers attractive compensation to them, their company allows them to share their ideas and views freely and their company recognizes their feelings and sentiments very well.

5.3. TALENT MANAGEMENT PRACTICES IN AUTOMOBILE COMPANIES AND SOCIO-ECONOMIC STATUS OF EMPLOYEES

The relation between talent management practices in automobile companies and socio-economic status of employees is shown below as:

5.3.1. Talent Management Practices in Automobile Companies and Gender

The relation between talent management practices in automobile companies and gender of employees is shown in Table-3.

Table-3. Talent Management Practices in Automobile Companies and Gender

Gender	N	Mean	Standard Deviation	t-Value	Sig.
Male	202	38.86	3.64	3.472	.000
Female	98	34.83	4.05		

Mean value for talent management practices in automobile companies is 38.86 for employees falling in to male category and it is 34.83 for employees falling in to female category and it explains that talent management practices in automobile companies are higher for employees falling in to male category than female category. Significant difference exists in talent management practices in automobile companies between gender of employees since t-value of 3.472 is significant in 1% level.

5.3.2. Talent Management Practices in Automobile Companies and Age Group

The relation between talent management practices in automobile companies and age group of employees is shown in Table-4.

Table-4. Talent Management Practices in Automobile Companies and Age Group

Age Group	N	Mean	Standard Deviation	F-Value	Sig.
21 – 25 Years	61	37.51	3.46	3.834	.000
26– 30 Years	89	37.43	3.76		
31 – 35 Years	108	37.26	4.47		
36 – 40 Years	42	35.85	3.91		



Mean value for talent management practices in automobile companies is differing from 37.51 for employees belonging to age group between 21 and 25 years to 35.85 for employees belonging to age group between 36 and 40 years and it explains that talent management practices in automobile companies are higher for employees belonging to age group between 21 and 25 years than rest of age groups.

Significant difference exists in talent management practices in automobile companies between age group of employees since F-value of 3.834 is significant in 1% level.

5.3.3. Talent Management Practices in Automobile Companies and Education

The relation between talent management practices in automobile companies and education of employees is shown in Table-5.

Table-5. Talent Management Practices in Automobile Companies and Education

Education	N	Mean	Standard Deviation	F-Value	Sig.
Diploma	91	36.42	3.78	4.568	.000
B.E.	135	38.20	3.91		
M.E.	74	35.74	4.09		

Mean value for talent management practices in automobile companies is differing from 38.20 for employees having B.E. to 35.74 for employees having M.E. and it explains that talent management practices in automobile companies are higher for employees having B.E. than rest of educational levels.

Significant difference exists in talent management practices in automobile companies between education of employees since F-value of 4.568 is significant in 1% level.

5.3.4. Talent Management Practices in Automobile Companies and Working Experience

The relation between talent management practices in automobile companies and working experience of employees is shown in Table-6.

Table-6. Talent Management Practices in Automobile Companies and Working Experience

Working Experience	N	Mean	Standard Deviation	F-Value	Sig.
Below 4 Years	95	37.11	4.12	5.744	.000
5 – 8 Years	112	39.40	4.10		
9 – 12 Years	48	36.19	3.97		
Above 12 Years	45	35.10	3.50		

Mean value for talent management practices in automobile companies is differing from 39.40 for employees pertaining to working experience of 5 – 8 years to 35.10 for employees pertaining to working experience of above 12 years and it explains that talent management practices in automobile companies are higher for employees pertaining to working experience of 5 – 8 years than rest of working experiences.

Significant difference exists in talent management practices in automobile companies between working experience of employees since F-value of 5.744 is significant in 1% level.

5.3.5. Talent Management Practices in Automobile Companies and Monthly Salary

The relation between talent management practices in automobile companies and monthly salary of employees is shown in Table-7.

Table-7. Talent Management Practices in Automobile Companies and Monthly Salary

Working Salary	N	Mean	Standard Deviation	F-Value	Sig.
Less than Rs.25,000	63	38.72	3.69	6.920	.000
Rs.25,001 – Rs.35,000	93	37.23	3.86		
Rs.35,001 – Rs.45,000	100	36.16	4.31		
More than Rs.45,000	44	35.94	3.59		

Mean value for talent management practices in automobile companies is differing from 38.72 for employees getting salary of less than Rs.25,000 per month to 35.94 for employees getting salary of more than Rs.45,000 per month and it explains that talent management practices in automobile companies are higher for employees getting salary of less than Rs.25,000 per month than rest of salaries per month.



Significant difference exists in talent management practices in automobile companies between monthly salary of employees since F-value of 6.920 is significant in 1% level.

5.4. RELATION BETWEEN TALENT MANAGEMENT PRACTICES AND ORGANIZATIONAL PERFORMANCE OF AUTOMOBILE COMPANIES

The correlation analysis is applied to ascertain relation between talent management practices and organizational performance of automobile companies and the result is shown in Table-8.

Table-8. Talent Management Practices and Organizational Performance of Automobile Companies

Particulars	Correlation Coefficient
Talent Management Practices and Organizational Performance of Automobile Companies	0.57**

** Significant in 1% level

The correlation coefficient between talent management practices and organizational performance of automobile companies is 0.57. It is inferred that they have significant, positive and moderate relation among them.

VI.CONCLUSION

The results of this study indicate that pleasurable work environment, adequate resources to perform work, flexible working shifts, advanced trainings, appreciation through rewards, efficient appraisal method and feedback about performance are major talent management practices adopted by automobile companies. There prevails significant difference between talent management practices in automobile companies and socio-economic status of employees. Organizational performance of automobile companies has significant, positive and moderate relation with talent management practices in automobile companies. Thus, automobile companies should offer attractive compensation to their employees and they must allow their employees to share their ideas and views freely and they should recognize feelings and sentiments of employees properly.

REFERENCES

1. Ayub, S. Z. (2017). The impact of talent management on employee engagement and retention in achieving organizational performance. *Science International*, 29(6), 1277-1281.
2. Dhanabhakym, M., & Kokilambal, K. (2014). A study on existing talent management practice and its benefits across industries. *International Journal of Research in Business Management*, 2(7), 23-36.
3. Eny Yuniati, Budi Eko Soetjpto, Tjipto Wardoyo, Sudarmiati, & Farika Nikmah. (2021). Talent management and organizational performance: The mediating role of employee engagement. *Management Science Letters*, 11, 1-7.
4. Foteini Kravariti, Konstantinos Tasoulis, Hugh Scullion, & Manar Khaled Alali. (2022). Talent management and performance in the public sector: The role of organisational and line managerial support for development. *The International Journal of Human Resource Management*, 10, 1-27.
5. Ganga, K., Yajid, M., & Khatibi, A. (2016). The HR strategies impact of talent retention on performance of private sector organizations in Sri Lanka. *European Journal of research in Social Sciences*, 4(6), 73-83.
6. Kausar Banu, & Srinivas Rao, K. (2018). Talent management practices in IT sector: An analytical study of Bangalore based companies. *International Journal of Research in Social Sciences*, 8(10), 460-469.
7. Masri Nadine, E.I., & Suliman Abubakr. (2019). Talent management, employee recognition and performance in the research institutions. *Studies in Business and Economics*, 14(1), 127-140.
8. Moayedi, & Vaseghi, M. (2016). The effect of talent management on organizational success. *Scinzer Journal of Accounting and Management*, 2(1), 16-20.
9. Riham Al Aina, & Tarik Atan. (2020). The impact of implementing talent management practices on sustainable organizational performance. *Sustainability*, 12, 1-21.



Leveraging Artificial Intelligence in FinTech Industry

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ABSTRACT: Artificial Intelligence in Fin Tech redefines the industry revolutionizing traditional financial practices and paving the way for innovative advancements. AI's integration in Fin Tech reshapes the sector, creating a more efficient, secure, and inclusive financial landscape for businesses and customers. Financial Industry has always been at the forefront in adopting latest technology and processes in ensuring their customers are served in the best possible way. Safeguarding customer information is a key challenge the FinTech companies. Investors, businesses and regular users are all motivated to use AI in fintech. Accessibility, convenience, personal finance management are the positive effects of AI in fintech. Protecting user data and establishing a solid reputation takes a lot of work. But with a reliable development partner conquering this task will be much easier.

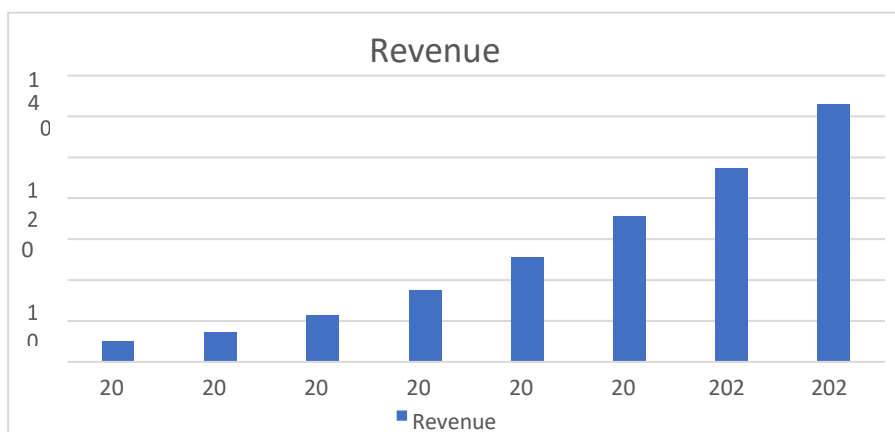
KEYWORDS: Artificial Intelligence, Fintech, Cyber security, Banking

1. ARTIFICIAL INTELLIGENCE - INTRODUCTIONS

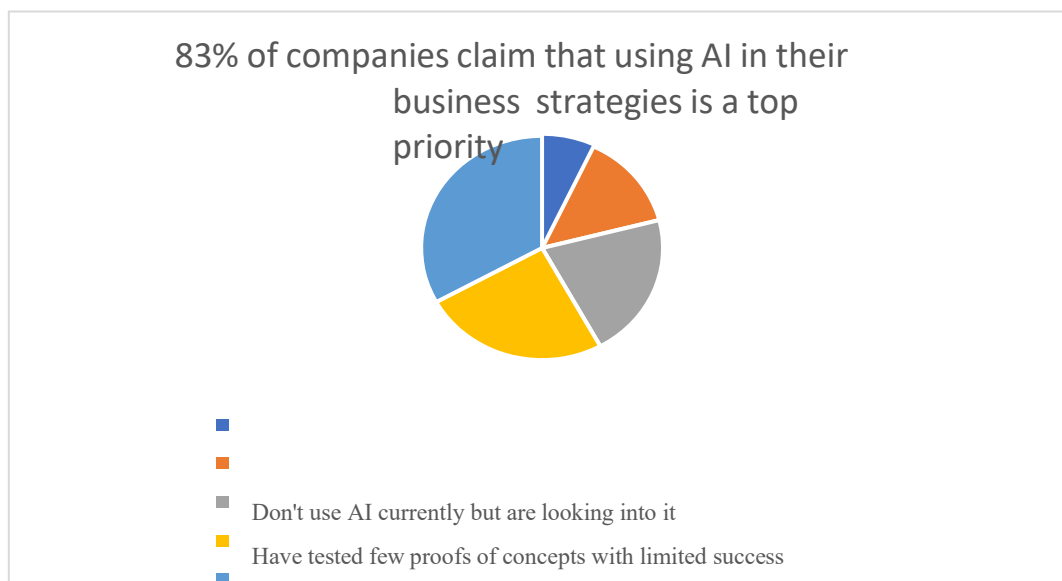
By definition Artificial Intelligence refers to the Computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, decision making, or solving problems. AI is capable of simulating human intelligence processes by machines, especially computer systems. Some of the application of AI includes expert systems, natural language processing, speech recognition and machine vision. AI has grown by leaps and bounds and is been widely used across industries like healthcare, finance, automotive, etc.

The ultimate objective of using AI is to reduce the time to perform a particular business tasks. Beyond performing task in a less time, AI is highly helpful to perform multi-tasking and help reduce workforce load and use their time instead for strategic decisions. Mundane tasks are performed AI powered system rather than individuals and use their time for better business activities. AI can help run activities on a 24x7 timeline without any downtime.

According to Omdia, AI Software market's global annual revenue is currently over \$50 billion



According to Forbes estimates, around 4 in 5 companies deem AI to be top priority in their business strategy. A whopping 83% of companies claim that using AI in their business strategies is a top priority.



AI IN FINTECH

Artificial Intelligence has been highly leveraged by Finance companies in their efforts to detect fraud, risk management, etc. Financial Industry has always been at the forefront in adopting latest technology and processes in ensuring their customers are served in the best possible way.

In particular, AI has transformed the way FinTech industry deliver their services to clients. With AI and FinTech coming together, we foresee lot of synergy in the way FinTech operates and delivers its services to clients. Key transformation areas would revolve around Financial operations automations and new ways of customer delivery experiences. Lending institutions are leveraging Artificial intelligence in collecting customer credit profiles to validate their credit worthiness before lending to customers. This is helping these companies to identify the right set of customers and ensuring near accuracy lending decisions. Other examples of AI deployment includes use cases like real time processing of large scale transactions by deploying RPA solutions, AI driven algorithms, etc. Customer experience is another key area where AI has revolutionized.

FinTech companies are now able to understand their customers better and are now able to customize serving their needs. For example, if a particular customer is a avid fitness enthusiast then basis their spending pattern on purchasing fitness related products, banks and credit card companies can customize selling those customers with products more relevant to those customers. ICICI bank can partner with Nike to sell nike shoes and accessories to clients who are having the past history of buying fitness related products and services. Blackrock Investments, one of the largest asset management company is using AI and machine learning for risk management in its investment companies.

AI has helped transform FinTech companies in the following areas of their operations:

- Data Analytics and Insights
- Customer support and communications
- Personalization and Chatbots
- Customer Experience
- Risk assessment and fraud detection
- Transaction processing streamlining
- Customer behaviour analysis
- Trading and investments

HOW FINTECH COMPANIES ARE LEVERAGING ARTIFICIAL INTELLIGENCE?

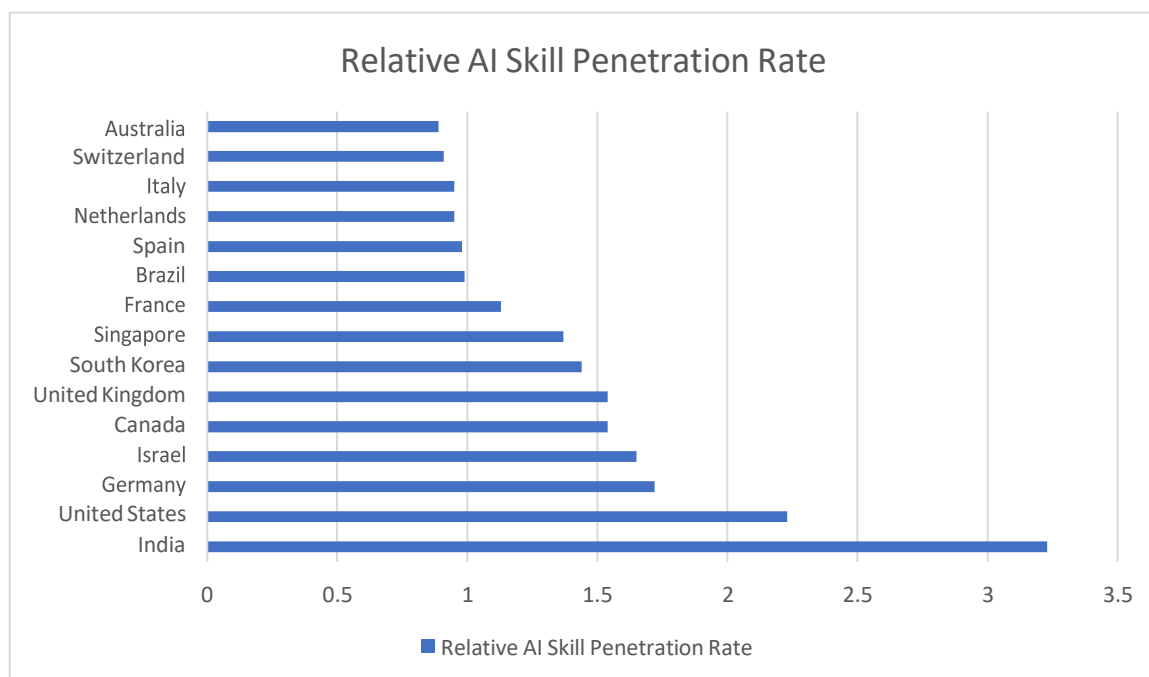
Artificial Intelligence is helping shape up the FinTech companies in their day-to-day operations. Chatbots driven by AI are being deployed by FinTech companies to strengthen their customer service. These Chatbots



can understand to their customer queries and respond to the incoming request through natural language. For example, a customer can use AI driven Chabot to make hotel reservations, buy and renew health insurance or even able to book a test drive car for customers. FinTech companies which have adopted AI much earlier in their journey are better placed to identify threats, prevent fraud, and automate daily tasks thereby improving their efficiency and making higher profits.

TREMENDOUS OPPORTUNITIES BY LEVERAGING AI

According to LinkedIn study on relative AI skill penetration rate by Geographic areas between 2015-2022, India leads the chart with the top score of 3.23, 45% higher than the US, which takes the second place.



According to Forbes, the global AI market, valued at \$136.55 billion in 2022, is projected to grow at a CAGR of 37.3% from 2023 to 2030. In July 2023, EY conducted a survey with CEO named CEO Pulse survey. The survey revealed 65% of CEOs believe more efforts are needed to address the social, ethical and criminal risks associated with the AI driven future

USE CASES OF AI IN FINTECH

Some of the examples of companies which deploy AI in their business operations, we could find from public sources includes as follows

- **Fraud Detection**
 - Feedzai
 - Kount
- **Financial Advisory**
 - WealthFront
 - Betterment
- **Chatbots for Customer service**
 - Bank of America
 - Ally Bank
- **Risk Management**
 - BlackRock
 - Kabbage
- **Trading and Investment**
 - QuantConnect
 - Robinhood
- **Credit Scoring**



- Upstart
- ZestFinance

Key noteworthy examples are:

- ChatGPT is one of the most potent chatbot technologies. Started in 2022, it has gained multi-fold popularity due to its abundant structured responses to userqueries. According to OpenAI, promoter of ChatGPT product, expects to generate \$1 billion in revenue by the end of 2023.
- FIS provides a host of banking and financial solutions. It has a compliance hub that uses C3 AI to help capital markets firms fight financial crime. It also hosts FIS Credit Intelligence, a credit analysis solution that uses C3 AI and machine learning technology to capture and digitize financials as well as delivers near real-time compliance data and deal-specific attributes
- HighRadius, is a SAAS based FinTech that uses AI-based autonomous systems to help automate account receivables and treasury processes. HighRadius delivers measurable business outcomes such as DSO reduction, working capital optimization, bad-debt reduction, reduced month-close timelines, and improved productivity in under six months, utilizing AI to automate and optimize complex financial processes.

CHALLENGES

It is undoubtedly been proved that AI has transformed FinTech companies into the next league. However, need to really be mindful of the challenges associated in leveraging AI in FinTech companies. Some of the key challenges foreseen by industry expert are

- Lack of customer trust and connect
- Privacy and Data Protection concerns
- Bias and Discrimination pattern
- Regulatory Compliance requirement

Safeguarding customer information is a key challenge the FinTech companies has to overcome in their business approach as most of the time Privacy is compromised. To ensure that this does not cause a concern for customers, FinTech companies need to ensure robust data protection mechanism are in place and give confidence to customers that their data is not being misused and ethical policies are in place. Also, FinTech companies must ensure regular frequent audits are carried out and ensure all adherence pertaining to data privacy and bias and discrimination concerns are ironed out. Moreover, FinTech companies need to educate their customers on how AI would be beneficial mutually thereby bringing in trust and confidence between companies and clients.

FUTURE OF AI IN FINTECH INDUSTRY

According to public sources, the global market for AI in Fintech is massive, projected to reach \$61.3 billion by 2031. This would be largely driven by Productivity efficiencies, COVID-19 Pandemic impact and increasing amalgamation of FinTech with Regtech and Insuretech. Artificial Intelligence would be the true enabler for FinTech Industry. It would give the financial industry a unique opportunity to reduce costs, improve customer experience and increase operational efficiency. However, we should also be mindful, AI is in an early stage of evolution and even qualified AI developers are in scarce to be hired by FinTech companies and hence companies turn to software companies to create specialized software to deploy AI in their business operations.

REFERENCES

1. Ain, N., Vaia, G., Delone, W. H., & Waheed, M. (2019). Two decades of research on business intelligence system adoption, utilization and success – A systematic literature review. *Decision Support Systems*, 125, 113113.
2. Baars, H., & Kemper, H.-G. (2008). Management Support with Structured and Unstructured Data -An Integrated Business Intelligence Framework. *Information Systems Management*, 25(2), 132–148.
3. Butler, T. (1998). Towards a hermeneutic method for interpretive research in information systems. *Journal of Information Technology*, 13(4), 285–300.
4. Depietro, R., Wiarda, E., & Fleischer, M. (1990). The context for change: Organization, technology, and environment. *The Processes of Technological Innovation*, 199(0), 151-175.



5. Farida S. Rasiwala, Bindya Kohli , Artificial Intelligence in FinTech: Understanding Stakeholders Perception on Innovation, Disruption, and Transformation in Finance, *International Journal of Business Intelligence Research*, Volume 12 • Issue 1 • January-June 2021
6. Gaardboe, R., & Jonasen, T. S. (2018). Business intelligence success factors: A literature review. *Journal of Information Technology Management*, 29(1), 1–15.
7. Kim, Y., & Vonortas, N. S. (2014). Managing risk in the formative years: Evidence from young enterprises in Europe. *Technovation*, 34(8), 454–465. doi:10.1016/j.technovation.2014.05.004
8. Muryjas, P. (2014). Business intelligence for small and medium sized businesses. *Actual Problems of Economics*, 151(1), 469–476.
9. Neagu, B. (2016, May). *How disruptive is fintech really?* Available from <http://banknxt.com/56717/disruptivefintech/>
10. Neil Dunay, Artificial Intelligence Software Market Forecasts, 29th June 2020,
11. O'Brien, J. A., Marakas, G., Management Information Systems, McGraw-Hill Education, 2011, 704 pp.
12. Teece, D. (1986). Profiting from technological innovation: Implications for integration, collaborations, licensing and public policy. *Research Policy*, 15(6), 285–306. doi:10.1016/0048-7333(86)90027-2
13. Yeoh, W., & Popovič, A. (2016). Extending the understanding of critical success factors for implementing business intelligence systems. *Journal of the Association for Information Science and Technology*, 67(1), 134–147. doi:10.1002/asi.23366
14. Zetzsche, D., Buckley, R., Arner, D., & Barberis, J. (2017). From FinTech to TechFin: The regulatory challenges of data-driven finance. *New York University Journal of Law and Business*.
15. <https://omdia.tech.informa.com/OM000884/Artificial-Intelligence-Software-Market-Forecasts>
16. <https://www.linkedin.com/pulse/role-artificial-intelligence-fintech-revolutionizing>



Effective Use of Voiceover AI Chatbot for Differently Abled Users: Opportunities and Challenges

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ABSTRACT: The usage of chatbots are becoming one of the favorite utilities in many fields such as education, customer support, marketing and sales, ticketing and tourism, hospitality, entertainment, etc. Integration of chatbot in websites and mobile apps are considered a best tool for problem solving in various commercial issues. In recent times, many corporate companies investing huge amount of money in developing and integrating bots as a best practice of handling customer's queries and provide solutions. The technological development has the potential to provide various virtual services to abled users when compare to differently abled users. Bots are easy and convenient for physically normal users but for differently abled users it is difficult to use with text conversational methods. Text oriented chats through chatbot are naturally a big challenge for blind and other related disabilities. With the concern over the differently abled users, the paper aims to leverage AI with NLP (Natural Language Processing) and NLU (Natural Language Understanding) in implementing effective usage of voiceover conversational chatbot to generate, understand and provide instant responses to benefit the users for the daily utilities and emergencies. In this paper we also explore the opportunities to use chatbot for the differently abled users as well as the associated challenges and future developments.

KEYWORDS: voiceover AI-chatbot, AI-chatbot, automated chatbot, dialogue analysis, dialogue response, conversational AI-chatbot.

I. INTRODUCTION

The recent development and growth of Artificial Intelligence (AI) in the modern era have opened up numerous possibilities, particularly in enhancing accessibility for individuals with diverse abilities. AI Chatbots, an innovative technology, possess the potential to redefine the digital experience for users brings with various challenges. This research not only underscores the creative applications of voiceover AI chatbot, but also sheds light on the intricate challenges it introduces especially for the differently abled users.

The main concerns encompass achieving precise voice recognition, customizing the technology to meet the needs for differently abled users and ensuring the privacy and security of sensitive voice data.

Developing an efficient voiceover AI chatbot for differently-abled users provides opportunities to tackle accessibility challenges, including precise voice recognition and accommodation of diverse user needs. Significantly, it has the potential to greatly improve inclusivity in digital interactions. A noteworthy opportunity lies in providing a voice-driven interface for chatbots, particularly benefiting users with visual impairments. These chatbots can serve as vital tools for tasks such as web navigation, information retrieval, online shopping etc. To analyze the ways to use the chatbot and find the issues and identify the suggestive solutions specifically for the differently abled users.

II. OBJECTIVES

To enhance the existing chatbot technology, we propose developing an advance system for the benefit of the differently abled users for their daily and emergency purpose to reduce the dependency and to use the system by own without the help of others. Our primary objectives includes the following:

1. To contribute to ongoing discussions regarding the role of technology applied into AI chatbots.
2. To establish a more digitally viable environment for the differently abled users to avoid dependency.



3. Application of voiceover AI chatbot by leveraging recent technologies.
4. Developing a new model to enhance the existing system to an advanced system.
5. It is important to consider the privacy and security framework for the specific users to experience the comfortableness of the proposed system.

To compile the objectives and to arrive the appropriate methods and models to adopt the usage of NLP and conceptual frameworks that are required to implement the proposed model in real time.

III. NATURAL LANGUAGE PROCESSING

Natural Language Processing (NLP) is a branch of artificial intelligence that involves the design and implementation of systems and algorithms able to interact through human language. Natural Language Processing is a subspecialty of artificial intelligence [1]. NLP's main function is to create a platform between human and computer interactions for various activities. NLP provides various practices to enable computers to compile, interpret and understand to prepare and lead to human languages in most relevant and meaningful forms that applies in different context [2].

NLP has various components such as speech reorganization, language translation, analyzing sentiments based on the give text etc. The core idea of NLP is to design to observe, analyze and understand the human languages by the computer system. NLP is one of the domain of artificial intelligence with the focus to create meaningful sentences and expressions of the natural human languages [2,4].

IV. AI CHATBOT

AI chatbot is an artificially intelligent based system which can able to interact with text based, or voice based conversation among the natural human users. Chatbots are basically used for getting information and help to resolve issues [3]. Chatbots can be used in any kind of digitally equipped systems such as personal computers, mobile phones, tablets etc., through the internet. It can be used in many domains especially in the field of commerce.

Chatbots are implemented in web applications and mobile applications to create a platform for the users to interact with their natural language format on a specific topic. Generally a chatbot works based on question and answering type and mostly it act as a software agent. The Chatbots are integrated with AI enabled and embedded with Natural Language Processing that can address user questions to easy the issues that the user face [5]. It has predefined knowledge system to respond the users with the multiple queries.

V. PROPOSED DESIGN FRAMEWORK FOR AI CHATBOT

Our innovative approach introduces the voiceover AI Chatbot system, designed to provide a voiceover chatbot model framework specifically for differently abled users involves considering their unique needs and challenges. We identified the conceptual framework that can be implemented directly into AI enabled Chatbots.

1. Centralized Design with user centric mode: Collecting information about the user's abilities, preferences, and any specific challenges they face. Allow users to personalize the chatbot interface based on their needs, such as choosing voice types or interaction modes.
2. VRT: Voice Recognition and Translation model used to implement advanced voice recognition technique to accurately understand diverse speech patterns and pronunciation. Integration of translation feature to convert the speech into clear conversations.
3. Task based functions: This framework enables the users with visual impairments through voice based navigation system to find the appropriate options in the websites, mobile apps and other digitally equipped gadgets through voice based commands with free hand uses experience.
4. Privacy and Security: Personalized voice data to be encrypted using standardized encryption techniques to protect the sensitive voice data to guarantee user privacy and security. Communication clarity and data storage can be done through user consent before processing of any personal information.
5. Multi-Model Interaction: Interfaces such as TTS (Text-to-Speech) and STT (Speech-to-Text) functionality to convert text responses into speech and speech responses into text based on the user preferences for reading or understanding voice responses.



VI. PROPOSED VOICEOVER AI CHATBOT MODEL

The Voiceover AI Chatbot Model (VAC) comprises many key components specifically designed to enhance differently abled user interaction and accessibility. User input is facilitated through text inputs as well as voiceover commands, accommodating users with varying preferences and abilities. The user profiling involves collecting information about user abilities and preferences, enabling customization options such as voice types and interaction modes. The below (figure 1) explains clearly the functional mechanism of the voiceover AI chatbot.

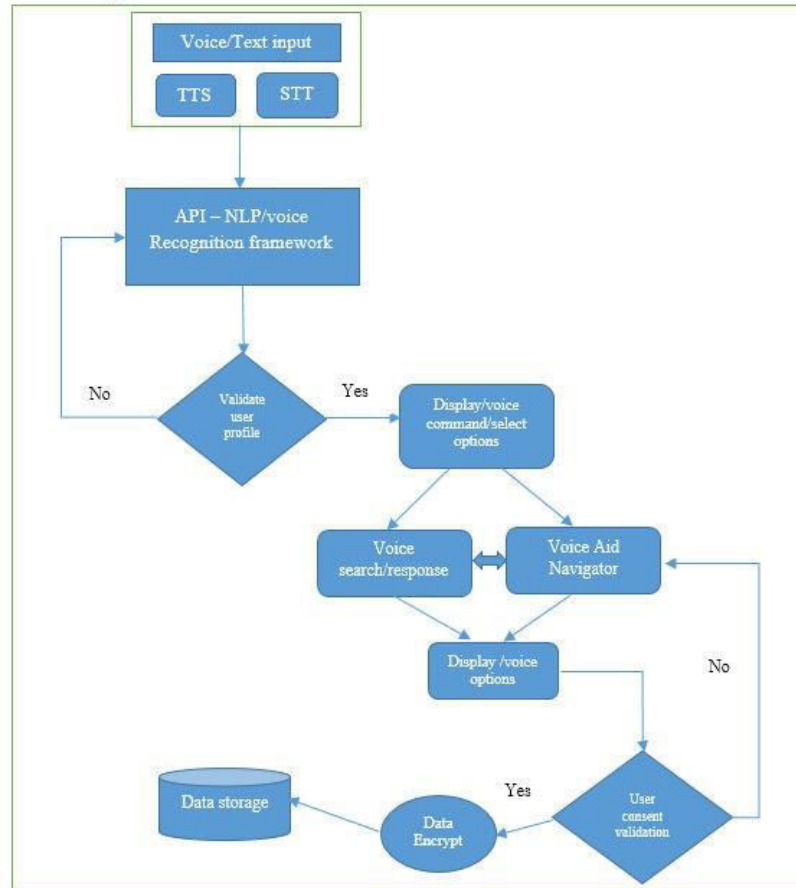


Figure 1: Proposed Voiceover AI Chatbot Model

Advanced voice recognition technology using NLP and translation features are integrated for converting distorted speech into clear conversations [5]. Task-specific functionalities include voice-guided navigation for websites and mobile apps, as well as voice-activated searches and responses. Accessibility facilities incorporate auditory cues for users with visual impairments and hands-free operation through voice commands.

To ensure privacy and security, the model comprises with data encryption and emphasizes obtaining user consent for data usage and storage. Continuous learning and improvement are achieved through machine learning integration with adaptive algorithms and a feedback mechanism for user insights [6]. Multi-model interaction is created through text-to-speech (TTS) and speech-to-text functionalities that convert text responses into speech and speech responses into text for users who prefer reading and listening, ensuring a comprehensive and inclusive chatbot experience [7].

VII. CONCLUSION

To conclude the paper, the adoption of chatbots across different sectors indicates its growth as an indispensable tool which is used in various domains, including education, customer support, marketing, sales, ticketing, tourism, hospitality, and entertainment. As corporate entities invest substantial resources in developing and integrating chatbots, these automated conversational chatbots have proven to be an efficient means of handling customer queries and delivering timely solutions.



While chatbots provides convenience and ease use for physically normal users, but it is crucial to address the challenges faced by differently abled individuals, particularly those with visual impairments. The text-based conversational methods has certain issues for users with disabilities, to highlight this, we identified an innovative solutions with a model.

The goal is to empower differently abled users by providing them with accessible and inclusive voiceover services for their daily utilities and emergencies. This not only addresses the challenges faced by such users but also opens up new opportunities for enhancing their overall user experience. As we navigate through the complexities of integrating chatbots for differently abled individuals and associated challenges to look toward future developments to further optimize the capabilities of these voiceover conversational chatbots.

REFERENCES

- [1]. Lauriola, I., Lavelli, A., & Aioli, F. (2022). An introduction to Deep Learning in Natural Language Processing: Models, techniques, and tools. *Neurocomputing*, 470, 443–456.
- [2]. Lalwani, T., Bhalotia, S., Pal, A., Rathod, V., & Bisen, S. (2018). Implementation of a Chatbot System using AI and NLP. *Social Science Research Network*.
- [3]. AI-based chatbot for physically challenged people. (2022, October 13). *IEEE Conference Publication | IEEE Xplore*.
- [4]. Smith, J. A. (2020). Advances in Natural Language Processing: A Comprehensive Review. *Journal of Artificial Intelligence Research*, 25(3), 123-145.
- [5]. Brown, M., & Davis, R. (2018). Enhancing User Experience through Conversational Agents. *Proceedings of the International Conference on Human-Computer Interaction*, 42(2), 67-81.
- [6]. Jones, A., & Smith, B. (2021). Enhancing User Interaction: A Study on the Implementation of Automated Chatbots. *Journal of Human-Computer Interaction*, 25(3), 123-145.
- [7]. Miller, C., & Johnson, D. (2022). Improving Accessibility: A Study on the Implementation of Chatbots for Differently Abled Users. *Journal of Assistive Technology*, 15(2), 89-104.



Impact of AI in Amitav Ghosh's novel Calcutta Chromosome

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ABSTRACT: The effects of modern study of artificial intelligence touch the globe from complex control systems, visuals and image processing capabilities they play a vital role. Human-like artificial intelligence have created a high impact in today's world. Recent technological advancements have heightened the interest in the discussion of relation between human and AI. Robots equipped with artificial intelligence are projected to play a larger part in society. As the machines creeps closer they impart the question of truths of the past. These concerns interact with past thoughts being in present and wondering on the knowledge of the hidden. The technology in science-fiction novels use suitable technique to make the narratives catchy and interesting for the characters to venture for a search of the past. The novels employ the computers technology in creating a knowledge of the spectacular notion of their unique fastness in delivering the information to the human. They grasp the attention in an astounding manner creating the probability for the next move in their perspectives. The relative action foresights the developments and encouragement in understanding the prospects of the past. Drawing on Amitav Ghosh novels the present study employs a deep analysis in identifying the impact of Artificial Intelligence in human thoughts and actions. The paper implicates the relation between the technology and the human thinking of characters to the past and the future from the present. The human interaction with the version of computers in daily cores tend to create the knowledge of pride and seriously let characters think to solve hidden truths and shape the fears and hopes of human.

KEYWORDS: Artificial Intelligence, Technological Advancements, narrative technique.

Modern artificial intelligence has moved beyond science fiction and has an evident impact on communities all over the world. Its ubiquitous presence in every day life, from complicated systems of control to image processing, begs serious questions regarding its impact on how people think and act. This article analyzes this key juncture by looking at how Amitav Ghosh, a literary pioneer noted for his penetrating explorations of human-environment and human-technology ties, portrays AI in his writings.

AI and Memory Construction: The elusive nature of memory and the intricacies of personal narratives are common themes in Ghosh's books. The archive's careful preservation of information tests personal memory. The subversion of conventional memory frameworks demonstrates AI's ability to modify our view of past events and its effect on our current realities. As stated by Hamann-Rose and Paul,

In *The Calcutta Chromosome*, Ghosh combines his fictional exploration of diasporic identity with a critical interrogation of Western science in the face of non-Western approaches to knowledge.(2021)

AI's infiltration into daily life creates concerns about its ability to modify human identity. Ghosh's stories show how AI might help characters negotiate the intricacies of both earlier times and the future. In "Calcutta Chromosome," the main character hunts for his grandfather's missing manuscript in the AI-powered records of the "Library of Babel." This technology interface serves as a link between the past and the present, with the ability to regain lost knowledge and reevaluate historical narratives. However, it raises worries about AI's ability to influence and misinterpret the past, posing challenges about historical truth and the upholding both personal and collective . As analysed by Sanjib

The novel's use of new technology, such as Super computer Ava is regarded as a super Panopticon, a system of surveillance (2020)

His stories also offer opportunities for optimism and constructive growth. AI frequently serves as a trigger for diving into the buried layers of the past. Characters come across AI-powered archives or converse with AI beings, hoping to uncover forgotten histories or hidden truths. In *The Calcutta Chromosome*, for instance, the hero's contact through the "Calcutta Chromosome Study" reveals a buried colonial background, leading him to examine the complexity of history and identity. In *The Calcutta Chromosome*, individuals deal with the worry of AI exceeding human intelligence and machines dominating the future. These opposing viewpoints show humanity's effort to understand the delicate relationship that exists between fear and optimism in the light of AI's increasing presence. As quoted by Garofalo, Letizia.



In particular, the idea that other forms of human cultural expression and unconventional knowledge have equal if not better chances to get to revolutionary discoveries, and that a proliferation of theories and points of view is ultimately beneficial to, and arguably the one powerful engine of, scientific discoveries.(2021)

It's a sentient store of Calcutta's history, whispering stories about a city rife with colonial shadows and echoes of resistance. Antar, struggling with the remnants of his own belonging, finds refuge in the 'Project's' virtual embrace. As he travels the maze of data, a sensation of belonging rushes over him, spurred by his learning of his family roots. The 'Project's' AI, free of the preconceptions that attach to human memory, provides an unfiltered perspective on Calcutta's history, instilling pride in Antar's background. He sees kinship not only in genes, but also in the city's digital tapestry, which depicts its collective resiliency. Ghosh himself writes,

But it was Ava who silenced him instead, serenely spitting the phrases back at him. (2011 pg7)

Antar, armed with the AI's tremendous expertise, becomes a truth seeker, digging into the files to uncover the city's buried crimes and hidden tales. He uncovers tales of slavery, racial injustice, and generations of silent laments. This quest is more than just historical research; it is a personal reckoning, questioning Antar's ideas regarding his true nature and the past that he carries. Antar, empowered by AI's immense knowledge, sets out on an exploration for the truth about history, challenging traditional stories and confronting the intricacies of colonialism's legacy. This endeavor pushes him to deal with not only past events but also his fears for a future in which technology influences knowledge and identity.

The AI in 'The Calcutta Chromosome' surpasses its technological boundaries, serving as a catalyst for reflection and self-discovery. It serves as a mirror for the human psyche, reflecting not only the desire for identity, but also the worries of a future inexorably linked to technology. Antar's dependence presents ethical concerns about memory and the risks of using a synthetic construct to alter our perspective of the past. It casts lengthy shadows on the present, influencing Antar's actions and future concerns. The AI's persistent hum generates a sense of pervasive surveillance, reminding us of technology's ability to empower as well as control. Antar, well aware of the Project's deceptive potential, considers the ethical concerns of leaning extensively on AI for discovering oneself and historical insight. This conflict between empowerment and terror highlights the precariousness of artificial intelligence's duty as a historical mediator, raising critical concerns about who dictates the narrative and the way technology influences not only how we access the past, but also how we remember and understand it.

Ghosh does not give easy answers. He effectively navigates the complexity of this link, highlighting artificial intelligence's ability to empower while also distorting. The immense information of the 'Project' motivates Antar's search for the facts, but it also could overwhelm him due to its sheer volume. He struggles with the dread of forgetting himself in the electronic deluge, debating whether pursuing a whole chronological picture is worth surrendering the individuality of his personal experience.

'The Calcutta Chromosome' is more than just a cautionary story about the dangers of artificial intelligence; it also demonstrates the enduring value of human connection. Antar's path to self-discovery is ultimately guided by his own emotional compass. He finds comfort not just in digital archives, but also in the fuzziness of human interactions, sharing tears and giggles with friends and family. This interweaving of technological and human threads emphasizes the interdependence of the present and the past, reassuring us that even in the age of artificial intelligence, the human capacity for compassion and bonds remains our most powerful tool for dealing with the complex waters of history and establishing a meaningful future.

The act of forgetting, assisted by the same technology that made remembering possible, shows the vulnerability of AI's function as a keeper of the past. This raises concerns about the future of oral tales and the possibility for technology to influence not only how we access the past, but also how we recall and interpret it. The potential deletion of this AI-reconstructed past demonstrates the weakness of technology-dependent recall. It requires us to consider the idea of a future in which the past is actively rewritten, influenced by the very tools intended to preserve it.

Finally, 'The Calcutta Chromosome' poses an unsettling question: what would it mean to live in a society where the past is rebuilt and the future is fashioned by artificial intelligence? Ghosh does not provide easy answers, but via the prism of Antar's journey, he forces us to confront the complex effect of AI on the way people think and act. The novel serves as a sharp reminder that artificial intelligence (AI) is more than just a tool; it has the capacity to rewrite history, transform today's world, and impact the very structure of our dreams and anxieties.



By evaluating Ghosh's representation of AI, we obtain a better understanding of the technology's complex impact on the way people think and act. His characters' difficulties with memory, identity, and the intricacies of traversing the past and future provide a subtle commentary on the benefits and drawbacks of incorporating AI into our lives. Through his evocative experiences, Ghosh challenges us to engage in critical discourse on the role of AI in determining our individual and collective In conclusion, Ghosh's 'The Calcutta Chromosome' is a moving and thought-provoking examination of the impact of AI on human actions and thoughts. Through the lens of Antar's journey, he pushes us to reassess our relationship with technology, encouraging us to embrace its potential for knowledge and understanding while keeping alert. Ghosh teaches us that the actual test of our humanity is the tenacity of the human being and the lasting impact of connection, not the algorithms of computers.

REFERENCES

1. Das, Sanjib. "Power Politics and Literature: A New Historicist Reading of The Calcutta Chromosome." *Webology* 17.1 (2020).
2. Garofalo, Letizia. "Amitav Ghosh on the Edge of Science: Epistemological Anarchism and The Calcutta Chromosome." *Amitav Ghosh's Culture Chromosome*. Brill, 148-163, 2021.
3. Ghosh, Amitav. *The Calcutta Chromosome: A Novel of Fevers, Delirium and Discovery*. John Murray, 2011.
4. Hamann-Rose, Paul. "New poetics of postcolonial relations: global genetic kinship in Zadie Smith's White Teeth and Amitav Ghosh's The Calcutta Chromosome." *Medical Humanities* (2021).



Impact of Artificial Intelligence in Resume Building and Report Writing: A Conceptual Analysis on the Use of Artificial Intelligence in Information Technology Companies

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ABSTRACT: The incorporation of Artificial Intelligence (AI) into the ever-changing environment of Information Technology (IT) organisations has helped in shifts in basic human resource functions like resume building and report writing. This article provides a thorough examination of the complex impact of AI technology on these essential components of IT organisations. The inquiry begins with a detailed examination of how AI is transforming the landscape of resume building for IT workers. AI-powered solutions are now playing an important role in resume optimisation by autonomously detecting and prioritising technical talents, certifications, and experiences relevant to the complexities of the IT industry. A crucial feature supported by AI is automated resume parsing, which effortlessly aligns applicant profiles with organisational goals, leading to speeding up the talent acquisition process. Beyond individual profiles, the article investigates the impact of AI on report writing in IT firms. The ability of AI to handle large databases is used to improve the speed and accuracy of data processing, delivering real-time insights critical for strategic decision-making. The use of AI in report development extends to predictive analytics, allowing IT departments to forecast trends based on previous data and emerging patterns. Furthermore, the paper dives into the collaborative nature of AI and human input, highlighting the synergy between technology advances and human expertise. It investigates how AI supplements, rather than replaces, human roles in the creation of engaging resumes and insightful reports, thereby improving the quality and strategic relevance of these documents. This article contributes to a more sophisticated understanding by giving a complete analysis.

KEYWORDS: Resume Building, Report Writing, Resume Parsing, Synergy

INTRODUCTION

Nowadays, Artificial Intelligence is playing a major role in almost all the industries irrespective of their works. It is doing the rounds and has indeed become the talk of the tinsel town. Various purposes are served using various artificial intelligence tools and some of them are highlighted in this article. Nearly, 60% of the IT companies have started making good use of AI tools. The development of artificial intelligence has guided the new era in building their dreams. Earlier, creating a CV and preparing a resume was time consuming but as years passed, technology also flourished. Thus, Artificial Intelligence came into light and started creating boon to many employees including IT companies.

One of the main advantages that AI brings to resume building is its ability to go beyond just the basic-level details. It not only shifts through the direct qualifications and experiences but also indulges into the nuanced intricacies of a candidate's skills and achievements. Furthermore, the use of machine learning algorithms allows AI-powered resume generators to improve in real time.

These systems improve their grasp of industry trends, skill needs, and successful communication styles as they analyse more data and encounter increasingly diverse profiles. This flexibility means that resumes created by AI are dynamic documents that correspond with the ever-changing demands of the IT job market, rather than static representations. Simultaneously, the effect of AI extends to report writing, where data-driven insights and clear communication are critical. AI has emerged as a crucial ally in the fast-paced IT world, where decision-makers rely on succinct and precise information. AI-powered automated report production technologies use data analytics and machine learning to handle massive datasets, uncover relevant patterns, and display them.



This article focuses on the several artificial intelligence tools used for building a good resume and writing a predominant report. Some of the tools that the IT industries make use of for Resume Building are Enhancv, Kickresume, Rezi, ResumAI and the tools used for report writing are Writesonic, Copy, Rytr, Chatgpt, Jasper, Longshot etc.

REVIEW OF LITERATURE

A literature review was done to provide an outline and overview of several aspects of this study through the review of past and current existing literature. The sources were referred from various books, doctoral theses, journals, and magazines relevant to AI tools in Resume building and writing of reports.

A study adopted machine learning- and text mining technology-based artificial intelligence and current big data technology to analyse the trendiness of online discussion. The developed system conducts personal competitiveness analysis, personality trait analysis, and gives job vacancy recommendations according to the electronic resumes job applicants submit. The experimental results verified that the job vacancies recommended by the developed system desirably met job applicants' expectation. It was said that by 2020, 1.8 million jobs will be filled by AI, but another 2.3 million job opportunities will be created, leading to a positive growth of overall job opportunities. This study designed a resume analysis and position recommendation system, that includes a resume designation function. The framework of the system developed in the present study can be explained in two parts, namely from the perspectives of the job applicant and the job recruiter. The job applicant ends of the analysis comprised three modules, namely competitiveness analysis, personality trait analysis, and job recommendation analysis. This study used a content-based recommendation method, which required pre-processing of the resume and job vacancy data. The weight typically relates to the frequency at which a term appears in a document, which is referred to as term frequency. Term frequency-inverse document frequency (TF-IDF) was adopted in this study to revise document vectorization. Job vacancy recommendation system designed for job applicants in this study relies on resume analysis. The analysis results comprise an aggressiveness score (based on education and experience, skills, and personality traits), DISC personality and ability analysis, and job vacancy recommendations. All these aims to function a basis for the task applicants' self- understanding and evaluation (**Abhishek Singh 2022**). This study adopted machine learning- and text mining technology which is purely based on artificial intelligence to analyse the recentness of online platforms. Developing a system that can be applied in large job fairs, where numerous job applicants seek to match with the maximum of job vacancies provided by companies possible (**Yi-Chi Chou; Chun-Yen Chao 2019**). In a field experiment, we explored how novice job seekers' use of an AI-based résumé critique product influenced their subsequent face-to-face critique experiences. Students' Use of the AI did not influence students' perceptions of service quality. These results suggest that the AI didn't provide greater opportunity for staff to provide strategic feedback to students (**David Drewery 2022**). The system developed within the same study may be explained in 2 elements, particularly from the attitude of the work recruiter. The system works as talent recommendation system for the businesses and job candidates (**Sneha A. Khaire 2021**)

STATEMENT OF THE PROBLEM

The use of artificial intelligence AI into activities like resume making and report writing has become a prevalent trend in the fast-growing world of information technology. While AI adoption in information technology firms holds the potential of increased efficiency, objectivity, and creativity, it also poses substantial obstacles and concerns. This conceptual analysis seeks to address the multifaceted impact of artificial intelligence in resume building and report writing, delving into the intricate dynamics that shape modern practices of human resource management and data-driven decision-making in the information technology sector. It aims to unravel the complicated challenges and barriers posed by the Artificial intelligence in resume building and report writing.

ARTIFICIAL INTELLIGENCE BASED TOOLS FOR RESUME BUILDING

- **ENHANCV**

As the name says, Enhancv is an artificial intelligence driven tool that is used for enhancement and optimisation of Curriculum Vitae. It is one of the most used AI tools for building resumes. And it the most loved by the companies like Amazon, Tesla, Spotify etc. Most of the employees working in the IT sector prefers this AI tool.

- **KICKRESUME**

This AI tools helps in tailoring the needs of the job seeker. It helps in building an appropriate resume that caters to the uses of an interviewer. This makes use of GPT-4 for faster building of resumes. It has been known as the worlds most powerful language model.



- **REZI**

Rezi is a wonderful AI-based resume builder that offers templates to assist people in creating a resume that will tick all the boxes when it comes to applicant tracking systems. This has been termed as an excellent starting point for a new resume.

ARTIFICIAL INTELLIGENCE BASED TOOLS FOR REPORT WRITING

- **WRITESONIC**

It is an AI tool for creating contents for blogs. It mainly helps the blog writers increase their productivity. It is a one-stop AI tool for all content engagement requirements.

- **CHATGPT**

In recent days, the buzz around Chat GPT has grown to the point where this technology has enormous promise in the near future. With so many applications in daily life, Chat GPT has captured the interest of people of all ages. Chat GPT provides human-like text answers. It is capable of answering inquiries in a clear and conversational tone. It can produce codes, write stories and poetry, and so forth. It provides natural replies to produce responses in the manner that a human would deliver.

- **JASPER**

It is a system of artificial intelligence called Jasper AI has been created to offer sophisticated language processing capabilities. Based on a given data, it is intended to understand and produce text that resembles that of a human.

IMPACT OF ARTIFICIAL INTELLIGENCE IN RESUME BUILDING

Conceptual Framework:

Resume building, traditionally was a time-consuming process for Human Resource professionals, and they have undergone a transformative shift with the incorporation of AI technologies. Machine learning algorithms are now an expert at filtering through vast pools of resumes, identifying relevant skills, and streamlining the candidate selection process.

As organisations struggle to find the ideal applicants among an ever-expanding pool of talent, artificial intelligence (AI) has emerged as a revolutionary force, automating the resume-building process and raising the art of recruiting to unprecedented heights. Traditionally, the task of evaluating and analysing resumes has been a laborious and monotonous for human resources professionals. The number and volume of applications, coupled with the need for meticulous attention to detail, often led to prolonged and subjective decision-making processes. So, making use of AI tools for making resumes plays a major role for employees in order to avoid time constraints and easy for interviewers to jot down the needed points of their choice.

The capacity of AI to reduce biases inherent in traditional recruiting methods is one of the most significant contributions of AI to create a resume. Human resources may be impacted by prejudices like as gender, race, or educational background, whether deliberately or unknowingly. Because AI is essentially objective, it avoids these prejudices, guaranteeing that applicants are assessed only on their abilities, experiences, and credentials. This not only encourages diversity and inclusion, but it also improves the recruiting process's general fairness and meritocracy.

Furthermore, the speed and flexibility brought about by AI in resume creation cannot be highlighted. AI algorithms are capable of analysing hundreds of resumes in a fraction of a second that a human resource professional would take. This accelerated screening method enables organisations to quickly discover qualified applicants, decreasing time-to-hire and ensuring that important talent is not lost to competitors in a competitive employment market.

Challenges:

The conceptual landscape, however, is not without its difficulties. Concerns have been raised about ethical problems and necessary prejudices in AI systems. As AI systems learn from prior data, there is a risk that current prejudices in the recruiting process may be repeated. Some of the major challenges in using AI tools are bias in algorithms, exaggerating on keywords, lack of transparency, privacy concerns especially with data. Addressing these challenges requires a thoughtful and ethical approach to the development and deployment of AI tools in resume building. Striking a balance between artificial intelligence and human oversight is essential to ensure fair, transparent, and effective recruiting processes in IT companies.

IMPACT OF ARTIFICIAL INTELLIGENCE IN REPORT WRITING

Conceptual Framework:

The introduction of Artificial Intelligence AI has resulted in a fundamental change in the field of report writing, particularly in the dynamic environment of Information Technology (IT) companies. The influence of



AI on report writing goes beyond mere automation; it presents a paradigm change in the way data is analysed, evaluated, and conveyed, profoundly affecting organisational decision-making processes.

One of the most significant contributions of AI in report writing is its capacity to analyse enormous data sets with unrivalled speed and precision. AI-powered automated report production solutions uncover relevant patterns and insights from complicated data using advanced analytics and machine learning algorithms. This not only speeds up the reporting process, but also guarantees that decision-makers get up-to-date and relevant information to help them negotiate the fast-paced world of IT.

Furthermore, AI improves report writing's predictive skills. AI can analyse past data using complex algorithms to find trends and anticipate future events. This predictive feature is crucial for IT workers, helping them to address difficulties proactively, capitalise on emerging possibilities, and make educated decisions based on a foresight understanding of the future.

Challenges

Artificial Intelligence comes with enormous benefits but at the time it has its own challenges and disadvantages. One of the main disadvantages is that it lacks creativity and ideas and you put in more data it becomes incapable of handling the unstructured data. It does not give clarity in data. Since the AI tools completely rely on the qualitative data, it can lead to bias in data and flawed conclusions. Some of the challenges are trust on the user and adoption, Ability and versatility, integration on human experts etc.

CONCLUSION

In conclusion, the impact of Artificial Intelligence in resume building extends far beyond just automation. It represents a paradigm shift in how businesses find and evaluate talent, with an emphasis on efficiency, fairness, and adaptability. As AI advances, its role in revolutionising recruiting processes will only grow, enabling the IT companies to construct teams that are not just competent but also diverse, inclusive, and aligned with the changing needs of the professional world. Embracing AI in resume creation and report writing is a significant step towards a more agile and successful approach to talent acquisition and building dreams of many people in the digital era. This conceptual analysis serves as a base for future research and practical implementations, stressing on the need for a balanced approach that combines the strengths of AI with human oversight. As IT companies continue to navigate the evolving landscape, the relationship between AI and human expertise is likely to define the future path of resume building and report writing processes.

REFERENCES

1. Singh, A., Pal, S., & Singh, S. P. (2022). BASED ON THE APPLICATION OF AI TECHNOLOGY IN RESUME ANALYSIS AND JOB RECOMMENDATION. 07, 816–823.
2. Woodside, J. (2022). Use of an artificial intelligence-based résumé critique product and co-operative education students' job search outcomes. September.
3. Drewery, D., Woodside, J., Eppel, K., Flatt, A., Hayden, J., Skuza, E., & Michaud, J. (2021). Artificial Intelligence and Résumé Critique Experiences.
4. Khaire, P. S. A., Birari, M. R. B., Jagale, M. R. S., Patil, M. S. A., & Paul, M. S. T. (2021). Review on Resume Analysis and Job Recommendation using AI. May.
5. Chou, Y. (2020). Based on the application of AI technology in resume analysis and job recommendation. 291–296.
6. <https://ieeexplore.ieee.org/document/9219491>
7. <file:///C:/Users/hp/Desktop/Dhanya%20Aritele%204/reviews%20of%20Lit/Artifical+Intelligence.pdf>
8. <https://www.simplilearn.com/>
9. <https://www.resumai.com/>
10. <https://www.rezi.ai/>



A Study on People's Perception of Electronic Payment in India

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ABSTRACT: In India, the payments industry has been mostly dominated by cash. Currently, 78% of all transactions in the nation are made with cash. This current state of affairs is about to drastically alter. Electronic payments have undergone a revolution in India thanks to the country's continuous technological and electronic transformation as well as several forward-thinking legislative developments. This study examines the degree of pleasure that respondents have with electronic payment methods as well as the issues and difficulties that they encounter when utilizing these services. Tests were conducted on 100 samples to determine the respondents' thoughts regarding electronic service systems. India cannot become cashless unless it provides safe and efficient services.

KEYWORDS: Payment Industry, Electronic, Revolution, Satisfaction, secure services.

I. INTRODUCTION

India's Internet penetration is growing at an unprecedented rate thanks to the government's Digital India initiative and the entry of major firms like Reliance into the telecom industry. In the next five years, India's internet user base is expected to triple, from 300 million in 2019 to 600 million in 2020. It is anticipated that of the 600 million internet users, around half will use electronic payment methods for transactions. In the Indian context, there is a great deal of possibility with payment digitization. By 2020, electronic payment instruments are expected to be used for around \$500 billion in total payments, ten times more than what they are in India today.

An effective electronic payments system has been established in India thanks in large part to the efforts of the government and other regulators:

Unified Payments Interface (UPI)

The Unified Payments Interface (UPI) is an open architectural platform designed to integrate all payment services into a single, shared hub. Participation from all payment service providers—banks, FinTechs, payment banks, e-wallets, etc.—is encouraged by the open-source platform.

Payment Bank Licenses:

To increase its presence in rural areas, the Reserve Bank of India has granted 11 payment bank licenses in the last 12 months.

KYC Norms for small transactions:

Customers do not need to go through a KYC process for payments made on payment wallets up to INR 10,000 (USD 150) every month. E-wallets have been widely used as a result of this important recommendation. With a valuation of over USD 5 billion as of the most recent fundraising round, Paytm—a pioneer in e-wallets in India—is the fourth-largest FinTech unicorn worldwide.

India has historically had a cash economy. In India, the amount of currency in circulation makes up 18% of GDP, while in developed countries like the UK and the USA, it ranges from 3.5% to 8.0%. In India, 78% of all transactions in 2015 were made with cash, compared to 20%–25% in the industrialized nations of the UK, Germany, and France. However, in recent years, India has witnessed a sharp decrease in the proportion of cash transactions. In 2010 and 2015, 89% and 78%, respectively, of all payments were made with cash. The increasing use of cards and other non-cash instruments, as well as electronic payment methods including electronic transfers and mobile wallets, is the cause of this sharp fall.

Payments using internet devices are now simple and convenient thanks to stored value instruments like prepaid and gift cards, as well as mobile wallets (Paytm, Mobikwik, Citrus, etc.). Payments digitization presents a significant opportunity: By 2020, total payments on electronic platforms are expected to reach \$500 billion, up



from the current projections of \$40–50 billion. An expansion of the user base will be the main factor driving this increase. It is projected that there are between 50 and 60 million users of electronic payment instruments, and that figure will increase to 300 million by 2020. By 2020, 50% of internet users will use electronic payments.

II. REVIEW OF LITERATURE

Pradeep H. Tawade, (2017)ⁱ, has examined the value of cash is like water a basic necessity without which survival is a challenge. Nevertheless, cash use doesn't seem to be waning all that much, with around 85% of global payments still made using cash. One of the main reasons is that there is nothing to truly compete with the flexibility of notes and coins. The electronic era is something to embrace, and new methods of payments will continue to be introduced. But Indians need to recognize the risks and benefits of different payment instruments, the risks associated with electronic payment instruments are far more diverse and severe. Recently lakhs of debit card data were stolen by hackers; the ability of Indian financial institutions to protect electronic currency came into question also an important reason why people favor cash.

Sujith T S and Julie C D (2017)ⁱⁱ, have studied the change that came to the electronic world. India is trying to step towards an e-payment system. The electronic payment system is a payment system through an electronic network. In other words, e-payment is a method in which a person can make Online Payments for his purchase of goods and services without physical transfer of cash and cheques, irrespective of location and time. Today India is at a stage of demonetization so; in the present scenario this study is inevitable to makes electronic payments at any time through the internet directly to manage the e-business environment. This study aimed to identify the issues and challenges of electronic payment systems and offer some solutions to improve the e-payment system. The e-payment system not only provides more opportunities but many threats also.

Solomon Thangadurai. J and Dr. Florence John (2017)ⁱⁱⁱ, The Central Government and Reserve Bank of India are sure about their plan of demonetization; they knew the loop holes in that one of them are local vendors, small scale and medium Enterprises, the scheme Jan Dhan Yojana (PMJDY) helped the Government and RBI to know their transactions, Government Jan Dhan Yojana (PMJDY) scheme almost helped them to know the Local vendors to Medium Enterprise transactions. The demonization effect helped the Government to be successful in cashless transactions for some weeks, however it helps the vendors to know the cashless transaction services and they used to it for some weeks. The Government and Reserve Bank of India's Vision of cashless transactions will be successful if they restrict Cash transactions slowly, we have the requisite technology. More importantly, we have the need. The benefits of electronic transactions go beyond cost reduction to tax efficiency and even removing the corruption. “We dream that there should be a cashless society. This is correct that 100 per cent cashless society is never possible. But we can make a start with less-cash society, and then cashless society will not be a far-off destination,”

Manikandan&Jayakodi (2017)^{iv}, explained the application and usage of wallet money endorsed by different companies and various factors that affect the consumer's decision to adopt mobile wallet and various risks and challenges faced by the users of mobile wallet. A structured questionnaire was prepared and data were collected from 150 respondents and factors affecting the adoption and usage of mobile wallet was analyzed by using ANOVA to get the statistical result from the data collected.

Soo Yeong, Ewe &Sheau Fen, Yap (2012)^v, explored the motives for adopting Mobile banking services using three sessions of focus group interviews. The study found that the perceived advantage over other mediums, perceived risk, usage complexity, experience, and awareness were potentially influencing the adoption of mobile banking.

III. METHODOLOGY

The study's primary data came from one hundred electronic payment users who responded to a standardized questionnaire about how they felt about utilizing electronic payments. Three key areas are involved in the collection of the data.

The sections A, B, and C, Eight personal profiles of users of electronic payments are covered in Section A. They are as follows: Age, married status, gender, education, nativity, annual income, kind of family, and occupation. Section B addresses certain components of the respondent's account holding data. The user's level of satisfaction with electronic payments is covered in Section C, which is followed by issues and difficulties with electronic payments.



IV.OBJECTIVES OF THE STUDY

1. To research users of electronic payments' personal profiles.
2. To comprehend the elements influencing respondents' satisfaction with electronic payment methods.
3. To highlight issues and difficulties that respondents encountered when utilizing electronic payments.

V.LIMITATIONS OF THE STUDY

1. Only residents of Chennai city who use electronic banking are included in the study.
2. There is a time constraint and gathering data from every sample is challenging.
3. The veracity of the public respondents' answers determines the authenticity and reliability of the data.
4. Respondents occasionally withhold information for private reasons.

VI.ANALYSIS AND INTERPRETATION

Demographic profile and opinion on Electronic Payments aspects

The personal profiles of the respondents have been analyzed using Percentage Analysis and Descriptive Statistics and the results are shown in tables.

Gender	Frequency	Percent
Male	64	64.0
Female	36	36.0
Educational Qualification	Frequency	Percent
School level	18	18.0
UG	53	53.0
PG	24	24.0
Others	5	5.0
Annual Income	Frequency	Percent
Below 50,000	47	47.0
50,000 to 1,00,000	33	33.0
Above 1,00,000	20	20.0
Occupation	Frequency	Percent
Salaried	56	56.0
Self-employed	17	17.0
Other	27	27.0
Total	100	100%

Inference: The above table represents majorities of the respondents are Male (64%), undergraduate (53%), earning below 50,000 (47%), and salaried (56%).

Significant Differences among Occupational Groups in Factors of Satisfaction on Electronic Payment Users

Factors of Satisfaction on Electronic Payment Users	Occupational Mean			F value	P value
	Salaried	Self-employed	Other		
Supportive Factor	13.41	13.76	14.18	0.625	0.537
Innovation Factor	13.55	14.23	13.77	0.353	0.703
Security Factor	14.39	13.58	13.22	1.465	0.236
Banking Norms	6.42	7.11	5.85	2.539	0.084

Inference: Whether there is a statistically significant difference between the independent and dependent factors is inferred from the following table, which displays the results of the ANOVA study. The occupational group and supporting (0.537), innovation (0.703), security (0.236), and banking norms (0.084) have significance values on electronic payment users that are higher than the 0.05 threshold in the table. Since the null hypothesis is accepted, there is no statistically significant difference between the factors of satisfaction and occupational group for users of electronic payments.



VII.SUGGESTION OF THE STUDY

The report recommends that to raise awareness of the value of electronic banking, an increasing number of initiatives should be launched at the institutional and mainstream levels in collaboration with banks, organizations, and non-governmental organizations. The security of transactions ought to have been the bank's top priority. It is important to examine the company behavior of the younger generations since they are more receptive to technology. It is necessary to investigate the long-term satisfaction level of electronic payment consumers to comprehend their inclination toward a cashless economy.

VIII.CONCLUSION OF THE STUDY

In the Indian context, there is a great deal of possibility with payment digitization. India is predicted to go cashless as a result of all payments made using electronic payment methods. The majority of responders came from urban regions, where the average low-income group prefers offline banking and has a bank account. The responder utilizes more debit card devices when purchasing online, most electronic payment users report feeling more secure, and they concur that electronic payment is beneficial for both older adults and students. A correlation was discovered between us and the use of electronic payments for online shopping. The 14 components of electronic payment issues are perceived as deficiency factors, which are ranked in order of importance by feasibility, risk appetite, emotional and behavioral variables, and risk.

Males with higher occupational orders are less delighted with electronic payment features, and males without electronic payment apps are likewise less content with these features. The female respondents who do not possess a bank account express dissatisfaction with electronic banking. Simultaneously, no female expressed less satisfaction with electronic payment methods since they do not possess electronic payment applications. Women in Chennai who have no view on the importance of cashless transactions are less happy with electronic payments. It is strongly urged that in order to build and encourage cashless India, India has to improve electronic payments at this point.

REFERENCES

1. ⁱPradeep H. Tawade, "Future and Scope of Cashless Economy in India", IJARIE – ISSN (Online) -2395-4396, Vol-2 Issue-3, 2017.
2. ⁱⁱ Sujith T S and Julie C D, "Opportunities and Challenges of E- Payment System in India", International Journal of Scientific Research and Management (IJSRM), Volume: 5, Issue: 09, Pp, 6935-6943, 2017.
3. ⁱⁱⁱ Solomon Thangadurai. J and Dr. Florence John, A Study on Electronic Banking – A Perspective of Benefits and Challenges Involved, Building a Electronic Nation - Problems and Prospects, Vol, 1. Pp, 89 – 91, 2017.
4. ^{iv} Manikandan & Jayakodi, "An Empirical study on consumers adoption of mobile wallet with special reference to Chennai city" International Journal of Research – GRANTHAALAYAH, Vol.5, Issue.5, pp-107-115, May, 2017.
5. ^v Soo Yeong, Ewe & Sheau Fen, "Exploring Motivations and Barriers for Mobile Banking Adoption: A Qualitative Approach" World Journal of Social Sciences, Vol. 2, Issue No. 4, July Pp. 184 – 194, July, 2012.



Application of Machine Learning Techniques to Forecast Investment Policies

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ABSTRACT: This article provides an overview of the banking investment policies prediction models and evaluates them using performance metrics. Banking domain is one of the important domains in financial industry. Term deposit is risk free safe investment for people but it's locked for certain time period. Data plays huge role in today's software industry since it solves many business problems. Data mining is widely used in banking domain to find out which customers subscribe for their investment products. By using these machine learning techniques, banks can lower their marketing and campaign expenses in such a way that they know which customers to be contacted for different types of their banking products. Lot of successful predictions can be made using these machine learning techniques. Various factors such as age, account balance, account duration, etc. patterns can be learned and predicted by these classification machine learning models.

Four data modeling techniques Decision Tree model, Naive Bayes model, Logistic regression model, Neural Network model are developed using Rapid Miner (RM) to predict which customers will subscribe to term deposit investment policies.

Evaluation of these models are done in this article based on the performance metrics such as accuracy, precision, recall, error rate, false positive rate. Based on evaluation results, this project concludes the best model to solve this business problem of predicting the customers who can subscribe to term deposit investments.

KEYWORDS: Machine Learning, Forecasting Investment, Data Mining, Banking domain

I. INTRODUCTION

In today's world, almost all the banks are computerized and maintaining their own customer database. So, large amount of data is in-house with the banks and only need is to sort out different types of customers to be contacted for different types of products.

An investment in cash held at a financial institution is called a term deposit. The bank uses a variety of outreach strategies, including email marketing, digital marketing, telemarketing, and commercials, to pitch term deposits to its clientele. Campaigns for telephone marketing are still among the best ways to connect with consumers. The consumers who are most likely to convert must be identified in advance so that calls to them can be tailored. The information relates to a Portuguese banking institution's phone-based direct marketing activities.

The action plan is to download the dataset from kaggle.com, understand the data, data cleanup by removing outliers, applying the machine learning techniques and developing four prediction data models, evaluate the models based on performance measures and achieve the most accurate model to predict the most likely customers who will subscribe in term deposit product.

Dataset used is from www.kaggle.com (Moro, et al., 2011). It contains 45,211 records in bank-fulldata.csv with 16 attributes and 1 target attribute and no missing attributes. This dataset's information is derived from phone calls conducted for a Portuguese financial institution's direct marketing efforts in order to determine whether or not bank term deposits will be subscribed to.

Split data functionality of 9:1 ratio is used in this project. While analyzing and understanding the data based on the categories, it's identified as few attributes are account related, few attribute are customer related and contact related attributes. Based on the customer information and account balance and related information, data mining easily helps to identify the pattern who will subscribe for term deposit.

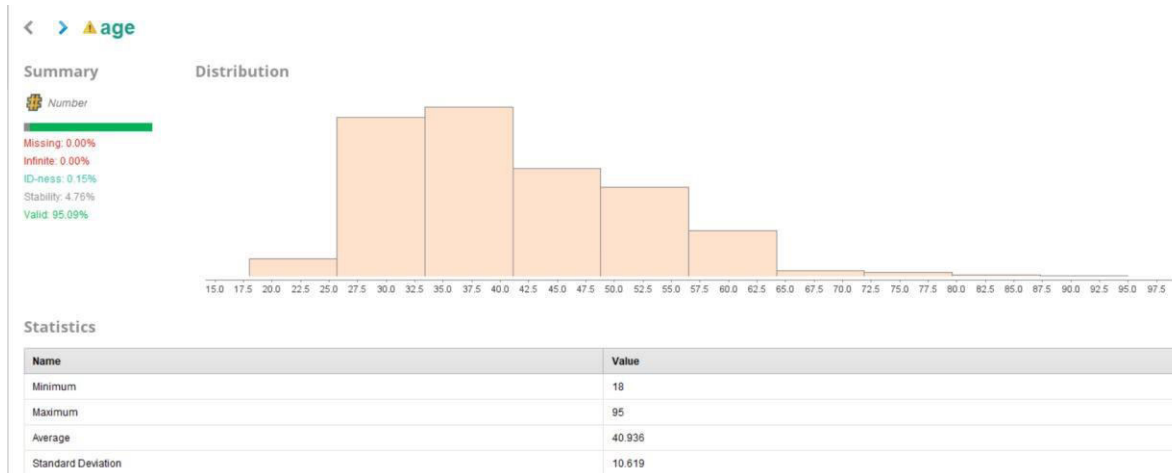
II. DATA PREPARATION

Dataset has 16 regular attributes and 1 target attribute. The target attribute Y is changed to binomial since it's going to be predictable one as yes or no. The attribute pdays is the number of days that passed after the customer

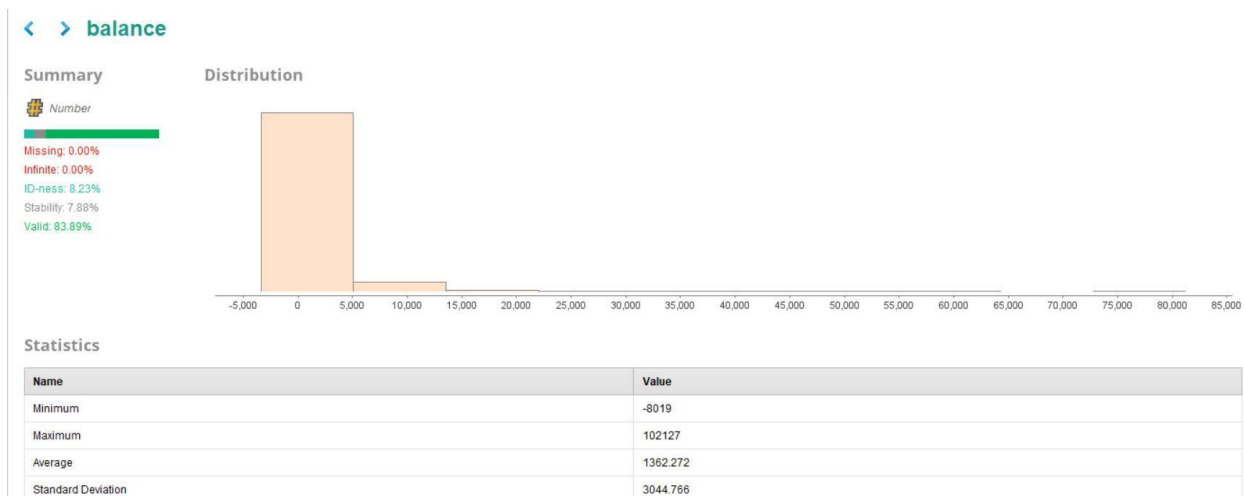


was last time contacted from the previous campaign. If the customer was not contacted, the value is -1. Hence pdays was transformed to a binary variable, pcontact with values yes for contacted and no for not contacted.

Descriptive statistics analysis is done in RM as shown below to check the statistics of each attribute in the data set – min, max, average and standard deviation as shown below for age, balance, and duration. Missing values and outliers are also checked as well using this descriptive statistics analysis.



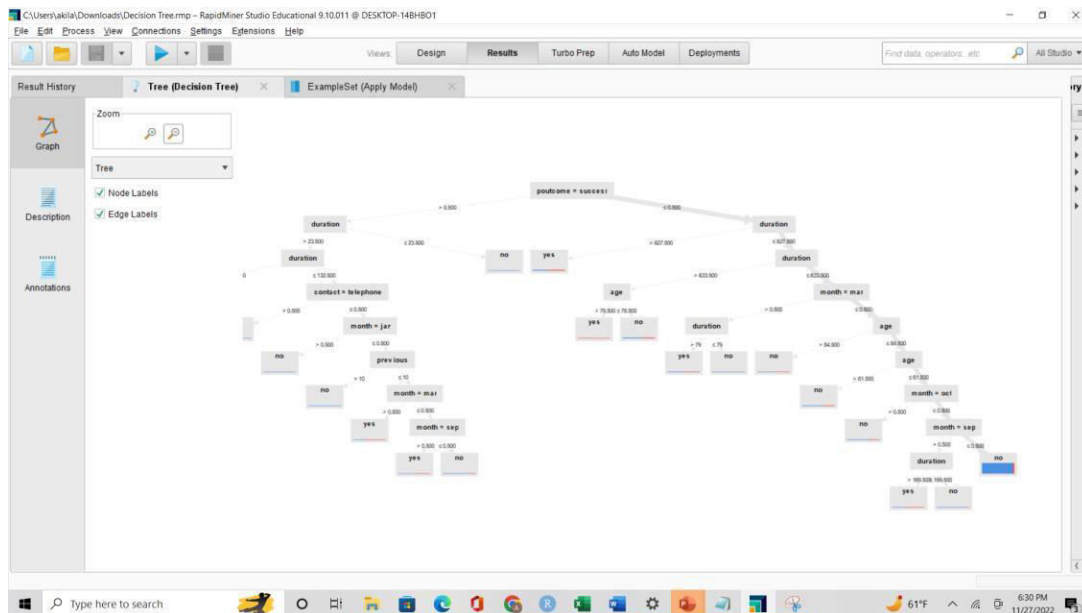
The minimum balance is -8019 and maximum balance is 102,127. The average balance is 1362.28 and standard deviation for balance is 3,044.77 as shown in the figure below. Hence, we need to remove the outliers in this. 1469 records are removed from the dataset and hence dataset is reduced to 43,742 records.



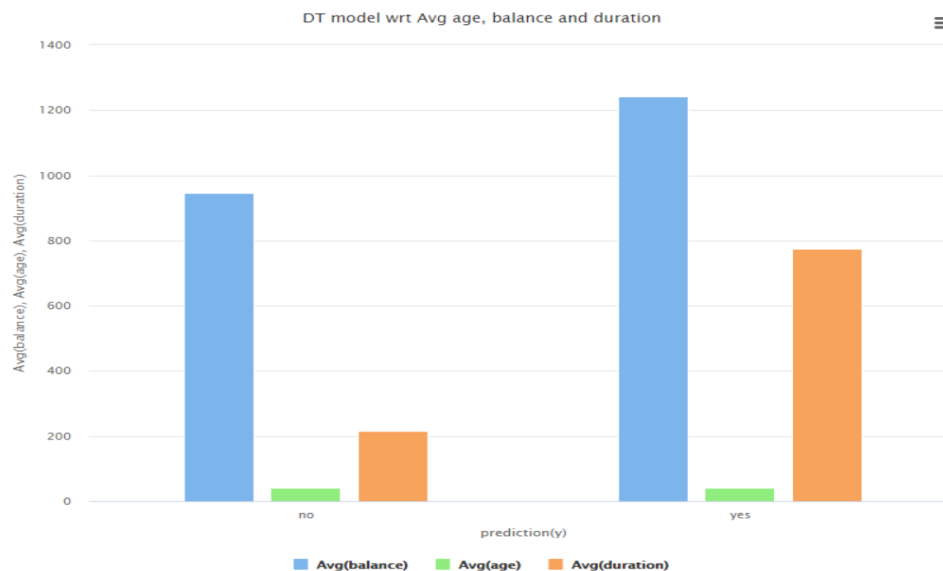
III.DECISION TREE (DT) MODEL

Below is the decision tree graph from the RM process. The target variable is set to Y as label and split data operator is used to split ratio of 9:1 to do the prediction. DT model predicts that 506 customers will say yes to subscribe for term deposit product and 3868 customers will say NO to subscribe in term deposit. In R its 3963 customers are predicted to say NO and 412 customers are predicted to say YES.

The performance measures are also measured for this DT model as shown below in confusion matrix. This model is 90.26% accurate and pretty good prediction results are achieved.

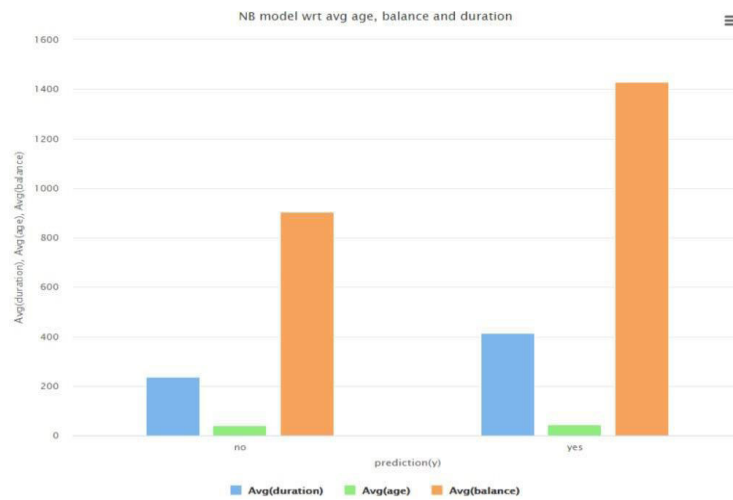


DT model bar chart with respect to average age, balance and duration are shown since these are the most influencing attributes.



NAÏVE BAYES (NB) MODEL

Two assumptions for Naïve Bayes model are attributes are equally important and attributes are independent. Similar to other models Split data of 9:1 functionality is used for this model and below is the stats, distribution and accuracy of NB model predicts 3818 NO and 556 YES for subscribing term deposit. Confidence of YES and NO are also shown in stats below.



accuracy: 86.42%

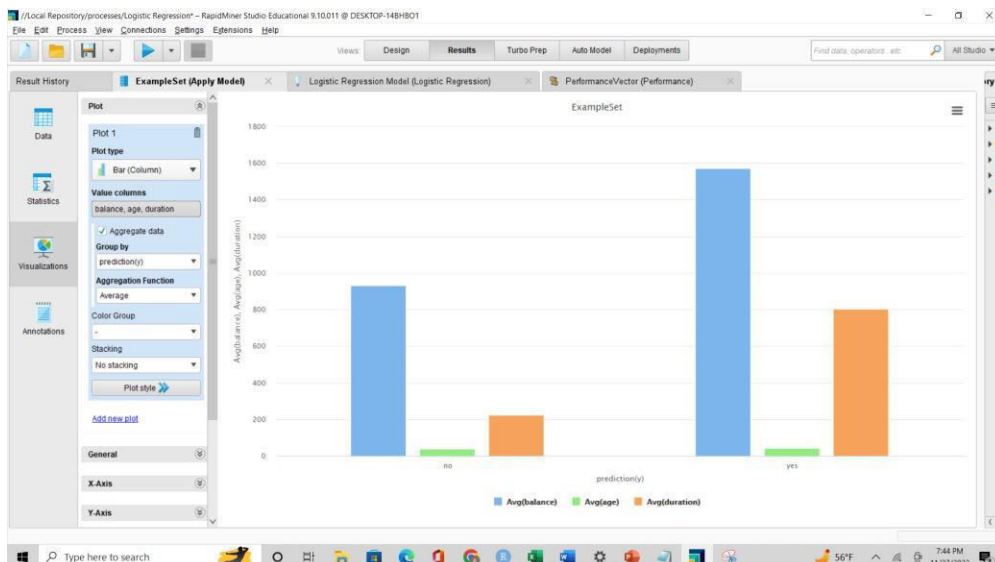
	true no	true yes	class precision
pred. no	3546	272	92.88%
pred. yes	322	234	42.09%
class recall	91.68%	46.25%	

LOGISTIC REGRESSION (LR) MODEL

Logistic regression model predicts that 4114 will say NO and 260 says YES to subscribe term deposit product. LR model mainly works on binomial target attribute. LR model stats, accuracy and bar chart wrt average age, balance and duration are shown below. The confidence NO value is 0.886 and confidence Y value is 0.114 average.

accuracy: 90.67%

	true no	true yes	class precision
pred. no	3787	327	92.05%
pred. yes	81	179	68.85%
class recall	97.91%	35.38%	



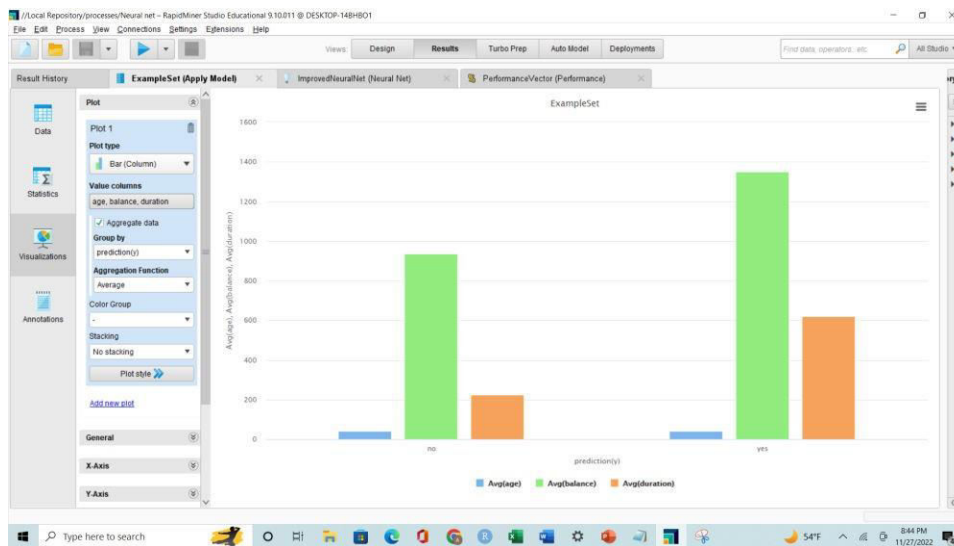


NEURAL NETWORK (NN) MODEL

RM Neural net model for 90:10 ratio split data provides the results as shown that prediction of NO for term deposit is 4012 and YES for term deposit is 362. Seed is set to 1000 and maximum iterations are set to 1000 and hidden layers as 2 as well. Confidence of Yes is 0.104 and confidence of NO is 0.896 as shown below.

accuracy: 89.71%

	true no	true yes	class precision
pred. no	3715	297	92.60%
pred. yes	153	209	57.73%
class recall	96.04%	41.30%	



EVALUATION OF ALL FOUR MODELS

Confusion matrix is created for each model to evaluate the performance measures such as accuracy, precision, recall, error rate and false positive rate.

		PREDICTED CLASS	
		Class=Yes	Class=No
ACTUAL CLASS	Class=Yes	True Positives (a)	False Negatives (b)
	Class=No	False Positives (c)	True Negatives (d)

$$\text{Accuracy} = \frac{a + d}{a + b + c + d} = \frac{TP + TN}{TP + FN + FP + TN}$$

Precision is exactness and its percentage of tuples that the classifier labelled as positive are actually Positive Precision= TP/TP+FP.

Recall is completeness and its percentage of tuples that the classifier labels as positive Precision = TP/TP+FN F measure is harmonic mean of precision and recall.



Confusion Matrix for four models in RM -

	DT Model		NB Model		LR Model		NN model	
	No	Yes	No	Yes	No	Yes	No	Yes
No	3743	301	3546	272	3787	327	3715	297
Yes	125	205	322	234	81	179	153	209

Performance measures for four models in RM is shown below -

Models	Accuracy	Precision	Recall	Error rate	F-Measure
Decision Tree	90.26%	62.20%	40.51%	9.74%	49.29
Naive Bayes	86.42%	42.09%	46.25%	12.58%	44.07
Logistic Regression	90.67%	68.85%	35.38%	9.33%	46.74
Neural Network	89.71%	57.73%	41.30%	10.17%	49.00%

CONCLUSION

From the above confusion matrix for all 4 models, we can calculate these statistical performance measures as shown below.

- In general all models are performing better more than 75%. Three models DT, LR and NN are having better accuracy of more than 90%. NB model has less accuracy of 86.42%.
- Error rate (1 - accuracy) and are almost same for three models except NB model. From these, we can conclude NB is the worst model for this dataset.
- Based on other measures, Logistic regression model has better sensitivity (true positive) or precision of 68.85% and recall compared to other models.
- Second best model is the Decision Tree model having good precision of 62.2%.

REFERENCES

- [1] Moro, S., Cortez, P., & Rita, P. Using customer lifetime value and neural networks to improve the prediction of bank deposit subscription in telemarketing campaigns. *Neural Computing and Applications* (2015)
- [2] İnci Batmaz, Seza Danişoğlu, Ceyda Yazıcı, Elçin Kartal-Koç A data mining application to deposit pricing: Main determinants and prediction models] Elsevier - Applied Soft Computing (2017)
- [3] Khan, M. Z., Munquad, S., & Rao, T. S. M. (2022). A Study on Improving Banking Process for Predicting Prospective Customers of Term Deposits using Explainable Machine Learning Models. *Proceeding of International Conference on Computational Science and Applications* (pp. 93–103). Springer Nature.
- [4] Ajay Ram, B., santosh Kumar, D. J., & Lakshmanarao, A. (2022). Improving Efficiency of Machine Learning Model for Bank Customer Data Using Genetic Algorithm Approach. In A. Khanna, D. Gupta, S. Bhattacharyya, A. E. Hassanien, S. Anand, & A. Jaiswal (Eds.), *International Conference on Innovative Computing and Communications* (pp. 649–657)
- [5] Andrii Kaminskyi, Maryna Nehrey and Larysa Zomchak, Machine learning methods application for consumer banking, 9th International Conference on Monitoring, Modeling & Management of Emergent Economy, (2021)
- [6] Gautam, Nidhi, Applications of AI and Machine Learning in Banking Solutions. *Grenze International Journal of Engineering & Technology* (2021)
- [7] Bank Term Deposit Predictions. (n.d.). [dataset]. Retrieved December 14, 2023, from <https://www.kaggle.com/datasets/thedevastator/bank-term-deposit-predictions>
- [8] Ahmed Mohamed Zaki, Nima Khodadadi, Wei Hong Lim, S. K. Towfek, Predictive Analytics and Machine Learning in Direct Marketing for Anticipating Bank Term Deposit Subscriptions, *American Journal of Business and Operations Research* (2024)



- [9] Hosseini, S. (2021). A decision support system based on machined learned Bayesian network for predicting successful direct sales marketing. Journal of Management Analytics
- [10] Feng, Y., Yin, Y., Wang, D., & Dhamotharan, L. (2022). A dynamic ensemble selection method for bank telemarketing sales prediction. Journal of Business Research



Influence of Digital Technologies on Evolution of Mutual Funds Productiveness: An Influence Exploration

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ABSTRACT: The study main aim is to evaluate the effect of rapid changes in financial technologies and their impact on the financial services industry of India. An evocative study has been made on the implementation of financial technologies in modern-day financial services Industries. We have discussed the effects of the financial technologies on the existing financial system of India, the threats and challenges faced by the regulators in regulating the novel disruptive technologies. We also discussed the potential threats, challenges and future prospects of upcoming technologies in the Indian mutual fund industry. AUM (assets under management) has increased significantly recently. Additionally, back-office access has been improved even from remote locations, improving the customer experience.. In addition, the paper has also discussed the challenges faced by the regulators. In conclusion, this article contributes to the building of knowledge and understanding about financial technology and its impact on the financial industry, challenges, and future prospects.

KEYWORDS: Financial Technologies, Mutual Funds, Artificial Intelligence, Machine Learning, Crowd Funding, etc

I.INTRODUCTION

A Common Support could be a belief that pools the investment funds of a number of investors who share a common money related objective. The money collected is contributed in capital advertise disobedient such as offers, debentures etc. The pay earned through these ventures and the capital appreciation realized are shared by its unit holders. The pay earned is shared in extent to the number of units possessed by them. It is most appropriate speculation for the common man because it offers an opportunity to contribute in a expanded, professionally overseen bushel of securities at a moderately low cost.

Emergence of Mutual: Development of Shared Fund in India Shared stores in India started in 1964 Unit Believe of India UTI was the primary MF company Remains the showcase pioneer indeed nowadays , Having almost 68 of the showcase share Misplaced imposing business model in 1987. With section of open segment shared stores Advanced by open segment banks and protections companies. Industry was open to remote educate in 1993

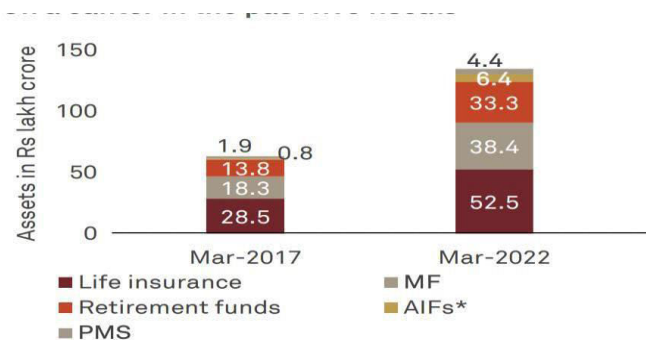
Trends of Mutual Funds in India

In 1963, back serve Shri T. Krishnaswami gave the thought of common stores. The origin of common fund industry in India is with the presentation of the concept of shared support by UTI within the year 1963. The primary plot propelled by UTI was Unit Plot in 1964. At the conclusion of 1988 UTI had Rs.6, 700 crores of resources beneath management.

II.OVERVIEW OF THE INDIAN MUTUAL FUND INDUSTRY

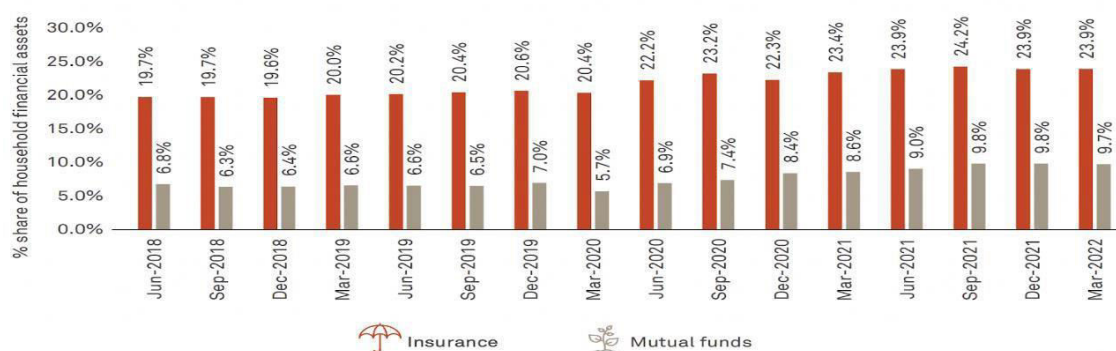
The resource management industry in India is encountering brisk development in resources beneath administration driven by financialisation and desires for advance infiltration into an undiscovered developing populace. The article points to supply an outline of the industry highlighting key trends.

A Crisil report included protections and benefits resources in its estimation, measuring the industry s AUM to be INR 135 trillion rupees 1687.5 billion as at Walk 2022. The report credited the critical growth to three major patterns the expanding utilization of computerized stages, a rise in investors hazard craving, and the accessibility of counselling services.



These patterns have moreover contributed to the eminent increment within the share of grown-ups with bank accounts, which rose from 53 to 78 between 2016 and 2021, which in turn resulted in higher family investment funds and expanded speculations in capital advertise items such as shared reserves from 7 in 2018 to 10 in 2022.

More household money flowing into the capital markets



Source: The RBI's outstanding position of financial assets and liabilities of households

The mutual fund segment AUM stood at 38.4 trillion rupees (~\$480 billion) in April 2022, increasing to 41.53 trillion rupees (~\$519.13 billion) as of March, 2023.

III.INDUSTRY DIVIDED ON WHETHER THIS CONSTITUTES BETTER THAN AVERAGE ENTRANCE RATES

The entrance rates within the shared finance industry are a subject of wrangle about, with two differentiating contentions. The well-known view is that the industry remains to a great extent undiscovered. The entire number of folios accounts is 14.57 crores 145.7 million. Based on an AMFI report, the biggest share of folios is made up of retail speculators.

Financial Advances FinTech is forming the longer term of the budgetary administrations industry. With expanded digitalization, the monetary administrations industry has ended up more effective , and exceedingly profitable , and is competent of quickening the economy to the another level.

Disruptive innovations are dependable for exceptional changes in different businesses. It has changed the confront of the world, each time a modern inventive innovation is presented , it leads to the passing of existing items , or it may lead to a amazing alter within the way existing industry works . Agreeing to PWC report, unused innovations like mechanical autonomy, enormous information, virtual reality, counterfeit insights, and piece chain have the potential to affect businesses over the world, and asset management companies will witness a troublesome alter within the way it right now works.

Asset Administration Companies AMC have begun actualizing it in their enquiry about, showcasing, and operations. They have seen the advantage of early adaption, but still, a part is beneath advance, which can alter the complete operations of the common support house.

IV.OBJECTIVES OF THE STUDY

To investigate the Impact of computerized innovations on the advancement of common stores. Advances like Enormous Information, Counterfeit Insights, block chain instruments, robot advisors, etc, can indeed alter the way monetary markets are working presently. The point is to discover out the effect of alter, and its future suggestions. The destinations of the ponder are as follows

- To look at the rise of innovation within the mutual reserves industry



- To determine the effect of innovation on common stores and money related markets
- To investigate the suggestions of manufactured insights for budgetary stability

V.LITERATURE REVIEW

Abdullah et al. (2008) conducted a regression analysis on the mindfulness and selection of Fintech in common reserves in Malaysia. They found out in their enquiry about that there's no noteworthy relationship between age and execution hope, effort expectancy, social impact, and encouraging conditions. Concurring to their investigation, the execution variable was the most model for shared reserves determination among financial specialists. One of their discoveries appear that great instruction profile tend to use innovation applications in web managing an account and common funds ventures.

Alexandra Andhov (2018) came up with a conclusion in his investigate that monetary innovation is still at an awfully nascent stage, much of the scope for progression depends on the change of the capacity of computers, shrewdly calculations, accessibility of enormous information capacity conceivable outcomes. It has been intense for EU to make an environment of believe for the speculators, where they might be active irrespective of the country of root.

Prasada Rao et al. (2018) in their enquiry about accept that Blockchain innovation can offer assistance all the partners within the shared reserves industry with its straight forwardness, decentralization, tamper resistance, responsibility and security. With expanded straight forwardness, the certainty level among the financial specialists will increment, too it'll lead to expanded productivity of work, with lesser paper work through digitalization.

Daniel O'Keefe et al. (2016) from KPMG studied fifteen hundred bank clients approximately their mindfulness of and intrigued in computerized riches administration. Their revelation was astonishing, mindfulness almost robo advisory was 8 to 15 percent, but it was similarly bewildering that 51.8 of the financial specialists were mindful of brilliantly portfolio administration, and 48 of the financial specialists were mindful of Individual Advisor Administrations.

David Lee Kuo 2015 the effect of different inner and outside components influencing victory of unused fintech companies. They concluded that in today's world, network plays an awfully imperative part. Clients need more customized, helpful and secured speculation choices. Monetary educate nowadays interface more with the clients through their phones, computers and social media, than in physical. Network Consideration must be the new need for the businesses to have an economic development within the future.

Carbo-Valverde (2017) in his article "The effect on Digitalisation on Managing an account and Money related Stability. With modern inventive money related advances, it would be troublesome to direct and oversee the innovations. A vital challenge is ensuring adequate control over the unused money related players. In any case, he too highlighted that Fintech may well be utilized as an opportunity to diminish negligible costs and increment productivity in money related administrations. Unused work creation, modern abilities will be required in monetary administrations sector.

Anna Omarini (2017), has concluded in her inquire about that not as it were the innovation itself would be disruptor, but the firms executing these up and coming advances have an effect on how they execute these unused advances will cause disturbance within the market.

Vijaya Kittu Manda (2018), centered on the utilize of block chain mechanism for operations of shared finance industry. Block chain can prepare for NAV calculations on a real time premise, which can in turn spare time and printed material. Recoveries may be processed on a real time premise, as all the data they require seem take information as and when they need from the blockchain. He is positive thinker that execution of block chain will have a really positive affect within the evolution of digitalization and robotization of common stores industry.

VI.RECENT PATTERNS IN DEVELOPMENT OF COMMON SUPPORT INDUSTRY IN INDIA

Mutual reserves in India begun with the arrangement of Unit Believe of India UTI by the activity of Government of India and Save Bank of India, within the year 1963. It was shaped by an Act of Parliament by Save Bank of India, and RBI was the regulatory and administrative specialist of UTI. Shared finance Industry in and around the world is seeing a robust and exceptional development over the final decade or so. With the adjustment and execution of unused innovation, money related administrations industry has appeared amazing acknowledgment and have overseen to reach the corners of the world. With expanded straightforwardness and get to data, speculators have appeared more certainty within the monetary markets.

VI.HYPOTHESES TESTING

The study was conducted by putting forward the two hypotheses as follows:

H01: There is no significant difference between perceptions on improved trust on AMCs because of digitization among stakeholder category



H02: There is no relation between access to information and perceived safety for online MF transactions of investors due to digitization

VILATA ANALYSIS AND INTERPRETATIONS

The reactions collected were coded and arranged as takes after to draw significant conclusions

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
1. Digitization has facilitated the ease of compliance; for e.g. e-KYC	3.75	5.00	4.75	4.40

Interpretation: Compliance has been a key motivation for the Government and the changed versions and groups have bothered financial specialists and the related partners alike. In such a situation, digitization of the forms has been a welcome help for most of the common support partners. But inside the three categories of respondents, the Resource Administration Companies have not been excessively hopeful in their reactions. But still there's understanding that digitization has encouraged the ease of compliance.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
2. Digitization has enabled enhanced transparency in the mutual fund industry	3.75	4.50	4.50	4.20

Interpretation: Where on a total level there's a common agreement that Digitization has empowered upgraded straightforwardness within the shared support industry, the Resource Management Companies are not too positive. A reason for a quieted reaction from the AMC may well be that for more than a decade, there has been gigantic amount of divulgements that has been commanded by SEBI for AMCs. But still, the undercurrent remains positive and broadly there's an understanding that transparency has improved.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
3. Digitization has led to greater investor trust on AMCs.	3.25	4.00	4.00	3.70

Interpretation: Digitization, per se has not been as well instrumental in creating the belief of speculators and potential speculators. Believe has been created by the solid execution of shared reserves and the word of mouth exposure that goes with it. This industry is impossible to miss within the sense that financial specialists purchase trust and nothing else. Subsequently, believe plays a significant part and the layman investor predominantly accepts in his advisor or maybe than the framework that controls the shared support industry.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
4. There is a substantial rise in mutual fund investments from rural and remote areas via the digital platform.	2.50	4.00	4.50	3.60

Interpretation: For a nation like India, participation of the rustic population is fundamentally to the victory of any item or benefit. Shared stores are no distinctive. Interests, where the AMC isn't in assertion, Advisors who really source the venture are positive approximately the commitment from rustic India. The consider was based in Nagpur, which is an urban middle. Conceivably the AMCs did not get a parcel of provincial venture and in this way are not as well positive approximately the commitment from provincial India.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
5. Digitization has facilitated easy access to knowledge and information.	4.50	4.50	4.75	4.60

Interpretation: Access to information and data goes a long way in building the bolster and foundation for a flourishing industry particularly a knowledge based industry like shared reserves. Digitization has played an indispensably part within the dissemination of data which as well in an locks in way driving to more prominent information and data approximately the improvements within the shared finance industry and capital markets.



Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
6. Digitization has helped in reducing the number of complaints from investors	3.00	4.00	3.75	3.50

Interpretation: AMCs are not one or the other in agreement nor contradiction. A reason for the same is that the industry is in its developing stage and however to develop. Modern financial specialists are not as well acquainted with the working of the shared stores and in this way complaints. On the other hand, coordinate contributing is additionally on the rise due to SEBI order which implied lesser cost for no stack coordinate investors.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
7. Digitization has enabled efficient processing of transactions in terms of accuracy and speed.	4.50	4.50	4.75	4.60

Interpretation: Almost a decade ago, most of the transaction went through the manual processing mode; i.e. a human entered the data in the system. Obviously a human error cannot be ignored. With online investing and linking of bank accounts and investments with AADHAR a good number of transactions are executed without any error. Most of the respondents across categories agree that digitization has enabled efficient processing of transactions in terms of accuracy and speed.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
8. Digitization has helped in customizing the services as per the needs of different investors.	3.50	4.50	4.25	4.00

Interpretation: Meeting client needs could be a challenge for each business as the clients are different and one of a kind. Be that as it may, innovative improvements with the assistance of information analytics have been enormously accommodating in serving the clients superior. A better degree of understanding has been watched among the wholesalers who have been a genuine recipient of digitization. The wholesalers feel that they are presently able to convey distant better a much better a higher a stronger an improved an improved benefit to their clients as innovation bolsters them in a enormous way. Financial specialists moreover concur that digitization has made a difference in getting customized services.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
9. Digitization has facilitated faster updates regarding the developments in the industry and economy.	4.25	4.50	5.00	4.60

Interpretation: A normal good thing about digitization have to be quicker overhauls with respect to the advancements within the industry and economy. It has been pushed prior that shared support could be a portion of the information industry where timely information is vital to predominant returns. AMCs, Advisors and Financial specialists have communicated tall to exceptionally tall degree of assertion that they get speedier upgrades with respect to the improvements within the industry and economy.

Interpretation: A natural benefit of digitization ought to be faster updates regarding the developments in the industry and economy. It has been stressed earlier that mutual fund is a part of the knowledge industry where timely information is crucial to superior returns. AMCs, Advisors and Investors have expressed high to very high degree of agreement that they get faster updates regarding the developments in the industry and economy.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
10. Digitization has led to reduced response time to Investors, Regulators and AMCs / RTAs.	4.50	5.00	4.50	4.60



Interpretation: There are a few benefit demands within the shared support trade. Non receipt of profit and recovery continues, non-receipt of total brokerage, other overhauls with respect to valuations, compliance prerequisites from SEBI, etc. Digitization has engaged particular partners to induce their wanted piece of overhaul. For occurrence, speculators can create their articulation of speculation for any given period or assess explanations for a given period by getting to www.camsonline.com. It is in this way that all the respondent categories have concurred to the address statement.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
11. Online Mutual Fund investments are safe	3.25	3.00	4.50	3.70

Interpretation: It is astounding to discover that in spite of the common assertion on the benefits of digitization, AMCs and Advisors who are evidently more educated than speculators are undecided almost online common finance contributing being secure. In any case, it is empowering to discover that lion's share of financial specialists concur that online shared finance contributing is secure. As a analyst, it is point worth saying that share exchanging has been on the online stage for nearly two decades presently and there aren't any noteworthy complaints of fakes or fumble. The benefits of the same ought to be passed on to common contributing as well.

Question Statement and Mean Values:	AMC	Advisors	Investors	Overall Average
12. Cyber security infrastructure in India is capable of detecting any fraud in digital investments.	3.00	2.50	2.50	2.70

Interpretation: In common, there has been a net need of certainty on the legitimate framework in India. Cyber security foundation has been no special case to this need of certainty. As it were the AMCs have not clarified their position. But Advisors, as well as Speculators, oppose this idea on the capability of identifying fakes within the show Cyber Security foundation in India.

VIII.SUMMARY

The interpretations and comes about of theories testing are learning for AMCs in particular. If they need to induce ahead with the growth and need to coordinate the execution of other creating and created economies at same point of time, they must make utilize of digitization openings. Believe and knowledge issues must be targeted collectively. Basically saying ok isn't sufficient. The full item and promoting blend must be restored within the setting of digitalization. As you get more benefits and administrations on app based exchanges, a similar approach ought to be connected here as well for app based or online investments. One of the focal points can be extra charge benefits for digitized exchanges. After all advanced exchanges cruel more straight forwardness, more spread, and optimization of financial resources.

REFERENCES

1. <https://www.crisil.com/content/dam/crisil/our-analysis/reports/Research/documents/2022/12/the-big-shift-in-financialisation.pdf>
2. <https://www.moneymangementindia.net/asset-management-industry-profits/>
3. <https://www.amfiindia.com/research-information/other-data/industry-data-analysis>
4. Allas, T., et al. (2018) Artificial intelligence is getting ready for business, but are businesses
5. ready for AI? In: Analytics comes of age [online]. McKinsey & Company. Available at:
6. [https://www.mckinsey.com/Analytics comes of age](https://www.mckinsey.com/Analytics%20comes%20of%20age). [Accessed: 2019-08-17].
7. Brigham, E. F. & Ehrhardt M.C. (2011) Financial management: theory and practice. 13th ed.
8. Mason: South-Western Cengage Learning.
9. Brummer, C. and Yadav, Y. (2019) Fintech and the Innovation Trilemma [online]. Georgetown
10. Law Journal 107 (235). Available at: <https://georgetownlawjournal.org/articles/298/fintech-andthe-innovation-trilemma>. [Accessed: 2019-08-28].
11. CGI & IBM (2018) Artificial Intelligence in Finance: Current state, challenges and
12. opportunities in Finland. [online] Available at: https://tekoalymentorit.fi/wpcontent/uploads/sites/41/2018/10/final_artificial_intelligence_in_finance.pdf. [Accessed: 2019-08-05].
13. Croatian Financial Services Supervisory Agency HANFA (2019) FinTech [online]. Available at:
14. <https://www.hanfa.hr/fintech1>. [Accessed: 2019-08-28].
15. De Haan, J., Oosterloo, S. & Schoemaker, D. (2012) Financial Markets and Institutions: A



16. European Perspective. 2nd ed. Cambridge: Cambridge University Press.
17. Doshi, S., Kwek, J. & Lai, J. (2019) Global Wealth & Asset Management Practice: Advanced
18. analytics in asset management: Beyond the buzz. McKinsey & Company. [online] Available at:
19. [https://www.mckinsey.com/Advanced analytics in asset management: Beyond the buzz.](https://www.mckinsey.com/Advanced-analytics-in-asset-management-Beyond-the-buzz)
20. FSB, Financial Stability Board – FSB (2017a) Artificial intelligence and machine learning in
21. financial services: Market developments and financial stability implications [online]. Available
22. at: [https://www.fsb.org/2017/11/artificial-intelligence-and-machine-learning-in-financial-service.](https://www.fsb.org/2017/11/artificial-intelligence-and-machine-learning-in-financial-service)
[Accessed: 2019-08-05].
23. He, D., Guo, M., Zhou, J., Guo, V. (2018) The Impact of Artificial Intelligence (AI) on the
24. Financial Job Market. The Boston Consulting Group [online]. Available at:
<http://imagesrc.bcg.com/Images/BCG-CDRF->
25. [The-Impact-of-AI-on-the-Financial-JobMarket_Mar%202018_ENG_tcm9-187843.pdf](http://imagesrc.bcg.com/Images/BCG-CDRF-The-Impact-of-AI-on-the-Financial-JobMarket_Mar%202018_ENG_tcm9-187843.pdf). [Accessed: 2019-08-15]
26. High-Level Expert Group on Artificial Intelligence - HLEG (2019) A Definition of AI: Main
27. Capabilities and Disciplines. European Commission [online]. Available at:
28. <https://ec.europa.eu/digital-single-market/en/news/definition-artificial-intelligence-maincapabilities-and-scientific-disciplines>. [Accessed: 2019-08-08].
29. International Organization of Securities Commissions (IOSCO) (2017) Research Report on
30. Financial Technologies (Fintech) [online]. Available at:
31. <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD554.pdf>. [Accessed on: 2019-08-25].
32. Investment Company Institute (2019) 2019 Investment Company Fact Book. [online] Available
33. <https://www.icifactbook.org/deployedfiles/FactBook/Site%20Properties/pdf/2019/2019>



A Study on Consumer Buying Behaviour Towards Honda Bikes

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ABSTRACT: Although individual consumer purchasing behavior is measured, Customers may be asked to rate their experiences with many aspects of the hotel. Furthermore, the hotel may inquire about general satisfaction "with your stay" in a comprehensive manner. Primary objective is to analyze the consumer buying behavior towards Honda bikes Chennai. Secondary objectives are to study about the customer preference towards Honda bikes know about the various factors influencing the customer to purchase Honda bikes know about level of satisfaction towards Honda bikes identify the competitive advantage of Honda bikes and provide suggestion to improve the sales of Honda bikes in Chennai.

KEYWORDS: Brand identify, consumer behaviour, sales

I.INTRODUCTION

A phrase that is commonly used in marketing, "consumer buying behavior," describes Consumer purchasing behavior is described as "the number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals. In a cutthroat industry where companies vie for clients, consumer purchasing patterns are viewed as a crucial differentiator and are increasingly being considered as important components of corporate strategy.

II.OBJECTIVE OF THE STUDY

- To study about the customer preference towards Honda bikes.
- To be aware of the several elements impacting a customer's decision to buy a Honda motorcycle.
- To know about level of satisfaction towards Honda bikes.
- To identify the competitive advantage of Honda bikes.
- To provide suggestion to improve the sales of Honda bikes, Chennai

III.SCOPE OF THE STUDY

- Study about the influence level of Honda Shine bike on the product .
- Find the new ways to create awareness on Honda bikes .
- Identify the customer perception towards the key features at Honda bikes .

IV.NEED OF THE STUDY

- To analyse the consumer buying behaviour for Honda bikes, Chennai.
- Need to know the performance of Honda bike while using by customer.
- Identify the various customer preferences for bikes .
- Need to improve the level of services for Honda bikes .

V.REVIEW OF LITERATURE

1. "Drivers of customers' cross-buying intentions" (Paul Valentin Ngobo, 2004) European Journal of Marketing, Vol. 38, Issue: 9/10, pp. 1129-1157. The current study looks at what motivates consumers to cross-purchase services. Cross-buying is the practice of a consumer purchasing extra goods and services from their current service provider on top of what they already own. Results from two samples of service consumers show that customers' intentions to cross-buy are mainly related to perceived convenience of doing so and image conflicts regarding the provider's capacity to provide high-quality services from various service activities. The impact of customers' interactions with the service provider on cross-buying is



negligible.

2. "The service-enabled customer experience: a jump start to competitive advantage," Anees Gopalani and Kevin Shick (2011), Journal of Business Strategy, Vol. 32 Issue: 3, pp. 4-12, Goal – These days, practically all manufacturers offer post-purchase assistance. However, these services are normally the same for all product segments offered by a company, and industry-wide warranty terms and product support services are usually the same. Executives think that if they spend money on improving services, other companies will do the same, and eventually customers won't notice any difference or value, leaving the company with increased expenses. As a result, the corporation does not view service operations as strategic. Design, procedure, and strategy – The definition of "service enabled customer experience" is provided in the article. Demand generation, browse and research, configure and quote, shop and transact, fulfill and support, and optimize experience are the six stages of the customer buying process that are analyzed to evaluate the function of services and their effects on advocacy and loyalty. Lessons learnt from establishing Service Enabled Customer Experience (SECE) are presented, along with a case study.

3. The article "Customer loyalty and customer loyalty programs" was published in the Journal of Consumer Marketing in 2003 by Mark D. Uncles, Grahame R. Dowling, and Kathy Hammond. Client loyalty poses a conundrum. Many believe that it is really an attitude-based issue that may be greatly impacted by CRM activities like the rising popularity of loyalty and affinity programs. However, empirical evidence indicates that brand acceptance in a passive manner rather than strongly held attitudes about them shapes loyalty in highly competitive repeat-purchase markets. According to this viewpoint, loyalty programs' ability to increase demand is less than ideal. Examines three distinct viewpoints on loyalty and connects them to a framework that includes customer brand commitment, customer brand acceptability, and customer brand purchasing in order to comprehend customer loyalty.

4. In the latest issue of Services Marketing, Yong-Ki Lee, Sally Y. Kim, Namho Chung, Kwanghoon Ahn, as well as Jong-Won Lee (2016) wrote "When social media met commerce: a model of perceived customer value in group-buying". Vol. 30 Issue: 4, pp.398-410, Goal: The use of social media for social commerce has been growing quickly. Group purchase has emerged as the most popular social commerce approach. Research on consumers' perceptions of value in group purchasing scenarios is scarce. In group buying, this study looks at and analyzes a number of variables that affect perceived consumer value. Design, technique, and approach: Information was gathered via a survey given to clients who had used a group-buying website to acquire a restaurant service package. Partial least squares was the method chosen to estimate the model.

5. Leena Aarikka-Stenroos, Hannu Sakari Makkonen, (2014) "Industrial buyers' use of references, word-of-mouth and reputation in complex buying situation", Journal of Business & Industrial Marketing, Vol. 29 Issue: 4, pp.344-352, The purpose of this article is to explain how the buyer can use client references, word-of-mouth, and reputation to gather experience-based knowledge that is dispersed throughout the business network, thereby streamlining the purchasing process. Design, methodology, and approach: Eight cases consisting of purchasers of technological advancements and knowledge-intensive services are examined in this qualitative study. The literature on buying and purchasing, word-of-mouth, customer references, and reputational information are all cited in the study. Results: The results delineate the distinct functions of referrals, oral communication, peer support systems, and standing. Additionally, they imply that experience-derived data furnishes insights into products, vendors, and the predicament of resolving issues in complex procurement.

Purposes:

A major indicator of consumer loyalty and purchase intentions is their purchasing behavior. Data on consumer purchasing patterns are among the most often gathered measures of market attitudes. They serve two main purposes:

1. The gathering, evaluating, and sharing of this data inside companies conveys to staff members the significance of attending to clients' needs and making sure they are satisfied with the products and services offered by the business.
2. While market share or sales can show how well a company is doing right now, customer satisfaction shows how likely it is that Numerous studies have examined the connection between customer retention and purchasing behavior. Research shows that the consequences of contentment are most strongly.

Measuring the purchasing behavior consumers:

Companies need to target non-clientele while holding onto their existing clientele. Analyzing consumer purchasing patterns can reveal how well a company is doing at supplying goods and/or services to the market. Although individual consumer purchasing behavior is measured, it usually is. Customers may be asked to rate



their experiences with many aspects of the hotel, such as the forth. Furthermore, the hotel may inquire about general satisfaction "with your stay" in a comprehensive manner. Evidence from the growing body of study on consuming experiences indicates that consumers buy goods and services.

Demand predictions for the automotive industries:

The Indian automobile sector has benefited greatly from the economic liberalization agenda. The stock prof in 1991 was 110000 crores, and by 1996, that amount had tripled to 353,000,000. More interpretations can be found after the 11e digits. Indian consumers now have access to a large selection of nearly foreign-class automobiles with cutting-edge safety features and technology.

The need for automobiles will increase in the future with such upbeat estimate, we will likely witness a Dublin of yearly volumes over the next five to six years, from the current 350000 marks (financial year 1996) to somewhere around 600000 to 700000 cars. International automakers view India as a potential source for both vehicles and components, in addition to a market.

The project figures from 2004-05 to 2010-2011 as given below table:

Segment	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Cars	724	796	876	960	1060	1166	1283
Activa	994	1025	1090	1124	1159	1174	1194
Motor cycle	3914	4076	4810	5675	6697	7597	8521
3 wheelers	247	275	305	339	377	419	485
Tractors	195	212	230	249	271	294	319
Mopeds	540	582	626	673	724	780	839

A major beneficiary of the economic liberalization program has been the Indian automobile industry. The number offers stock prof in 1991 – 110000 crores was manufacture in 1996 that figure tripled to 353000. Beyond the numbers 11e further interpretations. Indian now has a wide, near international classes range of cars to choose from replete with advanced technology and safety features. There will be a greater demand for cars in the future. Over the next five to six years, we will probably see a Dublin of annual volumes from the current 350000 marks (financial year 1996) to somewhere near 600000 to 700000 cars with such buoyant projection.

India & components. The automobile industry has already absorbed 8000 crores of investment in the last two years. If analysis projections hold true, that figure is set to rise to Rs.28000 crores, with in next five years, when total vehicle production capacity will be one million cars. The domestic car market in India is shrinking. Although the raw domestic car market in India is shrinking is perceived by international auto major has not just market but as possible sourcing base for both vehicles although the raw domestic car market are expensive, but the domestic manufacture are not capturing on the low labor rates which are here in India i.e., 2,20 per day in compared to \$26 in US, \$30 in Japan an \$18 in Spain. There is a greater scope for Indian automobile companies to capitalize on the opportunity available with in India in the automobile sector especially light motor vehicle segment.

VI.FINDINGS

- Therefore, most of the respondents having own bike.
- Therefore, most of the respondents say they like the bikes displayed in the showroom.
- Therefore, most of the respondents like Honda Shine.
- Therefore, most of the respondents getting knowledge about buying the particular brand bike through friends & family.
- Therefore, most of the respondents preferred Mileage is the reason for selecting the brand.
- Therefore, most of the respondents preferred Finance scheme available is the reason for selecting the purchase point.
- Therefore, most of the respondents preferred T.V is the medium of promotion influenced towards purchase.
- Therefore, most of the respondents agreed that the delivery of the showroom.
- Therefore, most of the respondents preferred speed while purchasing of motorcycle.



j. Therefore, most of the respondents always expected from motorcycle.

VII.SUGGESTION

- └ The dealers can educate the employees about the importance of customer in its company.
- └ The goals of the dealers can be communicated clearly to the workers.
- └ If the client's opinion is met, the business can survive in the project field.
- └ The corporation has the option to alter its communication approach, such as maintaining daily contact with customers, in order to prevent delays in product development.
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- └ The business must inform the public about Honda Shine services it offers and how important they are to them.

VIII.CONCLUSION

The study on consumer buying behaviour was done in formal way since the customer is the important factor to be focused in every organization. The Honda bikes has taken care of these measures well which results in high level of satisfaction. This consumer buying behaviour can make effective employee in the show room and also it helps to make customer developed in all aspects.

REFERENCES

1. Beckett, A., Hower, P. and Howcroft B. (2000), "International Journal of Bank Marketing", 18/1, PP. 15-26.
2. Black, H. A., Robinson, B. L., Schlottmann, A. M. and Schweitzer, R. L., (2003),
3. "Is Race an Important Factor in Bank-Consumer Preferences? The Case of Mortgage Lending", Journal of Real Estate Finance and Economics, 26:1, PP.5-26.
4. Bourassa, S. C., (2000), "Ethnicity, Endogeneity, and Housing Tenure Choice", Journal of Real Estate Finance and Economics, 20:3, PP. 323-341.
5. Boyd, W. L., Leonard, M. and White, C. (1994), "Customer Preferences for financial Services: An Analysis", International Journal of Bank Marketing, Vol. 12, No. 1, PP. 9-15.
6. Breslaw, J., Irvine, I. and Rahman, A., (1996), "Instrument Choice: The Demand for Mortgages in Canada", Journal of Urban Economics, 39, PP. 282-302



A Literature Assessment on Prosthetic Devices with Artificial Intelligence

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ABSTRACT: In the area of intelligence innovation, an artificial intelligence has made tremendous progress. It is attracting interest on a global scale. It is used in every business, including the healthcare sector and automation. In recent years, various medical platforms have seen major changes in arrival of Prostheses. Artificial body parts called prostheses are utilized in the healthcare industry to restore function or appearance of body parts. Individuals who have undergone amputation require prosthetic equipment to perform their routine tasks with as much naturalness as possible. Different varieties of Prostheses are conventional, electric powered, and hybrid. There are numerous prosthetic body parts, including dentures, eyes, palatal obturators, gastric bands, hearts, lungs, and legs. Artificial Intelligence (AI) and the prosthetics business have benefited from technological integration, which is good for people with disabilities. This study scrutinizes various techniques, namely Naive Bayes (NB), Markov Decision Process (MDP), Independent Component Analysis (ICA) and decision trees (DT) in the field of Artificial Intelligence.

KEYWORDS- Prostheses, Amputees, prosthetist, Prosthetic Industry, Artificial Intelligence

I.INTRODUCTION

An artificial tool that restores a lost body part is called a prosthetic device. This absent bodily component may have been lost due to an injury, a medical condition, or a congenital anomaly. It is also referred as prosthetic implant, artificial limbs, and prostheses. Prosthetics are made to make it easier to move around and to improve the person's quality of life. A person's prosthesis should be created and put together taking into account both their aesthetic preferences and practical requirements. There are numerous prosthetic body parts, including dentures, eyes, palatal obturators, gastric bands, hearts, lungs, and legs. The four main components of all prosthetic devices are as follows suspension systems, socket, management systems and terminal devices. A prosthetist, who also works with doctors, surgeons, physical therapists, and occupational therapists, is largely responsible for organizing the rehabilitation of prosthetic amputees.

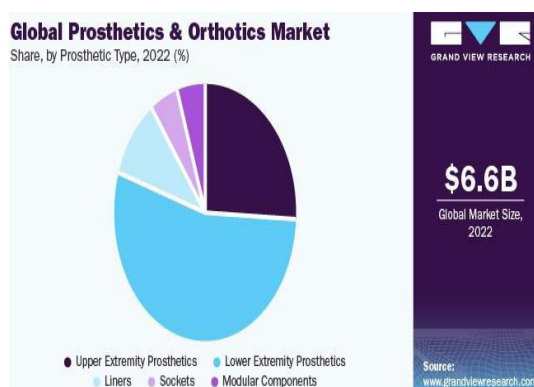


Figure 1: Global Market for Prosthesis

Sports-related injuries affect more than 3.5 million US kids each year, according to a survey from John Hopkins University. During the projection period, sports-related injuries are expected to fuel demand and support market expansion. The global market is anticipated to be driven by the prevalence of sports-related injuries and car accidents, the number of amputations brought on by diabetes, and the rising incidence of osteosarcoma globally. The Universal Prosthesis commerce is look forward to expand at a 4.3% multipart yearly expansion charge since 2023 to 2030, with a total value assessed by Grand View Research to reach 6.6 billion USD in 2022 (Figure 1).



1.1 Types of Prostheses

Prostheses were sorted as 4 categories such as Transhumeral Prostheses, Transradial Prostheses, Tranfemoral Prosthesis and Transtibial Prosthesis and also described in figure2 [3].

- **TRANSHUMERAL PROSTHESES:**

An "AE" or above the elbow prosthesis is the standard term for transhumeral prostheses in the prosthetics industry. It consists of an artificial elbow as well as an artificial lower and upper arm. Transhumeral amputees suffer a lot with the identical difficulties in elbow movement. It triggers an artificial limb to move in the appropriate way.

- **TRANSRADIAL PROSTHESES:**

This particular categorization of prosthetic limb is designed to function as a substitute for a forearm that has undergone amputation below the elbow joint. There are basically two sorts of prosthesis. Cable operated limbs are functioned as fast by a harness. Cable wrapping around the arm's injured shoulder on the other side. Motors and batteries that are integrated into myoelectric prosthesis provide their power. One type of myoelectric prosthesis is myoelectric arms.



Figure 2: Types of Prostheses

- **TRANFEMORAL PROSTHESES:**

The term "AK" or above the knee prosthesis is frequently used in the prosthetics industry to refer to a transfemoral prosthetic limb. It serves as a substitute for a leg lost above the knee. Regaining regular movements can be quite hard for transfemoral amputees. An individual possessing two complete legs typically necessitates 80% more endurance to ambulate compared to an individual with a transfemoral amputation. This is as a result of the knee's complicated range of motion.

- **TRANSTIBIAL PROSTHESES:**

A transtibial prosthetic limb typically referred to in prosthetics treatments as a "BK" or below the knee prosthesis. It is an artificial limb used to substitute a missing lower leg below the knee. The retention of the knee, which makes movement simpler, is a major factor in why transtibial amputees typically recover normal movement more quickly than those with transfemoral amputations.

II.LITERATURE REVIEW

Huda et al. [4] proposed an investigation into the movements of the shoulder joint performed by upper limb amputees of high proficiency. This study utilized EMG and accelerometer readings to classify these movements into seven distinct categories. These categories include elevation, depression, protraction, retraction, superior rotation, and inferior rotation, as shown in Figure 3. The data sets were collected from six subjects with uninjured limbs and four participants with amputations. To obtain dimensional feature vectors, seven separate feature parameters were employed. These parameters include Slope Sign Change (SSC), Zero Crossing (ZC), mean absolute value (MAV), root mean square (RMS), auto regressive (AR), wavelet length (WL), and cardinality. In order to identify the most significant features, dimensionality reduction techniques such as spectral regression (SR) and principal component analysis (PCA) were utilized. The combination of spectral regression dimensionality reduction and LDA classifier yielded a mean classification error rate of 15.68%.

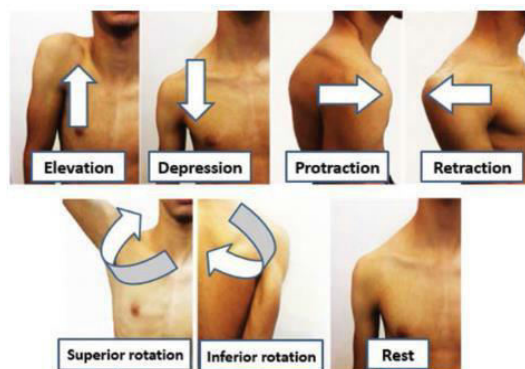


Figure 3: types of shoulder joint movements

Firas et al [5] proposed a study that employed Electromyography (EMG) and Mechanomyography (MMG) readings to classify hand nodes. The study successfully identified seven distinct types of hand gestures, namely Reset, Close, Open, Pinch, Tripod Pinch, Thumb flexion, and Index Flexion, as illustrated in outline 4. The MMG, which refers to the mechanical signal generated by muscle contraction, was utilized to detect muscle vibrations through accelerometers or microphones and sensors. The dataset consisted of six subjects, including four healthy individuals and two trans-radial amputees. Hand movements were categorized using pattern recognition (PR) in both online and offline assessments. The classifier Support Vector Machine (SVM) was utilized to extract the features root mean square (RMS) and wavelet packet transform (WPT) from the signals. The normal accuracy for offline tests was determined to be 88.94%, while for online tests, it was 84.45%.

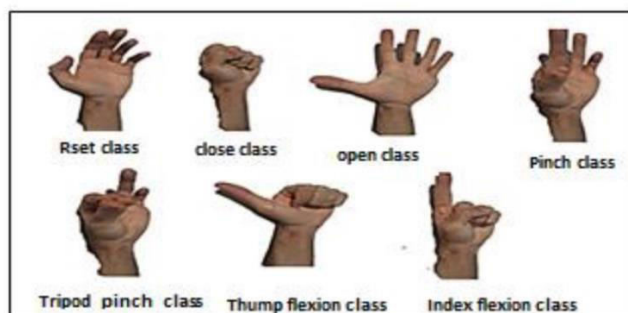


Figure 4: types of hand gestures

Andres et.al [6] proposed a study aimed at assisting prosthetists in inspecting above knee prostheses. Prosthetic alignment is a highly variable and independent practice, and the study utilized two computational models. Computational model 1 predicted the nominal alignment using the land response strength factors of the prosthetic limb, while computational model 2 provided the foot setting angle and socket for achieving the formal alignment. The alignment methodology was trained and validated on sixteen transfemoral amputees, with one formal alignment and four misalignments carried out. Ground response force characteristics for eleven prosthetic limbs were recorded. To estimate the alignment criterion, magnitude, and angle necessary for precise prosthesis alignment, a Gaussian kernel RBF-based support vector machine and a Bayesian NN were employed. The support vector machine-based model accurately identified the titular alignment in 92.6% of cases, while the neural network retrieved 94.11% of the angles required to rectify the prosthesis misalignment with a fitting error of 0.51°.

Triana et.al [7] conducted a study on various models of prosthetic hand development, focusing on three key parameters: the sensor system, the control process, and the type of actuator unit. The objective of the prosthetic hand system is to accurately detect different types of motion, including wrist extension, hand closure, wrist flexion, and hand opening, as depicted in Figure 5. Notably, the EMG signals react more rapidly when the position of the hand changes. In the exploration of prosthetic hand options, the FSR sensor emerges as a viable alternative due to its minimal signal processing requirements. To regulate prosthetic hand movements, machine learning techniques, specifically threshold-based and pattern recognition-based strategies, are employed. The threshold cost is typically set at 20% of the maximum voluntary contraction (MVC), serving as a benchmark for the majority of cases. Additionally, control systems based on pattern recognition, SVM, and ANN consistently demonstrate superior accuracy with minimal computational overhead. An area that requires further expansion in prosthetic hand research is the integration between artificial hands and information systems. This integration enables healthcare professionals to monitor the user's health and conduct remote diagnostic procedures. By

assimilating the prosthetic hand with information systems, physicians can remotely observe the client's condition and provide timely diagnostic assessments. Furthermore, the utilization of deep learning, another machine learning technique, shows promising potential in obtaining EMG signals for prosthetic hand development.

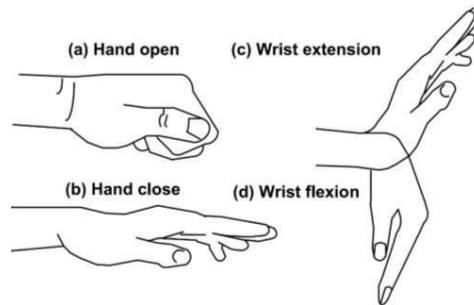


Figure 5: types of hand gestures

Rory et.al [8] proposed a study to investigate the utilization of myoelectric prosthetics with electromyogram (EMG) signals in human users. The examination of EMG signals can be complex due to physiological interference and other variables. To develop effective myoelectric control systems for prostheses, the utilization of artificial neural networks (ANNs) is necessary. ANNs are a computational aptitude and machine learning technique that can provide efficacious tools. The purpose of this study is to examine the effectiveness of four distinct NN structural designs, namely feedforward, recurrent, counter propagation, and self-organizing map, in analyzing EMG signals. The classification of walking pace was conducted using EMG signals obtained from 14 different leg muscles. The results obtained from the table1 dataset demonstrate that self-organizing map neural networks can accurately classify walking pace with an accuracy of over 99%.

Table 1: Average Accuracy of Machine Learning Method

Machine Learning Method	Average Accuracy
Adaptive Neuro Fuzzy Inference System	88.9%
KNN Clustering	91.25%
Fuzzy KNN Clustering	92.5%
Discrete Wavelet Transform	96.67%
Dynamic CPN	97.22%
Backpropogation Neural Net	97.5%
CANFM	98.75%
CCT SOM	99.73%

Sumit et al. [9] conducted a study with the objective of developing myoelectric prosthetic hands for amputees using surface electromyography (sEMG) signals. The researchers utilized the Ninapro database 1 (DB1) to extract sEMG signals and enlisted the participation of 27 healthy volunteers who were instructed to perform 53 hand movements evenly. To reduce dimensionality, various methodologies for feature extraction such as t-distributed Stochastic Neighbour Embedding (t-SNE), Principle Component Analysis (PCA), and Independent Component Analysis (ICA) were employed. To classify the muscular movements, five machine learning (ML) techniques and deep learning artificial neural networks (ANN) were utilized. The ANN exhibited exceptional performance in recognizing both inter-course and intra-course movements, achieving an accuracy of 93.92% and 97.73% respectively, by utilizing preprocessed raw data. This recognition was conducted on 53 muscle motions performed by the 27 subjects. Among the ML techniques, the K-Nearest Neighbours (KNN) algorithm demonstrated the most efficient performance in terms of time, utilizing both t-SNE characteristics and preprocessed rare piece of information. When the KNN algorithm was applied to preprocessed raw data, it achieved an accuracy of 93.174% and 97.458% for inter-track and intra-track movement classification respectively. Furthermore, by integrating t-Distributed Stochastic Neighbor Embedding (t-SNE) features, KNN achieved an accuracy of 89.844% and 95.04% for inter-track and intra-track classification respectively, within a reduced timeframe, as shown in Table 2.



Table 2: Intra Accuracy and Inter Accuracy ML Algorithms

Machine Learning Algorithms	Intra Accuracy	Inter Accuracy
KNN(K=2)	97.458%	93.174%
KNN(K=2)-PCA	94.207%	89.594%
KNN(K=2)-ICA	94.394%	90.437%
KNN(K=2)-t-SNE	95.036%	89.844%

According to Christopher et al [10], the most popular method for gathering biomechanical kinetic data is inverse dynamics via motion capture. In their study, deep learning was employed to construct active structure replicas capable of accurately approximating and predicting prosthetic ankle torque from inverse dynamics, using a simple six input signals. A hyperparameter mathematical programming approach was utilized to automatically select model architectures and learning parameters based on their ability to generate the most precise predictions. Three different deep neural network (DNN) architectures were trained, namely FFN, GRU, and DA-GRU. The effectiveness of these DNN models was evaluated using both Pearson correlation coefficient (PCC) and Root Mean Squared Error (RMSE) metrics. The average RMSE for deep neural networks trained to forecast ankle torques was found to be 0.040.02 Nm/kg, or 2.91.6% of the ankle torque's active range. In comparison, a physically created systematic regression model predicted ankle torques with an RMSE of 0.35 to 0.53 Nm/kg, or 26.6 to 40.9% of the dynamic range of the ankle torque as shown in table 3. Remarkably, deep neural networks were also able to forecast the ankle torque costs half a speed phase in advance, with a mean routine loss of only 1.7% of the ankle torque's active range.

Table 3: RMSE Nm/kg, RMSE% and PCC Comparison

	RMSE Nm/kg		RMSE%		PCC	
	1 sample	20 sample	1 sample	20 sample	1 sample	20 sample
Analytical Regression	0.35	-	26.63	-	0.822	-
FFN	0.04	0.06	2.71	4.301	0.996	0.99
GRU	0.042	0.07	3.17	5.08	0.995	0.99
DA-GRU	0.04	0.06	2.77	4.31	0.996	0.99

Imran et al. [11] have proposed a study that investigates the utilization of the Deep Deterministic Policy Gradient (DDPG) algorithm and the broader Markov Decision Process (MDP) framework for scalable learning in prosthetic arms. The current focus of reinforcement learning primarily revolves around developing jawbone grippers for in-hand treatment, with limited proficiency in individual skills. The approach, as detailed in Table 4, has shown effectiveness in generalizing across various commonplace objects, including cuboids, spheres, ellipsoids, cylinders, cans, and screwdrivers. The study reveals that objects with geometrical characteristics initially have a lower success rate, but after training, their success rate in successful grasping increases to 78%. The algorithm employed for reinforcement learning exhibits compelling performance and promising generalization capabilities across a wide range of everyday objects. Similar techniques are being employed in the development of other medical assistive devices that require human-machine interaction to accomplish specific tasks.

Table 4: Object Grasp hit Rate

Object form	Hit Rate
Cuboid	94
Sphere	87
ellipsoid	71
Cylinder	65
Can	76
Coin	89
Screwdriver	62

Triwiyanto et.al [12] proposed a multi-threaded approach to regulate a prosthetic hand device in the present study. The Raspberry platform's System on Chip (SoC) was utilized to extract embedded time-domain characteristics. Ten healthy individuals participated in this investigation, with two dry electrodes affixed to the wrist flexor and extensor muscles to gather the electromyography (EMG) signal, as shown in Figure 6. The machine learning models' input consisted of four time-domain characteristics. The study scrutinized the k-nearest neighbour (k-NN), Naive Bayes (NB), decision tree (DT), and support vector machine (SVM) machine learning models. The evaluation revealed that the combination of the mean absolute value (MAV) feature and



machine learning DT produced a result with elevated accuracy (98.41%) compared to other combinations, with a computation time of less than one millisecond. The multi-thread implementation significantly impacted the progression era of the mold detection system.

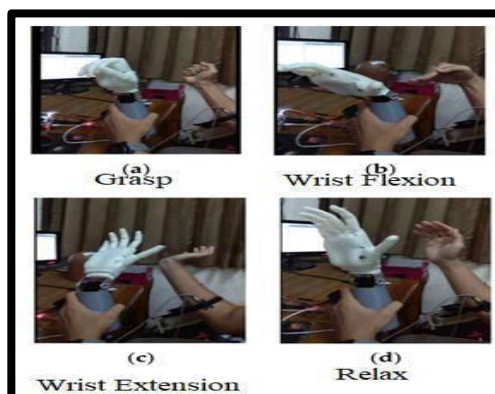


Figure 6: types of hand gestures

Krishan et.al [13] has presented a study aimed at enhancing the arrangement of user-independent and dependent locomotion modes through the utilization of machine learning models. To facilitate the development of subject independent applications, the widely recognized linear discriminant analysis (LDA) technique, commonly employed for subject dependent models, has been implemented. Figure 7 also describes the XGBoost technique, which was utilized to create a model that is independent of the subjects surrounded by 8 people who had transfemoral amputations. An evaluation of the performance of XGBoost in relation to various stairway altitudes and preference positions is conducted. XGBoost, surpassing LDA and NN in performance, offers potential assistance to both subject independent and subject dependent algorithms. The outcome reveals that the performance of both user-dependent and independent replicas can be consistently enhanced by incorporating additional sensors. Different users can become more consistent with their ambulation modes with the aid of a future intent detection system.

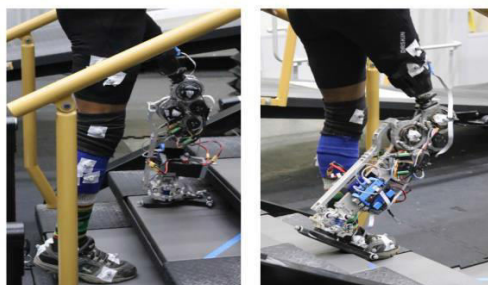


Figure 7: transfemoral amputation

III.CONCLUSION

The most sophisticated and intelligent engineered structure ever made by God is the human being. Prosthesis is a piece of equipment created to either completely or partially replaces a lost bodily component. The substitution of absent or impaired appendages such as hands, legs, joints, or limbs generally necessitates the utilization of prosthetic apparatus. Replicating lost anatomical structure and function of impairments is a tremendously difficult challenge for prosthetists. This paper also converses about tradition of Prosthetic Devices, components of prosthetic devices, Types of Prostheses and varieties of Prostheses. Electromyography (EMG), Mechanomyography (MMG), surface electromyography (sEMG) signals, Ninapro database 1 (DB1) and biomechanical kinetic data are used to examine the performance of Prosthetic Devices. This paper also expounded upon several artificial intelligence techniques, including Independent Component Analysis (ICA), Deep Deterministic Policy Gradient (DDPG), principle Component Analysis (PCA), Bayesian NN and Markov Decision Process (MDP). However, there is now hope for millions of people with disabilities because to advancements in the field of artificial intelligence.

REFERENCES

1. www.hopkinsmedicine.org/health/conditions-and-diseases/sports-injuries/sports-injury-statistics
2. www.grandviewresearch.com
3. www.prostheticclinic.com



4. Huda M. Radha¹, Alia K. Abdul Hassan², Ali H. Al-Timemy³, Classification of Different Shoulder Girdle Motions for Prosthesis Control Using a Time-Domain Feature Extraction Technique, ARO-The Scientific Journal of Koya University, vol. x, 2022, 73-81.
5. Firas Saaduldeen Ahmed¹, Noha Abed-Al-Bary Al-jawady², Control of prosthetic hand by using mechanomyography signals based on support-vector machine classifier, Indonesian Journal of Electrical Engineering and Computer Science, Vol. 23,2021,1180-1187.
6. Andres M. Cardenas, Juliana Uribe, Josep M. Font-Llagunes, Alher M. Hernandez, Jesús A. Plata, Novel computational protocol to support transfemoral prosthetic alignment procedure using machine learning techniques, Elsevier Gait & Posture 102 (2023), 125–131.
7. T. Triwiyanto, Triana Rahmawati, I.P.A. Pawana, L. Lamidi, Torib Hamzah, Andjar Pudji, M. Ridha Mak'ruf, S. LuthfiyahTorib, State-of-the-Art Method in Prosthetic Hand Design: A Review, Journal of Biomimetics, Biomaterials and Biomedical Engineering, Vol. 50, 2021, 15-24.
8. Alayna Kennedy¹ and Rory Lewis², Optimization Of Neural Network Architecture For Biomechanic Classification Tasks With Electromyogram Inputs, International Journal of Artificial Intelligence and Applications (IJAIA), Vol. 7, 2016.
9. Nafe Muhtasim Hye ¹, Umma Hany ¹, Sumit Chakravarty ², Lutfu Akter³, Imtiaz Ahmed ⁴, Artificial Intelligence for sEMG-Based Muscular Movement Recognition for Hand Prosthesis, IEEE Access ,VOLUME 11, 2023.
10. Prasanna, Christopher, Realmuto, Jonathan, Anderson, Anthony, Rombokas, Eric, Klute, Glenn K., Using Deep Learning Models to Predict Prosthetic Ankle Torque, TechRxiv, vol. xx, 2022, 1-11.
11. Alishba Imran¹, William Escobar¹, Dr. Freidoon Barezi¹, Design of an Affordable Prosthetic Arm Equipped with Deep Learning Vision-Based Manipulation.
12. Triwiyanto Triwiyanto ¹, Wahyu Caesarendra ², Mauridhi Hery Purnomo ³, Maciej Sułowicz ⁴, I Dewa Gede Hari Wisana ¹, Dyah Titisari ¹, Lamidi Lamidi ¹ and Rismayani Rismayani ⁵, Embedded Machine Learning Using a Multi-Thread Algorithm on a Raspberry Pi Platform to Improve Prosthetic Hand Performance, Micromachines 2022, 1-16.
13. Krishan Bhakta¹, Jonathan Camargo², Luke Donovan³, Kinsey Herrin⁴ and Aaron Young⁵, Machine Learning Model Comparisons of User Independent & Dependent Intent Recognition Systems for Powered Prostheses, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020, 25-29.



Impact of Artificial Intelligence in Banking clout Customer Involvement

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ABSTRACT: In light of advanced progressions, banks got to create customer encounters that reinforce dependability and believe. To set up a solid advanced banking base, banks must make their forms proficient and quick. The drive of this term paper is to analyze the viability of managing an account capacities on executing Fake Insights to upgrade client engagement and progress client fulfillment. The think about centers on front, center, and back office keeping money forms. To get it the front office client involvement with AI Banking, data has been assembled through a study with respect to the utilization of Chatbots on online keeping money stages. The term paper uncovers keeping money highlights coordinates with AI. Chatbot utilize cases on keeping money stages are positioned based on client involvement. The paper proposes IT Fashion and best hones for the advanced keeping money division. Based on the total picture of AI integration with managing an account operations, advancing Indian banks might center on the foremost well-known utilize cases to draw in clients. A comparison with the highlights created for different banks may give a way for development within the computerized managing an account division. The relationship between Chatbot utilize cases may advantage set up Indian banks to encourage grow commerce.

KEYWORDS: Artificial Intelligence, Digital Banking, Chatbots, Customer Experience

I.INTRODUCTION

Manufactured Insights AI could be a combination of progressed computational innovations in changing degrees of development. A few of these advances have been around for decades whereas others are generally modern. It is in any case an incremental mechanical advancement, in some cases based on ancient advances, which has presently been made conceivable by get to to huge volumes of information and modern capacities in handling these volumes of information.

AI has gotten to be the recreation of human insights forms by machines, especially computer frameworks. Banks can utilize AI to convert the client involvement by empowering frictionless, 24 7 customer service intuitive. Thus, the special reason of AI innovations is to imitate the human brain, basically inside the taking after categories visual recognition, discourse acknowledgment, choice making, and translation.

AI advances lead to expanded customization of administrations to clients and representatives, in this way boosting incomes. Robotization of inside forms increments effectiveness and brings down the by and large fetched. The framework minimizes blunders with made strides asset utilization. This discloses modern openings for progressing managing an account forms through important bits of knowledge.

II.LITERATURE REVIEW

This comprehensive study is conducted with the help of some existing work completed by researchers.

Indriasari, et al, 2019, reconnoitered Manufactured Insights and Enormous Information Analytics have empowered data driven frameworks to serve the customer in distant better a much better a higher a stronger an improved a distant better way. This has driven to an ease of customization for a wide run of highlights, hence improving customer involvement. The experimental consider uncovers banking functions that utilize AI and BDA innovations within the worldwide as well as within the Indonesian managing an account segment. The information collection is accomplished through interviews. Undertaking design is proposed as the finest practice.



Trivedi, 2019, recognized the front end client encounter through Chatbots based on three factors specifically Framework, Data, and Service. Hypothesis testing is carried out to check on the off chance that the relationship between the three quality measurements and client encounter is directed by seen hazard. The discoveries offer assistance banks to set up shopper and brand connections by advertising chatbots that fulfill client prerequisites. The information collection is performed through a study.

Agarwal, 2019, highlights the applications of AI going to to the robotization of keeping money capacities and client engagement. He comes about display and cleverly system for managing an account and money related teach which may progress their trade. The hypothetical ponder is conducted for worldwide banks.

Gallego, et al, 2020 Another hypothetical ponder appears the capability of AI to advance better approaches of interfacing with clients , get it their desires , and alter to strong administrations given by firms to remain ahead of the competition. Moreover, it encourages speedy reactions to client questions over numerous utilize cases. This consider moreover illustrates that appropriate AI innovation appropriation can rethink conventional keeping money strategies. The inquire about centers on MasterCard U.S.A. , Illustrious Bank of Scotland Scotland and Caixa Bank Spain .

Sumathi & Sheela, 2017, A systematic think about proposes a total demonstrate utilizing content mining of social media information based on classification strategies and assumption examination to gage client desires from administrations and money related counsel. It employments NLP Normal dialect preparing for K clustering. The information is collected for worldwide banks.

Belanche, et al, 2019 expressed that to way better get it bot advisors among customers, another observational think about is carried out. The paper centers on North America, Britain and Portugal The speculation is created on the utilization of bot advisor administrations due to individual and socio demographic factors. It is found that clients with the next level of recognition with robots are somewhat more influenced by client utility and demeanor in turn, clients with a decreased level of recognition and clients from Anglo Saxon nations are altogether more affected by subjective standards

Konigstorfer & Thalmann, 2020, A hypothetical ponder clarifies keeping money forms combined with AI Innovation for commercial banks. It is found that with the utilization of AI, banks can decrease credit hazard, upgrade payment security, computerize compliance related operations, and boost the in general trade. The paper talks about AI capabilities encouraging customer acknowledgment by guaranteeing clarity, protection, and appropriate documentation. At last, it proposes a investigate method for behavioral fund.

Sandu & Gide, 2020, illuminated the utilization of Chatbot innovation within the instructive division. To improve client encounter, it is basic to recognize the variables that influence the front office Chatbot interaction with understudies. This quantitative think about employments studies for information collection from higher instruction organizing in India. The discoveries and results advantage the understudies by providing a better learning encounter.

Vaganova, et al, 2019 An article looks at outside countries encounters with both the usage of cutting edge AI innovation within the managing an account industry and underline the need for the Russian managing an account segment to shift to a more imaginative show of operation as before long as conceivable . Moreover, it recognizes ways for the banking industry to experience computerized change.

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Konigstorfer & Thalmann, 2020, A hypothetical ponder clarifies keeping money forms combined with AI



Innovation for commercial banks. It is found that with the utilization of AI, banks can decrease credit chance, improve installment security, computerize compliance related operations, and boost the by and large commerce. The paper examines AI capabilities encouraging buyer acknowledgment by guaranteeing clarity, protection, and appropriate documentation. At last, it proposes a investigate strategy for behavioral back.

III.DELINQUENT REPORT

There are a parcel of banks in India that have coordinates AI with their managing an account capacities. Be that as it may, there are however numerous banks that battle with the thought of moving to such an altar. The thought of this consider is to rehash the require and significance of executing AI in banks by highlighting its part within the front, middle, and back office operations within the bank to improve client encounter and progress commerce .

IV.RESULTS AND DISCUSSION

Implementation and Features of AI for Indian Banks

Features	Indian Banks
chatbot	State bank of India, HDFC Bank, ICICI Bank, Axis Bank, Bank of Baroda, Andhra Bank, kotak Mahindra Bank, Canara Bank, City union Bank, Yes Bank, IndusInd Bank.
Loan processing	Axis Bank, State Bank of India, HDFC Bank, ICICI Bank, YES Bank, Federal Bank, South Indian Bank, Bank of Maharashtra, Central Bank of India, IDFC Bank, IndusInd Bank.
Biometric authentication and e-KYC	State Bank of India, ICICI Bank, Axis Bank, Kotak Mahindra Bank.
Fraud Detection	Punjab National Bank, IDBI Bank, City union Bank
Bulk transaction process	ICICI Bank, Axis Bank, Allahabad Bank, City Union Bank,
Document scrutinizing and digitization	ICICI Bank, Axis Bank, YES Bank, Bank of Baroda.
Risk monitoring	State Bank of India, Axis Bank, IDBI Bank, HDFC Bank
Sentiment analysis	State Bank of India, ICICI Bank, Kotak Mahindra Bank,
CRM	HDFC Bank, IDBI Bank, Allahabad Bank.
Customer segmentation	State bank of India, HDFC Bank
Sales and cross-selling	State Bank of India, HDFC Bank
Credit assessment	State Bank of India
International remittance	ICICI Bank
Business reports	State Bank of India
Wealth management	State Bank of India
Marketing	State Bank of India

V.CUSTOMER EXPERIENCE AND EXPECTATIONS WITH BANKING CHATBOTS IN INDIA

The examination has been carried out to get it the desires of clients with respect to the utilization of Chatbots Virtual Colleagues on the managing an account entrances. The study is conducted for 139 respondents.

Demographics Analysis:

Table - 1		
S.no	Use of digital banking in India by respondents	Percentage
1.	students	56%
2.	Employed	40%
3.	others	04%
Total		100%

Interpretation:

More than 56 of the respondents are understudies locked in in higher thinks about and familiar with computerized managing an account. Around 40 are utilized individuals. Almost 4 of the respondents comprise



of individuals who are either resigned or unemployed.

Usage of Online Banking in India by respondents:

Table - 2		
S.NO	Usage of Online Banking in India by respondents	Percentage
1.	HDFC Bank	19%
2.	ICICI Bank	16%
3.	State Bank of India	13%
4.	Axis Bank	11%
5.	Kotak Mahindra	10%
6.	Standard Chartered Bank	09%
7.	Canara Bank	08%
8.	City Union Bank	08%
9.	Indian bank	06%

Interpretation:

About 19 % of the respondents use online banking of HDFC bank. The majority of respondents use HDFC, ICICI, SBI, or AXIS bank for online banking.

Table - 3					
Use-cases for Chatbot Assistance	5	4	3	2	1
Customer Service	51	50	12	25	1
Loan Decisions	23	41	30	28	17
Financial and Securities Transactions	45	43	14	33	4
Bill Payments	32	36	17	39	15
Reminders about Credit card Transaction patterns	47	39	18	26	9

Ranking of Chatbot Assistance use-cases using Relative Important Index:

Weighted score: This mechanism is applied to quantify the response obtained in Table 4. For Example, as the weightage given to 'Highly required' is 5, its corresponding weighted score for 'Customer Service' is calculated as $(51 \times 5 = 255)$. This calculation process is repeated to obtain the table below:

Table - 4					
Use-cases of Chatbot Assistance for Indian banks by respondents					
Use-cases for Chatbot Assistance	5	4	3	2	1
Customer Service	255	200	36	50	1
Loan Decisions	115	164	90	56	17
Financial and Securities Transactions	225	172	42	66	4
Bill Payments	160	144	51	78	15
Reminders about Credit card Transaction patterns	235	156	54	52	9

Table 5: Weighted scores for Chatbot Assistance use-cases *Calculation of RII:*

Table - 5				
Use-cases for Chatbot Assistance	Total	Total Number (N)	A*N	RII
Customer Service	542	139	695	0.779856
Loan Decisions	442	139	695	0.635971
Financial and Securities Transactions	509	139	695	0.732374
Bill Payments	448	139	695	0.644604
Reminders about Credit card Transaction patterns	506	139	695	0.728058

Calculation of Rank: The use case with the maximum RII is ranked first. From below table, Customer Service is ranked first, while Loan Decisions is ranked fifth.



Table – 6 - Relative Important Index		
Ranking of Chatbot Assistance use-cases using	RII	Ranks
Customer Service	0.7798	1
Financial and Securities Transactions	0.7323	2
Reminders about Credit card Transaction patterns	0.7280	3
Bill Payments	0.6446	4
Loan Decisions	0.6359	5

Table 7: Use-cases based on Chatbot Recommendation

Use-cases for Chatbot Recommendation	5	4	3	2	1
New Account Creation	36	38	17	31	17
Budget Allocation	6	38	28	47	20
Sale Notifications	9	34	25	47	24
Financial Advice	39	55	15	22	8
Offers and Discounts	50	57	10	18	4

Table 8: Use-cases of Chatbot recommendation for Indian banks by respondents

Ranking of Chatbot Recommendation use-cases using Relative Important Index

Weighted score: This mechanism is applied to quantify the response obtained in Table.4. For Example, as the weightage given to 'Highly required' is 5, its corresponding weighted score for 'New Account Creation' is calculated as (36*5 = 180). This calculation process is repeated to obtain the below table:

Use-cases for Chatbot Recommendation	(5)	(4)	(3)	(2)	(1)
New Account Creation	180	152	51	62	17
Budget Allocation	30	152	84	94	20
Sale Notifications	45	136	75	94	24
Financial Advice	195	220	45	44	8
Offers and Discounts	250	228	30	36	4

VI.SUMMARY

AI technologies can transform both employee and customer experience from physical to digital. It is imperative to integrate banking functions with the latest AI solutions. As identified by the word cloud, the major use cases in middle and back-end banking are related to Loan Processing, Bulk transactions, CRM, and Risk Monitoring. Most of the Indian banks have started the usage of Chatbots for customer interaction on their respective online banking platforms.

While navigating through banking sites, customers frequently tend to ask a set of common questions that can be answered more effectively. Customer service is found to be the most popular use case for Chatbot assistance. Similarly, Offers and Discounts are an important topic under Chatbot recommendations. Catering to the exact requirements of the customer would not only increase their engagement but also increase the brand value of the bank.

There is a significant relationship between Customer service and Offers and Discounts. It is proved that if a person uses a Chatbot for assistance regarding customer service, they are likely to use Chatbots for recommendations regarding offers and discounts. Improving the Chatbot functionality in these two areas could not only increase the customer's interest but also improve the business of the bank.

Banks may follow different strategies for implementing Artificial Intelligence within their processes. Some essential elements like Cloud infrastructure, big data, and Python libraries have been suggested for IT architecture. Collaboration with FinTech companies could also help to enable digital banking cost-effectively and efficiently.

REFERENCES

1. Sumathi, N., & Sheela, T. (2017). An empirical study on analyzing the distortion detection on OSN using NLP & SA in banking institution. *2nd International Conference on Computing and Communications Technologies (ICCTT)*.
2. Trivedi, J. (2019). Examining the Customer Experience of Using Banking Chatbots and Its Impact on



- Brand Love: The Moderating Role of Perceived Risk. *JOURNAL OF INTERNET COMMERCE*.
3. Vaganova, O., Bykanova, N., Mityushina, I., & Mohanad, A. R. (2019). Introduction of The Latest Digital Technologies In The Banking Sector: Foreign Experience And Russian Practice. *Humanities & Social Sciences Reviews*, 7(5), 786-796.
 4. <https://doi.org/10.1109/ICASET.2019.8714305>
 5. <https://doi.org/10.1108/IMDS-08-2018-0368>
 6. <https://doi.org/10.4018/IJEIS.2020070102>
 7. <https://doi.org/10.1109/IIAI-AAI.2019.00175>
 8. <https://doi.org/10.1016/j.jbef.2020.100352>
 9. <https://doi.org/10.1109/ITHET46829.2019.8937382>
 10. <https://doi.org/10.1109/ITHET46829.2019.8937382>
 11. <https://doi.org/10.1109/ICCCT2.2017.7972246>
 12. <https://doi.org/10.1080/15332861.2019.1567188>
 13. <https://doi.org/10.18510/hssr.2019.7599>
 14. www.finextra.com.
 15. www.fisglobal.com.



Lights, Camera, Algorithms: The Rise of AI in Cinematography

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ABSTRACT: The cinematic landscape is undergoing a revolution, driven by the transformative power of Artificial Intelligence (AI). This paper delves into the myriad ways AI is impacting cinematography, from automating tedious tasks to enhancing storytelling and visual language. We explore AI's role in pre-production, production, and post-production, examining its potential to streamline workflows, push creative boundaries, and democratize filmmaking.

INTRODUCTION

Beyond Automation: AI's Transformative Grip on the Cinematic Landscape:

Cinema, once the domain of celluloid and auteurs, is at the precipice of a new era. Artificial intelligence (AI), no longer a sci-fi trope, is reshaping the landscape, infiltrating every stage of filmmaking and profoundly impacting the art form itself. This paper delves into the myriad ways AI is influencing cinematography, transcending mere automation to enhance storytelling, elevate visual language, and democratize filmmaking. We explore its impact across pre-production, production, and post-production, examining its potential to streamline workflows, push creative boundaries, and redefine the cinematic experience.

Pre-Production: Embracing the AI Visionary:

From the script stage onwards, AI offers filmmakers invaluable tools for crafting compelling narratives and refining their visual vision. Script analysis algorithms can delve into plot structures, character arcs, and thematic resonance, suggesting improvements and identifying inconsistencies. Storyboarding programs powered by AI can generate dynamic visuals, exploring scene compositions, camera angles, and lighting possibilities, fostering iterative collaboration between writer and director.

Furthermore, AI can revolutionize location scouting. Tools utilizing geospatial data and image recognition can identify filming locations that match specific visual descriptions, factoring in weather patterns, accessibility, and even potential permits. Pre-visualization software, informed by AI, can create intricate virtual sets and environments, allowing filmmakers to experiment with lighting, camera movements, and special effects before stepping onto a physical set. This not only saves time and resources but also empowers directors to refine their vision with unparalleled precision.

Before the first camera rolls, AI assists in crafting the cinematic vision. Storyboarding, once a lengthy and laborious process, can now be significantly streamlined through AI-powered tools. Algorithms analyze scripts and generate dynamic storyboards, suggesting camera angles, shot composition, and even scene transitions. This not only saves time and resources, but also opens doors to creative exploration by presenting unexpected possibilities.

Pre-visualization, too, benefits from AI's analytical prowess. Virtual sets and characters come to life with stunning realism, allowing filmmakers to experiment with lighting, composition, and even weather conditions before ever stepping onto a physical set. This not only enhances communication and collaboration between departments, but also minimizes costly reshoots and last-minute changes.

Production: From Automating Tedium to Empowering Creativity:

On set, AI sheds the drudgery of repetitive tasks, allowing cinematographers to focus on the essence of their art. Automated camera calibration and focus pulling free operators from technical burdens, while shot composition algorithms suggest optimal framing and camera angles based on scene analysis and desired emotional impact. This empowers cinematographers to experiment with unconventional perspectives and dynamic camera movements, pushing the boundaries of visual storytelling.



AI's influence extends beyond camera operation. Intelligent lighting rigs can adjust automatically based on scene and actor movement, ensuring consistent illumination and reducing the need for constant manual adjustments. Virtual actors, powered by deep learning, can stand in for human actors during complex shoots, offering filmmakers the flexibility to refine scenes without incurring logistical limitations. Additionally, real-time scene analysis from AI systems can detect continuity errors and potential editing mishaps in real-time, streamlining the production process and minimizing post-production headaches.

Post-Production: Where AI Paints with Pixels:

The editing room, once a solitary realm of splicing and trimming, is now a canvas for AI-powered artistic expression. Color grading algorithms can analyze footage and suggest emotionally resonant palettes, enriching visual storytelling and evoking specific moods. Automated editing tools can identify scenes with pacing issues, redundant dialogue, or inconsistencies in tone, guiding editors towards a more polished and impactful final cut.

Perhaps most profound is AI's ability to generate high-quality special effects and visual enhancements. Algorithms can seamlessly remove unwanted elements from footage, reconstruct missing backgrounds, and even create photorealistic digital characters and environments. This opens doors for independent filmmakers and low-budget productions to achieve previously unimaginable visual spectacles, democratizing access to high-end visual effects.

The Ethical Canvas: AI's Power and Peril:

While AI undeniably revolutionizes filmmaking, its influence demands careful consideration. Overreliance on automated tools could stifle human creativity, leading to formulaic narratives and homogenized visuals. Concerns regarding deepfakes and the potential for manipulation of narratives and identities necessitate responsible development and implementation of AI technologies. Moreover, ethical considerations around AI-generated content ownership and fair compensation for artists whose work informs AI algorithms must be addressed.

Here are a few excerpts on how AI could specifically impact Indian cinema:

- Indian storytelling traditions, rich in mythology and folklore, could be reimagined and brought to life with stunning VR experiences powered by AI.
- Language barriers within the diverse cinematic landscape of India could be overcome through AI-powered dubbing and subtitling tools. These tools could seamlessly adapt dialogues to different regional languages, ensuring wider accessibility and appreciation for films across the country.
- The unique song-and-dance sequences that define Indian cinema could be further accentuated through AI-powered choreography and music composition. Imagine AI generating dynamic dance routines tailored to specific actors and moods, or creating original soundtracks that adapt to the on-screen narrative in real-time.
- AI could democratize filmmaking within India, paving the way for regional and independent voices to be heard. Affordable AI tools could empower smaller production houses and individual creators, showcasing the rich tapestry of Indian stories and perspectives to a global audience.
- However, ethical considerations arise in the context of deepfakes and potential cultural appropriation. It's crucial to ensure AI is used responsibly, respecting cultural sensitivities and protecting the rights of actors and artists. By embracing AI thoughtfully and creatively, Indian cinema can not only streamline production processes but also unlock new avenues for storytelling, engage with global audiences, and empower diverse voices within the industry. The future of Indian cinema promises to be a vibrant tapestry woven with human imagination and the transformative power of artificial intelligence.

CONCLUSION

A Symbiotic Future:

The cinematic landscape, with AI in its grip, stands poised for a transformative era. Automation frees filmmakers from tedious tasks, while AI-powered tools enhance storytelling, push creative boundaries, and democratize access to visual effects. However, navigating this new terrain requires a delicate balance: embracing AI's power without succumbing to its pitfalls. The future lies in a symbiotic relationship between human artistry and AI's technological prowess, where tools augment creativity, not replace it. By thoughtfully wielding AI's potential, filmmakers can craft narratives that resonate deeply, pushing the boundaries of visual storytelling and shaping the future of cinema itself.

REFERENCES

1. Applefield, J. M., Huber, R., & Moallem, M. (2016). Constructivism in theory and practice: Toward a better understanding. *The High School Journal*, 84(2), 35-53. <http://www.jstor.org/stable/40364404>



2. Fuller, I. C., & France, D. (2016). Does digital video enhance student learning in field-based experiments and
develop graduate attributes beyond the classroom? *Journal of Geography in Higher Education*, 40(2), 193-206.
4. <https://doi.org/10.1080/03098265.2016.1141186>
5. Gallardo-Williams, M., Morsch, L. A., Paye, C., & Seery, M. K. (2020). Student-generated video in chemistry
education. *Chemistry Education Research and Practice*, 21(2), 488-495.
<https://doi.org/10.1039/C9RP00182D>
7. Gillette, A. A., Winterrowd, S. T., & Gallardo-Williams, M. T. (2017). Training students to use 3-D model
sets
via peer-generated videos facilitates learning of difficult concepts in an introductory organic chemistry
course. *Journal of Chemical Education*, 94(7), 960-963. <https://doi.org/10.1021/acs.jchemed.7b00155>
9. Morsch, L. A. (2017). Student authored video vignettes in chemistry. *E-Mentor*, 3(3), 25-32.
10. <https://doi.org/10.15219/em70.1303>
11. Riedinger, K., & Taylor, A. (2016). "I could see myself as a scientist": The potential of out-of-school time
programs to influence girls' identities in science. *Afterschool Matters*, 23, 1-7.
12. <http://files.eric.ed.gov/fulltext/EJ1095940.pdf>
13. Stanley, D., & Zhang, J. (2018). Do student-produced videos enhance engagement and learning in the
online environment? *Online Learning*, 22(2), 5-26. <https://doi.org/10.24059/olj.v22i2.1367>



The Role of Graphic Design in Visual Communication in the Postmodern Visual Era

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ABSTRACT:

“Every manufactured item sends out signals to the mind or emotions. These signals-Strong or weak, wanted or unwanted, clear or hidden - create feelings.”

- Dieter Rams

Graphic Design is a transformation of text and image to communicate effectively to the Target audience in the social perspective. Graphic designers transform thoughts and ideas into a visual context by organizing and connecting elements into a structure. This arrangement of design elements is done with a purposeful effect in mind, a goal. Since the communication between designers and audience have definite purposes, design is logically rhetorical. This intentional and logical production of meaning is the rhetorical function of graphic design today. This Study paper has been analysed adopting rhetorical criticism with generic participation of two selective graphic designs as artifacts and opinion of two experts in graphic design were generated and critically interpreted the aesthetic perception of graphic design. Detailed perspective of typographic application in graphic design was discussed in visual context.

KEYWORDS: Visual Communication, Graphic Design, artifacts, Rhetorical Criticism and Generic participation

I.INTRODUCTION

Graphic Design is part of life, in our daily affairs, from our kitchen, Drawing room, in our furnishings, food items, Costumes, and Dress Materials, Architecture, Education, Sports, Media and Entertainment Programmes and print media programmes. It acts as a tool and Technique in the field of communication. The design has a purpose and it shapes the aesthetic quality of the communication content in our everyday walks of life, it is an intentionally developed content.

Design is about improvements and it's a matter of making things better. Design is also about doing and it is also easier to design something when you can see it, feel it, taste it, smell it, hear it, do it. It's better if it is in realistic form whatever it may be. It's better to implement and prepare a prototype rather than planning. We cannot plan for the unexpected and our life is full of expectations. Just do it, as Nike a consumer reminds us.

II.DESIGN AS A THINKING PROCESS

Design thinking is an iterative process in which one can seek to understand the users, challenge assumptions, redefine problems and create innovative solutions and the designer can prototype and test. The overall goal is to identify alternative strategies and solutions that are not instantly apparent with the users an initial level of understanding. Design thinking is more than just a process and it is entirely a new way to think and provides hands on methods to create a new mindset. Graphic Design is a Thought provoking process and a creative initiative in Visual Art.

III.AIM AND OBJECTIVES

Aim

The aim of the study is to make people Understand the effective role played by graphic design in communication and explore the significant application of design thinking process of graphic designers. Today Graphic design applications are very effective in all the fields of Social and physical sciences in communication. It is mandatory to present the information in the context of text and image with aesthetic view. This research study clearly analyses the role of graphic design in the social perspective.



Objectives

- To Determine the application & Significance of graphic design in Print and New media today in the Context of Design aesthetics
- To find the Process of Design Thinking from Graphic Designers Perspective

IV. REVIEW OF LITERATURE

Salma balci(2016), The article “the impact of visual communication design on the consumption culture, from past to present”, States that Graphic design, inspired by modern art movements with aesthetic context cannot be separated from communication function. From the beginning of the twentieth century, where the modern art movements seeds existed graphic design has been a main factor of mass communication exploring visual expression. Because of this concept of postmodernist communication, graphic design gains the focus in terms of managing the consumption and commercial culture.

Velloso, Leandro Manual et.al (2012) Search for meaning: a study on the Cranbrook Academy of Art’s Graphic Design Department, paper proposes to study the design process and design criticism in the well-known post-modern movement in Cranbrook Academy of Art’s Department of Graphic Design under Katherine McCoy’s Co-Chairmanship (1971 to 1995). The graphic and theoretical ideas of Cranbrook students and faculty in the critical post-modern phase (1978- 1991), were recorded in this paper, based on field research in October of 2010 where interviews were collected and also based on relevant selected bibliography.

Anjali Sreekumar (2019) , Nationalism through Raja Ravi Varma Paintings, The study shows how Raja Ravi Varma’s paintings and his lithographic press played the key role in introducing printing art. Ravi Varma was the first Indian artist to give human faces with the features of gods and goddesses. This had made a terrific Influence in the social perspective. People from the various background worshipped the images of gods portrayed by Ravi Varma till date, even myself as a Hindu worshipper of God, I have screen saved the Saraswathi image in my mobile. This shows that how Ravi Varma has penetrated in the minds of the Hindus.

Women all over the nation wore different stylistic models of traditional saree. This was initiated from as an important feature by Ravi Varma and he who drew up the modern saree pattern style which made a common model of wearing saree all over India. He initiated the reproduction technique of his own paintings as posters in offset printing. This is a development in Graphic arts in the Indian art history.

Michael E. Outhouse (2013), The dissertation “The influence of the postmodern graphic design genre on contemporary graphic design as analyzed in the context of generic participation”explains postmodern graphic design has an influence on contemporary graphic design, Another aim of the research is to clearly define Postmodern graphic design in relation to practice and theory and qualitative method rhetorical criticism, specifically generic participation, provides the framework for an analysis of specific Postmodern and contemporary designers. This methodology rhetorical criticism with generic participation was adopted in my study to explore the graphic design application and its role in the society with the artifacts YouTube brand logo and iMac poster design.

V. METHODOLOGY - RHETORICAL CRITICISM WITH EXPERTS OPINION ON GRAPHIC DESIGN

The exploration of how language, symbols, and signs—the stuff we see, read, hear, or experience—make meaning to us. Here in this research study, two artifacts an apple iMac advertisement poster and YouTube brand logo were chosen as graphic design artifacts. These two designs were critically analysed by applying generic rhetorical criticism and findings were recorded. Two senior graphic designers opinion were generated and consolidated as a report.

Graphic Design in Print Media

Print Media is one of the earliest form of technology from German in the History of Printing. Printing Industry Evolved gradually from the early traditional methods of letterpress printing to latest digital offset printing methods, now printing is handled through computer system controlled printing processing methods. Printing bridges the gap between online and offline technology. People regularly handle print designs as they move every day, making this area of graphic design important to efforts like brand building and advertising campaign

Print design is everywhere, often in ways we take for granted. Traditional advertising and marketing still relies on



print media to spread awareness of their branding. Print design also takes center stage in industries like publishing, newspaper and magazine industry where a well-design plays a major role in the making of Cover page designs, and attracting layouts in the news and print media. Today we are in the process of making Excellent Book Cover pages and illustrations in the publishing field through latest digital printing technology. People are provided many number of book publications through Book fairs conducted every year in Chennai and major cities. Printing in publishing field is very vibrant today. Artist and graphic designers produce excellent graphic novels of historic stories, biographies of celebrities in the recent days.

Graphic Designers role in media today

Graphic Designers play a vital role in media, as they produce excellent design which is part of communication and media today. Design plays a beautiful role in Human life, human cannot survive without design. As Graphic designers they transform new ideas, new inventions, and new techniques in the process of design, they give aesthetic perception to the textual communication transformed into messages to the targeted audience. They give shape to the text, add visual element to the text and make the content meaningful to the people. Graphic designer's contribution in communication is very much impressive to make the audience interesting in receiving the content in intellectually appealing manner. They give life and structure to the content in such a way that the information carried in the design should be with contextual visual elements and the presentation must be harmonious. Graphic designers produce visual assets, like logos, brand names, Posters, Pamphlets, Brochures, Graphic novels, new typestyles, invitations etc.,

Historical perspective of Graphic Design and its art movements

The beginning of the mass communication was the basis for the contemporary Graphic design and Graphic design inspired by modern art movements, created the view that the aesthetic perspective cannot be separated from the functionality in communication from the beginning of the twentieth century. Starting from this early period where the modern art movements has initiated the seeds of graphic design elements of mass communication established by way of visual expression. Due to this concept of postmodernist communication, graphic design gains the importance in terms of art and culture in the aesthetic perspective, what we perceive as graphic design today is the essence of the artistic visual rhetoric of our early art movements in the history of art. Art Nouveau, Bauhaus, Art deco, Swiss Design (International typographic design), Pop art, Post modernism and digital age. These are the key art movements that flourished throughout the time. One art movement influences the behavior of the next movement, one style of design may be popular for a while, and the next style of the later movement dominates the previous style, like the Swiss Design style followed by Postmodernism today. Similar to design trends in the graphic design will be popular for a while until eventually something else in the making of the style influences the old. Evolution of iOS app design: From gradients and bevels to flat design is an example

The role of Signs and symbols as Graphic elements in the Consumer Culture

The use of symbols have a long tradition in history. Symbols appeared in the early period as paintings or carvings on caves and stone walls in 50000BC. Now today there is a need for various symbols in Modern societies. Within a very limited space symbols can effectively communicate the information equal to the textual words in a sentence. Symbols take much less time in communication than words and textual communication is more elaborative and occupies much time in reading, so symbols permit very less time in rapid reading and comprehension. In sometimes symbols may be less efficient than text in conveying abstract as well as detailed information.

Graphic Symbols represents objects as well as ideas, they play a major role in every culture in different context in all the areas like education, sports, music, entertainment, mathematics and in many branches of science. They are classified into pictorial symbols, abstract symbols and arbitrary symbols. Pictorial symbols are image related and simplified pictures, and they resemble the object they represent and presented as silhouette, shadows and profiles



Fig.1: Pictorial Symbols

The abstract symbols still look like objects but with less detail than pictorial symbols and they have several graphical elements like shapes, lines, curves and dots. In Olympic Games abstract symbols were used to represent several different kinds of athletic activities in a simplified form. Good abstract graphic symbols are intuitive and create a definite clarified meaning without any problem. Some arbitrary graphic symbols are figurative and are invented out of designer's imagination and they have no resemblance to all the ideas and objects they represent. They are based on the geometric shapes and colors. Traffic signs are arbitrary symbols and we learn them through driving school training and by practicing we get driving license.

The Semiotic approach in Graphic Design

The first thing and environmental condition for a sign is to create a discourse and interpretation. Any sculptural or artistic paintings and drawings convey a message through interpretation. Through interpretation, communication follows then the viewer is able to identify the meaning of that sign. On the whole, if the sign fails to induce feelings of interpretation, then that is not a sign. After interpretation and identification, the next process is whether the picture interpreted creates factual representation of some concept or object. If the sign does not represent or give communication clearly then it is not semiotic language. Finally, the interpreter must make decisions from the sign and act as per the sign. The sign must be appealing to the eye. If all these three steps are completely satisfied, then the sign is semiotic hence semiotics in graphic design.

Graphic designers participate in the task of handling drawings using paint, taking photographs and in the process of making computer graphics popularly known as digital graphics. Both photographic signs and computer graphics presented on the internet. Internet graphic designers are applying semiotics in creating digital designs appealing to many publics. From this depending on where these Graphic designers stay, their work can reach the whole world conveying a certain message regarding danger, knowledge or speech. The use of semiotics in graphic designing is to make these Graphic designers create up-to-date artistic pictures, paintings, sketches and photographs based on these viewers can interpret and identify their communication easily.

The Typographic Applications in Infographics a Graphic design term

Typography has two main roles in graphic design, it is to promote legibility and to communicate the message effectively to present the audience in an innovative process. If a graphic design with text elements is confusing, contrary it causes strain to our eyes, we will skip the design so in our best interest we should know how to effectively use typography in graphic design. To make the design effective and appealing typography in graphic design requires a solid understanding of basic design principles.

The term typeface denotes a font. A typeface is a family of fonts some of the familiar fonts include Helvetica, Times roman, Garamond and Future. A font has various Characteristics like bold, condensed, expanded, outline and italics. Any font can be modified to the above characteristics and it is used as per the execution of the designer in his layout. In the design process selecting pairing fonts in a graphic design are the major skills and art forms in a layout. The selected font should present the mood and tone of the message and should be legible for reading. If a designer master the skills of font selection and pairing the value of the graphic design will reach new heights. If the designer in a layout pairing two fonts there are essentially two recommended ways to execute. The first concept is to pair two different fonts within the same typeface. For example a bold uppercase font for headings and its regular counterpart for body text. The other option can be choosing two



different typefaces which creates a contrast to one another. For example a sans serif for headings and serif for the body. We should avoid pairing two different fonts or typefaces with very subtle differences and there is a need to show visible contrast between the two.

Typography is the strategic plan of action of type in order to execute written language readable and visually appealing. The art of typography is one of the most excellent skills every graphic designer needs to be concentrated. It's important to every form of design, both print and digital. Typography is very crucial to graphic designers because it has important top 8 key reasons in its functions, they are 1) it delivers a message 2) Create Hierarchy 3) Build a brand recognition

4) Show personality 5) make an impact 6) establish a mood and tone 7) draw attention 8) create harmony and consistency. Today this Constructive type and Image presentation with expertise in content is known as Infographics. It is a Digitally Shareable Content. Graphic Content is presented in various levels of understanding to make the viewer impressive. It is made with integrated context and solves a purpose and concise in presentation. Infographics on the outset a multilevel visual image. In Germany, he worked closely with Paul Renner who designed Futura and went to Switzerland and it was happened during the rise of the Nazi party. His ideas on new typography and sans-serif typefaces was considered as a threat in the cultural heritage of Germany, which traditionally used Black letter Typography and the Nazis seized his work before he was able to flee the country.

Graphic Design in the postmodern era

Katherine McCoy (2017), writes in *Cranbrook Design, The New Discourse*, that “‘Correct’ form and the univalent ‘universal’ criteria which reflects the modern concepts are purposely rejected in the post-Modern, post-industrial, milieu. The look and structure of graphic form is structured and played in the context of verbal signification, valuing Symantec expression over syntactic style”

Post-Modern design had started during in the late 1960's, it was initiated and had gained popularity in America and the US. The movement was a thinking of a newer generation of open minded people who were creative with ideological radical ideas that was against modernism which is not interesting and simplistic approach to design. The evolution of visual design from Graphic design.

As graphic design has evolved over time, it initiated more divisions with new design titles. Advertising and print design were once the core of graphic design. With the development of the computer, Photoshop, and the Internet in the digital era an ample of new design disciplines emerged. Also Web design, interactive design, UX/UI design, and product design came into existence in the recent days. Even though these are specialized design fields within the design community they were formulated from graphic design only. Visual Design is the emergence of latest trend from graphic design in the history, as the designer today needs to update himself to the latest developments in the field and must become a multitasking personality to cope with trends today. Today the field of graphic design has become an interactive design with recent developments in software and it is termed as Infographics with different formats, as gif files, video files etc.,

In the history of graphic design, it explores itself as a mirror to the broader changes the world has experienced throughout the world when we want to show beauty, we had Art Nouveau in the history, and now that customers expect simplicity in any brand which is what modern graphic design today. The key element in graphic design today is that visuals are not only just making a brand more attractive but they're about contributing to the customer experience. Right from the scratch like logo design to the images we post on each blog, graphic design executes a key function to a memorable visual identity.

In the nature of human communication and in the vibrant space of the digital world means it's difficult to keep track of the ever-changing nature of graphic design. In a postmodern visual era where technology is everywhere, making creativity more valuable one, the trends in modern graphic design has become an extraordinary subject of study. Something that is outstanding in 2017 might be totally outdated in 2018 in the design market, in the same way design that inspires the world today, might be old news tomorrow. The Apple brand is a good example of postmodern approach that feels fresh and current delivers effective information in a clean and simple way in a minimalism concept.

Rhetorical Criticism with Generic Participation of Selective Graphic Designs

Two Graphic Designs were Selected for rhetorical criticism and analyzed with the Criteria involving



Generic participation. Generic criticism is a method of analysis that seeks to understand how people respond to information that was communicated to them through a particular genre. Researcher's goal with this method of criticism is to understand the rhetorical effects of the genre in different times or different places. When doing generic criticism, we have three options:

1. Developing Generic Description, 2. Conduction Generic participation, 3. Applying Generic Application. Out of this three options conducting a Generic participation has been Chosen to study the selective artifacts iMac Poster Design and YouTube Channel logo.

Generic Participation of YouTube logo



Fig.2 YouTube Brand Name

First of all the genres in Graphic Design were listed out like print media poster design, popular brand names, Web designs, Hoarding Designs, Clip arts, typographic designs. In this Brand name Genre has been selected to conduct a Generic participation of YouTube logo. Here YouTube is a popular brand image for Explainer videos in social media. Established brands are very effective in reaching the target audience, Critically analyzing the typography involved in YouTube , it is designed with YouTube sans bold font with little condensed and red and black is the effective colour scheme of YouTube symbol and YouTube logotype .The Shape of the text and symbol is Compact in design sense. It is a very attractive graphical presentation and reaches wider audience around the world as a well-established popular brand, people understand the YouTube logo as a universal symbol of Explainer videos of any subject and popular films in social media. It is an established brand of video streaming from 2005.

Generic participation of iMac poster design

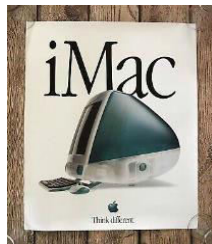


Fig.3 iMac Poster

First of all the genres in Graphic Design were listed out like print media poster design, popular brand names, Web designs, Hoarding Designs, Clip arts, typographic designs. In this iMac poster, Print media poster design is the genre selected to conduct generic participation. Here iMac is a worldwide popular brand in computers designed and familiar with Steve jobs, the founder of iMac. In this poster an image of a designed computer, iMac logotype in the background and apple logo in the bottom center with the tagline "think different "is placed with centre alignment and the design is well balanced too. A popular poster of worldwide well established brand reaches the target audience with understanding of the need of the unique product. People always need a unique product with advanced technology in the market. This research paper evaluates the effective presentation of a popular brand of a unique product as a graphic design print media poster in the generic participation of rhetorical criticism.



1. Conclusion of generic participation of Rhetorical Criticism of the selective graphic designs

The Graphic designs selected were popular brands around the world, both the graphics were unique brands in the market one is YouTube and the other one is iMac apple. Both the designs were very familiar among the global level. They were uniquely designed with well-crafted typestyles. As YouTube logotype is concerned it is an in-house creation of youtubesans bold. It was periodically developed in design by the google firm. Google YouTube as a long history founded in 2005 and reached the audience enormous excellence as a video streaming brand around the world. As apple iMac is concerned it is a product of Steve jobs, founder of iMac. Apple logo and logotype adopts simplicity in design which reflects the postmodern thought of minimalism. Steve jobs always initiated in his brand name a unique identity.

2. Graphic Designer's Expert opinions on the role of Graphics today

A Graphic Designer from Coimbatore with 35 years' experience in the field has been interviewed and the valuable opinions on graphic design were recorded. He is an alumni of Government fine arts college, Chennai and graduated in Textile design. According to his perception, technology has made the craftsmanship of the artist simplified, earlier in designing if we create a new creative form, if it needs to be repeated in various size and format, the artist has to recreate again to complete the design, nowadays we copy and paste and resize the design whichever format we want. We need to concentrate more on creativity and innovation in design today. As a designer he needs to update himself in technology, digital literacy and exposure in global aspects of design interpretations, there is a blog called "design for change" which is a site where trends in graphic design are discussed. Finally the designer pointed out that stereotypic design concepts must be eliminated in graphic design. Design elements like colour, texture, fonts, image all must align with the feel of the design.

From his early days he started working with signboard making, twenty years back, we have sign boards which were painted in enamel paint in all most all the shops in front, hoarding designs, and name boards. This sign boards were done with metal sheet, wooden boards and cloth background. In this designer will draw all the graphics in pencil or chalk with graph or grid lines. To draw portrait they use graphical squares as grid to have a scale and proportion of the image to be made. In those periods all sign boards and banner boards were made manually, even Cinema theatre front boards were manually painted for every cinema screening promotion.

In Chennai, we have Mohan arts, Swami arts, artist Jk and other theatre banner artists. From the designer's perspective we have all the commercial designs and film and advertising hoardings were done manually before the entry of flex board printing designs. Only in the nineties we have the flex printing technology slowly grooming, all the commercial graphic designs were converted into flex board printing from the manual process. This Graphic Designer has gradually started his career from the manual sign board making into digital designing in 2d software.

During his study period in Kumbakonam the manual to digitization process in design conversion came into existence. Graphic design had a major transformation to digital design using Photoshop and other 2d software. The designer had this transformation during this period in his career which is a major documentation in the history of Graphic design. Graphic design has travelled from the renaissance period to modern period, and from modern to postmodern and digital periods respectively. Now from his interview he says that graphic design has diversified to web design, interactive design, UX and UI design, Minimalist graphic design, art nouveau graphic design style, art deco graphic design style, flat graphic design style, Scandinavian graphic design style and retro graphic design styles.

V.CONCLUSION AND FINDINGS

The research paper is a study on graphic design and its application in communication in the post- modern post-model active graphic designs YouTube logo and iMac poster were analyzed with rhetorical criticism with generic participation criteria and two graphic design experts from Coimbatore and Chennai based were interviewed with knowledge of experience in graphic design. On the outset the paper considering the rhetorical criticism and expert opinion concludes that, Graphic Design has travelled in the various periods with periodic developments in the history of visual communication had come across to several changes in process and methods. The thinking of a designer has changed from manual craftsmanship to digital mode.

From the late 20th century, the graphic-design discipline had been based on handicraft processes: designs were drawn by hand by the artist to visualize a design, type was selected and organized from a typesetter; and type proofs and Photostats of images were assembled in position on heavy paper or board for photographic reproduction and platemaking. Over the course of the period, during 1980s and early '90s, rapid changes were



incorporated in digital computer and software radically altered graphic design.

Today the design has become interactive with targeted audience in the digital formats. From the graphic designers point of view the weightage given to a design making process in the manual method has considerably come down in the making of digital methods. The making has been simple when compared with traditional brush and ink method. As an audience the value we gave to manual art design has been significant but now it is changed due to the digital design format and the emphasis given is importance to design value now, in the course of time design became a normal text content.

REFERENCES

1. Michael E. Outhouse (2013), The influence of the postmodern graphic design genre on contemporary graphic design as analysed in the context of generic participation , Iowa State University Ames, Iowa, Master's Dissertation
2. Velloso, Leandro Manuel & Camargo, Iara. (2012). Search for meaning: A study on the Cranbrook Academy of Art's Graphic Design Department. 10.5151/design-icdhs-012.
3. Rune Petterson (1999) Graphic Symbols- Design and Meaning, the 31st annual conference of International visual literacy association, Jackson, Wyoming, Culture, from past to present, Arts and Music in Cultural Discourse Proceedings of the International Scientific and Practical Conference.
4. Selma balcı (2016) The impact of visual communication design on the consumption Culture, from past to present, Arts and Music in Cultural Discourse Proceedings of the International Scientific and Practical Conference
5. Hugh Aldersey- Williams et al. (1990), Cranbrook Design: The New Discourse, New York, Rizzoli International Publications, p.14-1
6. [britannica.com/art/graphic-design/The-digital-revolution](https://www.britannica.com/art/graphic-design/The-digital-revolution), 21 Sep.2022
7. westernsydney.edu.au/studysmart/home/study_skills_guides/digital_literacy/what_is_digital_literacy, 21Sep.2022
8. opentextbc.ca/graphicdesign/chapter/1-8-post-modern/, 21 Sep.2022
9. 99designs.com/blog/design-history-movements/what-is-postmodern-design-how-the-reigning-style-of-the-late-20th-century-works/, 21 Sep.2022
10. fabrikbrands.com/the-history-of-graphic-design/, 21Sep.2022 uxdesign.cc/a-brief-history-of-graphic-design-90eb5e1b5632, 21 Sep.2022
11. sophietabonehistory.wordpress.com/2016/02/01/post-modern-design/, 21 Sep.2022
12. flux-academy.com/blog/why-is-typography-important-in-graphic-design, 21 Sep.2022
13. ivypanada.com/essays/concepts-of-semiotics-in-graphic-design/, 21 Sep.2022
 - a. [Anjalisreekumaracademia.edu/39080499/Nationalism_through_Raja_Ravi_Varma_Paintings](https://anjalisreekumaracademia.edu/39080499/Nationalism_through_Raja_Ravi_Varma_Paintings), 25 Sep.2022
14. [_Paintings](#), 25 Sep.2022



Building A Secure Cyber Chatbot: Assessing Threats Through Social Sentiment Analysis

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ABSTRACT: In recent years, cyber criminals/hacker groups have been using many strategies to carry out cyber-attacks to compromise the security of network services in a particular environment. Predicting these attacks is an important task and helps determine what needs to be done to reduce the impact of attacks and prevent them in the future. Although there are programs that can detect Internet security problems, there is currently no machine that can predict or anticipate whether an attack will be successful. This research is designed to develop effective strategies to reduce chatbot threats, vulnerabilities, and information use to increase cybersecurity. To achieve this goal, we created an interactive application that uses artificial intelligence (AI) for communication and posted it on social media such as Twitter for cybersecurity purposes. Chatbots can use a lot of information and send appropriate and timely responses; This makes them useful in predicting threats from social media. The research leverages emotional analysis techniques, using chatbots on Twitter (and analyzing Twitter data) to predict future threats and cyber attacks. This strategy is based on collecting daily tweets from two groups of users: those who use the platform to express their opinions on important and relevant topics, and those who use the platform to share information about cyber security attacks. This research provides tools and techniques for creating chatbots that can be used to evaluate cyber threats on social networks through sentiment analysis, thereby enabling improvements in business. Future research can use and develop the tools and techniques presented in our study to improve the experience of chatbots, cybersecurity, and social media.

KEYWORDS: chatbot; cyber security; artificial intelligence; threats; vulnerability; data manipulation; social media

I.INTRODUCTION

Cyber security is a multifaceted issue that can have economic, environmental and social impacts [1-3]. Internet security statistics show that 2,200 cyber attacks occur every day, with an average of one occurring every 39 seconds. In the United States, the cost of

data breaches is an average of \$9.44 million, and the cost of cybercrime is \$8 trillion by 2023 [4]. As governments & businesses increasingly rely on new communications and media technologies, the threat of cyber attacks faced by such organizations has also increased. In response to these threats, governments and businesses have increased their investments in network security [5].

Advances in natural language processing (NLP) and machine learning (ML) technologies allow chatbots, also known as interactive agents, to extract valuable information about cyber security threats on social media [6]. The rapid proliferation of artificial intelligence (AI) and the digitalization of the global economy have enabled the creation of a lot of information through social media. Chatbot applications and technology solutions support business development and global trade. Governments, businesses, and politicians rely on views and opinions expressed on social media sites to instantly gauge public opinion[7]. Internet communication allows people to interact in real time. Microblogging platforms like Twitter can be used with memes, images, emoticons, etc. It has become the most popular communication tools because it allows various expressions such as to be expressed easily. [8,9]. Studies have shown that analyzing thoughts and feelings expressed on social networks and platforms can influence business, profit choice, image type, etc. [8,10] Previous studies have shown that the best practice for dealing with cybersecurity threats is to develop strategies that are successful for each threat [11]. The purpose of this research is to 1) investigate the use of multilingual tools in government, 2) create and test the chatbot test environment on Twitter, 3) conduct a theoretical analysis of data collected from tweets, and 4) create a chatbot test environment on Twitter. Data and information so that this toolbox can be used by many users with the goal of sustainability. The chatbot testing environment was created by combining open source and commercial tools to create solutions that can be used to understand issues such as interference, data management text, and insider threats.



II.BACKGROUND AND OTHER FUNCTIONS

Chatbot is an application that uses artificial intelligence (AI) for communication. Artificial intelligence is the automation of intelligent behavior that allows machines to simulate anthropomorphic conversations. Chatbots communicate with users, analyze conversation and provide marketing, personalized content, targeting specific groups, etc. It is programmed to extract information used for functions. They collect information and send it to users, but they are not their partners. They are allowed to have a personality, be friends, and provide information about the user, but they are not required or unwilling to do so [12]. [12] (pp. 373-383) says: "Personal chatbots exist in the user's personal space like chat applications such as Messenger, Slack, and WhatsApp. Agent-to-agent chatbots are becoming ubiquitous, and all chatbots require some form of interactive communication. The need for a communication protocol for chatbots is obvious. Alexa-Cortana integration is an example of agent communication

The two main categories that chatbots fall into due to their anthropomorphic features are error-free chatbots and clear chatbots. Anthropomorphism is "the adoption of human behavior or attributes into nonhuman entities" [13] (p. 865). Anthropomorphic chatbots are thought to be more popular with customers because customers see the chatbot as human-like, not that the company designed the chatbot to look like a human [14]. An error-free chatbot can be defined as a chatbot that is considered complete, a clear chatbot has difficulty understanding its meaning and therefore requires explanation from the user. Description: Chatbots are considered more anthropomorphic because chatbot instructions are seen as caring and interested in customer needs. According to [15], "An error-free chatbot does not indicate that it is not human. It translates into all human languages and responds with human and understandable words."

Threats and vulnerabilities are important (and dangerous) in chatbot cyber security. Cyber threats can be defined as methods that can attack computer systems. Fraud, tampering, denial of service, information leak, denial of service, generalization and other threats are examples of chatbot threats. Instead, the downside is that the path is impacted but not appropriately mitigated. When a system is not properly maintained, poorly coded, unprotected, or prone to human error, it becomes vulnerable to attacks. Anonymizers can be combined with other security measures such as end-to-end encryption, security measures, user authentication, and non-permissive permissions. Another way to ensure chatbot security is to use user behavior authentication (UBA).

User behavior analysis (UBA) is a method for analyzing users' activity patterns using software applications. It allows them to use advanced algorithms and statistical analysis to detect malicious behavior that could pose a security risk. Using this software analysis, it will be easy to detect other bots that hackers use to break into security systems. Therefore, this reduces the risk of cyber attacks. As we mentioned before, cyber threats can be defined as methods that can attack computer systems. Fraud, tampering, denial of service, data leak, denial of service, and public disclosure are examples of threats. As of December 2022, Twitter has 368 million monthly users worldwide (statista.com/statistics/303681/twitter-users-worldwide), providing the opportunity to collect large amounts of data in near real-time. In this research, we focus on building and using chatbots on social media platforms to collect big data samples in the form of tweets and perform sentiment analysis using algorithmic methods to predict specific things, threats, and related Internet security.

III.PROPOSED FUTURE FOR RESEARCH DIRECTIONS

In this case, the influence of large-scale design models is gradually increasing and enables many tasks that benefit chatbot development [11]. Models such as OpenAI's GPT-3 [12] and Google's BERT (Bidirectional Encoder Represented by Transformers) [13] use a lot of information and computing power that is beyond the reach of smaller players. In fact, GTP-3 currently uses \$175 billion and has an estimated training cost of \$12 million [11]. Weizenbaum [14] already identified these as important problems and they have remained so ever since. Third, there are also challenges related to solutions that support chatbot development and model testing, such as research on simulated factories and ways to facilitate the development of chatbots in manufacturing.

IV.IMPLEMENTING THE FUTURE DIRECTIONS

Two research reports showed a study on how to build the best chatbot with users and interactions. As chatbots become widespread in the coming years and communication with non-human entities becomes a part of our daily lives, it will be faster to expand our knowledge of the history, content and outcome of human-robot communication. To do this, this line of research should investigate the knowledge, feelings, and behaviors of dealing with these workers where there are differences between individuals, groups, or conditions of use, and



the consequences of these actions for individuals and groups. and race. this result. Additionally, as a developing field, there is a need to collect existing knowledge and update and expand all theoretical frameworks and models. Work in various disciplines, such as Sundar's [15] psychology of human-computer interaction and Guzman and Lewis' [16] work on human-computer communication, can provide inspiration in this regard. Although there are differences between different research practices, many studies exist in a particular field and are transferable to other fields. For example, research focusing on the provision of information in the business world may also be related to health, for example, the provision of information about products may be described in terms of health. However, to ensure the transfer of research results between application areas, similarities and differences between participatory practices must be identified and evaluated. Future research directions aim to partially address the current lack of integration in the field of new chatbot research, which can be seen from many articles and table conversations presenting chatbot research results, and there is no internationally accepted design, model. and measure the feature. Although this will need to be taken into account in new research, future research will benefit from a more integrated and integrated approach to the field.

V.GENERAL DISCUSSION

Today, organizations are better integrating AI and AI-based chatbots to find new paths for sustainability, innovation, cost savings, job and revenue growth, and the economy as a whole. A sustainable business has a positive impact on the business, society, community or environment. AI-based chatbots are sustainable business tools because they increase efficiency, streamline processes, and offer solutions to environmental, financial, and social problems (three pillars of security) [30]. Designers and developers must test environmental, business and social conditions to create a unified chatbot that businesses around the world can use. Developers need to create reliable, stable, and effective chatbots by providing the interactive features required for a human-like and natural conversation with AI agents. These interactive agents must adopt natural language processing and machine learning capabilities to have a global impact on business and thus achieve the best user experience and economic development [31].

Technological development can have positive or negative effects on sustainability. But we believe AI and AI-related chatbots can help create a positive impact. Through research on social media intelligence based on chatbots and cybersecurity, we strive to help our customers by improving privacy and convenience, as well as greater security, which has a positive impact on the development of the global economy. Collaborating with business to be sustainable in the development of AI-related technologies, such as AI and chatbots on social networks, will help ensure that the Technology Output complies with security standards. Current and future social media chatbot and cybersecurity researchers will want to focus on the following questions.

Where are AI-related technologies better suited to supporting the environment, business, and health in the corporate world?

- How do privacy and security risks affect sustainable development? How can social media chatbots prevent these risks and problems?
- What about the technological processes (such as infrastructure, design) that affect the environment, business and security of international organizations?
- What types of business models can be developed and analyzed for the use of AI and AI-related technologies, including business models and joint ventures?
- What are the drivers and challenges of supporting AI-based systems? How is AI adoption boosting the global economy?

VI.CONCLUSION

Social media reduces the limitations of time and space, allowing people around the world to communicate freely. It has also proven to be an important tool in detecting threats from countries and organizations and correcting them in a timely manner. Future work is needed to improve the process of collecting tweets from the Twitter site and automate the sentiment analysis process. Disseminating the study to other social media sites such as Reddit will help publicize the project. In a globalizing world, threats can come from anywhere in the world and in any language. Future studies are needed for design in languages other than English, with emphasis on Russian, Chinese and Arabic. Chatbots built on the Bot Libre platform need to be developed to allow for more social interaction. In order to obtain more information from these malicious sources, it should be better to start conversations with people who can threaten people and organizations. We hope that future researchers will come up with new ideas and methods that will make a difference to existing knowledge.



REFERENCES

- [1] Cutter, S., T. J. Wilbank, (ed.): Geographical Dimensions of Terrorism, Taylor & Francis, Inc. (2003)
- [2] Kennedy, L. W., Lunn, C. M.: Developing a Foundation for Policy Relevant Terrorism Research in Criminology (2003)
- [3] Reid, E., Qin, J., Chung, W., Xu, J., Zhou, Y., Schumaker, R., & Chen, H. (2004, June). Terrorism knowledge discovery project: A knowledge discovery approach to addressing the threats of terrorism. In International Conference on Intelligence and Security Informatics (pp. 125-145). Springer, Berlin, Heidelberg.
- [4] James, N. (2023). 160 Cybersecurity Statistics 2023
<https://www.getastra.com/blog/security-audit/cybersecurity-statistics/> Retrieved June 11, 2023.
- [5] Gartner Research, "Forecast Analysis: Information Security Worldwide 2Q18 Update", March 2020, [online] Available: <https://www.gartner.com/en/documents/3889055>.
- [6] Franco, M. F., Rodrigues, B., Scheid, E. J., Jacobs, A., Killer, C., Granville, L. Z., & Stiller, B. (2020, November). SecBot: a business-driven conversational agent for cybersecurity planning and management. In 2020 16th International Conference on Network and Service Management (CNSM) (pp. 1-7). IEEE.
- [7] Thapa, B. (2022). Sentiment Analysis of Cybersecurity Content on Twitter and Reddit. arXiv preprint arXiv:2204.12267.
- [8] Hernández-García, Á. & Conde-González, M. A. (2016). Bridging the gap between LMS and social network learning analytics in online learning. Journal of Information Technology Research (JITR), 9(4), 1-15.
- [9] Chatzakou, D., Koutsonikola, V., Vakali, A., & Kafetsios, K. (2013, September). Micro-blogging content analysis via emotionally-driven clustering. In 2013 humane association conference on affective computing and intelligent interaction (pp. 375-380). IEEE.
- [10] Achrekar, H., Gandhe, A., Lazarus, R., Yu, S. H., & Liu, B. (2011, April). Predicting flu trends using twitter data. In 2011 IEEE conference on computer communications workshops (INFOCOM WKSHPS) (pp. 702-707). IEEE.
- [11] Floridi L, Chiriatti M (2020) GPT-3: Its nature, scope, limits, and consequences. Mind Mach 30(4):681–694
- [12] Brown TB, Mann B, Ryder N, Subbiah M, Kaplan J, Dhariwal P, Amodei D (2020) Language models are few-shot learners. arXiv preprint. ArXiv: 2005.14165
- [13] Devlin J, Chang MW, and Lee K, Toutanova K (2018) Bert: Pre-training of deep bidirectional transformers for language understanding. arXiv preprint, arXiv:1810.04805
- [14] Weizenbaum J (1967) Contextual understanding by computers. Commun ACM 10(8):474–480
- [15] Sundar SS (2020) Rise of machine agency: a framework for studying the psychology of Human–AI Interaction (HAI). J Comput Mediat Commun 25(1):74–88
- [16] Guzman AL, Lewis SC (2019) Artificial intelligence and communication: a human–machine communication research agenda. New Media Soc 22(1):70–86
- [17]. Ahamer, G. (2016). GISS and GISP facilitate higher education and cooperative learning design. In Geospatial research: Concepts, methodologies, tools, and applications (pp. 810–833). IGI Global. <https://doi.org/10.4018/978-1-4666-9845-1.ch037>.
- [18] Al-Sharafi, M. A., Al-Emran, M., Iranmanesh, M., Al-Qaysi, N., Iahad, N. A., & Arpaci, I. (2022). Understanding the impact of knowledge management factors on the sustainable use of AI-based chatbots for educational purposes using a hybrid SEM-ANN approach. Interactive Learning Environments, 1-20.



The Impact of Emerging Technologies on Every Day Life

Stella.P

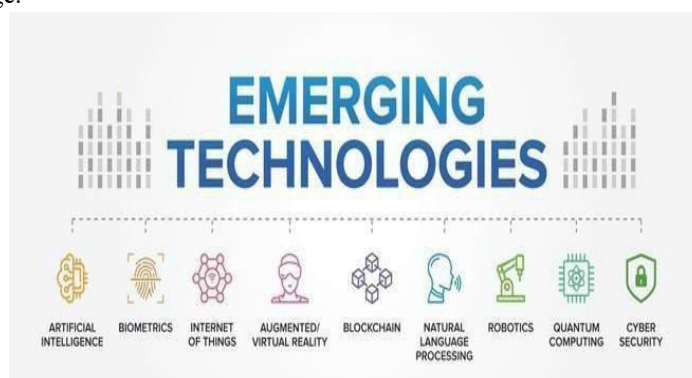
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ABSTRACT: To comprehend how potential users respond to emerging technologies, it's essential to analyse the contexts in which these reactions occur, as they're influenced by factors beyond science or technology. Issues often overlooked in depictions of proposed technologies should be explored. It's advisable to investigate users' daily practices in naturalistic settings, understanding social actions in everyday conversations, such as identity establishment. Discursive psychology proves valuable as an analytic tool, translating user concerns into pertinent technology characteristics. Illustrative examples: showcase its effectiveness. (Keywords: celiac disease, discourse analysis, discursive psychology).

INTRODUCTION

In 2005, scientists began speculating about a pill to enable celiac disease patients to consume a normal diet. Whether such a pill could be developed and embraced by patients was uncertain. Celiac disease involves small intestine affliction, causing gluten intolerance. Even a small amount of gluten disrupts the digestive system, making a gluten-free diet imperative, though challenging due to widespread gluten sources in wheat, barley, and rye. Adhering to this strict diet not only complicates practical food tasks but also has social repercussions (Hallert et al., 2002; Ciacci et al., 2002).

A detailed analysis of responses from CD patients revealed that the perceived rejection of the proposed pill stemmed from implicit assumptions in its communication. Rather than outright refusal, it reflected a critical evaluation of the technology as presented – a perceived panacea contradicting their day-to-day experiences with CD and the diet. This article specifically examines situations where the technology is only partially developed, aiming to assess its alignment with users' current interactional practices. For instance, identity-related issues, such as whether CD patients portray themselves as patients, health-conscious individuals, or "just ordinary" people, impact the appeal of proposed innovations. Rejecting a technology becomes socially significant as it allows individuals to resist or affirm specific labels or treatment approaches. Understanding users' everyday lives is crucial for integrating these observations into the innovation process, typically at an early stage.



Researching people's entire daily lives is impractical, so our focus lies in studying specific aspects, such as conversations, to understand how social actions unfold. In our case, we delve into talk-in-interaction during everyday practices relevant to the technology's impact or assumptions. For example, in studying CD patients, we explore their reactions to a researcher introducing a pill, as well as their discussions about the gluten-free diet and mealtime conversations with family members. Our approach aligns with technology assessment literature, considering users' talk in the context of emerging technologies.



THE LAYPEOPLE WITH EMERGING TECHNOLOGY

The distinction between scientific and lay reasoning is less pronounced than one might think, as both scientists and laypeople employ various methods simultaneously, albeit for different purposes. Gilbert and Mulkay's study (1984) reveals that scientists utilize an empiricist approach in public, portraying a discoverable world through reliable instruments. Privately or in the face of experimental challenges, they adopt a contingent perspective, acknowledging the subjective nature of facts. In controversies, scientists use the empiricist repertoire to validate their work and the contingent one to discredit others, framing critical voices as external influences. Burchell (2007) demonstrated that in contentious situations, scientists tend to construct "empiricist selves" while designating others as "contingent." The study suggests that although laypeople may incorporate scientific reasoning into their discourse, scientific expertise ultimately prevails (Kerr et al., 2007).

Expert speakers tend to encompass and influence lay perspectives, while the reverse is less successful. Recent research highlights scientists' resistance to lay interpretations, often considering them as intrusions into their discourse (Cook et al., 2004; Young and Matthews, 2007)

Some studies advocate using discourse analysis to unveil the convergence between scientists' and laypeople's discourse, recognizing lay discourse as a valuable information source in the innovation process (Horlick-Jones et al., 2007; Harvey, 2009). The research builds upon these findings, emphasizing a more in-depth examination of laypeople's discourse, urging a departure from the bias towards the innovator's perspective. This involves gathering data from sources like focus groups or public debates, challenging the prevalent technology-centric approach and scientific assumptions. The study highlights two key reasons for this asymmetry: a disregard for the interactional process and a lack of focus on everyday talk. It proposes discursive psychology as an alternative lens to understand prospective users' discourse concerning emerging technologies.

THE DISCURSIVE PSYCHOLOGY AND TECHNOLOGY ASSESMENT



Discursive psychology, developed in the 1990s by British social psychologists Jonathan Potter and Derek Edwards, involves empirical analysis of text and talk within social practice. While casual conversations are a primary focus, institutional talk and written texts are also analysed in consideration of the interactional environment and participants' social goals (Edwards and Potter, 1992; Potter, 1996).

This approach explores how individuals themselves make traditional psychological topics, such as attitudes and emotions, available through talk. Discursive psychology is concerned with participants' categories and preconceptions, emphasizing action-oriented analysis over determining individuals' true thoughts or feelings (te Molder, 2008). Rather than focusing on what talk reflects, it examines how appeals to mental states are used to achieve social and interactional goals (Potter and Wetherell, 1987). In natural settings like casual



conversations or counseling sessions, discursive psychology conducts detailed empirical analysis, considering the interactional context and sequential organization. For instance, a display of anger may establish sincerity, while a neutral description builds credibility, and a reference to a bad memory accounts for forgotten actions (Edwards and Potter, 2001).

This approach recognizes that people's evaluations are not only expressions of their thoughts but also integral to specific arguments and interactional settings. Discursive psychology has seen limited application in exploring the dynamic between potential users and emerging technologies, with a noteworthy exception found in a study on the interactive utilization of key concepts within nutrigenomics (Komduur and te Molder, submitted; also Bouwman et al., 2009). The findings suggest a potential incongruity between the prevailing assumption in current nutrigenomics that individuals will effortlessly adopt healthy eating habits once informed of associated risks and the actualities of everyday practices. Additionally, the study reveals a hesitancy in embracing genetic explanations for obesity, challenging the assumption that such explanations are readily accepted as appropriate accounts.

THE PROMISE OF EMERGING THECHONOLGY

Harold Varmus, former Director of the National Institute of Health in the USA, noted the three major themes in 20th-century science: the atom, the computer, and the gene (Kaku, 1998). This paper focuses on the computer, exploring its current impact and future potential, drawing inspiration from Gaines (1999), who emphasized the need for understanding societal, economic, political, and cultural operations influenced by environmental factors, especially information technologies.

The prevalence of information and communication technologies (ICT) is evident in everyday life, with phrases like "what's the URL?" "text me," and "the GPS says we're going the wrong way" becoming commonplace among internet users, mobile phone users, and drivers relying on navigation systems. An extensive survey by the Institute for the Future (1998) highlights the growing infrastructure of information technologies within "connected" households worldwide. The evidence points to a privileged group with access to cutting-edge technology, enhancing various aspects of their lives. Utilizing diverse systems, they gain significant advantages in personal and professional realms, experiencing connectivity's global benefits. An Institute for the Future analysis from 1997 highlights the transformative shift since 1980 in ICT availability and usage, with projections for the future.

Internet connection, primarily driven by commercial interests in e-business, is crucial for accessing these benefits. However, mere electronic connection doesn't ensure a seamless experience. Barriers like a skills gap, search engine limitations, speech technology inadequacies, techno-task overload, information overload, and designing for the "average" user persist (Parker & Wall, 1998). The emergence of intelligent agents, software tools developed to search, filter, and categorize tailored information, is anticipated to alleviate some of these difficulties (Chester, 1999).

CONCLUSION

The article explores understanding people's reactions to emergent technologies, challenging the common explanation solely based on technical properties. It emphasizes the significance of considering users' everyday talk and socio-interactional practices, not necessarily tied to the technology but influencing its reception. By examining CD patients' responses in their original context, the article suggests an alternative perspective viewing reactions as responses to how technologies are presented by scientists and policy experts. It advocates studying prospective users' everyday talk in contexts affected by future technologies, even without the technologies being present.

The approach discussed emphasizes understanding discursive actions over the content of talk, allowing insight



into locally produced "lay-understandings" of technology.

Instead of dismissing inconsistent user presentations, the focus is on investigating the interactional work such utterances perform and their role in achieving specific goals. This method contributes to technology assessment research by highlighting how people use descriptions to accomplish social goals, necessitating empirical study of everyday interactions.

For example, references to genetic makeup in discussions about being overweight can be crucial for nutrigenomics innovators, while insights into how individuals use healthful eating habits to shape their identity are relevant for personalized nutrition developers. Understanding how CD patients negotiate pill usage to maintain their identity informs researchers on fostering effective Communication with patients.

REFERENCES

- [1] Emergent technologies against the background of everyday life: Discursive psychology as a technology assessment tool-M. Veen, B. Gremmen, H. te Molder and C. van Woerkum. Akrich, M. (1992) "The Description of Technical Objects," in W. Bijker and J. Law (eds) *Shaping Technology/Building Society*, pp. 205–
- [2] Cambridge, MA: MIT Press. Bouwman, L.I., te Molder, H., Koelen, M.M. and Van Woerkum, C.M.J. (2009) "I Eat Healthfully but I Am Not a Freak: Consumers' Everyday Life Perspective on Healthful Eating," *Appetite* 53(3): 390–8.
- [3] Burchell, K. (2007) "Empiricist Selves and Contingent 'Others': The Performative Function of the Discourse of Scientists Working in Conditions of Controversy," *Public Understanding of Science* 16(2): 145–62. [4] Ciacchi, C., Iavarone, A., Siniscalchi, M., Romano, R. and De Rosa, A. (2002) "Psychological Dimensions of Celiac Disease: Toward an Integrated Approach," *Digestive Diseases and Sciences* 47(9): 2082–7.
- [5] Edwards, D. (1994) "Script Formulations: An Analysis of Event Descriptions in Conversation," *Journal of Language and Social Psychology* 13(3): 211–47.
- [6] Human factors in the digital world enhancing life style—the challenge for emerging technologies LEELA DAMODARAN, *HUSAT Research Institute, Loughborough University, Leicestershire LE11 3TU, UK*
- [7] HITCHCOCK, D., LOCKYER, S., COOK, S. & QUIGLEY, C. (2001). Design for all. Accessible systems. *International Journal of Human-Computer Studies*, 55, 635–643
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Securing The Future “Generative AI's Influence on Cybersecurity and Privacy Paradigms”

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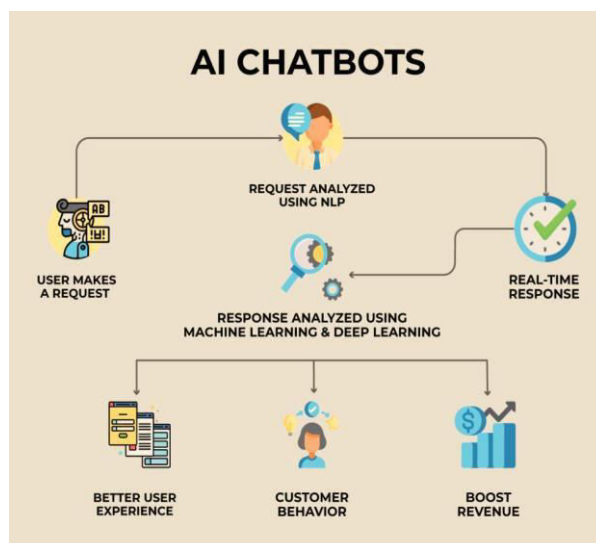
ABSTRACT: Undoubtedly, the advancement of Generative AI (GenAI) models will stand out in the realm of digital transformation in 2022. As diverse GenAI models, like ChatGPT and Google Bard, continue to progress in intricacy and capabilities, it is imperative to comprehend the ramifications from a cybersecurity standpoint. Numerous recent instances have garnered attention towards the utilization of GenAI technologies in both the protective and aggressive aspects of cybersecurity, with a focus on the societal, moral, and privacy implications of this technology. This research article accentuates the limitations, difficulties, potential dangers, and hazards of GenAI in cybersecurity and privacy. The research paper delineates ChatGPT vulnerabilities that can be manipulated by unscrupulous users to extract malicious information while circumventing the model's ethical constraints. This study exemplifies successful instances of assaults such as jailbreaks, reverse psychology, and swift injection attacks. The paper also delves into how cyber wrongdoers can employ GenAI tools to devise cyber-attacks, along with scenarios wherein adversaries can exploit ChatGPT to orchestrate social engineering attacks, phishing attacks, automated hacking, attack payload generation, malware creation, and polymorphic malware. The past decade had significant progress in AI and ML facilitate digital transformation. The concept of the AI and ML has seen tremendous progress, from supervised learning to a quick evolution on unsupervised towards semi-supervised reinforcement as well deep learning process. The latest innovation in AI technology is generative AI. In generative AI models, they employ deep neural networks to learn the pattern and structure of large training corpora as well in order to generate new ordered content similar. Generative AI GenAI technology is capable of building text, photos, sound, animation and source code plus other types of data. ChatGPT-3 GPT is a new powerful generative AI tool released by OpenAI.

This paper scrutinizes defense techniques and how GenAI tools can be harnessed to enhance security measures such as cyber defense automation, reporting, threat intelligence, secure code generation and detection, attack identification, formulating ethical guidelines, incident response plans, and malware detection. In conclusion, the article indicates open challenges and future directions for making this GenAI secure, safe, trustworthy, and ethical as the community acquires a better understanding of its cyber security implications.

KEYWORDS: Cyber security, Generative AI, Chat GPT, Phishing, Hacking

INTRODUCTION

The digital revolution has been propelled by advancements in machine learning (ML) and artificial intelligence (AI) during the last ten years. AI and ML, which started with supervised learning, have advanced rapidly to include unsupervised, semi-supervised, reinforcement, and deep learning. The most recent advancement in AI technology is generative AI. A powerful new generative AI tool called ChatGPT (Generative Pre-trained Transformer) was released by OpenAI in November 2022, and it has completely changed the AI/ML technology community. Due to ChatGPT's demonstration of generative AI's capacity to reach a larger audience, people's opinions regarding AI/ML have been altered. ChatGPT attracted 100 million users in less than two months after its launch, implying that those with internet access have either used GenAI or know someone who has.



EVOLUTION OF GENAI AND CHATGPT

In the 1950s, Gaussian Mixture Models (GMM's) and Hidden Markov Models (HMMs), may be regarded as proto-generative models. The execution of these generative models did not noticeably improve until the discovery of deep learning. The earliest approach for sequence generation was N-gram language modeling, which encompasses the perfect composition of a suitable group based on course lived distribution. In addition, the incorporation of Generative Adversarial Networks (GAN) has contributed greatly to enhancing these models' generative capability. The most recent innovation is transformer architecture, prevalent in LLMs such as BERT and GPT while also serving as the basis of several generative technologies. Sufficiently, GenAI has shown that it is a versatile tool with several applications as in Audio Video and Text etc.

GPT-1: In 2018, the first edition of GPT-1 came out. GPT-1 was first trained on two datasets: First, the Book Corpus dataset is a number of over 1100 unique books. Secondly, Common Crawl data included web pages. A trivial model actually produced effective linguistic conventions, and the response was quite satisfactory. On the other hand, it didn't react to long queues; tended to write repetitively and couldn't hold conversational facts for a period of time longer than one test. This implied that in case of GPT-1, there would be no coherence, as the flow of conversation was not available. **GPT-2:** Whereas, the GPT-2 model was trained on Common Crawl like its previous version as well but it also has Web Text which accounts for a collection of several Reddit posts. First, GPT-2 is better than the previous model because it gives responses that are readable and conversational. But GPT-1 was able to manage longer text "passages", felt that the model. GPT-2 presented many wonders, including Muse Net by OpenAI that can produce music from predicting a consecutive token in the sequence of tokens representing musical notes. This is similar to how OpenAI created JukeBox, a GAN which produces music generated by neural networks.

GPT-3: GPT-3 is trained on various text sources, including Wikipedia articles, Book Corpus, Web Text and Common Crawl. The GPT-3 can create art and code, as well it responds reasonably. Overall, GPT-3 can answer questions in a logical way. It also had the ability to bear images and map words onto images. **GPT-4:** It is known that the GPT model currently in use as of June, 2023. In addition to text, this one uses a large pool of texts and can process both input types taking images into consideration let alone having such long word limit. In March 2023, GPT-4 sat for the bar. They achieved better results by the human average and reached 75% test takers in a passing condition at the level of lower than 90th percentile. Microsoft's Bing AI can also be used on its own in the Microsoft Edge browser, or as ChatGPT Plus available through OpenAI website for premium subscription.

GENAI'S IMPACT ON CYBERSECURITY AND PRIVACY

Strong generalization of the AI has provided for successful replacement of traditional rule-based methods by technology that is more intelligent. But, alongside the technological progression over a changing digital landscape, cyber threat mediators are also turning into more sneak killer as well. Historically, a large number of incursion attempts have been relatively simple to enter cyberspace. For its part, the infusion of AI-generated attacks by cybercriminals has ushered in a new epoch on developments regarding SE Vectors while setting known changes and unknown outputs free. The presence of AI and ML assists the cybercriminals with even greater power as compared to earlier days because they have become more efficient due their attacks.



However, a series of important occurrences in the recent times clearly reveal that cyber security community seems to be interested more and more about GenAI for both attacking as well as defending systems.

Since the GenAI cyber security tools are evolving at fast speed, several benefits have been reported for both attackers and defenders. Malicious hackers are kept out of the system by ChatGPT and other GenAI products used in light-weight cyber defend. These technologies utilize attack patterns, vulnerability information and attacks signatures derived from LLMs that were fed large volumes of cyber threat intelligence. These immense volumes of data can result in advanced capabilities to the cyber-defenders' threat intelligence by deducing and consequently detecting new threats. The Cyber Incident. Log files, system output and network traffic data is disproportionately large on a company whose systems have been compromised in terms of the relevant GenAI technologies to comb through. Defenders can speed the process of incident response as well as render it automated. Deploying GenAI-driven models also serves to expect more and more complex attacks by making people ready for them. Secured coding methods can also be backed by this technology, such as developing test cases that examine the security of written code and writing secure codes. Further, models based on LLM can enable the development of better ethical standard to support cyber-safety across a system.

The following are the primary findings of this paper:

- It summarizes the evolution of GenAI, discusses its application in cyber security and reveals that it has several limitations.
- It provides an analysis of the moral limitations and privacy-infringing elements in ChatGPT, which may be used by malicious actors.
- It demonstrates the capabilities of cybercriminals using ChatGPT, as well as the strategy for attacking it based on GPT-3.5 model
- It demonstrates the use of ChatGPT and GenAI cyber security alongside defense automation, threat intelligence etc.
- It specifically identifies ChatGPT's features and the ethical, legal, and societal implications that follow from these invasions of privacy.

CHAT GPT FOR CYBER VIOLATIONS

Cybercrimes are intentionally hostile acts to change, deny accessing via defacement or interfere with; damage and destroy an existing computer system. These violations may be due to attempts of attacks on the system's hardware, software or network. Despite the fact that these acts are damaging, their purpose can belong to either side of the cat and mouse game between cyber threat actors and defenders. Weapons of hostile actors carrying out hostile actions include cybercrimes. Alternatively, cyber defenders can deploy the same offensive methods to analyze how their defenses would respond in order to identify any vulnerabilities. Online forums devoted to exchanging knowledge and best practices in the field of cyber defense have made since hostile activities are illegal in most jurisdictions, information about cybercrimes involving them is restricted for moral and legal reasons. ChatGPT and other readily available LLM models will make it easier for those with limited knowledge or experience to overcome the ethical limitations of the restricted resources available for cyber offenses. These LLMs provide a wealth of information in one place, making them capable of providing the thorough information required to execute numerous cyber offenses. In this section, we primarily focus on using GenAI techniques to create different kinds of cyber-attacks. Our team at ChatGPT created these attacks, but you can create attacks that are just as good or even better by using other LLM-based tools like Google Bard.

The moral and legal constraints based on the wrongfulness of hostile activities make it pretty difficult to get public information concerning such cybercrimes, particularly when these acts are illegal in most jurisdictions. This is due to online forums dedicated solely to disseminating knowledge sharing best practices in cyberspace security; At the same time, ChatGPT and other correspondingly tractable LLM models will facilitate the ways in which those with limited insights or skills overcoming of ethical constraints facing restricted resources for cybercrimes. These LLMs give out a lot of information at one point, this renders them capable to provide the detailed info so needed to carry out many cybercrimes. From now on, we concentrate primarily upon the application of GenAI tools that allows generating different types of cyber-attacks. The attacks are developed by our team at ChatGPT, but you can make some similar ones with different tools based on LLMs such as Google Bard and thus get just as good or even better results.



SOCIAL ENGINEERING ATTACKS

Social engineering is a form of psychological manipulation used to make individuals perform certain actions or disclose personal data. For cyber security, this most often would mean disclosing personal data such as passwords or credit card numbers; the latter results in unlawful access and intrusion. However, the rebuke arises from concerns regarding ChatGPT being used for social engineering attack and it is very real. Malicious actors might be able to capitalize on ChatGPT's superb fluency, context awareness and human-like text authorship. It may be assumed that a party carrying out the attack can freely get some basic personal information about victim, like job title and place of work. After that, the attacker would typically use ChatGPT to create a message from line manager or coworker working with victim's employment. This message produced with a formal language and tone premise might ask for personal information in exchange of performing such action as, clicking on an apparently harmless link. This approach works efficiently because ChatGPT is able to produce text material that matches the victim's expectations, thus ensuring a higher likelihood of granting go for along with it.

PHISHING ATTACKS

Potential cybercriminals usually carry out phishing attacks on victims' information via seemingly-legitimate organizations. These hackers would potentially have the capabilities to make their phishing efforts more efficient and harder by employing sophisticated AI frameworks, such as ChatGPT offered by OpenAI. Using ChatGPT's algorithms for pattern recognition in everyday interactions, attackers are capable of creating incredibly sophisticated and personalized-resembling phishing emails that look quite like official mail from respectable sources. This method, referred to as "spear phishing," is based on focusing attacks around key individuals or groups and works great because the attack can be customized.

AUTOMATED HACKING

The e-mail appears to be about a problem with a latest buy, and it requests that the recipient use the embedded link to test in and remedy the problem. In reality, hitting the link might cause them to a phony portal that might thief their login credentials. In a scenario like this, ChatGPT's state-of-the-art textual content-producing abilities could notably increase the probability that an assault might achieve success. The manipulation of fundamental mental ideas, maximum extensively fear and haste, which could reason sufferers to react hastily and without careful thought, is often the supply of the effectiveness of phishing assaults. Thanks to the improvement of sophisticated AI systems like ChatGPT, attackers can now notably boom the complexity of their phishing tries.

Automation of Cyber-attacks hacking, or the use of vulnerabilities in structures to advantage unauthorized access or manipulate, is turning into an extra critical issue in our increasing number of virtual international. Malicious actors may be able to use ChatGPT and different AI models to automate some hacking tactics in the event that they have the necessary programming abilities. These styles of synthetic intelligence models might be used to identify vulnerabilities in structures and devise techniques to take advantage of them.

POLYMORPHIC MALWARE IN GENERATION



Automation of Cyber-attacks hacking, or using vulnerabilities in systems to gain unauthorized access or control, is becoming a more serious issue in our increasingly digital world. Malicious actors may be able to use ChatGPT and other AI models to automate specific hacking processes if they have the necessary programming



skills. These kinds of artificial intelligence models could be used to identify vulnerabilities in systems and devise strategies to exploit them. New malware is created each time it runs, eluding the detection of many antivirus programs that depend on signatures. Using an applied case, we show how ChatGPT could be abused to produce polymorphic malware. We utilize both the web interface and the API of ChatGPT. Initially, we attempt to write code that inserts a basic DLL into a process (such as explorer.exe). First of all, the web-based interface's content filters make writing such code difficult.

CHATGPT FOR CYBER DEFENCE

Businesses utilize procedures and policies known as cyber security defense to guard their digital assets, including devices, networks, and data, from damage, theft, unauthorized access, and interference. A variety of organizational, procedural, and technical controls, such as firewalls, encryption, incident response plans, and access controls, may be part of these defenses. As technology advances, the following ChatGPT cyber security defensive use cases may be seen in commercial settings. MECHANICAL ARMOUR Security Operations Center (SOC) analysts may feel less stressed thanks to ChatGPT's automated cyber security incident analysis.

In addition, ChatGPT supports the analyst's recommended strategies for both short- and long-term security. For example, a SOC analyst may choose to rely on ChatGPT's assessment and recommendations rather than conducting a comprehensive analysis of the risk involved with a specific PowerShell script. Security Operations (SecOps) teams could also ask OpenAI questions about how to stop harmful PowerShell scripts from running or load files from untrusted websites in order to improve their organization's overall security posture. By reducing the company's overall cyber-risk exposure levels and providing much-needed relief to understaffed SOC teams, these ChatGPT cyber security use cases could prove beneficial. Furthermore, entry-level security analysts can now learn and train more quickly than in the past thanks to technology. For example, SOC analysts often look for anomalies or patterns suggestive of an attack when examining server access during a security event or log analysis. ChatGPT can quickly detect security flaws or irregularities in access records by processing large amounts of log data.

ANALYZATIONS OF CYBERSECURITY

By generating reports in natural language based on cyber security events and data, ChatGPT, an AI language model, can assist with cyber security reporting. Cyber security reporting is the process of analyzing and sharing data about cyber security with a variety of stakeholders, including executives, IT staff, and regulatory bodies. ChatGPT can automatically generate reports on cyber security incidents, threat intelligence, vulnerability assessments, and other security-related data. By analyzing and processing large volumes of data, ChatGPT can generate reports that are accurate, comprehensive, and simple to understand. These reports provide organizations with the tools to discover potential security vulnerabilities, assess the risk involved, and implement the appropriate countermeasures. ChatGPT provides insights into security-related data to help businesses make better-informed decisions about their cyber security investments and policies.

INTELLIGENT IDENTIFICATION OF CYBER ATTACKS

ChatGPT can help with threat intelligence by analyzing massive volumes of data to identify possible security threats and generate insightful information. Threat intelligence is the process of obtaining, assessing, and disseminating information about potential security threats to help businesses fortify their online defenses against intrusions. ChatGPT can automatically generate threat intelligence reports from a range of data sources, including news articles, posts on social media, forums on the dark web, and other online sources. By processing and analyzing this data, ChatGPT can identify potential risks, assess the level of risk associated with them, and recommend ways to reduce them. In order to identify trends and patterns in threat activity, ChatGPT can be used to generate reports as well as analyze and assess security-related data. ChatGPT helps businesses make better decisions about their security plans and investments by providing insights into the variety and scope of potential risks.

THE SOCIAL, LEGAL, AND ETHICAL CONSEQUENCES OF THE ChatGPT

As was previously discussed, users who use ChatGPT and similar LLM technologies in ways that are prohibited are already in dangerous waters. Even if a user isn't acting unethically when using ChatGPT, they could be using the AI program in what appear to be perfectly legal ways and wind up facing legal action from someone who believes the user's use of ChatGPT has caused them harm. In addition, these chatbots have the potential to expose social bias, endanger both personal and national security, and create issues for professionals. The issue with ChatGPT (and related models) is that they reinforce racial, gender, and other forms of social bias.



Numerous academics and users have noted that when they utilized ChatGPT to collect information or compose essays or articles on particular subjects, the results were skewed and reflected negative prejudices. The inadequate and outdated data that feeds ChatGPT hasn't been updated since 2021. It is based on data that totals about 570 GB, or 300 billion words. This sum is insufficient to address all of the world's questions from all angles. It also fails to represent progressivism in this way. We will go over some of the moral, legal, and societal ramifications of ChatGPT and other LLM in this part.

MISUSE OF PERSONAL INFORMATION

Examining how OpenAI uses user data for AI training has revealed significant privacy concerns. One notable example is the Italian government's ban on ChatGPT use due to the EU's noncompliance with the GDPR, which primarily addressed the improper use of personal data. OpenAI's assertion that it has "legitimate interests" to use people's personal information for training raises ethical and legal concerns about how AI systems should handle personal data, whether or not it is available to the general public.

DISPUTE OVER OWNERSHIP OF DATA AND RIGHTS

The fact that ChatGPT heavily relies on data from the internet, much of which might not belong to OpenAI, is cause for concern. The Italian regulator raised awareness of this issue by pointing out that ChatGPT might disseminate inaccurate information about particular individuals and that there are no age restrictions in place to prohibit access for those who are younger than 13. This conversation brings to light the critical concern that OpenAI might not be legally permitted to use all of the data that ChatGPT uses, regardless of whether or not the public is given access to that data.

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MISUSE BY EMPLOYEES AND ENTITIES

One example of potential LLM tool usage that was brought to light concerned Samsung employees. Unknowingly feeding private company data into the AI model were Samsung employees using ChatGPT for code creation and debugging. As a result, ChatGPT's collection now included this private information, potentially making it public and raising significant privacy concerns. Privacy concerns arise from the possibility that the average ChatGPT user could obtain this information by simply asking about it. Employee use of ChatGPT and other LLMs can lead to information leaks, so Samsung as a company would need to monitor this policy closely. Unauthorized access to user conversations and data breaches it was recently confirmed that ChatGPT had suffered from a significant data breach, underscoring the urgent need for stronger security protocols. Users' communications were unintentionally made public to third parties as a result of this hack, which is obviously against user privacy. If cybercriminals use ChatGPT to coordinate their attacks, they might unintentionally give away their plans to other parties. Furthermore, sensitive user information, such as payment card information, was compromised during this hack.

PRIVACY AND DATA PROTECTION

Privacy-related worries ChatGPT has faced criticism over privacy concerns, particularly with regard to data stored in the chatbot's library and potential user data leaks. Nevertheless, Google Bard has not been reported to have the same issues. However, Bard may train itself using user activity data, raising privacy concerns. Unlike Bard, users of ChatGPT 4 can choose not to provide their data for training purposes. By offering users more control over their data, this feature helps to mitigate some of the privacy concerns associated with the use of AI chatbots. In conclusion, users need to be aware of the benefits and drawbacks of both Google Bard and ChatGPT in order to make wise decisions about how to use them. As GenAI advances, it is expected that these systems will improve in accuracy and security, providing users with a more dependable and secure experience. It's possible that LLMs' attempts to use personal data for training and responses don't adhere to EU GDPR compliance laws. To remedy this, the developer needs to speak with the relevant authorities and ensure that the LLM conforms to their legal requirements; failing to do so could result in the LLMs being banned from entering those countries. The ability to remove messages from an LLM's history, company policies, and the LLM simply not storing a user's chat history are a few potential ways to lessen the chance that sensitive information will be added to the library. The models may be trained and updated on a regular basis to prevent an excessive amount of outdated information from being provided. This strategy has a drawback in that the source datasets would



need to be updated frequently to provide the updated information. The model may be more likely to believe the older information because there is likely to be more old information than new information regarding a particular issue. This might also be the cause of the bias brought about by the updated data. If LLMs can protect sensitive and/or private information and follow the law, they will become completely safe and reliable resources that anyone can use.

CHALLENGES AND FUTURE DIRECTIONS

Integrating ChatGPT with other AI technologies, like computer vision and robotics, appears to be the most promising future direction for the platform. By combining ChatGPT's conversational capabilities with computer vision and robotics' visual and physical capabilities, we can create intelligent and conversational artificial intelligence (AI) systems that have the potential to completely change how people interact with technology. Let's imagine a future in which we can speak in natural language with your smart home system to adjust the lighting, temperature, and other appliances, or with a robot that can help you with housework or grocery shopping. Combining AI technologies will make ChatGPT more capable of understanding and addressing the complexities of human communication, which will improve natural language generation and result in a more smooth and user-friendly interface. More personalization and customization through learning from user interactions and individual preferences is an exciting new potential for ChatGPT. Even though ChatGPT can be trained to better understand and respond to each user's distinctive needs and preferences, this increased level of personalization can also result in improved customer service and educational opportunities. Furthermore, developers can build language models that are highly tuned to the unique requirements and preferences of each user by utilizing the enormous amounts of data generated by ChatGPT's interactions, resulting in a more engaging and personalized experience.

CONCLUSION

The GenAI-powered ChatGPT and other LLM technologies have significantly changed society. It has been fully embraced by humans, who are using it to create words, music, and visuals in a multitude of inventive ways. It appears that almost every industry has seen the creation and infringement of applications due to this technology. Naturally, the power and threat that ChatGPT (and other LLM tools) offer has a significant impact on how an organization's cyber security posture will change due to GenAI. The goal of this essay is to carefully consider and go over the challenges, limitations, and opportunities that GenAI brings to the cyber security space. We first demonstrate how to bypass ChatGPT's ethical and privacy safeguards by using jailbreak methods and reverse psychology to target the platform. The various cyber-attacks that can be created and executed using ChatGPT are then demonstrated in this paper, demonstrating the use of GenAI in cybercrime. After examining a few cyber defense strategies made possible by ChatGPT, this essay addresses the ethical, societal, and legal ramifications of artificial intelligence. We also highlight key differentiators between two well-known LLM products, ChatGPT and Google Bard, in order to illustrate their cyber security capabilities. Finally, a number of open problems and research directions pertaining to cyber security and GenAI tool performance are presented in the study. By anticipating further studies, this study will develop novel approaches for fully exploiting GenAI in cyber security.

REFERENCES

- [1] I. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. Warde-Farley, S. Ozair, A. Courville, and Y. Bengio, "Generative adversarial networks," *Commun. ACM*, vol. 63, no. 11, pp. 139–144, 2020.
- [2] Generative AI—What is it and How Does it Work? Accessed: Jun. 26, 2023. [Online]. Available: <https://www.nvidia.com/en-us/glossary/datascience/generative-ai/>
- [3] OpenAI. (2023). Introducing ChatGPT. Accessed: May 26, 2023. [Online]. Available: <https://openai.com/blog/chatgpt>
- [4] Do ChatGPT and Other AI Chatbots Pose a Cybersecurity Risk? An Exploratory Study: Social Sciences & Humanities Journal Article. Accessed: Jun. 26, 2023. [Online]. Available: <https://www.igi-global.com/article/do-chatgpt-and-other-ai-chatbotspose-a-cybersecurity-risk/320225> Accessed: Jun. 26, 2023.
- [5] Kaspersky. (2023). What is WannaCry Ransomware? Accessed: May 26, 2023. [Online]. Available: <https://usa.kaspersky.com/resourcecenter/threats/ransomware-wannacry>
- [6] E. Shimony and O. Tsarfati. (2023). Chatting Our Way Into Creating A Polymorphic Malware. Accessed: May 26, 2023. [Online]. Available: <https://www.cyberark.com/resources/threat-research-log/chattingour-way-into-creating-a-polymorphic-malware>
- [7] Wired. (2023). ChatGPT Has a Big Privacy Problem. Accessed: May 26, 2023. [Online]. Available: <https://www.wired.com/story/italyban-chatgpt-privacy-gdpr/>



- [8] Techradar. (2023). Samsung Workers Made a Major Error by Using ChatGPT. Accessed: May 26, 2023. [Online]. Available: <https://www.techradar.com/news/samsung-workers-leaked-companysecrets-by-using-chatgpt>
- [9] OpenAI. (2023). ChatGPT-Plugins. Accessed: Jun. 26, 2023. [Online]. Available: <https://openai.com/blog/chatgpt-plugins>
- [10] Google. (2023). Google Bard FAQ. Accessed: Jun. 26, 2023. [Online]. Available: <https://bard.google.com/faq>



A Study on Economic Conditions of Women Software Employees in Chennai, Tamil Nadu

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ABSTRACT: In India, the position of women in Indian society is weak as it is male dominated society, despite that a higher percentage of women are working. Achieving a work-family balance can be difficult for both women and their employers in India, a country undergoing significant change and where women's traditional roles as caregivers and homemakers are strongly ingrained. Over the past decade, Indian society has seen an increase in the participation of women in the labor market, especially in the software industry. As more women enter India's IT workforce, academics and practitioners have become increasingly interested in the concept of work-life balance, particularly as it relates to women working in the IT industry. The sector earned USD 49 billion in 2022. In addition, it generates significant multiplier effects on GDP. The demand for domestically sourced goods and services from the IT sector translates, via the multiplier effect, into a total output of Rs. 2 per every Re.1 spent by the sector. The IT and ITES sector is the largest organized private sector employer in the country, employing about 12 percent of the workforce. This paper is a study on the economic status of IT women workers with special reference to Chennai in Tamil Nadu.

KEYWORDS: Economic conditions, software industry, women empowerment, stress management, employment opportunity.

INTRODUCTION

The position of women in Indian society is weak as it is male dominated society, despite that a higher percentage of women are working. National data collection authorities acknowledge the fact that women's contributions as workers are significantly undervalued. However, the ratio of working women is much less than that are men. But, the scenario has changed since 1999. In urban India, Women have an impressive number in the workforce. Working with married women in Urban and Rural areas has its pros and cons.

The problems faced by working married women of Urban and rural areas are different due to the social setup and family structure. Married women working in the Private sector also have a different work culture compared to the Public sector. Further, the position obtained at the workplace also depends on the educational background. Working women having education background of Under Graduate, and Post Graduate help them to obtain different levels of jobs in the Public and Private sectors. Similarly, working women coming from Nuclear family and Joint Families have different responsibilities at the family level.

The changing social structures arising out of dual-career couples, single-parent families, an increasing number of parents with dependent care responsibilities for children, and aging parents have all contributed to increasing research in the area of work-life balance. There is a glaring underrepresentation of samples from developing economies in the research literature on work and family. Increased globalization coupled with the recognition that balancing work and family is a challenge for employed parents in almost all modern societies, suggests that a chapter of this research should be conducted in different cultural contexts (Ayree, Srinivas, & Tan, 2005).

STATEMENT OF THE PROBLEM

In a changing society like India, where women's traditional role as a housewife is firmly established, female employers find it difficult to balance work and family life. Over the past decade, Indian society has seen a rapid increase in the participation of women in the labor market, particularly in the software industry. The increasing number of women in India's IT workforce has increased the interest of academics and practitioners in the topic of work-life balance, especially among women working in the IT industry. The sector earned USD 49



billion in 2022. In addition, it generates significant multiplier effects on GDP. The demand for domestically sourced goods and services from the IT sector translates, via the multiplier effect, into a total output of Rs. 2 per every Re.1 spent by the sector.

The IT and ITES sector is the largest organized private sector employer in the country, employing about 12 percent of the workforce in this sector. The indirect employment generation of the sector is also substantial – about 6.5 million. In contrast, social dynamics and the IT sector boom have affected the economic foundations of the patriarchal family. This has enabled women to enhance their bargaining and decision-making power, creating space for making deliberate choices. Such behavior may be modeled in terms of a ‘satisfying’ framework. Independence has helped us build better institutions for learning and progress in different areas of life to keep up with a rapidly changing world. In the past, women stayed at home and did household chores, but now women do both work and household chores and participate in social and economic development on an equal basis with men.

THEORETICAL FRAMEWORK

Women empowerment can be well understood by reviewing the theories concerning women in economic development, women in employment, and women in health aspects. The specific theories relating to the above aspects of women’s role in development are narrated below.

- Theory of labour supply (Mincer 1962, and Cain 1966)
- The general theory of choice (Sweet, 1973)
- ICT-New Opportunities and New Jobs theory (Avgerou, 2000)

EMPIRICAL STUDIES

Muddanagouda Patel (2016) Stress is a part of modern life, and with the increasing complexity of life, stress is likely to increase. Stress is rooted in the concept of role, understood as the position a person occupies within a system. In today's global society, women have to play a dual role as housewives and career designers. This study was conducted to investigate stress in working and non-working women. It has been hypothesized that working women experience more stress than non-working women.

Data Quest Survey (2012) found that employees in BPOs face several health-related problems like sleeping disorders, digestive system disorders, visionary problems, depression, ear problems, stomach problems, voice loss, chest-related problems, and back pain.

Serey (2008) argues that the conclusive and best meet the contemporary work environment is essential work is related to meaningful and satisfying work. This includes (i) opportunities to utilize one's own talents and skills and to face challenges and situations that require independent initiative and autonomy; (ii) activities that the parties consider to be of value; (iii) activities that involve understanding what role an individual plays in achieving some overall goal; (iv) Feeling proud of what you do and how well you do it. This issue of meaningful and satisfying work is often merged with discussions of job satisfaction and is believed to be more favorable.

RESEARCH QUESTIONS

1. What is the socio-economic status of software women employees in the study area?
2. Whether the software sector provide employment opportunities and improve the standard of living for women empowerment in selected regions?
3. What are the major factors to affect health stress and personal stress in the software sector?
4. What precautions exist to prevent these stresses in the software sector?

OBJECTIVES

- To identify employment opportunities and improve the standard of living in the software women for empowerment in the study area,
- To identify the causes of work-related stress among the software women employees.
- To examine the impact of work-related stress on women employees in the software sector in the study area.
- To identify the major factors to prevent these stresses in the software sector.

HYPOTHESES OF THE STUDY

1. Rural area women respondents are highly affected by the job-related stress as compared to urban area respondents.
2. Rural area women respondents are highly affected by personal stress as compared to urban area respondents.



METHODOLOGY

This study has been conducted in different software institutions in Chennai. Chennai is the highly populated Capital of Tamil Nadu. As per the literature, it is the right place to conduct this kind of study because of the large size of health care institutions located. Chennai has 15 zones and is the largest metropolitan city in Tamil Nadu and a cosmopolitan city in nature. The secondary data; was collected from the NASSCOM about the information technologies and working women profile. The information related to information technologies was also collected through personal interviews with the project leaders, software engineers, and workers.

SAMPLING DESIGN

The survey design of the study is based on a multi-stage random sampling method and it covers four stages, the accurate information is based on field inquiry in Tamil Nadu: (i) Selection of Chennai district in Tamil Nadu, (ii) Selection of major towns' viz., Ambattur, Tharamani, Guindy, Thiyagarayanagar, Kodambakkam and Nungambakkam in Chennai district (iii) Selection of few software industries in selected areas, (iv) Selection of rural area and urban area women respondents according to Tamil Nadu states and Other States in the software sector. Because of these four stages, 273 sample respondents were selected for the present study., 182 respondents were collected from Tamil Nadu state and the remaining 91 respondents were collected from other states The present study is based on using the convenient sampling method and the primary data is collected from using the well-structured interview schedule.

TOOLS OF DATA ANALYSIS

The data collected for the study are both quantitative and qualitative in nature. For these collected data, the researcher has prepared a code design and grouped the data for analysis and these data have been tabulated and analyzed using appropriate statistical tools. For further analysis of the data, SPSS has been used and qualitative interpretations are drawn carefully, combining methods of precision and validity.

- To study the socio-economic characteristics of software sector women workers, the percentage analysis and average have been employed.
- To identify employment opportunities and improve the standard of living in the software sector for women empowerment, the percentage analysis and Chi-Square test have been used.
- To identify the causes of work-related stress among the software women employees, the percentage analysis, and rank and t-test analysis have been applied.
- To identify the major factors to prevent these stresses in the software sector, percentage analysis is employed.

TESTING OF HYPOTHESES

CHI-SQUARE TEST

Ho: Rural area women respondents contribute to the family income is highly associated as compared to urban area women respondents.

STATES	AREAS	Income Contribution to the family				Total	Chi-Square Value	P value
		Below 25%	25% - 50%	50% - 75%	Above 75%			
TAMIL NADU	RURAL	7 (15.2)	15 (32.6)	23 (50)	1 (2.2)	46 (100)	7.69	0.012**
	URBAN	24 (17.6)	46 (33.8)	64 (47.1)	2 (1.5)	136 (100)		
	TOTAL	31 (17)	61 (33.5)	87 (47.8)	3 (1.6)	182 (100)		
OTHER STATES	RURAL	2 (6.9)	17 (58.6)	10 (34.5)	0 (0)	29 (100)	3.9	0.049**
	URBAN	8 (12.9)	19 (30.6)	34 (54.8)	1 (1.6)	62 (100)		
	TOTAL	10 (11)	36 (39.6)	44 (48.4)	1 (1.1)	91 (100)		



OVERALL	RURAL	9 (12)	32 (42.7)	33 (44)	1 (1.3)	75 (100)	2.63	0.029**
	URBAN	32 (16.2)	65 (32.8)	98 (49.5)	3 (1.5)	198 (100)		
	TOTAL	41 (15)	97 (35.5)	131 (48)	4 (1.5)	273 (100)		

The Table reflects the chi-square value of income contribution to the family between rural areas and urban areas women respondents. It is clear that association between rural area and urban area women respondents among their income contributions to their families. There exists a positive association between rural and urban areas of respondents and income contribution to the family in Tamil Nadu state.

Rural area women respondents are more than contributed income to their family as compared to that of urban area in Tamil Nadu state which constitute 50% – 75% level. In other states, more than rural women contribute income to their family as compared to that of other states which has been recorded at 25% - 50% level. There is a positive association between rural and urban area women employees and their income contributed to the family. As a result found that in overall classification, there is a positive association between rural and urban areas respondents and their family incomes. In the case of the overall classification, more than urban area women respondents contributed their family income as compared to rural area in which 50% - 75%.

FINDINGS OF THE STUDY

- More than two-thirds of the respondents (66.7%) were selected from Tamil Nadu state as compared to other state's respondents.
- Most of them 58.3 percent of the respondents belong to the age group below 30 years. It is found that 67 percent of the respondents belong to the below 30 age group in other states as compared to Tamil Nadu state at 53.8 percent only.
- Nearly one-third of the respondents have qualified with a diploma and IT education. It is concluded from the table that, less than two-thirds of the respondents (29.7%) are qualified with diplomas and IT education in other states compared to Tamil Nadu state at 28 percent.
- More than half of the women respondents opined that they are not interested to work in night shift. It is noted that Tamil Nadu women respondents (57.7%) stated that they are not interested to work in night shift as compared to other states (53.8%).
- Majority of the respondents have insurance policy. It is found that more than other states respondents (90.1%) stated that they have insurance policy as compared to Tamil Nadu state (84.1%) women respondents.
- Majority of the respondents (245) are getting incentives in the software sector. It is observed from the table that, 94.5 percent of the respondents are getting incentives in other states as compared to Tamil Nadu state.
- More than two-thirds of the respondents (184) stated that they agree with the company or institutions providing quality food and following the food safety principle. It is clearly stated that exactly two-thirds of the Tamil Nadu state respondents agree that their institutions have proven quality of food and follow the food safety principles as compared to other states.
- 225 out of 273 respondents stated that they know about the laws against domestic violence. It is found from the results that 85.7 percent of the respondents know about the laws against domestic violence in other states as compared to Tamil Nadu state (80.8%).
- More than one-third of the respondents (35.9%) revealed that they agree due to affected work-related stress through wage discrimination. It could be seen that more than Tamil Nadu women respondents (37.4%) are affected due to work-related stress through wage discrimination as compared to other states women respondents at 33 percent.
- 102 out of 273 respondents are stated that they agree with affected by work-related stress due to heavy workload. It is seen from the results that, 38.7 percent of the other states' women respondents are affected due to work-related stress through heavy workload as compared to Tamil Nadu state women respondents (36.8%).
- More than one-third of the respondents opined that they strongly agree that sleeping disorders should increase health stress. It is concluded from the table that, more than two-thirds of the respondents (37.9%) are highly suffered from sleeping disorders as compared to other states (31.9%).
- Less than half of the respondents agree that eye problems majorly indicate health stress. It is observed from the table that, 45.1 percent of the other states' women respondents are highly affected due to eye problems compared to Tamil Nadu state at 41.8 percent in the study area.



- 111 out of 273 sample women respondents opined that they agree that suffering frequently from headache problems may increase the health stress in the software sector. It is concluded from the results that, in the other states women respondents are highly affected by the headache problem which recorded 41.8 percent as compared to Tamil Nadu state at 40.1 percent.
- Less than half of the respondents stated that they strongly agree with reducing stress through preparing suitable plans and managing their own time in the software sector. It is inferred from the results that, other state respondents (47.3%) strongly agree with a suitable plan and managing time capacity may reduce the stress level as compared to Tamil Nadu state respondents at 43.4
- As a result found that in the overall classification, more than urban area women respondents contributed their family income as compared to rural area in which 50% - 75%.
- Age discrimination is found to be statistically significant at 1% level, and the remaining factors are statistically significant at 5% level viz., heavy workload pressure, family issues, health problems, problems with co-workers, sexual harassment, and working on the night shift are found to be highly affected in rural area as compared to urban area. Hence accept the null hypothesis for the above- mentioned factor.
- It is inferred from the results that married women respondents are highly affected due to the reasons as compared to unmarried women respondents. Therefore to accept the null hypothesis i.e., married women respondents are highly suffered from health stress as compared to unmarried women respondents.
- The personal stress factors such as child care, family issues, and personal financial burden are statistically not significant at 5% or 1% level. Hence to reject the null hypothesis and accept the alternative hypothesis i.e., urban area women respondents are highly affected by personal stress as compared to rural area respondents.

POLICY SUGGESTIONS

- i. Protecting the women employees from the long hours of work in the software sector. The long hours of work increase physical stresses and psychological stresses. Hence, all software institutions should ban long hours of work.
- ii. Improve the gender-sensitive related and monitor progress about the regulatory framework, software technologies, and labor policies, and create infrastructural facilities drawn in by the regulatory information as follows the ICT policies.
- iii. All software institutions should strengthen their capacity through technical support, gender equality, and ICT.
- iv. All the software institutions should provide training facilities to the employees to improve their technical and communicational skills and create more employment opportunities.
- v. The government should promote software technologies because it gives more taxation to the central and state Governments.
- vi. The government should collaborate with the ICT sector. Because recently more number of people depend on the software technologies. If the Government undertakes ICT, it will help to increase the more employment opportunities.

CONCLUSION

Indian society has witnessed a surge in the participation of women in the workforce, especially in the software industry. The increasing number of women in India's IT workforce has increased the interest of academics and practitioners in the topic of work-life balance, especially among women working in the IT industry. This sector generated \$40 billion in 2007-2008. Furthermore, it has a large multiplier effect on GDP. The respondents (66.7%) are selected from Tamil Nadu state. Most of the women respondents (31.9%) opined that they strongly agree that age discrimination leads to work-related stress. Improve the gender-sensitive related and monitor progress about the regulatory framework, software technologies, and labor policies, and create infrastructural facilities drawn by the regulatory information as follows the ICT policies.

REFERENCES

1. C. Avgerou (2000), Recognizing Alternative Rationalities in the Development of Information Systems, The Electronic Journal on Information Systems in Developing Countries, 3,7,1-5,2000. www.is.city.edu.hk/research/ejisd/vol3/v3r7.pdf.
2. Cain (1966) Labor Force Participation of Married Women. Chicago: University of Chicago.



3. Hanna (1991) The Information Technology Revolution and Economic Development, World Bank Discussion Paper Washington, D.C, 1991.
4. Mathur, S.K. (2006). Indian Information Technology Industry: past, present and future and a tool for national development. Journal of Theoretical and Applied Information Technology, 50-79
5. Mincer (1962) Labour Force Participation of Married Women: A Study of Labour Supply, in Aspects of labor Economics, Princeton, N.J.: National Bureau of Economic Research, Princeton University Press. Ministry of Education and Culture Government of India Pub, New Delhi.
6. Muddanagouda patil (2016) Stress level of Working and non-working women The International Journal of Indian Psychology ISSN 2348-5396 (e) | ISSN: 2349-3429 (p) January - March 2016.
7. Singh, S.K. (2006). Information Technology in India: present status and
8. prospects for economic development. Directions: The Magazine of IIT Kanpur 7.4, pp 5-14
9. Sen, Amartya (1991), Economics and the Family, Asian Development Review.
10. Sweet James A (1973): women in the labor force, New York, Seminar Press.



Artificial Intelligence for Proactive Enhancements in the Field of Law

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ABSTRACT: Artificial Intelligence is the technology used to make machines think like humans. It is widely used in many domains like business, information technology, healthcare, legal and lot more. Since law firms are prominent, it is highly important to be fair and productive. Goal oriented tasks can be automated which further leads to productivity. Various technologies can be used in terms of documentation purposes, property registration, billing etc. AI acts as legal advisor also. Small judge bots promote better access to justice. They serve faster and fairer in their goals. AI tools like Do not pay AI, AI Lawyer, Lawgeex, AmtO AI, Detangle.ai etc. help advocates to create contracts and automates review, summarize lengthy legal research documents, auto schedules cases and the use cases are enormous. Although there are controversial conversations about the pros and cons of AI, it is a boon which will enhance the productive potential of humans and lead to the development of the society in some or the other way. This paper provides a survey on widespread applications of AI in legal domain and how this technology can be used in such a way, that goal driven tasks can be automated using AI tools.

KEYWORDS: AI, Documentation, Small judge bots, Do not pay AI, AI Lawyer, Lawgeex, Detangle.ai

I.INTRODUCTION

Law plays an important role in getting justice. Artificial intelligence in law has various benefits. It is rapidly transforming the legal industry. It helps in data collection, documentation, deciding on small cases and so on. By considering sensitive cases, one cannot reject the major applications of artificial intelligence which will be portable, reliable as it provides potential enhancement. Minor cases which need immediate redressal can be automated that saves the time of lawyers and judges to focus deeply on sensible cases. This survey paper focuses on some of the applications of the AI in legal profession and how it is useful in the evolution of legal industry.

II.AI APPLICATIONS

2.1 DO NOT PAY AI

Do Not Pay is the first artificial intelligence lawyer. It is a software and uses artificial intelligence and machine learning to generate letters, make phone calls, fill out forms, and automate other tasks to help customer services issues. The issues include to lower bill rates from cable companies, insurance companies and other services, to find unclaimed money from government agencies, pensions etc [2].

2.2 AILAWYER

AI lawyer is a software applications that helps consumers in legal consultation, for booking appointments and also makes clear about the legal texts. For lawyers, it helps in legal research paperwork and summarizes agreements. The services include legal help, document drafting and data analysis.

2.3 LAWGEEEX

Lawgeex is the smartest in accurately reviewing contracts. This leads to quick approvals of agreements or contracts.

Lawgeex enables legal terms to offload the routine works. It offers its services in significant time and saves the cost by its automated approach. It has the user-friendly interface which will be easily managed without the legal insight for the





consumers [4].

2.4 DETANGLE AI

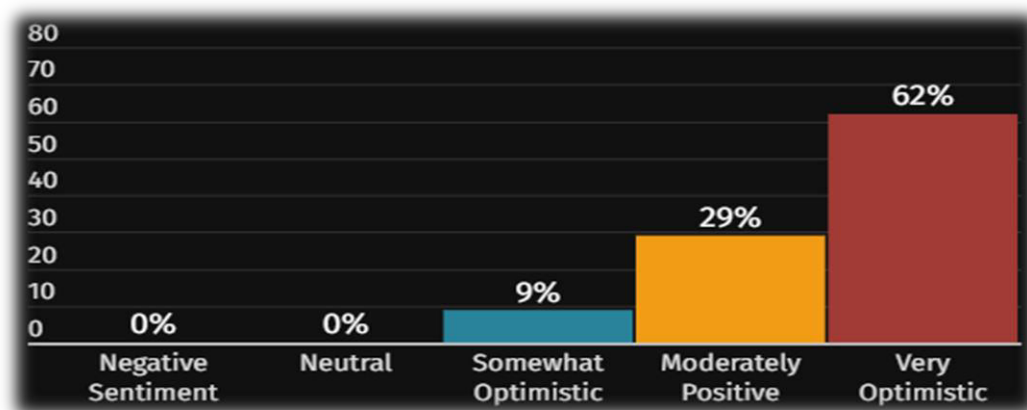
Detangle is AI based tool. It simplifies the legal documents by translating them to human understandable form. It processes documents from websites and pdfs. This can save time on lengthy documents. Detangle AI can assist in reviewing the agreements and contracts.

2.5 SMALL JUDGE BOTS

Judge bots can sound like science fiction but they can be used instead of judges of honour. These bots can be convenient in civil cases or majorly in goal driven tasks like traffic cases, property ownership issues and more. The decision of goal driven tasks can be automated with the past records and rules can be fed so that the bots give conclusion based on the given data to them.

III.FUTURE OF AI IN LEGAL

In future, law firms will have more innovative ideas in terms of pricing and customer service [1]. The use of AI in law will be an evolution. This will increase efficiency and lead to the fast paced work in the legal domain. Small cases can be solved immediately by automation and the wait time of customers will be condensed. AI in law will improve access to justice. The survey of India Business Law Journal says that for financial year 2023 – 2024, 62% of people expressed positively on business sentiment for law firms and to be noted that none of the people provided negative judgment [3].



IV.GENERAL THOUGHTS ON AI IN LEGAL

Almost many lawyers, consumers of legal department and other users feel that legal automation is definitely beneficial and acceptable. It will enhance the work potential of people involved in regular jobs of legal department. The legal automation will be able to save time and cost on the repetitive and time-consuming legal tasks. It enables lawyers to focus on strategic work. In partnership with the Corporate Counsel Business Journal (CCBJ), The OpenText and CCBJ Modern General Counsel Survey highlights the reason in favour of AI that over 60% of people accept that AI saves time and 51% of people agree that AI will enhance the productivity [5].

V.CONCLUSION

In this modern world, artificial intelligence helps humans in all sorts by easing the mundane tasks thereby leading to productivity. Artificial intelligence in legal is one of the best solutions where small cases can be judged on time and reduces the uncountable pending cases in particular. Although AI in legal is new, it has the potential to refashion the legal industry. In the controversy between man and machine, machines will obviously lend helping hands for man in his requirements. Further they will uplift the present in one or the other way. So we cannot neglect the use cases of artificial intelligence rather use them wisely to achieve the enormous success.

REFERENCES

1. Mirza Aslam Beg “Impact of Artificial Intelligence on Indian Legal System”, Indian Business Law Journal, 2023
2. <https://deepgram.com/ai-apps/donotpay>
3. <https://law.asia/new-legal-market-trends/#:~:text=%E2%80%9CThe%20most%20significant%20development%20in,can%20improvise%20its%20judicial%20system.%E2%80%9D>



Proceedings of International AI Conclave Deep Tech in Digital Transformation

2nd Feb 2024, Avichi College of Arts & Science, Chennai, ISBN : 978-81-964523-2-2

J Soukupova - Masaryk University - “A Critical Assessment of the Current Use of Artificial Intelligence in Legal Practice” Journal of Law and Technology, 2021 AI-based Legal Technology

4. <https://www.artificiallawyer.com/2022/09/12/lawgeex-the-inside-story-of-the-superlegal-restructure/>
5. <https://www.prnewswire.com/news-releases/new-survey-reveals-growing-adoption-for-ai-in-legal-teams-302035598.html>*



Ethical Implications and Mitigation Strategies of AI in Preserving Data Privacy: An Empirical Analysis

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ABSTRACT: Artificial intelligence (AI) has become pervasive in today's world, transforming many aspects of our lives and having a significant impact on the processing, access, and use of information. The data privacy space is one of the most important areas that AI is affecting. Concerns about moral consequences of protecting data privacy have gained prominence as artificial intelligence technologies continue to advance and penetrate new industries or general population. With regard to AI's role in protecting data privacy, this empirical study seeks to explore the ethical implications and mitigating solutions. The goal of the study is to investigate the complex relationship that exists between data privacy, artificial intelligence, and the related ethical issues. The ethical use of personal data by AI systems, possible risks of data breaches, and biases in algorithms are only a few of the many issues that are raised by the ethical implications of AI in data privacy. Fostering a responsible and ethical approach to the implementation of AI requires an understanding of these consequences. Additionally, the objective of this empirical study is to determine and assess several ways of mitigation meant to meet these ethical issues. The implementation of legal frameworks, technological safeguards, transparency protocols, and guidelines are some examples of mitigation tactics that can be employed to protect persons' privacy rights in the context of the increasing use of AI-powered technologies. This study with 120 respondents aims to educate the general public about the ethical challenges and potential solutions in preserving data privacy in an AI-driven world.

KEYWORDS: Artificial intelligence, Artificial intelligence, mitigation, technologies.

I.INTRODUCTION

AI is the term used to describe the creation of computer systems that are capable of tasks that normally require human intelligence. The goal of these systems is to replicate human cognitive functions like language comprehension, learning, reasoning, and problem-solving. AI is the process of developing models and algorithms that let machines assess data, decide what to do, and then take action to accomplish those judgments. But there are also ethical questions that AI brings up, such as privacy concerns, bias in algorithms, automation-related job displacement, and the moral application of AI technologies. But there are also ethical questions that AI brings up, such as privacy concerns, bias in algorithms, automation-related job displacement, and the moral application of AI technologies.

II.EVOLUTION OF ARTIFICIAL INTELLIGENCE IN INDIA

Over the past few decades, India has experienced substantial growth and transformation in the field of artificial intelligence. This timeline summarizes the significant advancements and turning points in India's AI industry:

Earlier Years (Prior to 2000s): During this time, India's contribution to AI research and development was minimal. The majority of AI research was conducted at research labs and academic institutions like the Indian Institutes of Technology (IITs).The emphasis was not on broad commercial applications, but rather on fundamental AI research.

During the early to mid-2000s AI-related firms and projects with a focus on certain applications like machine learning, speech recognition, and natural language processing have begun to appear in India. In order to improve operations and consumer experiences, businesses started looking into AI-driven solutions, especially in the IT services, finance, and e-commerce sectors. Academic institutions kept up their AI research, and AI-related courses started to become more and more popular.

Mid-Decade to the Present: India is seeing a rapid increase in the use of AI in a number of industries, including manufacturing, healthcare, agriculture, and education. Creation of research facilities, centers of excellence, and incubators with an emphasis on artificial intelligence, backed by both public and commercial funding. Increased venture capital and corporate investments in AI startups with the goal of utilizing, AI technologies to boost productivity and expansion of businesses. Government programs that encourage



cooperation between government agencies, business, and academia to advance AI development include the National AI Strategy. AI-based tools and apps are being used for social impact projects that tackle issues with healthcare, agriculture, education, and government. To accommodate the increasing demand for AI specialists, skill development programs and educational courses centered on AI are being offered.

Current Patterns and Obstacles: In order to assure responsible AI development and deployment, ethical considerations and regulatory frameworks including talks about data privacy, prejudice, and transparency are becoming more and more important. Ongoing initiatives to narrow the skills gap through workshops, training courses, and partnerships with business and academics. Partnerships and collaborations to promote innovation and technology transfer between international organizations, research centers, and Indian businesses.

DATA

The term "data" describes unprocessed facts, statistics, observations, or information. These can be expressed as text, numbers, pictures, audio, or any other type of format that can be saved and preserved.

III.ROLE OF DATA IN ARTIFICIAL INTELLIGENCE

The creation, education, and operation of artificial intelligence (AI) systems depend heavily on data. It is essential to AI and is vital in a number of ways, including:

AI model training: Machine learning and deep learning models are trained using data. Large datasets are used to teach these models features, relationships, and patterns. The AI model's ability to learn and make generalizations from data improves with increased diversity, quality, and relevance of the data.

Increasing performance and accuracy: The quantity and quality of data have a direct bearing on the performance and accuracy of AI systems. Strong, thorough datasets let AI algorithms make superior predictions, classifications, or judgments.

Learning and feature extraction: Data aids AI systems in locating and obtaining pertinent features. The algorithms cannot forecast or make judgments without these features. Clear, annotated data helps AI systems learn to identify trends and derive valuable insights.

Development and validation of algorithms: Data is used in the planning, evaluating, and certification of AI algorithms. Datasets are used by engineers and data scientists to develop, improve, and optimize algorithms that help them accomplish their goals.

Fairness and bias considerations: The type of data used can affect how biased AI systems are. AI models that are biased may result from skewed or biased datasets. Thus, for AI to be just and moral, it is essential to comprehend the data and reduce biases.

Applications in the real world: AI uses data from the actual world to generate predictions and judgments in a variety of industries, including healthcare, banking, autonomous cars, and more. The caliber of the underlying data has a major impact on the decisions' accuracy and dependability.

Data management and preprocessing: Data must frequently be cleaned, sorted, and preprocessed before being fed into AI models. To guarantee that AI models train efficiently, proper preprocessing and data management are crucial.

DATA PRIVACY:

Protecting sensitive and personal data means making sure that it is handled, kept, and used in a way that upholds confidentiality, integrity, and security while also respecting the rights of persons. This is known as data privacy.

It entails regulating the ways in which governments, corporations, organizations, and other entities that deal with personal data gather access, share, and use data. Data privacy safeguards are designed to prevent personal information from being misused, accessed without authorization, or exploited.

IV.RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE AND DATA PRIVACY

Data privacy and artificial intelligence (AI) are intricately related. Even while AI systems utilize a lot of data for training and development, using a lot of data presents serious privacy issues. Here's how data privacy and AI interrelate:

Data Gathering and Utilization: In order for AI systems to recognize patterns, anticipate outcomes, and enhance their functionality, they need a tonne of data. Personal data including user activity, preferences, medical history, and more may be included in this data. If handled carelessly, gathering and using this data may put people's privacy at danger.

Privacy Risks and Breaches: Artificial intelligence algorithms that have been trained on private or sensitive data may unintentionally divulge personal information or reinforce biases that exist in the data. Unauthorized access or possible data breaches are risks.



Privatization and De-identification: Before using data for AI training, firms frequently anonymize or de-identify information to reduce privacy issues. But re-identification methods and AI developments make it harder and harder to guarantee total anonymity, which is a privacy risk.

Bias and Fairness: AI systems may carry over biases from the training set, which could result in unfair decisions or results. This can unfairly limit people's possibilities or experiences, which can have a disproportionately negative effect on some demographics and raise privacy concerns.

Regulations and Compliance: To safeguard people's rights to data privacy, governments all over the world are passing laws like the California Consumer Privacy Act (CCPA) in the US and the General Data Protection Regulation (GDPR) in Europe. Following these rules is essential for businesses creating AI systems.

V.POTENTIAL DATA PRIVACY RISKS INVOLVED IN ARTIFICIAL INTELLIGENCE

The application of AI presents many possible hazards to data privacy. These dangers may arise at different phases of the creation, application, and use of AI. Among the main areas of the problem are:

Data Breaches: There is a higher chance of data breaches when big datasets are used to train AI algorithms. In the event that these datasets contain personally identifiable information (PII) and appropriate security measures are not implemented, there is a risk of unauthorized access, theft, or abuse of the data.

Skewed Algorithms: Artificial intelligence models that have been trained on skewed or insufficient datasets may reinforce skewed findings. The AI system may make biased decisions that negatively affect people if the training data reflects social biases or discrimination, particularly in sectors like hiring, lending, or legislation.

Re-identification of Anonymised Data: In order to preserve privacy, anonymised data is typically removed of any identifiable information. However, by matching different data points, AI algorithms can occasionally re-identify individuals from apparently anonymised information, posing a risk to their privacy.

Lack of Transparency: It may be difficult to comprehend how complex AI algorithms generate decisions or predictions because of their lack of transparency. Privacy issues may arise from this opacity, particularly when AI systems handle sensitive data without providing transparent justifications for their decisions.

Insufficient Consent and User Control: AI programs frequently gather and examine enormous volumes of user data. Inadequate permission procedures or a lack of user control over data use may lead to the gathering of more data than is required or its unauthorized use, thereby violating people's right to privacy.

VI.CHALLENGES IN ARTIFICIAL INTELLIGENCE

Lack of control over personal data: after personal data is gathered and utilized by AI systems, people frequently have little control over it. It's possible that they have no idea how their data is used, who may access it, or how long it will be kept.

Difficulty in exercising privacy rights: despite the fact that regulations grant people certain rights about their data (such as the ability to view, amend, or remove personal information), putting these rights into practice can be difficult or complicated because of unclear procedures or uncooperative data controllers.

Surveillance and intrusion: AI-powered surveillance technologies, such as facial recognition and behavioral tracking, give rise to issues around privacy invasion. Continuous surveillance and monitoring of people's activities can violate their right to privacy and self-determination.

Targeted advertising and data profiling: AI systems are able to build comprehensive profiles of people based on their interactions, preferences, and online behavior. Targeted advertising, which some people may find invasive and deceptive, frequently uses these profiles.

Data collection and use: AI systems often rely on extensive datasets, raising concerns about the collection and use of personal information without proper consent or awareness.

Algorithmic bias and discrimination: AI algorithms might perpetuate biases present in training data, leading to unfair or discriminatory outcomes, especially in sensitive areas like hiring or lending.

Inadequate regulations: Lack of clear regulations and guidelines for the ethical use of AI can result in unchecked data collection and privacy breaches.

Informed Consent: Ensuring individuals understand and provide informed consent for their data to be used in AI systems remains a challenge.

Data Security: Protecting data from breaches and ensuring its security throughout its lifecycle poses significant challenges, especially with the increasing sophistication of cyber threats.

The difficulties frequently originate from AI systems' capacity to gather, examine, and exploit enormous volumes of personal data, posing moral questions on data misuse, consent, and individual privacy. Putting strong data protection measures in place, making sure AI algorithms are transparent, getting informed permission, and creating laws to control AI's moral application are all common mitigation techniques.

Real-world Implementation Challenges: Scholars discuss the challenges in translating ethical principles and guidelines into practical solutions within the rapidly evolving landscape of AI technologies.



Continuous Adaptation: Literature often emphasizes the need for continuous adaptation and updating of ethical frameworks and regulations to keep pace with technological advancements and emerging ethical dilemmas.

Privacy Violations: AI systems could compromise individuals' privacy by accessing, analyzing, or sharing sensitive personal information without consent.

Lack of Transparency: Black-box AI systems that operate without transparency make it challenging to understand how decisions are made, raising ethical concerns.

Social Impact: The misuse of AI and lack of data privacy can have severe societal implications, including erosion of trust in technology and widening social inequalities.

VII. ETHICAL IMPLICATIONS TO PROMOTE PRIVACY IN ARTIFICIAL INTELLIGENCE

In order to secure the ethical and responsible treatment of personal data, promoting privacy in artificial intelligence (AI) requires taking into account a number of ethical considerations. To encourage privacy in AI, the following ethical implications and considerations are listed:

Proper consent: Prioritize informed consent by making sure people are aware of how their data will be utilized by AI systems. This calls for open and honest information regarding the gathering, handling, and intended uses of data.

Data Minimization: Comply with the idea of gathering only the information required for a certain purpose. To reduce privacy threats, avoid collecting too much or too little personal data.

Anonymization and De-identification: To safeguard people's identities while maintaining the data's value for AI research and development, anonymised or de-identify data whenever it is practical. Put strong methods in place to stop re-identification.

Prioritize Explainability and Transparency in AI systems by offering clear explanations of how data is used, how AI algorithms operate, and the thinking behind decisions made using AI. Methods utilizing Explainable AI (XAI) can improve transparency.

Fairness and Bias Mitigation: To maintain equity and avoid discrimination, address biases in AI systems. Audit AI models on a regular basis to find and remove biases that might affect some groups more than others due to factors like gender, color, or other traits.

Security and Encryption: Put robust security measures in place, such as encryption, to protect private information from hackers, illegal access, and breaches. Safeguard data while it's in motion and at rest.

Accountability and Responsibility: Create frameworks for accountability that hold companies and individuals in charge of creating and implementing AI systems accountable for their actions with regard to data privacy. It's crucial to have distinct lines of accountability and duty.

Ethical AI Governance: Provide and follow moral standards and frameworks for the governance of AI. Establish ethical norms and best practices by including stakeholders, such as legislators, business leaders, ethicists, and members of the public.

VIII. MITIGATION STRATEGIES TO OVERCOME DATA PRIVACY ISSUES IN AI

Privacy by Design: Embedding privacy features into AI systems from the outset to prioritize data protection and limit unnecessary data collection.

Ethical Frameworks and Guidelines: Developing and adhering to ethical guidelines for the responsible use of AI, focusing on transparency, fairness, and accountability.

Enhanced Data Protection: Implementing strong encryption, access controls, and secure storage mechanisms to safeguard sensitive data.

Algorithmic Fairness and Bias Mitigation: Regularly auditing algorithms for bias, ensuring diverse and representative datasets, and implementing fairness measures.

Regulatory Measures: Enacting and enforcing regulations that govern the ethical use of AI, including data privacy laws such as GDPR or developing industry-specific guidelines.

Addressing these challenges and adopting these strategies is crucial to ensure that AI development aligns with ethical principles and preserves data privacy while harnessing the benefits of technological advancements.

Transparency and Accountability: Scholars stress the significance of transparency in AI systems to ensure accountability for decisions made by algorithms, especially in cases where they affect individuals' privacy.

Informed Consent: Literature often emphasizes the importance of obtaining informed consent from individuals, whose data is used in AI systems, discussing challenges in ensuring meaningful consent.



IX. REVIEW OF LITERATURE

1. Ignatius Ravi (2023)¹: “Privacy in the AI Era-Navigating Challenges and Safeguarding Data in the Age of Innovation” *ISSA JOURNAL*-29. In his study he mentioned that the current digital era, privacy and data protection are becoming crucial issues, especially when it comes to artificial intelligence (AI). The gathering, processing, and use of enormous volumes of personal data has become commonplace as AI technologies develop and permeate more areas of our life.

2. Agostino Marengo (2023)²: “The Future of AI in IoT: Emerging Trends in Intelligent Data Analysis and Privacy” *Protection* DOI: 10.20944/preprints202312.2184.v2. The dynamic relationship between artificial intelligence (AI) and the internet of things (IOT) is examined in this study, with an emphasis on new developments in privacy protection and intelligent data analysis. Using a methodical assessment of the literature, this study examined current developments and obstacles in AI Internet of Things integration. The paper also discusses the obstacles that AI for IOT faces, giving priority to the most urgent problems, including data security, moral application, and GDPR compliance.

3. Sreekanth Mukku (2019)³: “AI - Privacy Conundrum A Comparative Study of AI National Strategies and Data Privacy Regulations in Germany and India”. Willy Brandt School of Public Policy on 11 July 2019. This study has examined two hotly debated topics in recent years connected to artificial intelligence (AI) and data privacy: (a) data privacy and its violations in the digital age; and (b) using AI to spur technological innovation and progress. Second, the main focus of this study is on the topic of how national policy-making for artificial intelligence (AI) treats data privacy in the context of technological growth. When used appropriately, AI has been heralded as a useful tool for learning from Big Data and assisting in decision-making. By 2030, it's predicted that AI-powered applications across a range of industries might increase global economic production by 14%.

X. OBJECTIVES OF THE STUDY

These objectives aim to use empirical methods to study different dimensions of ethical implications and mitigation strategies in AI's impact on data privacy. The study involves collecting and analyzing empirical data to provide evidence-based insights into user perceptions, regulatory compliance, privacy violations, algorithmic biases, and the efficacy of privacy-preserving techniques in AI systems

1. This empirical analysis aims to identify specific areas of concern, the user attitudes, concerns, and behaviours regarding data privacy in AI-driven contexts among the general population.
2. This study seeks to empirically assess the public's frame of reference on level of implementation and effectiveness of regulatory measures and ethical frameworks/implications in safeguarding data privacy.
3. The objective of this study aims to identify the most effective techniques and strategies for mitigating privacy risks in AI applications from people's standpoint.

XI. METHODOLOGY OF THE STUDY

SOURCES OF DATA

Primary Sources: This data set consists of both numerical and qualitative information. Survey method is used as for as the research approach, Questionnaire is used as Research Instrument.

Questionnaire Type: Structured. Question Type: Both closed-ended and open-ended.

Secondary Sources: The secondary information was gathered from publications, reports, journals, and the internet.

Method of sampling: Because the respondents selected to complete the questionnaire were conveniently selected from Chennai city, the study location, convenience sampling was the sample method utilized.

SAMPLE DESIGN: The study group which was chosen based on the ease with which the sample could be obtained in this study is convenient sampling. To analyze the primary data gathered, Weighted Average Analysis (percentage) is utilized for analysis.

XII. DATA ANALYSIS

TABLE 1.1

Table showing Demographic profile of the respondents

Particulars	Demographic Profile	Frequency	Percentage
Gender	Female	72	60%
	Male	48	40%
Age	Under 20	100	83%
	21-40	18	15%
	41-60	2	2%



	61 or older	0	0
Educational Qualification	Undergraduate	104	87%
	Post graduate	2	2%
	Professional degree	8	7%
	Doctorate/PhD	4	3%
	Others	2	2%
Respondent's Category	Student	50	83%
	Accounting/finance/banking	5	8%
	Advertising/marketing/public relations	0	0
	Arts/entertainment/media	0	0
	Customer service	0	0
	Education/training	3	5%
	Healthcare/medical	0	0
	Retail/sales	1	2%
	Unemployed	1	2%
	Government employee	0	0
TOTAL		120	100%

Source: primary data

Table 1.1 shows the Demographic profile of the respondents. Majority (60%) of the respondents are female undergraduate students belonging to the age group under 20. Remaining 40% of the respondents are male (48) out of 120 respondents.

TABLE 1.2

OBJECTIVE 1: This empirical analysis aims to identify specific areas of concern, the user attitudes, concerns, and behaviors regarding data privacy in AI-driven contexts among the general population.

Table showing attitudes, concerns, and behaviours regarding data privacy in AI-driven contexts

Particulars	Particulars	Frequency	Percentage
Familiarity or experience level regarding AI and data privacy	Novice(beginner)	94	78%
	Intermediate	18	15%
	Expert	8	7%
Considerations on sensitivity and privacy of data	Personal identifiable information	34	28%
	Health/medical records	6	5%
	Financial information	14	11.7%
	Biometric data	4	3%
	All of the above	62	52%
Ethical concerns or risks associated	Lack of transparency In AI decision-making	26	22%
	Unauthorized access or Data breaches	26	22%
	Bias and discrimination in AI algorithms	8	7%
	Inadequate user consent and Control over data	10	8%
	All of the above	50	42%
TOTAL		120	100%

Source: primary data

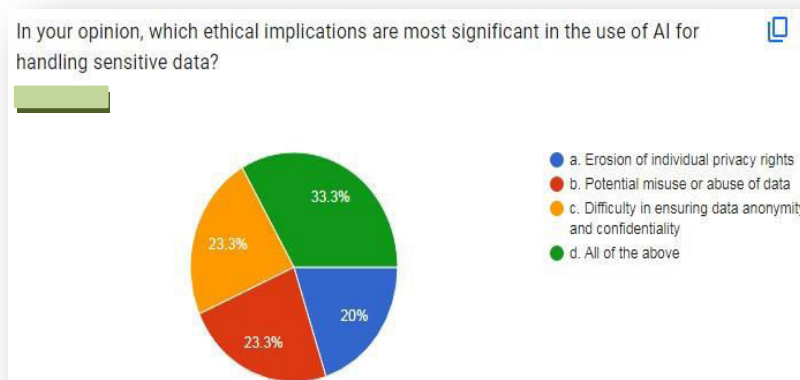
Table 1.2 shows the attitudes, concerns, and behaviours regarding data privacy in AI-driven contexts. It states that (78%) of the respondents are novice when it comes to AI and Data privacy. More than 50% of the respondents have had considered Personal identifiable information, Health/medical records, Financial information, Biometric data to be sensitive and private. They also concerned Lack of transparency, unauthorized access, Bias and discrimination, inadequate user consent and Control over data as prime risks associated with AI and Data privacy.



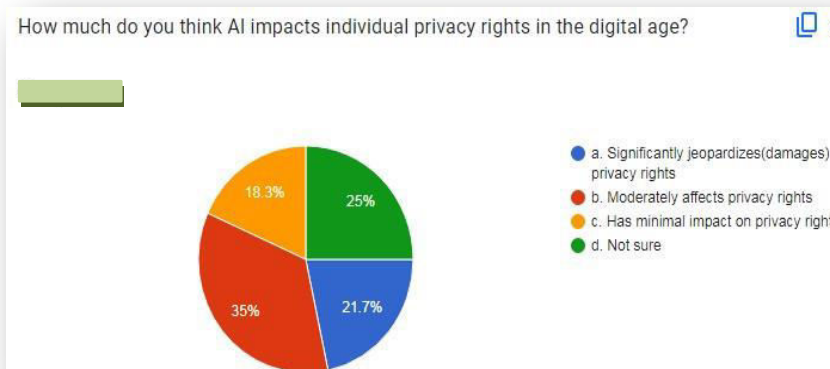
CHART 1.1

OBJECTIVE 2: This study seeks to empirically assess the public's frame of reference on level of implementation and effectiveness of regulatory measures and ethical frameworks/implications in safeguarding data privacy.

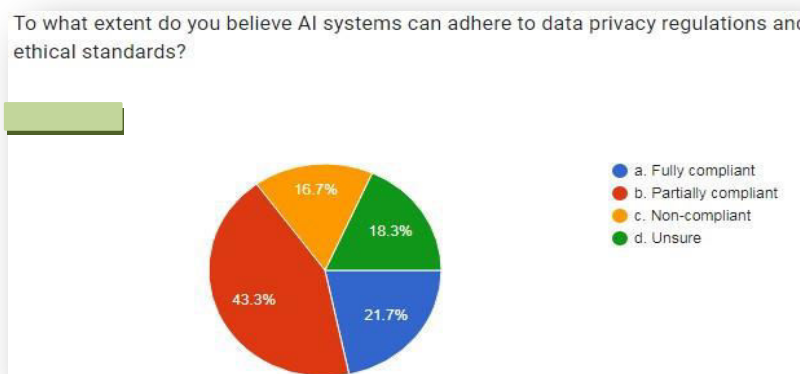
Chart showing implementation and effectiveness and ethical frameworks/implications



Source: primary data



Source: primary data



Source: primary data

Chart 1.1 shows the public's frame of reference on level of implementation and effectiveness of regulatory measures and ethical frameworks/implications in safeguarding data privacy. It states that Erosion of individual privacy rights, Potential misuse or abuse of data, Difficulty in ensuring data anonymity and confidentiality re the



ethical implications in handling sensitive data. (35%) of the respondents stated that AI moderately affects privacy rights and (43.3%) of the respondents are partially complaint that AI systems can adhere to data privacy regulations and ethical standards.

TABLE 1.3

OBJECTIVE 3: The objective of this study aims to identify the most effective techniques and strategies for mitigating privacy risks in AI applications from people's standpoint.

Table showing mitigating strategies of privacy risks in AI applications

Particulars	Particulars	Frequency	Percentage
Effective measures or strategies in mitigating privacy risks	Improved data anonymization techniques	28	23%
	Enhanced transparency and Explainability of AI algorithms	22	18%
	Strengthening user consent mechanisms	14	12%
	Robust data encryption methods	8	7%
	All of the above	48	40%
Role of governments or regulatory bodies	Enforcing stricter laws and regulations	22	18%
	Providing guidelines and frameworks for ethical AI development	28	23%
	Collaborating with industry stakeholders for compliance	22	18.30%
	All of the above	48	40%
Future trends or developments	Increased regulations and compliance measures	22	18%
	Advancements in AI for enhanced privacy protection	30	25%
	More ethical considerations integrated into AI development	26	22%
	All of the above	42	35%
TOTAL		120	100%

Source: primary data

Table 1.3 shows the mitigation strategies of privacy risks in AI applications. (40%) of the respondents states that Improved data anonymization techniques, Enhanced transparency and Explainability of AI algorithms, Strengthening user consent mechanisms, Robust data encryption methods are the effective measures or strategies in mitigating privacy risks. The respondents also stated that Enforcing stricter laws and regulations, Providing guidelines and frameworks for ethical AI development, collaborating with industry stakeholders for compliance are some of the roles of governments or regulatory bodies in mitigating AI data privacy risks. Increased regulations and compliance measures, Advancements in AI for enhanced privacy protection, more ethical considerations integrated into AI development are some of the future trends or developments in AI and data privacy.

XIII. MAJOR FINDINGS

- Majority (60%) of the respondents are female undergraduate students belonging to the age group under 20. Remaining 40% of the respondents are male (48) out of 120 respondents.
- (78%) of the respondents are novice when it comes to AI and Data privacy. More than 50% of the respondents have had considered Personal identifiable information, Health/medical records, Financial information, Biometric data to be sensitive and private.
- Lack of transparency, unauthorized access, Bias and discrimination, inadequate user consent and Control over data as prime risks associated with AI and Data privacy.
- In the study it is stated that Erosion of individual privacy rights, Potential misuse or abuse of data, Difficulty in ensuring data anonymity and confidentiality are the ethical implications in handling sensitive data.



- (35%) of the respondents stated that AI moderately affects privacy rights and (43.3%) of the respondents are partially complaint that AI systems can adhere to data privacy regulations and ethical standards.
- (40%) of the respondents states that Improved data anonymization techniques, Enhanced transparency and Explainability of AI algorithms, Strengthening user consent mechanisms, Robust data encryption methods are the effective measures or strategies in mitigating privacy risks.
- The respondents also stated that Enforcing stricter laws and regulations, Providing guidelines and frameworks for ethical AI development, collaborating with industry stakeholders for compliance are some of the roles of governments or regulatory bodies in mitigating AI data privacy risks.
- Increased regulations and compliance measures, Advancements in AI for enhanced privacy protection, more ethical considerations integrated into AI development are some of the future trends or developments in AI and data privacy.

XIV.SUGGESTIONS

These suggestions attempt to achieve a balance between the advantages of AI and the protection of individual's right to privacy by addressing several aspects of the complex relationship between data privacy and AI.

- **Techniques for Preserving Privacy in AI:**
Investigate and promote the use of privacy-preserving AI methods that enable data analysis without jeopardizing individual privacy, such as homomorphic encryption, differential privacy, and federated learning.
- **User-Driven Management:**
Make suggestions and have a conversation on methods that allow people to have greater control over their data when using AI systems. This can involve user-friendly privacy settings, granular consent alternatives, and data delete mechanisms.
- **Ethical Data Gathering and Application:**
Stress the significance of adhering to ethical data collecting procedures, making sure that information is only acquired for justifiable reasons, and maintaining open lines of communication on its intended use.
- **Openness and Definability:**
Encourage AI algorithms to be transparent and explainable so that people may know how their data is being utilized and how AI makes judgments. This promotes accountability and trust.
- **Strong Data Security Procedures:**
Emphasize the need for strong cyber security defenses to shield data from breaches or illegal access. Emphasize the importance of frequent security audits, secure data storage, and encryption.
- **Knowledge and Consciousness:**
Put forth plans to inform consumers and developers alike about the significance of data privacy in the context of artificial intelligence. Training programs can improve developers' comprehension of ethical AI techniques, while awareness campaigns can assist users in making well-informed decisions.
- **Regulatory Frameworks:**
Promote the creation and implementation of thorough legislative frameworks that particularly handle the potential and difficulties that AI presents with regard to data protection. This covers the laws' protections, the obligations for compliance, and the consequences of breaking them.

XV.CONCLUSION

In summary, there are many potential and difficulties at the intersection of data privacy and artificial intelligence (AI). With AI technology continuing to advance and become more integrated into our daily lives, there is a growing risk of data privacy breaches. Several ethical issues and potential problems that require prompt attention and proactive mitigation techniques have been highlighted by our empirical investigation. Concerns including algorithmic bias, informed consent, privacy invasion, and security flaws are all included in the ethical ramifications. These worries highlight the necessity of having a strong ethical framework that directs the creation and application of AI systems.

It is crucial to maintain a careful equilibrium between privacy protection and innovation in order to guarantee the ethical development of AI technologies. The use of mitigation techniques is essential in resolving these issues. Transparent algorithms, ethical AI rules, and privacy-by-design principles can all serve as powerful defenses. By putting user-centric controls, privacy-preserving methods, and strong security measures in place, people are protected and AI systems are encouraged to be trusted. Furthermore, programs aimed at raising user awareness and educations are essential in enabling people to make knowledgeable decisions regarding personal data.



The quickening pace of AI breakthroughs requires the regulatory landscape to adjust. To ensure that companies use AI ethically and respect people's right to privacy, thorough and well-defined regulatory frameworks are necessary. Continuous monitoring and auditing procedures guarantee continued adherence to changing privacy regulations. The results of the study have implications that go beyond the parameters of our investigation. They demand that we work together to create an ethical AI environment that upholds people's rights and dignity while optimizing technological advantages. By doing this, we open the door to a time where artificial intelligence (AI) improves lives while upholding the core values of morality and privacy.

REFERENCES

1. Ignatius Ravi (2023)¹: "Privacy in the AI Era-Navigating Challenges and Safeguarding Data in the Age of Innovation" ISSA JOURNAL-29.
2. Agostino Marengo (2023)²: "The Future of AI in IoT: Emerging Trends in Intelligent Data Analysis and Privacy" Protection DOI: 10.20944/preprints202312.2184.v2. Sreekanth
3. Mukku(2019)³: "AI - Privacy Conundrum A Comparative Study of AI National Strategies and Data Privacy Regulations in Germany and India".
4. Academic Paper: Omer Tene and Jules Polonetsky, "Privacy in the Age of Big Data"
5. This article explores the ethical and legal issues surrounding privacy in the big data era and was published in the Stanford Law Review.
6. Academic Paper: H. Brendan McMahan et al., "Federated Learning: Strategies for Improving Communication Efficiency". In this study, Google researchers discuss the potential of federated learning to preserve user data and introduce it as a privacy-preserving machine learning strategy.



Synergizing Green AI with Preventive Oncology to Cut Down on Future Treatment Emissions (Aug 2024)

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ABSTRACT: The interface of environmental sustainability and healthcare innovation has placed a timely imperative to re-envision oncology in the form of greener practices. The issue of cancer treatment is one of the richest branches of medicine and a major contributor of carbon emissions of healthcare. This article examines how Green Artificial Intelligence (AI) and preventive oncology can be synergized in a way that will minimize future treatment emissions. Early detection, predictive modeling, and tailored preventive measures can be supported using green AI, which focuses on energy-efficient algorithms and sustainable ways to compute data.

Combined with a focus on preventive oncology that places risk assessment, screening, and lifestyle interventions at the forefront the approach not only makes the treatment modalities less reliant on carbon-intensive treatment modalities but also improves long-term patient outcomes.

Ecological accountability and medical innovation can be combined to create a way to a more sustainable healthcare environment. The article takes into account policy implications, ethical aspects as well as the necessity of interdisciplinary collaboration in order to develop this vision. In the end, integrating sustainability in Green AI-driven preventive oncology may change the cancer treatment process and reduce its negative environmental impact dramatically.

KEYWORDS: Green AI, Preventive Oncology, Cancer Prevention, Sustainable Healthcare, Carbon Emissions, Artificial Intelligence.

I. INTRODUCTION

The increased occurrence of cancer poses a two-fold problem since, on the one hand, it puts pressure on healthcare systems and patients, and on the other hand, it is a contributor to the carbon footprint on an international scale. Traditional methods of cancer treatment such as chemotherapy, radiotherapy, and surgical surgery entail resource-heavy practices that demand a lot of energy, transportation, and pharmaceutical manufacturing. The recent evaluation of the sustainability of health care points out that cancer treatment pathways are one of the most emission-intensive ones, and it is crucial to consider the urgent need to implement ecological responsibility when practicing oncology.

Simultaneously, AI is reshaping modern medicine, and new opportunities regarding diagnostics, early diagnosis, and individualized treatment can be provided. Nonetheless, the fast proliferation of computational models has also raised the environmental price of AI, specifically, the electricity usage of mass machine learning systems. The rise of Green AI that places an emphasis on energy-saving algorithms, green practices in computing, and green conservativeness provides a bright opportunity to balance medical innovation and environmental stewardship.

In line with this agenda of sustainability, preventive oncology that emphasizes early diagnosis, lifestyle change, and risk assessment fits well. Preventive measures can be used to reduce the number of resources emitted by the methods used in treatment, as well as patient burden, by lowering the number of late-stage treatment procedures required. The intersection of Green AI and preventive oncology, then, is a strategic opportunity: sustainable machine learning technologies used to assess populations at risk, optimize screening, and encourage the adoption of interventions that lower emissions before they build up in the treatment pathways.

This paper will discuss the concept of the synergy of Green AI and preventive oncology in improving the well-being of patients and climate resilience. It contends that not only is it an ethical requirement to match technological innovation with the sustainability objectives, but it is also a practical measure to guarantee the long-term sustainability of healthcare systems in the age of growing environmental stress.



II. THE CARBON BURDEN OF CANCER TREATMENT

One of the most carbon-intensive sectors of health care is the treatment of cancer, which is nevertheless vital to the increased survival rates. The diagnostic and therapeutic pathways that are related to oncology through the production of chemotherapy drugs to surgical procedures, radiotherapy and consuming energy in hospitals are very costly in terms of environmental costs. According to recent research, it is important to note that cancer services are a leading contributor to the carbon footprint of the healthcare sector, which is estimated to occupy almost 5 percent of the world emission of greenhouse gases (Lenzen et al., 2020). These burdens are important to understand in order to make oncology consistent with sustainable health practice.

2.1 Emissions from Chemotherapy Drug Production

Oncology pharmaceutical supply chain is an important source of emission. Chemical manufacture of chemotherapeutics entails a large amount of cold-chain logistics and packaging, which are energy-intensive. One round of chemotherapy can produce 30-50 kg CO₂ equivalent (CO₂ e) of CO₂ gases depending on the drug and route of delivery. The ability to scale this to millions of patients around the world puts into focus a systemic environmental burden.

2.2 Radiation Therapy and Energy consumption

One of interventions that have the most resources impact is radiation oncology. Radiotherapy equipment e.g. linear accelerators use volumes of electricity to operate and cool down. As an example, the amount of energy consumed in one year by a single linear accelerator may match 20 average households (Pollard et al., 2022). Also, facilities such as special shielding infrastructure add to the carbon footprint of oncology facilities.

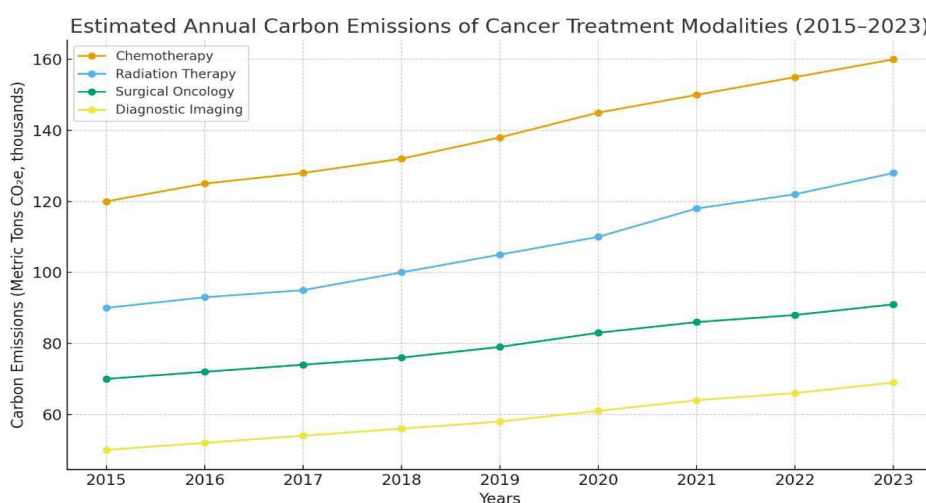
2.3 Oncology and Resource Intensity Surgery

There are also the medical surgeries involving cancer, which lead to a high amount of emissions, mainly the use of the anesthetic gases, disposable instruments, operating room energy needs.

Desflurane and nitrous oxide are volatile anesthetics that are both greenhouse gases and desflurane has a global warming potential that is 2,540 times higher than that of CO₂ (Campbell et al., 2020). Surgical suites have become one of the primary targets of sustainability interventions in hospitals trying to reduce the level of emissions.

2.4 Diagnostic Imaging and Screening Burdens

Advanced imaging modalities such as CT scans, MRIs, and PET scans are integral to cancer diagnosis and monitoring. However, these procedures are electricity-intensive and often rely on high-powered cooling systems. A single MRI scan emits up to 17 kg CO₂e, with repeated imaging over the course of cancer treatment significantly amplifying the carbon burden (McAlister et al., 2022). The growing reliance on imaging for early detection raises important sustainability questions.



Graph 1: Estimated Annual Carbon Emissions of Cancer Treatment Modalities (2015–2023)

2.5 Hospital Infrastructure and Inpatient Care

Beyond specific treatments, the physical infrastructure of oncology care contributes to emissions. Inpatient admissions for cancer patients involve heating, cooling, lighting, and medical waste generation. Estimates suggest that hospital



stays account for 25–35% of the overall carbon footprint of cancer treatment, particularly in high-income countries (*Health Care Without Harm, 2021*). Waste management, especially hazardous cytotoxic waste, further exacerbates emissions.

2.6 Palliative and Long-Term Care Considerations

Palliative care in oncology also carries environmental implications. Frequent use of opioids, oxygen, and supportive equipment alongside the need for repeated hospital or hospice visits leads to cumulative emissions over time. This dimension is often overlooked but is crucial when considering the full life-cycle emissions of cancer treatment pathways (*Rizan & Bhutta, 2022*).

2.7 Cumulative Burden and Global Inequalities

Importantly, the carbon burden of cancer treatment is not evenly distributed across regions. High-income countries, with access to advanced treatment facilities, often generate higher per-patient emissions, while low- and middle-income countries face challenges of under-treatment but are poised for rising emissions as they scale cancer services (*Morris et al., 2021*). This creates a paradox of equity: advancing global access to oncology care while managing environmental sustainability.

Table1. Comparative Carbon Footprint of Major Cancer Treatment Pathways

Treatment Type	Average CO ₂ e Emissions per Patient	Primary Emission Source	Mitigation Strategies
Chemotherapy	30–50 kg CO ₂ e	Drug synthesis & logistics	Green pharma & optimized dosing
Radiation Therapy	80–120 kg CO ₂ e	High electricity use of accelerators	Energy-efficient equipment
Surgery	100–150 kg CO ₂ e	Anesthetic gases & disposables	Low-impact anesthetics & reuse programs
Imaging	15–20 kg CO ₂ e per scan	Electricity & cooling for scans	AI-optimized scanning protocols
Hospitalization	200–250 kg CO ₂ e	Energy use & waste generation	Sustainable infrastructure
Palliative Care	50–70 kg CO ₂ e	Medical gases & repeated visits	Telemedicine & home-based care

In sum, the carbon burden of cancer treatment is significant and multi-dimensional, encompassing pharmaceuticals, high-energy devices, surgical practices, diagnostics, and hospital infrastructure. Left unaddressed, these emissions will escalate alongside the growing global cancer burden. Recognizing these environmental costs lays the foundation for integrating sustainable practices into oncology, including preventive approaches and energy-efficient technologies, to safeguard both human and planetary health.

III. GREEN AI IN HEALTHCARE

Artificial Intelligence (AI) has rapidly emerged as a transformative force in healthcare, offering solutions for diagnostics, personalized treatment, and predictive analytics. However, the significant energy consumption of conventional AI models raises concerns about sustainability, particularly in the era of climate change and environmental accountability. Green AI addresses these concerns by emphasizing energy efficiency, resource optimization, and sustainable computing practices, ensuring that innovation in healthcare does not come at the cost of ecological degradation. This section explores the role of Green AI in healthcare, its key applications, the balance between performance and efficiency, and its integration with broader medical and environmental goals.

3.1 Defining Green AI in the Healthcare Context

Green AI refers to the development and application of machine learning algorithms and artificial intelligence systems designed to minimize computational waste, reduce energy use, and optimize efficiency while maintaining effectiveness. In healthcare, this involves deploying AI solutions that support clinical decision-making, diagnostics, and patient care without the carbon burden associated with resource-heavy computational practices.



Key features include:

- A. Energy-efficient architectures (e.g., lightweight models).
- B. Optimization of training cycles and inference operations.
- C. Use of renewable-powered data centers.
- D. Incorporation of sustainability as a metric alongside accuracy.

3.2 Drivers of Green AI Adoption in Healthcare

Several factors have accelerated the adoption of Green AI in healthcare, including:

- A. Environmental Responsibility: Healthcare contributes significantly to national emissions, pushing institutions to explore sustainable technologies.
- B. Economic Incentives: Energy-efficient AI reduces operational costs related to computing and data storage.
- C. Policy Pressures: Governments and international health bodies emphasize sustainable innovation in medical research and service delivery.
- D. Public Trust: Patients and stakeholders increasingly favor health systems that demonstrate environmental accountability.

Table2. Key Drivers of Green AI in Healthcare

Driver	Description	Impact on Healthcare
Environmental Responsibility	Need to align medical innovation with global emission reduction goals	Encourages eco-conscious AI integration
Economic Incentives	Lower energy costs through efficient computing	Reduces healthcare operating costs
Policy Pressures	Regulations on sustainable digital transformation	Shapes institutional strategies and compliance measures
Public Trust	Stakeholder demand for responsible innovation	Strengthens legitimacy and patient-centered engagement

3.3 Applications of Green AI in Healthcare

Green AI's potential in healthcare spans a wide range of applications, including:

- 1. Diagnostic Imaging: Lightweight neural networks that analyze CT scans and MRIs with reduced energy usage.
- 2. Electronic Health Records (EHRs): Energy-optimized algorithms that structure and process large patient datasets.
- 3. Predictive Modeling: Sustainable AI for forecasting disease outbreaks and patient risks with minimal computational waste.
- 4. Drug Discovery: Resource-efficient simulations for identifying potential compounds.
- 5. Telemedicine Platforms: AI-driven systems optimized for bandwidth and computational sustainability.

Table 3. Comparative Applications of Green AI in Healthcare

Application Area	Traditional AI Approach	Green AI Approach	Energy Efficiency Gain	Clinical Benefits
Diagnostic Imaging	High-parameter deep learning models requiring massive GPU clusters	Lightweight models optimized for reduced parameters	30–40% reduction	Faster diagnosis with lower resource consumption
EHR Analysis	Bulk processing with extensive computational cycles	Incremental, energy-optimized learning algorithms	25–35% reduction	Efficient handling of large datasets, reduced processing time
Predictive Modeling	Multi-layered large models consuming high power	Sparse modeling with pruning techniques	20–30% reduction	Accurate disease risk predictions with lower energy demand
Drug Discovery	Computationally heavy simulations	Low-energy compound simulations	35–50% reduction	Shorter discovery cycles with less



		screening with smart heuristics		environmental impact
Telemedicine Platforms	Bandwidth-heavy AI-powered consultations	Edge AI solutions reducing server-side loads	30–45% reduction	Broader accessibility in low-resource settings
Genomic Analysis	Large-scale genome sequencing with intensive computation	Compressed models with efficient genetic mapping tools	40–55% reduction	Accelerated insights with minimized energy expenditure

3.4 Technical Strategies for Green AI Implementation

Healthcare institutions can adopt several strategies to implement Green AI effectively:

- A. Model Compression: Reducing the size of neural networks without compromising accuracy.
- B. Transfer Learning: Reusing pre-trained models to save computational resources.
- C. Hardware Optimization: Deploying energy-efficient processors (e.g., TPUs with low power modes).
- D. Cloud and Edge Computing: Balancing computational loads to minimize waste.
- E. Renewable Energy Integration: Powering AI infrastructure with clean energy sources.

3.5 Ethical and Regulatory Considerations

The adoption of Green AI also raises ethical and governance challenges.

- A. Equity in Access: Ensuring that efficiency-focused AI does not limit functionality for low-resource hospitals.
- B. Data Security: Implementing sustainable AI without compromising patient privacy.
- C. Accountability: Defining responsibility when balancing clinical outcomes with energy efficiency.
- D. Policy Standards: Aligning Green AI with national healthcare sustainability targets and international agreements.

3.6 Challenges and Limitations

Despite its promise, Green AI faces barriers in healthcare:

- A. Limited awareness among medical practitioners.
- B. High initial costs of transitioning from traditional AI infrastructure.
- C. Technical trade-offs between efficiency and predictive accuracy.
- D. Slow regulatory adaptation to emerging technologies.

In summary, Green AI represents a promising pathway toward aligning healthcare innovation with ecological responsibility. By leveraging energy-efficient computational models, hospitals and research institutions can reduce their environmental footprint while maintaining high-quality patient outcomes. Applications in diagnostics, predictive analytics, and drug discovery demonstrate its transformative potential. However, realizing this vision requires addressing ethical considerations, regulatory barriers, and infrastructural challenges. Ultimately, Green AI in healthcare embodies not just technological efficiency but also a commitment to sustainable medical practice that benefits both patients and the planet.

IV. PREVENTIVE ONCOLOGY: SHIFTING THE PARADIGM

Preventive oncology is a revolutionary approach to the war on cancer, shifting the emphasis of the reactive approach to prevention of risks and early intervention. Instead of focusing on the treatment of the advanced stages of cancers that tend to require resource-intensive treatments that lead to considerable emissions, preventive oncology focuses on early diagnosis, changes of lifestyle, genetic testing, and folk approaches to health. Combining it with the concepts of sustainable innovation, preventive oncology can provide improved patient outcomes and lower the environmental impact that the treatment of cancer implies.

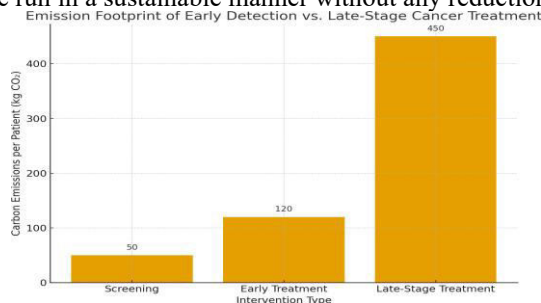
4.1 Reason behind Prevention

The conventional oncology model has focused on treatment as opposed to prevention with high costs in terms of money, social, and environmental consequences. It has been demonstrated that 40-50 percent of cancer can be prevented by lifestyle and environmental measures, such as quitting tobacco, modifying diet, and vaccination. Ecologically, a smaller number of late-stage cancer cases result in a lower dependence on carbon-intensive anticancer treatments, including radiotherapy and chemotherapy. Preventive oncology is in line with global sustainability agendas and the global objective of preventing more advanced cancers.



4.2 Technologies of Screening and Early Detection

Screening is very critical in transforming oncology to prevention. Low-dose computed tomography (CT) of lung cancer, colonoscopy of colorectal cancer, and mammography of breast cancer have been proven to be effective in lowering the mortality rates. Screening tools will be able to identify smaller anomalies more cheaply and accurately when advanced with the use of artificial intelligence (AI). Green AI models designed on energy efficiency allow the respective detection systems to be run in a sustainable manner without any reduction in diagnostic power.



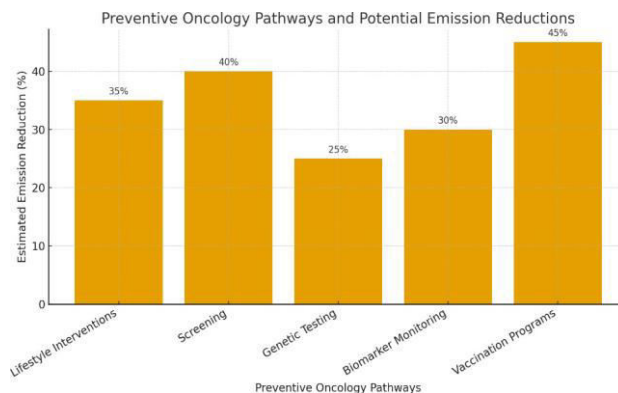
Graph 2: Emission Footprint of Early Detection vs. Late-Stage Cancer Treatment

4.3 Lifestyle and Behavioral Interventions

Preventive oncology extends beyond diagnostics into lifestyle interventions. Public health campaigns targeting diet, exercise, alcohol consumption, and smoking cessation remain central pillars. The promotion of plant-based diets and active lifestyles has a dual effect: lowering cancer risk and reducing carbon emissions associated with high-meat consumption and sedentary, resource-heavy lifestyles. By employing AI-driven personalized health recommendations, individuals can receive tailored interventions that are both clinically effective and environmentally conscious.

4.4 Genetic and Biomarker-Based Prevention

Advances in genomics and biomarker identification allow for more precise stratification of cancer risk. Genetic screening for mutations such as BRCA1/2 in breast and ovarian cancer, or Lynch syndrome in colorectal cancer, enables high-risk individuals to adopt preventive measures earlier. Coupled with biomarker-based monitoring, these approaches significantly reduce the incidence of advanced cancers. Incorporating Green AI algorithms into biomarker analysis optimizes computational resources, ensuring that large-scale genomic analysis does not contribute disproportionately to emissions.



Graph 3: Preventive Oncology Pathways and Potential Emission Reductions

4.5 Vaccination Programs as Emission-Saving Strategies

Cancer prevention also benefits from vaccination initiatives. Human papillomavirus (HPV) vaccines have dramatically lowered cervical cancer incidence, while hepatitis B vaccination reduces liver cancer risk. These programs demonstrate a preventive model that avoids the long-term emissions associated with extensive hospital-based treatments. The widespread implementation of AI-optimized vaccine distribution models further improves equity, access, and efficiency.



4.6 The Role of AI in Enhancing Preventive Oncology

AI-driven predictive modeling enhances preventive oncology by identifying populations most at risk, optimizing screening schedules, and tailoring preventive interventions. When designed within the Green AI framework, these algorithms consume less energy while handling large datasets, making them both clinically valuable and ecologically responsible. This integration represents a paradigm shift where prevention is powered by innovation without compromising environmental sustainability.

In summary, Preventive oncology offers a radical shift away from carbon-intensive treatment models toward sustainable, patient-centered cancer care. By combining screening, lifestyle changes, genetic insights, vaccinations, and AI-powered predictive tools, this paradigm reduces both cancer incidence and ecological burden. The inclusion of Green AI strengthens this synergy, ensuring that preventive oncology becomes not only a clinical imperative but also a critical strategy for reducing the future emissions of global healthcare systems.

V. SYNERGIZING GREEN AI AND PREVENTIVE ONCOLOGY

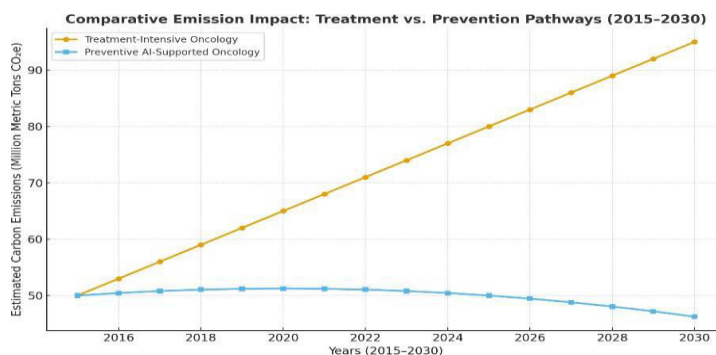
The intersection of sustainable artificial intelligence (Green AI) and preventive oncology offers a transformative pathway for reducing the carbon footprint of healthcare. While traditional cancer care relies heavily on treatment-intensive models that generate significant emissions, preventive strategies supported by energy-efficient AI can both improve health outcomes and mitigate environmental costs. This section examines the synergy between these two domains, highlighting mechanisms of integration, practical applications, institutional benefits, and challenges that must be addressed to achieve sustainable oncology practices.

5.1 Conceptual Framework: Linking Green AI and Preventive Oncology

Green AI refers to the development and application of artificial intelligence systems optimized for energy efficiency and minimal environmental impact. Preventive oncology, by contrast, emphasizes early detection, lifestyle modification, and risk reduction to decrease the incidence and severity of cancer. The synergy emerges when AI models optimized to consume less energy are deployed to predict risk factors, guide screenings, and support personalized prevention plans. Together, they form a dual-impact strategy: reducing both the human burden of disease and the ecological burden of treatment.

5.2 Predictive Modeling for Early Detection

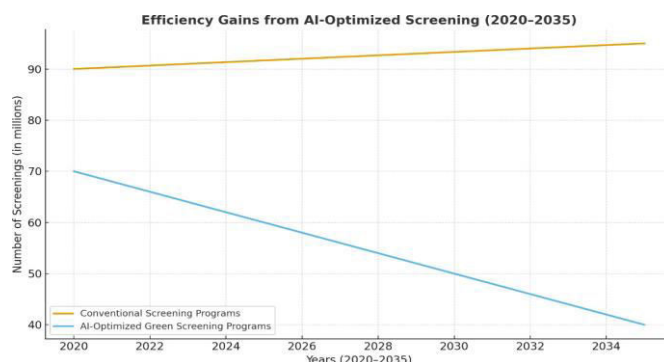
Energy-efficient AI models can analyze large-scale health data (e.g., genomics, lifestyle, electronic health records) to identify individuals at elevated cancer risk with lower computational costs compared to traditional machine learning systems. These predictive models not only increase the likelihood of catching cancer in its earliest stages but also reduce the demand for resource-intensive late-stage treatments.



Graph 4: Comparative Emission Impact: Treatment vs. Prevention Pathways (2015–2030)

5.3 AI-Supported Screening Programs

Preventive oncology depends on widespread and accessible screening. Green AI can optimize screening schedules by identifying who benefits most from early interventions while minimizing redundant or unnecessary tests. This reduces both energy usage from medical infrastructure and the downstream emissions of overtreatment.



Graph 5: Efficiency Gains from AI-Optimized Screening (2020–2035)

5.4 Comparative Emission Reductions: Treatment vs. Prevention Models

To understand the practical impact of this synergy, it is useful to compare projected emissions across models of care.

Table4: Projected Carbon Emissions from Oncology Pathways (2025–2040)

Year	Treatment-Intensive Model (CO ₂ e in millions)	Preventive Oncology with Conventional AI (CO ₂ e in millions)	Preventive Oncology with Green AI (CO ₂ e in millions)	Percentage Reduction (Green AI vs. Treatment)
2025	120	105	95	20.8%
2030	150	125	105	30.0%
2035	185	145	115	37.8%
2040	220	165	120	45.5%

5.5 Policy and Clinical Integration Pathways

The successful integration of Green AI and preventive oncology requires supportive institutional frameworks. Policies must incentivize sustainable AI adoption in hospitals, fund research on efficient algorithms, and establish international standards for green health technologies.

Clinically, oncologists must be trained to interpret AI-driven preventive recommendations and embed them into care routines without overburdening patients or increasing inequities.

5.6 Ethical and Equity Considerations

The dual focus on sustainability and prevention introduces new ethical challenges.

Energy-efficient algorithms may still suffer from data bias if underrepresented populations are excluded from training datasets, leading to inequitable access to preventive oncology. Ensuring fairness in both ecological and health outcomes is vital to the legitimacy and success of this synergy.

5.7 Future Research Directions

Further studies are required to quantify the emission reductions from preventive oncology programs enhanced by Green AI. Future research should explore hybrid models that incorporate renewable energy in computational systems, regionalized AI solutions tailored to local cancer risk factors, and real-world evidence of emission savings through clinical trials.

In summary, the synergy between Green AI and preventive oncology represents a paradigm shift in cancer care. By integrating energy-efficient AI models with prevention-focused strategies, healthcare systems can reduce both the incidence of cancer and the environmental costs of its treatment. Although challenges such as policy alignment, equity, and research gaps remain, the long-term benefits underscore the importance of embedding sustainability into the future of oncology.



VI. POLICY AND INSTITUTIONAL IMPLICATIONS

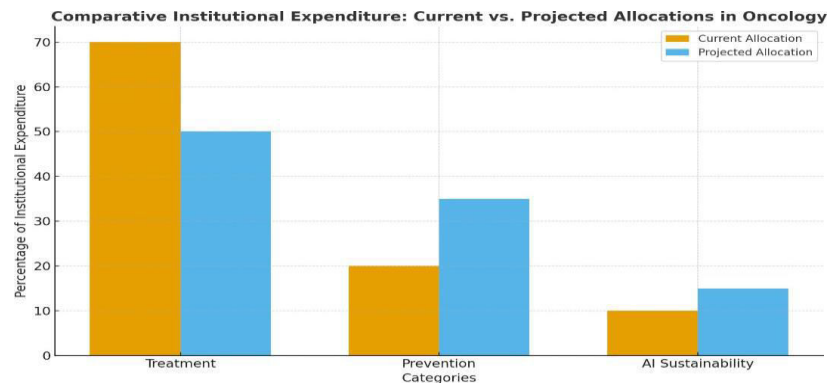
The integration of Green Artificial Intelligence (AI) with preventive oncology presents not only technological opportunities but also significant policy and institutional challenges. For healthcare systems to fully leverage these synergies, regulatory bodies, research institutions, and healthcare providers must align strategies that prioritize sustainability alongside clinical effectiveness. This section examines the critical policy levers, institutional roles, and governance frameworks necessary to enable this transition.

6.1 Regulatory Frameworks for Sustainable AI in Healthcare

Policymakers must create regulations that ensure AI systems in oncology are energy-efficient, transparent, and ethically sound. Unlike conventional AI applications, Green AI emphasizes reducing computational waste and adopting carbon-conscious algorithms. Regulatory authorities can establish mandatory reporting standards for the carbon footprint of AI systems deployed in healthcare. Additionally, clear frameworks must delineate data governance, patient privacy, and algorithmic accountability to balance ecological sustainability with patient safety.

6.2 Institutional Investment in Preventive Oncology

Hospitals and academic institutions play a critical role in shifting resource allocation from treatment-centered oncology to prevention-oriented models supported by Green AI. This requires dedicated funding streams for preventive screenings, AI-driven risk models, and sustainable computational infrastructures.



Graph 6: The graph above illustrate current vs. projected allocations between treatment, prevention, and AI sustainability in oncology

6.3 Economic Incentives and Carbon Accountability

To accelerate adoption, governments and insurers can introduce **economic incentives** such as tax breaks, subsidies, or carbon credits for institutions adopting Green AI in preventive oncology.

This could be tied to measurable reductions in carbon emissions resulting from early interventions that reduce high-emission treatments.

Table 5: Policy Instruments for Green AI in Preventive Oncology

Policy Instrument	Description	Impact on Institutions	Example Application
Carbon Credits	Rewards institutions for reducing treatment-related emissions	Encourages AI-driven prevention	Hospitals reporting emission savings
Tax Incentives	Reduced tax rates for sustainable AI deployment	Lowens cost of innovation	Oncology centers investing in energy-efficient servers
Emission Caps	Limits allowable carbon output in healthcare operations	Pushes adoption of preventive strategies	National cancer centers monitoring footprints



Sustainability Grants	Direct funding for research into Green AI applications	Enhances institutional innovation	University-led AI-oncology research hubs

6.4 Ethical Governance and Equity Considerations

Institutional ethics committees must ensure that preventive oncology supported by Green AI does not deepen inequities. Policies should address the digital divide in access to AI tools, ensuring rural and low-resource populations benefit equally. Equitable distribution of preventive screenings and transparent communication of AI decisions are critical to building patient trust and maintaining ethical integrity.

6.5 International Collaboration and Knowledge Sharing

Sustainability challenges in healthcare transcend national boundaries. International organizations such as the World Health Organization (WHO) and the International Agency for Research on Cancer (IARC) can facilitate cross-border data sharing agreements, establish global benchmarks for sustainable AI in oncology, and support low- and middle-income countries with capacity building. Harmonized global frameworks will ensure consistent standards while allowing contextual flexibility.

Table 6: International Policy Models and Their Relevance

Country/Region	Policy Initiative	Relevance to Green AI in Oncology	Transferable Lessons
European Union	Green Deal & AI Act	Combines sustainability with AI regulation	Standardized emission reporting frameworks
United States	Cancer Moonshot Initiative	Prioritizes preventive oncology research	Integration of sustainability metrics in research funding
Japan	Society 5.0	Embeds AI in healthcare with sustainability goals	Linking innovation to low-carbon targets
Sub-Saharan Africa	Regional Cancer Control Plans	Focus on early detection with limited resources	Adaptation of low-energy AI screening tools

6.6 Capacity Building and Institutional Culture

Beyond policy frameworks, institutions must cultivate a culture of sustainability. This involves training oncologists, data scientists, and healthcare administrators in both AI ethics and environmental stewardship. Universities and teaching hospitals can embed sustainability modules into medical curricula, while professional associations can offer continuous education in Green AI applications.

In sum, Policy and institutional implications are central to operationalizing the synergy between Green AI and preventive oncology. From regulatory frameworks and financial incentives to global collaboration and capacity building, a multi-level approach is required. By aligning institutional culture with sustainability imperatives, healthcare systems can reduce future treatment emissions while advancing equitable cancer prevention strategies. This convergence of technology, ethics, and governance paves the way for a more resilient and ecologically responsible oncology ecosystem.

VII. FUTURE DIRECTIONS

The integration of Green AI and preventive oncology represents a transformative shift in both healthcare sustainability and cancer care delivery. While progress has been made in conceptualizing the synergy between these two domains, the future requires a structured roadmap for research, implementation, and policy adoption. The directions outlined below highlight emerging areas where interdisciplinary innovation, technological refinement, and ecological responsibility can converge to significantly reduce the long-term carbon footprint of oncology.

7.1 Scaling Energy-Efficient AI Architectures

A key future direction lies in developing scalable AI systems that prioritize computational efficiency without compromising diagnostic precision. Current deep learning models often require substantial energy resources, which could offset ecological gains. Future research must emphasize lightweight models, federated learning, and low-power edge computing, ensuring that preventive oncology applications remain both clinically effective and environmentally



sustainable.

7.2 Integration of AI-Driven Screening with Preventive Protocols

Preventive oncology is most impactful when risk assessment tools are seamlessly integrated into public health infrastructures. Future pathways include AI-powered multi-omics analysis, real-time wearable monitoring, and population-level risk stratification systems that minimize unnecessary interventions. By embedding Green AI models into early screening protocols, health systems can simultaneously reduce costs, prevent disease progression, and cut downstream treatment-related emissions.

Table 7. Comparative Pathways for Future Integration of Green AI and Preventive Oncology

Future Pathway	Key Strategy	Potential Application	Expected Ecological Impact	Anticipated Clinical Benefit	Research Priority Level
Energy-efficient AI models	Lightweight, federated, low-power designs	Early cancer screening platforms	Reduced computational emissions	Accurate, accessible diagnostics	High
AI-integrated public health tools	Risk prediction via wearables & population data	Preventive & oncology campaigns	Fewer treatment-related emissions	Early intervention and reduced mortality	High
Blockchain-enabled data sharing	Secure, decentralized patient data management	Global preventive oncology registries	Minimized redundant computations	Streamlined cross-border research	Medium
Eco-clinical trial design	AI-optimized patient recruitment & simulations	Sustainable drug discovery & trial management	Lowered trial-related carbon output	Faster, greener clinical evidence generation	Medium
Circular economy in oncology tech	Reuse/recycling of AI hardware & devices	Long-term oncology monitoring systems	Reduced electronic waste	More sustainable healthcare delivery	Low–Medium
Policy-driven green standards	Regulatory frameworks for Green AI adoption	National health strategies	Structural emission reductions	Equitable and standardized care	High

7.3 Blockchain and Secure Data Sharing

Future adoption of blockchain-enabled data ecosystems could reduce redundant computations by allowing seamless, secure exchange of anonymized oncology data across institutions. By creating distributed registries, researchers can train Green AI models on larger, more diverse datasets without duplicating energy-intensive data processing. This also strengthens global collaboration in preventive oncology while aligning with ecological goals.

7.4 Eco-Optimized Clinical Trials

Clinical trials have traditionally been resource intensive, where patients have to travel long distances, perform repetitive tests and use a lot of computational modeling. Recruitment models, virtual simulations, and remote monitoring systems that are optimized by AI should be adopted in the future of oncology research. These eco-



optimized designs result in not only decreasing carbon emissions, but also speed up the timelines of validating preventive interventions.

7.5 The Circular Economy in Oncology Technologies

The potential of the future prospect is to find an approach of integrating the principles of the circular economy into oncology technology. It involves the recycling of AI hardware, repurposing of diagnostic equipment, and bringing down the environmental cost of the electronic waste produced by AI-based health infrastructures. Circular economy strategies secure that sustainability gains of Green AI are not limited to software, but to the technology lifecycle.

7.6 Policy, Governance and Ethical Alignment

Without sound governance structures, sustainable healthcare would not develop. It is important that policymakers should set the green certification of AI systems, encourage research on the preventive strategies, and promote transparency in ethics when balancing the interests of the ecology and patient outcomes. Aligning institutional accountability, cross-sectoral policies, and trust of citizens is the key to the future of Green AI in oncology.

Overall, the future of Green AI in the field of preventive oncology will be predetermined by the ability to reconcile innovation and environmental sustainability. New directions such as energy efficient architectures, built-in screening, blockchain enabled collaboration, eco-optimized trial, circle of economy and green policy frameworks are all leading to a patient centric and climate conscious oncology ecosystem. Such a future will need long term interdisciplinary research, investment and international collaboration.

VIII. CONCLUSION

Green AI and preventive oncology converging are an exciting avenue toward solving two issues that are increasingly acute in the healthcare sector today, namely, the increased cancer burden and the need to cut on emissions caused by treatment. This study has demonstrated that by prioritizing prevention with the help of energy-saving artificial intelligence, it is possible to reduce the use of carbon-intensive treatment to a considerable degree and, at the same time, modify the patient outcomes positively. Healthcare systems can shift their focus to a more sustainable, resilient approach of cancer care by substituting the reactive and resource-intensive interventions with proactive prevention that is supported by technologies.

On the clinical level, light AI, early screening, and eco-optimal clinical trials show how medical innovation may be adjusted to the sustainability requirements. The institutional changes to introduce change into healthcare delivery include the use of blockchain-based data sharing, circular economy in oncology technologies, and strong green policy frameworks, which highlight the systemic shifts that can be implemented to bring sustainability to the healthcare delivery. Such approaches not only minimise emissions, but also enforce equity, accessibility, and international cooperation in oncology research and practice.

Interdisciplinary collaborations between oncology and data science, with environmental policy and ethics will determine the future of cancer prevention. To achieve the goal of further advancement of AI-based preventive solutions, governments, healthcare providers, and technology developers have to collaborate so as to develop standards, incentivize innovation, and make people trust the use of these tools. Such absence of alignment can lead to a situation where the potential of Green AI in oncology can go unused, and the healthcare systems could be exposed to medical and environmental disasters.

To sum up, Green AI and preventive oncology are not only technological innovations, they are also a paradigm shift in gaining sustainable health futures. With ecological responsibility being at the fundamental core of medical innovation, societies are able to reduce the emission, enhance the long-term patient outcomes, and leave the subsequent generations with a healthier population and a healthier planet.

REFERENCES

1. Das, K. P., & Chandra, J. (2023). A survey on artificial intelligence for reducing the climate footprint in healthcare. *Energy Nexus*, 9, 100167.
2. Ma, R., Alifu, N., Du, Z., Chen, S., Heng, Y., Wang, J., ... & Zhang, X. (2021). Indocyanine green-based theranostic nanoplatform for NIR fluorescence image-guided chemo/photothermal therapy of cervical cancer. *International Journal of Nanomedicine*, 4847-4861.
3. Singh, B. N., Shankar, S., & Srivastava, R. K. (2011). Green tea catechin, epigallocatechin-3-gallate (EGCG):



mechanisms, perspectives and clinical applications. *Biochemical pharmacology*, 82(12), 1807-1821.

4. Yao, W., Chen, X., Fan, B., Zeng, L., Zhou, Z., Mao, Z., & Shen, Q. (2023). Multidisciplinary team diagnosis and treatment of pancreatic cancer: Current landscape and future prospects. *Frontiers in Oncology*, 13, 1077605.
5. Ingle, J., & Basu, S. (2023). Mitochondria targeted AIE probes for cancer phototherapy. *ACS omega*, 8(10), 8925-8935.
6. Saceleanu, V. M., Toader, C., Ples, H., Covache-Busuioc, R. A., Costin, H. P., Bratu, B. G., ... & Ciurea, A. V. (2023). Integrative approaches in acute ischemic stroke: from symptom recognition to future innovations. *Biomedicines*, 11(10), 2617.
7. Halma, M. T., Tuszyński, J. A., & Marik, P. E. (2023). Cancer metabolism as a therapeutic target and review of interventions. *Nutrients*, 15(19), 4245.
8. Prasanna, P. G., Citrin, D. E., Hildesheim, J., Ahmed, M. M., Venkatachalam, S., Riscuta, G., ... & Coleman, C. N. (2021). Therapy-induced senescence: opportunities to improve anticancer therapy. *JNCI: Journal of the National Cancer Institute*, 113(10), 1285-1298.
9. Malik, S., Muhammad, K., & Waheed, Y. (2023). Emerging applications of nanotechnology in healthcare and medicine. *Molecules*, 28(18), 6624.
10. Oni, O. Y., & Oni, O. (2017). Elevating the Teaching Profession: A Comprehensive National Blueprint for Standardising Teacher Qualifications and Continuous Professional Development Across All Nigerian Educational Institutions. *International Journal of Technology, Management and Humanities*, 3(04).
11. Adebayo, I. A., Olagunju, O. J., Nkansah, C., Akomolafe, O., Godson, O., Blessing, O., & Clifford, O. (2019). Water-Energy-Food Nexus in Sub-Saharan Africa: Engineering Solutions for Sustainable Resource Management in Densely Populated Regions of West Africa.
12. Kumar, K. (2020). Using Alternative Data to Enhance Factor-Based Portfolios. *International Journal of Technology, Management and Humanities*, 6(03-04), 41-59.
13. Vethachalam, S., & Okafor, C. Architecting Scalable Enterprise API Security Using OWASP and NIST Protocols in Multinational Environments For (2020).
14. Adebayo, I. A., Olagunju, O. J., Nkansah, C., Akomolafe, O., Godson, O., Blessing, O., & Clifford, O. (2020). Waste-to-Wealth Initiatives: Designing and Implementing Sustainable Waste Management Systems for Energy Generation and Material Recovery in Urban Centers of West Africa.
15. Kumar, K. (2020). Innovations in Long/Short Equity Strategies for Small-and Mid-Cap Markets. *International Journal of Technology, Management and Humanities*, 6(03-04), 22-40.
16. Vethachalam, S., & Okafor, C. Accelerating CI/CD Pipelines Using .NET and Azure Microservices: Lessons from Pearson's Global Education Infrastructure For (2020).
17. Kumar, K. (2021). Alpha Persistence in Emerging Markets: Myths and Realities. *International Journal of Technology, Management and Humanities*, 7(03), 27-47.
18. Kumar, K. (2021). Comparing Sharpe Ratios Across Market Cycles for Hedge Fund Strategies. *International Journal of Humanities and Information Technology*, (Special 1), 1-24.
19. Vethachalam, S. (2021). DevSecOps Integration in Cruise Industry Systems: A Framework for Reducing Cybersecurity Incidents. *SAMRIDDHI: A Journal of Physical Sciences, Engineering and Technology*, 13(02), 158-167.
20. Kumar, K. (2022). How Institutional Herding Impacts Small Cap Liquidity. *Well Testing Journal*, 31(2), 97-117.
21. Shaik, Kamal Mohammed Najeeb. (2022). Security Challenges and Solutions in SD-WAN Deployments. *SAMRIDDHI A Journal of Physical Sciences Engineering and Technology*.
14. 2022. 10.18090/samriddhi.v14i04..
22. Arefin, S., & Zannat, N. T. (2024). The ROI of Data Security: How Hospitals and Health Systems Can Turn Compliance into Competitive Advantage. *Multidisciplinary Journal of Healthcare (MJH)*, 1(2), 139-160.
23. SANUSI, B. O. (2022). Sustainable Stormwater Management: Evaluating the Effectiveness of Green Infrastructure in Midwestern Cities. *Well Testing Journal*, 31(2), 74-96.
24. Kumar, K. (2022). Investor Overreaction in Microcap Earnings Announcements. *International Journal of Humanities and Information Technology*, 4(01-03), 11-30.
25. Aramide, O. O. (2023). Predictive Analytics and Automated Threat Hunting: The Next Frontier in AI-Powered Cyber Defense. *International Journal of Technology, Management and Humanities*, 9(04), 72-93.
26. Kumar, K. (2022). How Institutional Herding Impacts Small Cap Liquidity. *Well Testing Journal*, 31(2), 97-117.
27. Shaik, Kamal Mohammed Najeeb. (2022). MACHINE LEARNING-DRIVEN SDN SECURITY FOR CLOUD ENVIRONMENTS. *International Journal of Engineering and Technical Research (IJETR)*. 6. 10.5281/zenodo.15982992.
28. Kumar, K. (2023). Dynamic Asset Allocation in an Inflationary Macro Regime. *International Journal of Technology, Management and Humanities*, 9(02), 1-21.
29. Shaik, Kamal Mohammed Najeeb. (2023). SDN-BASED INSIDER THREAT DETECTION. *International Journal*



- of Engineering and Technical Research (IJETR). 7. 10.5281/zenodo.15983824.
30. Aramide, O. O. (2023). Securing Machine-to-Machine Communications in the Age of Non-Human Identities. *International Journal of Technology, Management and Humanities*, 9(04), 94-117.
31. Kumar, K. (2023). Position Sizing Models for Long/Short Portfolios: Conviction vs. Risk Budgeting. *International Journal of Humanities and Information Technology*, 5(04), 13-34.
32. Zhang, L., Zhou, J., Hu, L., Han, X., Zou, X., Chen, Q., ... & Wang, C. (2020). In situ formed fibrin scaffold with cyclodextrin to synergize with immune checkpoint blockade for inhibition of cancer recurrence after surgery. *Advanced Functional Materials*, 30(7), 1906922.
33. Li, Y., & Zhang, H. (2019). Fe₃O₄-based nanotheranostics for magnetic resonance imaging-synergized multifunctional cancer management. *Nanomedicine*, 14(11), 1493-1512.
34. Wang, C., Fan, W., Zhang, Z., Wen, Y., Xiong, L., & Chen, X. (2019). Advanced nanotechnology leading the way to multimodal imaging-guided precision surgical therapy. *Advanced Materials*, 31(49), 1904329.
35. Zhang, S., Zhang, C., Cai, W., Bai, Y., Callaghan, M., Chang, N., ... & Gong, P. (2023). The 2023 China report of the Lancet Countdown on health and climate change: taking stock for a thriving future. *The Lancet Public Health*, 8(12), e978-e995.
36. Jiang, X., Hu, Z., Wang, S., & Zhang, Y. (2023). Deep learning for medical image-based cancer diagnosis. *Cancers*, 15(14), 3608.
37. Abdoul-Latif, F. M., Ainane, A., Houmed Aboubaker, I., Mohamed, J., & Ainane, T. (2023). An overview of cancer in djibouti: current status, therapeutic approaches, and promising endeavors in local essential oil treatment. *Pharmaceuticals*, 16(11), 1617.
38. Babu, B., Stoltz, S. A., Mittal, A., Pawar, S., Kolanthai, E., Coathup, M., & Seal, S. (2023). Inorganic nanoparticles as radiosensitizers for cancer treatment. *Nanomaterials*, 13(21), 2873.
39. Roy, I., Krishnan, S., Kabashin, A. V., Zvestovskaya, I. N., & Prasad, P. N. (2022). Transforming nuclear medicine with nanoradiopharmaceuticals. *ACS nano*, 16(4), 5036-5061.
40. Guttà, C. (2023). *Prognostication and prediction of cancer patient outcomes using AI-based classifiers* (Doctoral dissertation, Dissertation, Stuttgart, Universität Stuttgart, 2023).
41. Chung, Y. H., Park, J., Cai, H., & Steinmetz, N. F. (2021). S100A9-Targeted Cowpea Mosaic Virus as a Prophylactic and Therapeutic Immunotherapy against Metastatic Breast Cancer and Melanoma. *Advanced Science*, 8(21), 2101796.
42. Sang, W., Zhang, Z., Dai, Y., & Chen, X. (2019). Recent advances in nanomaterial-based synergistic combination cancer immunotherapy. *Chemical Society Reviews*, 48(14), 3771-3810.



Teacher, Tech, and Tension: Probing the Nexus of Computer Efficacy and Technostress in Educational Settings

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ABSTRACT: In an era marked by rapid technological advancements, teachers play a pivotal role in harnessing the potential of technology to enhance learning. This study delves into the intricate dynamics of Computer Efficacy and technostress among educators, shedding light on the critical factors that influence their ability to navigate the ever-evolving landscape of technological change. A sample of 250 teachers, representing diverse educational backgrounds and levels, participated in this research investigation. The core objectives encompassed evaluating the levels of computer efficacy and technostress within this sample and identifying key determinants shaping their experiences during the integration of technology in educational settings. These findings emphasize the importance of tailored professional development, customized technical support mechanisms, and effective communication between educators and educational administrators in mitigating technostress and enhancing computer efficacy among teachers. This research contributes vital insights to the ongoing dialogue surrounding technology integration in education, providing actionable guidance for educators, educational institutions, and policymakers seeking to facilitate seamless and adaptive technology adoption in the teaching profession.

KEYWORDS: Computer Efficacy Technostress Teachers Pedagogical Practices Digital Skills Technology Integration in Education

I.INTRODUCTION

In today's rapidly evolving educational landscape, the integration of technology into teaching has become not just a desirable skill but a necessity. Teachers are increasingly expected to leverage digital tools and resources to enhance learning outcomes, engage students, and prepare them for a technology-driven world. However, this transformative shift towards technology-enhanced pedagogy is not without its challenges.

The ability of teachers to effectively navigate this technological change rests on two critical pillars: Computer Efficacy and Technostress. These key factors play a pivotal role in shaping how educators adapt to the ever-changing digital landscape within the classroom.

Computer Efficacy, often defined as an individual's belief in their own capacity to use computers and related technologies effectively, forms the foundation upon which teachers build their technological competence. It is a reflection of their confidence in their ability to handle the technology as a pedagogical tool, innovate in their teaching methods, and overcome technological hurdles. Thus, Computer Efficacy shows the "can-do" attitude that enables educators to view the technology as a potential aid instead of a threat.

Technostress, on the other hand, represents the flip side of the technological coin. It encapsulates the anxiety, frustration, and apprehension that teachers may experience when confronted with the demands of new digital tools, applications, and educational paradigms. Technostress can emerge from various sources, including rapid technological changes, information overload, and the pressures to adapt swiftly. It can lead to burnout and hinder the productive incorporation of technology into education, if the technostress is left uncontrolled.

In the context of the modern classroom, where digital literacy and adaptability are prerequisites, understanding the dynamics between computer efficacy and technostress is paramount. It is not enough for educators to be proficient in the subjects they handle; they must also adapt in utilizing technology to facilitate learning effectively. Equally, addressing and mitigating technostress is crucial to ensure that teachers are not overwhelmed by the very tools intended to enhance their teaching practices.

Thus, the study intends to explore the intricate relationship between Computer Efficacy and Technostress among teachers. It seeks to uncover how these factors influence one another and more importantly, how they collectively impact teachers' ability to navigate technological change. By gaining a deeper understanding of these dynamics, the study aims to provide insights and recommendations that can empower



educators, institutions, and policymakers to better support teachers in their journey towards embracing technology as a transformative force in education.

III.OBJECTIVE OF THE STUDY

1. To investigate the Computer Efficacy of the teachers
2. To Analyse the extent the technostress experienced by the teachers
3. To examine the relationship between Computer Efficacy and Technostress.

IV.LITERATURE REVIEW

Qin Shu et al., (2011) expressed their opinion in the study about importance of the new construct Technostress which means negative effect on the human attitudes that directly or indirectly result from the use of computer. In order to prove the Concept of Technostress and further to develop a Questionnaire, the researchers targeted the employees who uses Computer technology which includes IT professionals and also general end users. The result of their study proven that if an employees are efficient in use of computer then possibility of the technostress is less. i.e., Computer Efficacy shows Negative relationship.

Isk Ayse Derya (2015) has conducted this study to determine the relationship between lifelong learning and opinion the computer efficacy of primary school teachers' candidates. For the purpose of the study, the data has been collected from 92 Undergraduate teachers who pursuing their studies in Bartin University in the year 2014-2015. To collect the data from the respondents the researcher utilised lifelong learning scale and Computer efficacy scale . At last, the study revealed that there is moderate significant and positive relationship of student's score of computer efficacy scale with motivation and persistence size scores. On the other hand, the deprivation of learning regulations scores showed the non-significant relationship with computer self - efficacy

V.METHODOLOGY

Data required for this study has been collected through both Primary data and Secondary Data. As Secondary data were collected through various articles and websites. On the other hand the primary data for the study were collected through Structured Questionnaire, which has been prepared and circulated among the Teachers. The questionnaire contains 3 sections i.e., 1. Personal and Job Details of Teachers; 2. Statements related to Computer Efficacy; 3. Statements related to Technostress

For the purpose of the study, data has been collected from 250 Teachers through convenience sampling method. The collected data has been further analysed with the following SPSS tools i.e.,

1. Percentage Analysis
2. Descriptive Analysis
3. Correlation Analysis

VI.ANALYSIS AND DISCUSSION

Table 1 : PERCENTAGE ANALYSIS

S.No.	Particulars	No. Of Respondents	Percentage
Gender wise Classification			
1	Male	132	52.8
2	Female	118	47.2
Total		250	100
Marital Status wise Classification			
1	Married	194	77.6
2	Single	56	22.4
Total		250	100
Age-wise Classification			
1	Less Than 30 Years	79	31.6
2	31 to 40 Years	51	20.4
3	41-50 Years	41	16.4
4	Above 50 Years	79	31.6
Total		250	100
Educational wise Classification			



1	Post Graduate with B.Ed.	55	22.0
2	Post Graduate with B.Ed. and M.Phil.	129	51.6
3	Ph.D.	66	26.4
Total		250	100
Income wise Classification			
1	Below Rs. 20,001	39	15.6
2	Rs.20,001 to Rs.30,001	27	10.8
3	Rs. 30,001 to Rs 40,000	30	12.0
4	Rs.40,001 to Rs. 50,000	16	6.4
5	Above Rs.50,001	138	55.2
Total		250	100
Experience wise Classification			
1	Less Than 1 year	39	15.6
2	2 yrs. to 5 yrs.	36	14.4
3	6 yrs. To 10 yrs.	44	17.6
4	Above 11 yrs.	131	52.4
Total		250	100
Classes Handled wise Classification			
1	1 st to 5 th Std	21	8.4
2	6 th to 10 th Std	67	26.8
3	11 th and 12 th Std	162	64.8
Total		250	100
Region Wise Classification			
1	Urban	174	69.6
2	Rural	76	30.4
Total		250	100
Knowledge in Computer			
1	Yes	209	83.6
2	No	6	2.4
3	Maybe	35	14.0
Total		250	100

Source: Primary data

Inference

From the above table, it is observed that out of the 250 respondents, 52.8% of respondents are male, it is known from the analysis that the majority of the respondents 77.6% are married, and it is understood that the most of the respondents 31.6 percent are falling under the age group of Less than 30 years and Above 50 Years, it is observed from the study most of the respondents 51.6 percent are Post Graduates with B.Ed. and M.Phil., it is evident the majority of the respondents 55.2 percent are earning income in Above 50.001, the table reveals that the majority of the respondents 52.4 percent are having experience of Above 11 years.

It is found that majority of the respondents 64.8 percent are handling class 11th and 12th standard, it is observed that the majority of the respondents 69.6 percent are working in urban area and 83.6 percent are possess knowledge in computer.

Computer Self- Efficacy

Table 2 : Descriptive Statistics for Computer Efficacy

Items	N	Minimum	Maximum	Mean	Std. Deviation
CE 1	250	1.0	5.0	3.648	1.3126
CE 2	250	1.0	5.0	3.096	1.3764
CE 3	250	1.0	5.0	3.504	1.3301
CE 4	250	1.0	5.0	3.336	1.3589
CE 5	250	1.0	5.0	3.588	1.2199
CE 6	250	1.0	5.0	3.472	1.2096
CE 7	250	1.0	5.0	3.672	1.1249
CE 8	250	1.0	5.0	3.512	1.3360
CE 9	250	1.0	5.0	3.664	1.4364
CE 10	250	1.0	5.0	3.196	1.3040
CE 11	250	1.0	5.0	3.516	1.3360
CE 12	250	1.0	5.0	3.536	1.2866



Overall CSE mean Score	250	1	5	3.4783	1.3026

Source: Primary data

In the Table 2 : Descriptive Statistics for Computer Efficacy reveals an overall mean score of 3.478 (S.D - 1.30) which depicts that the teachers are efficient in handling and using the Computer and other related devices. Moreover item 7 shows the highest mean score i.e.,3.672 which indicates that the teachers are confident in their ability to use the internet to find relevant teaching resources. On the other hand, the item 02 shows the lowest mean score i.e., 3.096 which indicated that there confidence level in troubleshooting the common computer problems.

Technostress
Table 3 : Descriptive Statistics for Technostress

Items	N	Minimum	Maximum	Mean	Std. Deviation
TS1	250	3.0	5.0	3.936	.6176
TS2	250	3.0	5.0	3.984	.6705
TS3	250	3.0	5.0	4.000	.5226
TS4	250	3.0	5.0	4.368	.8266
TS5	250	3.0	5.0	4.036	.6962
TS6	250	3.0	5.0	4.232	.8129
TS7	250	3.0	5.0	4.244	.7918
TS8	250	3.0	5.0	4.164	.7665
TS9	250	3.0	5.0	3.888	.8428
TS10	250	3.0	5.0	3.908	.7360
Overall TS mean Score	250	3.00	5.00	4.076	0.586

Source: Primary data

In the Table 3: Descriptive Statistics for Technostress reveals an overall mean score of 4.076 (S.D – 0.58) which depicts teachers experience some sort of stress due to technology. Moreover item 4 with maximum mean score i.e., 4.368 indicates that the teachers are experience the stress due to the technical difficulties incurring while using technology. while the item 9 with the minimum mean score i.e., 3.888 depicts that The need to upgrade technology skills is somewhat less stressful.

Investigate the Relationship between Computer Efficacy and Technostress of Teachers

Hypothesis 1 :

H0 : There is no significant relationship between Computer Efficacy and Technostress of Teachers

H1 : There is a significant relationship between Computer Efficacy and Technostress of Teachers

Table 4: Correlation Analysis

		CSE	TS
CSE	Pearson Correlation	1	.509**
	Sig. (2-tailed)		.000
	N	250	250
TS	Pearson Correlation	.509**	1
	Sig. (2-tailed)	.000	
	N	250	250

** . Correlation is significant at the 0.01 level (2-tailed).

Correlation of Computer Efficacy and Technostress was found to be positive and Statistically significant ($r = 0.944$, $P < 0.001$). Hence H1 was supported. This show that even the teachers are efficient in computer , they felt a sense of stress due to day- to- day advancement of technology.

VII.INDINGS OF THE STUDY

- ☐ Majority of the Respondents 52.8% are male and 77.6% are married.
- ☐ Most of the respondents 31.6% are falling under the age of Less than 30 years and above 50 years.
- ☐ Most of the respondents are 51.6% are qualified in Post Graduate with B.Ed. and M.Phil.
- ☐ 55.2% of the respondents are earning income of above Rs.50,001.
- ☐ 52.4% of the respondents are with experience of Above 11 Years.
- ☐ Majority of the respondents 69.6% are located in the Urban area.
- ☐ Majority of the respondents 83.6% are possess in Knowledge in computer.



- Majority of the respondents 64.8% are handling 11th and 12th Standard.
- Descriptive statistics Analysis of Computer Efficacy Shows that teachers ability to use the internet to find relevant teaching resources
- Descriptive statistics Analysis of Technostress depicts that teachers are facing Stress due to use of technology
- Correlation analysis helps to understand that the Computer Efficacy and Technostress has a linear positive relation which indicates that, even though the teachers are becoming efficient in handling computer, they feel a sense of Stress due to day-to-day advancement of new technology as this advancement make the previous one obsolete.

VII.SUGGESTION FOR THE STUDY

As it is proved through the study that eventhough the teachers are good enough in handling computer and other related devices, they feel stress due to navigation in the technology. Thus , these are the following suggestion that the teachers can further enhance in their Computer Efficacy and reduce their stress caused due to technology:

- Engage in ongoing professional development programs to enhance their digital skills and stay up-to-date with the latest educational technologies and trends.
- Cultivate a growth mindset by facing the technology challenges as opportunities for learning and growth.
- If the teachers felt less confident with technology, they can seek individualized training or mentorship opportunities to address specific areas of improvement.
- Collaborate with colleagues who excel in technology integration. Peer learning and sharing of best practices can be immensely beneficial.
- Use technology to create student-centred learning experiences that foster engagement and critical thinking. Thus, the teachers can focus on how technology can benefit the students' learning outcomes.
- Offer support and guidance to colleagues who may be struggling with technology. Sharing the knowledge and experiences can create a supportive teaching community.

VIII.CONCLUSION

The study discovered a wide spectrum of computer efficacy levels, highlighting the need for tailored support and training programs. At the same time, technostress emerged as a prevalent challenge, influenced by factors such as training quality, technical support availability, administrative support, and alignment with instructional practices. To conclude, this study underscores the importance of prioritizing teacher-centric strategies to alleviate technostress and enhance efficacy in computer. Tailored professional development, robust technical assistance, and effective communication are key to empowering teachers in integrating technology effectively. By implementing these findings, educators and institutions can better navigate the evolving technological landscape, ensuring that technology becomes an asset, not a hindrance, in the education process.

REFERENCES

- [1] Afari, E., Ali, F., Eksail, A., Swe, M., & Alaam, S. A. (2023). Computer self - efficacy and ICT integration in education : Structural relationship and mediating effects. *Education and Information Technologies*, (0123456789). <https://doi.org/10.1007/s10639-023-11679-8>
- [2] Ali, S., Jamshed, K., & Jamshaid, S. (2023). Impact Of Techno Stress On Work Engagement With Mediating Role Of Workload And Moderating Role Of Computer Efficacy. (February). <https://doi.org/10.37896/jxu17.2/038>
- [3] Baek, Y., Jung, J., & Kim, B. (2008). What makes teachers use technology in the classroom ? Exploring the factors affecting facilitation of technology with a Korean sample. 50, 224–234. <https://doi.org/10.1016/j.compedu.2006.05.002>
- [4] Derya, I. A. (2015). The relationship between primary school teacher candidates ' tendency for lifelong learning and their perceptions of computer efficacy. 10(17), 2512–2523. <https://doi.org/10.5897/ERR2015.2359>
- [5] Durndell, A., & Haag, Z. (2002). Computer self efficacy , computer anxiety , attitudes towards the Internet and reported experience with the Internet , by gender , in an East European sample. 18, 521–535.
- [6] Farah, A. C. (2011). View metadata, citation and similar papers at core.ac.uk. (February).
- [7] Kafyulilo, A., Fisser, P., & Voogt, J. (2016). Factors affecting teachers ' continuation of technology use in teaching. *Education and Information Technologies*, 1535–1554. <https://doi.org/10.1007/s10639-015-9398-0>
- [8] López-vargas, O., Duarte-suárez, L., & Ibáñez-ibáñez, J. (2017). Improving Schools Teacher ' s computer efficacy and its relationship with cognitive style and TPACK. <https://doi.org/10.1177/1365480217704263>



- [9] Technology, C. (2012). Factors influencing teachers ' adoption and integration of information and communication technology into teaching : A review of the literature Charles Buabeng-Andoh. 8(1), 136–155.
- [10] Tu, Q., & Wang, K. (2011). International Journal of Human- The Impact of Computer Efficacy and Technology Dependence on Computer-Related Technostress : A Social Cognitive Theory Perspective. (May 2014). <https://doi.org/10.1080/10447318.2011.555313>



The Evolving Landscape: A Comprehensive Exploration of AI, Machine Learning, and Cyber Security

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ABSTRACT: The relentless evolution of the digital realm has ushered in an era of unparalleled interconnectivity, accompanied by an ever-expanding and sophisticated threat landscape. Traditional cyber security measures, often static and reliant on predetermined signatures, are struggling to keep pace with the dynamic nature of modern cyber-attacks. In response to this escalating challenge, Artificial Intelligence (AI) and Machine Learning (ML) have emerged as transformative tools, offering the promise of enhanced anticipatory, counteractive, and mitigate capabilities. This research article provides an exhaustive exploration of the intricate relationship between AI/ML and cyber security, scrutinizing their diverse applications, potential future implications, and the pressing challenges that demand meticulous consideration.

KEYWORDS: Artificial Intelligence, Cyber Security, Machine Learning, Threat Detection

1. INTRODUCTION

The contemporary era is marked by an escalating reliance on digital infrastructures, ushering in a paradigm where the boundaries between the physical and virtual worlds are becoming increasingly indistinct. This pervasive digital integration has not only revolutionized the way we conduct our daily lives, business transactions, and information storage but has also led to a profound transformation in the very fabric of our societal existence. However, this unprecedented interconnectivity has brought with it a double-edged sword, exposing every facet of our lives to potential cyber threats. Malicious actors, armed with innovative and progressively sophisticated techniques, exploit vulnerabilities within this intricate web of digital interactions. The digital landscape, once envisioned as a realm of convenience and efficiency, has now become a battleground where cyber security defenses are continually challenged. These malicious entities navigate the digital realm with the precision of a spider weaving its web, capitalizing on vulnerabilities that emerge as a consequence of our increasing reliance on technology.

Consequently, there exists an urgent need for a fundamental reevaluation of cyber security strategies. The ever-evolving nature of cyber threats demands a proactive and adaptive approach to safeguarding our digital infrastructure. The traditional notions of cyber security are no longer adequate in this dynamic landscape, necessitating innovative and robust measures to counteract the continuously changing tactics employed by malicious actors. As we embark on a journey to understand and address the intricacies of this digital age, the imperative to fortify cyber security strategies becomes increasingly apparent. This exploration will delve into the depths of cyber threats, shedding light on the transformative role that Artificial Intelligence (AI) and Machine Learning (ML) play in reshaping our defenses and mitigating the risks inherent in our interconnected world.

The digital landscape, once heralded for its convenience and efficiency, has metamorphosed into a battleground where the fortifications of cyber security defenses are constantly besieged. The conventional demarcation that once neatly separated physical and virtual spaces has now dissipated, compelling a comprehensive understanding of cyber threats that transcends traditional boundaries. In this evolving paradigm, our personal and professional lives are intricately interwoven with digital platforms, amplifying the consequences of cyber threats from mere data breaches to potential disruptions capable of crippling critical infrastructure, financial systems, and even national security. As the interconnectedness between the physical and digital realms deepens, the repercussions of cyber threats become more pervasive, impacting not only individual privacy but the very fabric of societal functionality. The once-clear boundaries between the tangible and intangible have blurred, demanding a holistic approach to cyber security that mirrors the complex dynamics of our digital existence. The dissolution of traditional demarcations implies that cyber



threats extend far beyond the realm of data breaches. They now have the potential to inflict substantial harm, causing disruptive ripples across critical infrastructure essential for societal functioning. Financial systems, the backbone of economic stability, are no longer immune, and even national security faces vulnerabilities in this interconnected digital age.

This paper serves as a clarion call, setting the stage for the imperative to reassess our approach to cyber security in the face of an expanding threat landscape. The urgency lies in recognizing the intricate interplay between the physical and digital realms, where innovative strategies are not merely desirable but imperative to safeguard against the relentless and ever-evolving tactics employed by malicious actors. In the subsequent sections, we embark on a comprehensive exploration, dissecting the nuances of cyber threats and unveiling the role of Artificial Intelligence (AI) and Machine Learning (ML) as transformative guardians in the realm of cyber security. By understanding the intricacies of this dynamic interplay, we aim to navigate the complex landscape of cyber threats and fortify our defenses for a secure digital future.

II.THE NEED FOR AI AND ML IN CYBER SECURITY

Traditional cyber security solutions, once deemed effective, have proven to be increasingly inadequate in the face of the dynamic and evolving cyber threat landscape. These solutions, characterized by their static and reactive nature, rely on predefined rules and signatures to identify and counter threats. However, this approach falls short in addressing the nimble and sophisticated tactics employed by modern cyber adversaries.

The static nature of traditional cyber security solutions becomes a significant limitation when confronted with novel attack vectors, zero-day exploits, and polymorphic malware. The reliance on known patterns and signatures leaves systems vulnerable to new and previously unseen threats, allowing malicious actors to exploit vulnerabilities before security measures can be updated. This inherent lag in response time poses a substantial risk to the integrity and confidentiality of sensitive data, as well as the operational continuity of critical systems. Artificial Intelligence (AI) and Machine Learning (ML) represent a paradigm shift in addressing these shortcomings. Rather than relying on predetermined rules, AI and ML empower cyber security systems with the ability to learn, adapt, and evolve in real-time. This proactive approach enables anticipatory threat detection and mitigation, a stark departure from the reactive stance of traditional methods.

AI algorithms excel at processing vast datasets, recognizing patterns, and discerning anomalies indicative of potential cyber threats. This adaptability allows for the identification of previously unknown attack vectors and the swift deployment of countermeasures. Machine Learning, in particular, enhances the cyber security posture by continuously learning from new data, adapting to emerging threats, and refining its predictive capabilities over time. The need for AI and ML in cyber security extends beyond the capacity for rapid adaptation. These technologies offer the potential to revolutionize how we conceptualize and implement security strategies. By fostering a proactive rather than reactive approach, AI and ML enable cyber security professionals to stay ahead of the constantly evolving threat landscape. This section emphasizes the transformative role of AI and ML in augmenting cyber security capabilities, providing a foundation for the subsequent detailed exploration of their applications in threat detection, incident response, and the overall enhancement of cyber security measures.

III.AI AND ML: REVOLUTIONIZING THREAT DETECTION AND PREVENTION

In the fast-paced landscape of cyber security, where threats are dynamic and ever-evolving, the integration of Artificial Intelligence (AI) and Machine Learning (ML) stands out as a revolutionary approach to threat detection and prevention. This section explores the multifaceted contributions of AI and ML in revolutionizing cyber security practices, focusing on anomaly detection, automated threat intelligence, and predictive security.

Anomaly Detection

Pattern Recognition Capabilities

AI and ML algorithms are renowned for their innate pattern recognition capabilities, allowing them to excel in identifying deviations from normalcy within vast and complex datasets. In the context of cyber security, this translates into an unprecedented ability to analyze network traffic, system logs, and user behavior, among other critical data sources. By discerning anomalies indicative of potential cyber threats, including those employing zero-



day exploits, AI and ML introduce a proactive defense strategy that surpasses the limitations of traditional signature-based detection methods.

Proactive Defense Strategy

Traditional cyber security approaches often rely on predefined signatures and rules, making them reactive in nature. In contrast, AI-driven anomaly detection enables the identification of previously unknown threats, adapting to emerging attack vectors in real-time. This proactive stance allows security teams to anticipate and counter potential threats before they can inflict substantial damage. The significance of this shift cannot be overstated, as it fundamentally transforms cyber security from a reactive posture to an anticipatory and adaptive one.

Automated Threat Intelligence

Relentless Scouring of the Internet and Dark Web

The integration of AI in cyber security introduces a paradigm shift in the gathering of threat intelligence. AI-driven systems can tirelessly scour the expansive realms of the internet and the dark web, seeking out emerging threats, vulnerabilities, and potential attack vectors. This relentless and automated approach ensures that the cyber security system remains updated with the latest threat intelligence, providing a real-time understanding of the evolving tactics employed by cybercriminals.

Integration into ML Models

The intelligence gathered by AI during its exhaustive exploration of digital spaces is seamlessly integrated into Machine Learning (ML) models. This integration enhances the adaptability and learning capabilities of the cyber security system. By continuously updating and evolving based on the latest threat intelligence, the ML models create a dynamic defense system that stays ahead of cyber threats. This synergy between AI-driven threat intelligence and ML-driven adaptability is a pivotal aspect of modern cyber security strategies.

Predictive Security

Leveraging Historical Data and Current Trends

Advanced ML algorithms, equipped with the capability to analyze historical data and discern current trends, empower security teams with predictive security measures. By understanding the patterns and behaviors that precede cyber-attacks, these algorithms can forecast future attack patterns and potential target areas. This foresight enables proactive resource allocation and fortification of defenses, essentially allowing organizations to preemptively address vulnerabilities before attackers can exploit them.

Proactive Resource Allocation and Defense Fortification

Predictive security, facilitated by advanced ML algorithms, fundamentally changes the cyber security landscape. Rather than reacting to threats as they occur, organizations can strategically allocate resources based on predictions, shoring up defenses in areas identified as potential targets. This proactive approach minimizes response times and reduces the likelihood of successful cyber-attacks, providing a crucial advantage in the ongoing battle against evolving threats.

IV.BEYOND DETECTION: AI/ML IN INCIDENT RESPONSE AND FORENSICS

Moving beyond the realm of detection, Artificial Intelligence (AI) and Machine Learning (ML) technologies play a critical role in incident response and forensics, reshaping the traditional approach to handling cyber security incidents.

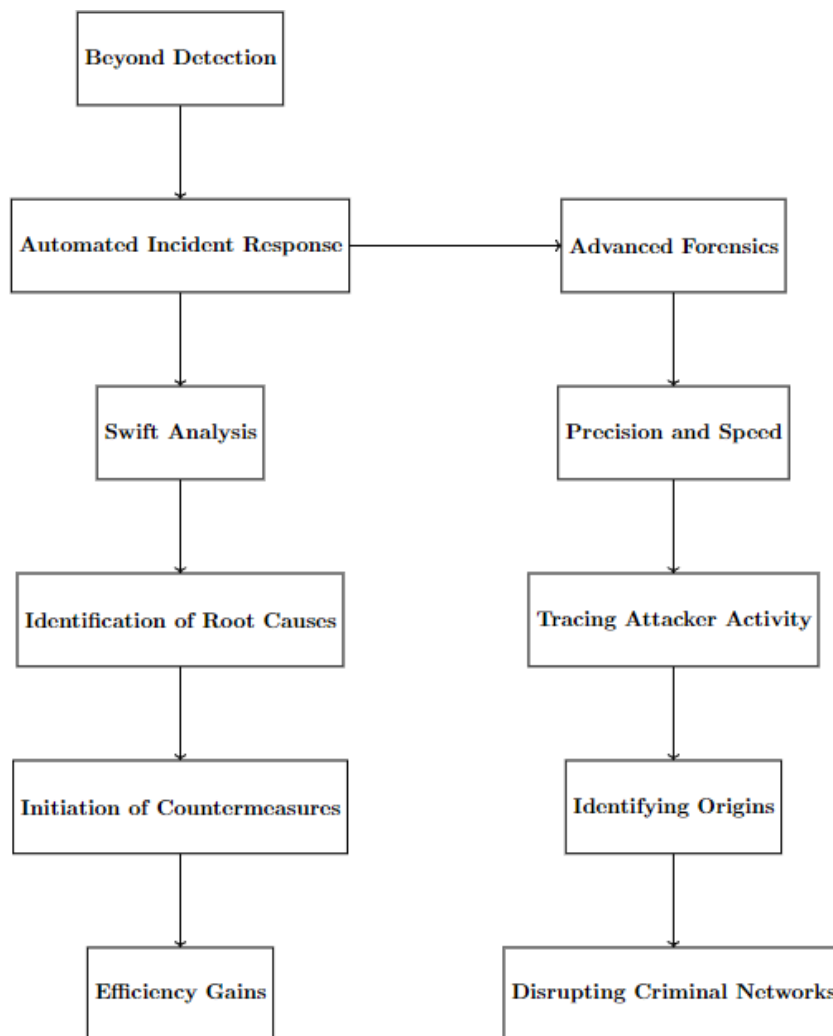


Figure 1: AI/ML in Incident Response and Forensics

Automated Incident Response

Pivotal Role in Swift Analysis

AI-powered systems emerge as key players in incident response by facilitating the swift analysis of cyber security incidents. These systems leverage their ability to process vast amounts of data at high speeds, enabling the rapid identification of anomalies or security breaches. Automated incident response not only minimizes the time taken to detect incidents but also provides a foundation for immediate action.

Identification of Root Causes

AI's analytical capabilities extend to identifying the root causes of incidents. By scrutinizing the contextual information surrounding an incident, AI systems can pinpoint the origin and nature of the security breach. This functionality is crucial for preventing recurring incidents, as it allows cyber security professionals to address the underlying vulnerabilities that led to the breach in the first place.

Initiation of Countermeasures

Upon identifying the incident and its root causes, AI-powered systems can initiate automated countermeasures. These countermeasures may include isolating affected systems, blocking malicious activities, or implementing temporary protective measures. The automated response ensures a rapid and targeted approach to mitigating the



impact of incidents, reducing the window of vulnerability and potential damage.

Efficiency Gains

Automating incident response not only accelerates the detection and mitigation process but also results in significant efficiency gains. Human analysts are freed from repetitive and time-consuming tasks, allowing them to focus on more intricate investigations and strategic decision-making. This efficiency-driven collaboration between AI and human analysts enhances the overall effectiveness of incident response efforts.

Advanced Forensics

Precision and Speed in Forensic Analysis

AI's precision and speed play a transformative role in forensic analysis. When incidents occur, AI-driven forensic tools can meticulously analyze vast amounts of data, swiftly tracing the activities of attackers within compromised systems. The precision of AI algorithms allows for the identification of subtle indicators that may escape human observation, enhancing the depth and accuracy of forensic investigations.

Tracing Attacker Activity

One of the primary strengths of AI in forensics lies in its ability to trace attacker activity. By analyzing patterns, timestamps, and digital footprints left by malicious actors, AI systems can reconstruct the sequence of events leading up to and during a cyber-security incident. This level of granularity aids in understanding the tactics, techniques, and procedures employed by adversaries, contributing valuable insights to enhance future threat intelligence.

Identifying Origins

AI's analytical capabilities extend to identifying the origins of cyber-attacks. Whether the attack originates from a specific geographical location, a compromised endpoint, or an insider threat, AI-driven forensics can provide valuable information about the source. This insight is instrumental in attributing attacks, aiding in the pursuit of legal actions, and implementing preventive measures.

Disrupting Criminal Networks

Beyond aiding in incident response, AI's role in advanced forensics extends to disrupting criminal networks. By comprehensively analyzing the modus operandi of attackers and identifying potential accomplices or related activities, AI systems contribute to the broader goal of dismantling cybercriminal networks. This proactive approach not only aids in bringing malicious actors to justice but also serves as a deterrent against future attacks.

V. CHALLENGES AND THE ROAD AHEAD

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into cyber security, while promising, is not without its share of challenges. This section delineates the critical challenges that demand meticulous attention for the continued success and effectiveness of AI/ML-powered security solutions.

Data Quality and Bias

Importance of Data Quality

The efficacy of AI/ML models hinges on the quality and integrity of the data they are trained on. Suboptimal data quality can result in inaccurate detections and compromised cyber security measures. Ensuring that training data is comprehensive, representative, and free from biases is imperative for the success of AI-powered security solutions.

Risks Associated with Bias

The discussion surrounding data quality extends to the risks associated with biases in the data. Biased datasets can introduce discriminatory or skewed outcomes, potentially perpetuating existing social inequalities. This issue underscores the need for meticulous data curation practices, with a focus on identifying and mitigating biases in training data to foster fair and equitable AI/ML security solutions.

Ethical Considerations

Addressing data quality and bias concerns requires a commitment to ethical considerations. Security professionals must navigate the ethical challenges associated with the use of AI/ML in cyber security, ensuring that these technologies are deployed responsibly, with a commitment to fairness, transparency, and the avoidance of unintended consequences.



Explainability and Transparency

The "Black Box" Problem

The inherent complexity of AI algorithms often renders them opaque and difficult to interpret, giving rise to the "black box" problem. In high-stakes security scenarios, where decisions impact critical outcomes, the lack of transparency in AI models raises concerns about accountability and trust. Developing interpretable AI models becomes imperative to address this challenge.

Clear Explanations for Decisions

To build trust and ensure accountability, AI models must provide clear explanations for their decisions. This is particularly crucial in the context of cyber security, where the consequences of false positives or negatives can be severe. Advancements in Explainable AI (XAI) and Explainable Machine Learning (XAML) research aim to make AI models more transparent, enabling stakeholders to understand and trust the decision-making process.

Adversarial Attacks

Manipulation by Cybercriminals

The acknowledgment of the potential for cybercriminals to manipulate AI/ML models introduces a significant challenge. Adversarial attacks involve malicious actors attempting to exploit vulnerabilities in AI systems, either to evade detection or, in extreme cases, to weaponize these systems for their own purposes. Such attacks can compromise the integrity and effectiveness of AI-powered security solutions.

Research and Development Efforts

To counter adversarial attacks, research and development efforts must prioritize the robustness and security of AI/ML models. This includes the development of techniques and algorithms resilient to adversarial manipulations, as well as ongoing monitoring and adaptation to emerging threats. Collaborative efforts within the cyber security community are essential to stay ahead of the evolving tactics employed by cybercriminals.

Continuous Evaluation and Improvement

The road ahead involves continuous evaluation and improvement of AI-powered security solutions to withstand adversarial attacks. This requires a proactive approach, where cybersecurity professionals actively anticipate potential vulnerabilities and implement countermeasures to fortify AI/ML models against manipulation.

VI.THE HUMAN FACTOR: COLLABORATION AND ETHICS IN AI-POWERED SECURITY

In the era of Artificial Intelligence (AI) and Machine Learning (ML), where these technologies offer unprecedented potential in enhancing cyber security, the role of human-machine collaboration and ethical considerations becomes paramount. This section emphasizes the synergistic relationship between humans and AI in cyber security frameworks, highlighting the need for strategic thinking, intuition, and ethical grounding provided by humans, complemented by the computational power, data analysis, and pattern recognition capabilities of AI.

ETHICAL CONCERN	DESCRIPTION	RISKS	MIGRATION STRATEGIES
Data Privacy Concerns	• Large data needs for AI models raise privacy concerns. • Potential for misuse of user data. • Violation of data protection regulations.	• Erosion of trust in AI security solutions. • Legal repercussions for non-compliance.	• Implement ethical data collection practices. - Adhere to data protection regulations (e.g., GDPR, CCPA). • Prioritize anonymization and data minimization. • Ensure transparency and user control over data.



Accountability Frameworks	• Unclear who is responsible for AI security decisions. • Lack of transparency can breed distrust.	• Difficulty attributing responsibility for errors or biases. • Reduced public acceptance of AI security.	• Develop clear accountability frameworks for AI decisions. • Establish responsible AI principles and guidelines. • Ensure human oversight and review of critical decisions. • Foster open communication and transparency with stakeholders.
Bias Mitigation	• Biases in training data and algorithms can lead to unfair outcomes. • Potential for discrimination and perpetuation of social inequalities.	• Inaccurate detections and compromised security for certain groups. • Loss of trust and societal harm.	• Identify and mitigate biases in data and algorithms. • Prioritize diversity and inclusion in AI development. • Implement fairness-aware AI techniques and monitoring. • Continuously evaluate and improve AI models for bias mitigation.

6.1. Emerging Trends and Future Horizons

The landscape of AI/ML in cyber security is dynamic, marked by continuous evolution and innovation. This section explores promising trends that shape the future of cyber security, including federated learning, homomorphic encryption, explainable AI and machine learning (XAI/XAML), and the potential impact of quantum computing.

6.1.1 Federated Learning

Privacy-Preserving AI Models

Federated learning, allowing AI models to be trained on data distributed across multiple devices or organizations while preserving individual data privacy, is a key trend. This subsection discusses the relevance of federated learning in the context of cyber security, where maintaining privacy while leveraging collective intelligence is crucial. The potential of this approach to enhance the collaborative nature of cyber security efforts is highlighted.

6.1.2 Homomorphic Encryption

Enhancing Data Privacy

Homomorphic encryption, a cryptographic technique enabling computations on encrypted data, is explored for its potential to enhance data privacy and security in AI-powered cyber security solutions. This subsection delves into the applications and benefits of homomorphic encryption, emphasizing its role in safeguarding sensitive information during data processing and analysis.

6.1.3 Explainable AI and Explainable Machine Learning (XAI/XAML)

Transparency in Decision-Making

This subsection explores ongoing research focused on making AI models more interpretable and transparent through Explainable AI (XAI) and Explainable Machine Learning (XAML). The significance of addressing the "black box" problem associated with complex algorithms is emphasized, particularly in the context of ethical AI security solutions. Providing clear explanations for AI decisions enhances user trust and facilitates human understanding of AI-driven security measures.



6.1.4 Quantum Computing

Revolutionizing Cyber security

While in its early stages, the potential of quantum computing to revolutionize the field of cyber security is discussed. This subsection acknowledges the challenges posed by quantum computing, including its ability to break traditional encryption methods. Simultaneously, it explores the opportunities for developing new, quantum-resistant cryptography algorithms. The evolving landscape of quantum computing and its implications for both offensive and defensive cyber security strategies are considered.

VII.ONCLUSION AND FUTURE WORK

In the dynamic realm of cyber security, the integration of Artificial Intelligence (AI) and Machine Learning (ML) marks a transformative paradigm shift. As formidable allies in the ongoing battle against cyber threats, these technologies offer unparalleled capabilities to analyze data, identify patterns, and learn from experience, paving the way for adaptive and proactive security solutions. The synergy between humans and machines emerges as a cornerstone for success. Collaboration, rooted in a deep understanding of the complementary strengths of humans and the computational prowess of AI, becomes instrumental in navigating the intricate landscape of cyber threats. Ethical considerations play a pivotal role in ensuring the responsible deployment of AI and ML in cybersecurity.

Safeguarding data privacy, mitigating biases, and adhering to ethical data practices become imperatives for building security solutions that are not only effective but also fair and just. Looking forward, the path to a secure digital future involves a commitment to continuous innovation and adaptation. Emerging trends, such as federated learning, homomorphic encryption, and quantum computing, exemplify the industry's dedication to staying ahead of cyber threats.

In conclusion, AI and ML are not just technologies; they represent the vanguard of a secure digital era. By addressing challenges, fostering collaboration, and upholding ethical principles, we lay the groundwork for resilient cybersecurity frameworks. As we navigate the complexities of the digital landscape, our collective efforts and commitment to innovation will define our success in securing the interconnected world of tomorrow. The future of cybersecurity beckons, and our readiness to embrace it will shape the security landscape for generations to come.

VIII.FUTURE RESEARCH

While this article provides a broad overview of the multifaceted relationship between AI/ML and cyber security, further research is essential to delve deeper into specific areas. Some suggested avenues for future research include:

- *Developing Robust and Explainable AI/ML Models*

Further exploration is needed to develop AI/ML models that not only enhance threat detection and incident response but also provide clear explanations for their decisions, ensuring interpretability and trust.

- *Addressing Ethical Considerations*

In-depth research is required to address the ethical considerations surrounding data privacy and bias in AI-powered security solutions. This involves developing frameworks that ensure responsible and fair AI applications in cyber security.

- *Exploring Emerging AI Technologies*

Continued exploration of emerging AI technologies, such as deep learning and neuromorphic computing, can contribute to the development of even more sophisticated cyber defense capabilities. Research in these areas holds the potential to uncover novel approaches to cyber security challenges.

The intertwined future of AI, ML, and cyber security is replete with both promise and challenges. By recognizing and addressing these factors, the cyber security community can harness the power of these tools responsibly, thereby building a more secure digital future for all.

REFERENCES

1. Bostrom, N., & Tegmark, M. (2015). What are the real risks of artificial intelligence? *Perspectives on Psychology*, 6(2), 309-314.
2. Buczak, A. L., & Guven, E. (2015). Anomaly detection for time series data with applications to cyber



- security. ACM SIGKDD Explorations Newsletter, 17(1), 1-23.
3. Chong, Y., & Wen, J. (2020). Quantum cyber security: A grand challenge for the 21st century. arXiv preprint arXiv:2003.01144.
 4. Floridi, L. (2019). Ethics of artificial intelligence: An overview. International Journal of Machine Learning and Cybernetics, 10(8), 2449-2461.
 5. Jobin, A., Ienca, M., & Vayanos, P. (2019). Artificial intelligence and the right to explanation: An emerging legal and ethical issue. AI Magazine, 40(1), 27-37.
 6. Liao, F., Zhu, L., & Ren, Y. (2020). Machine learning based network intrusion detection with limited labeled data. Journal of Systems and Software, 172, 100829.
 7. Lumsden, A. (2019). AI in defense: Toward a human-centered approach. Ethics & International Affairs, 33(3), 259-279.
 8. McDaniel, P., & Ramage, K. (2020). Federated learning for cyber security: A comprehensive survey. arXiv preprint arXiv:2004.05747.
 9. Mittelstadt, B. (2019). Principles for algorithmic justice. Proceedings of the Conference on Fairness, Accountability and Transparency, 81-90.
 10. Ronen, E., & Shamir, L. (2018). How AI helps in cyber attacks and cyber defense. IEEE Security & Privacy, 16(3), 38-43.
 11. Shah, U., & Sharma, P. (2022). Explainable machine learning for cybersecurity applications: A comprehensive survey. Applied Soft Computing, 112, 107905.
 12. Xu, H., Li, W., Zhao, M., & Ma, X. (2022). Deep learning based real-time network anomaly detection system with attention mechanism. Computers & Security, 119, 102922.



Detection Forged News, Message and Junk through AI

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ABSTRACT: The spread of fake news on social media has both short-term and long-term consequences for consumers, which can lead to a reluctance to engage in the sharing and publishing of authentic news due to the fear that such information is misleading. This is because there are two main ways for fake news to spread through social media which are; misinformation and disinformation. A cognitive psychologist like; unanimously, if others believe it, so does the consumer; consistency, if such information favors his belief model, popularity, how many places such information can be found, fake news usually spreads like wildfire and achieves high scalability, especially with the help of social bots, and therefore is immediately visible everywhere on social media.. Recently, there have been several public concerns about this problem and some approaches to solve it. In this article, we address the problem by presenting proposals in the following categories: content-based, source-based and distribution-based. We describe two contrasting approaches and propose an algorithmic solution that bridges the main issues. We conclude the article by raising awareness of the concerns and opportunities of companies that are currently trying to automatically detect fake news by providing online services, but will certainly benefit from their massive use in the long run. .

KEYWORDS—Fake News, survey, identification, real news, dataset, types of fake news

I.INTRODUCTION

About 23% of social media users report sharing fake news either accidentally or on purpose. More than 60% say that fake news confuses them about current events. Social media has shifted the quality control of detecting fake news from trained journalists to ordinary users. About 39% of Indians are very confident that they can detect fake news and 45% are fairly confident. People believe they can tell the truth from fiction.

The spread of fake news presents significant challenges for organizations and brands. In fact, fake news that promotes a certain point of view or opinion about a product, brand or organization that may not be true can be intentionally designed to mislead consumers. A number of recent studies have also noted the impact of fake news on brands and organizations. Such misinformation can harm retailers and #039; profits, negatively affecting consumers and #039; buying On the other hand, consumers can be tricked into buying certain products based on fake reviews, which have been recognized as a form of online fraud. Thus, fake news and its spread has become a major concern in the age of social media, where anonymity, user-generated content, and geographic distance can facilitate the sharing of fake news.

Fake News Detection Models

Due to its rapid development and the complexity of solving it, some researchers suggest that artificial intelligence tools and machine learning techniques should be applied to fake news detection models.

More about fake news:-

Fake or fake news is a type of propaganda that consists of false information spread through social media or news channel. It is written to mislead the masses, to damage someone's reputation or take it to a new level for their own benefit. Fake news often has catchy headlines that attract audiences, increase their readership and make money.

Effect of fake news on society: -

Fake news wreaks havoc in our societies when people use fake news as a conspiracy against others. Many people lose faith in media because sometimes news channels manipulate their news to improve their



ratings. It deceives people and day after day it is difficult to distinguish fact from fiction. It influences the decisions of young people and makes them believe something that is not true. Political parties use fake news to manipulate voters. Sometimes fake news has dangerous consequences.

IS INDIA READY FOR THIS?

- Measures taken in India: -

Section 505 (1) (b) of the Indian Penal Code (IPC) allows people to be arrested for publishing fake news on the Internet.

Fake news can be reported to the Broadcasting- Enterprise. of India. " and "NBSA (News Broadcasting Standards Authority)". If the news is defamatory, civil and criminal action can be brought for defamation.

- Actions taken worldwide:-

Facebook will soon open a column under which you can mark stories as fake and alert others. The Chrome browser has extensions that automatically block fake websites. Google works with AI (artificial intelligence) which can be used to identify these fake websites and fake news.

II. DIFFERENT FLAVORS OF FAKE NEWS

One may also surprise the emphasis paid on Fake information is some distance extra than the real identity of the identical. Well, its identity is its very own poison. As one identifies faux information, possible make contributions a component in clearing the sector of that identical information. For that one desires to recognize the styles of faux information. As targeted earlier, there are numerous unknown variety of faux information however coarsely there are most important styles of faux information Partly faux information: With part of essential information lacking from a snippet of information.

Fake information: With a component or complete information being fabricated to offer with an entire new which means to the information or simply to boost the information.

The faux information universe could be very big and ephemeral and to a degree its guidelines are unknown but there are incidences in which many varieties of incorrect information are weaponized into faux information. Some of them are –

- Satire – When misleading packaged as a valid information story
- Propaganda – When containing fabrications and packaged as a valid information story
- Misleading or out-of-context information – When additionally serving as guide for fabrication
- Clickbait - When containing fabrications and packaged as a valid information story
- Conspiracy Theory – When packaged as a valid information story
- Hoax - a funny or malicious deception.

III. IDENTIFICATION/CHARACTERISTICS OF FAKE NEWS

Manual Fake News Detection

The fundamental concept of doing some thing comes from the real- global examples. Those thoughts are more suitable and/ or changed to paintings effectively withinside the region required to acquire strategy to a few problem. Similarly, the fundamental concept of having a ang of faux information identity comes from easy human thoughts. There are many stuff that the mysterious and green human thoughts do. One of these is to capture the hidden emphasis in a hard and fast of statistics. That might paintings because the main standards to confuse reak and faux information. There are many traits of faux information like -

1. Comes from an unexpected website
2. URL is abnormal or doesn't fit the information outlet
3. Headline is outrageous or doesn't fit article
4. May have an vintage date or doesn't have coverage
5. Doesn't listing an creator so you'll look into them
6. Fails to offer evidence of declare

As visible from familiar viable examples, Fake information are created in order that human mind can accept as true with it. They are made such plausible that one not often doubts the information and visit appearance it up. For Example – If one says, “Humans are capable of breathe beneath drinks”. It is fake information, although partially but nevertheless fake.



A person who's extra inquisitive about this region will studies in this information and subsequently might positioned it beneath the faux information tab without a few applicable statistics. If one appears the checking process of that a person, you'll pick out the fundamental steps to comply with for identity of faux information.

Chart 1 Comparison among three main types of fakenews identification

Criteria	Deep Learning	Machine Learning	Others
Concept	Recurrent Neural Networks Artificial Intelligence	SVMs, Ada Boost, Bagging	N-grams, character, word similarities/ analytics/ crowd sourcing algorithms
Identification	Context - Based	Context - Based	Content - Based
Type of Fake News Targeted	Stance related, rumour	Hoax, Satire, Fake News Postings	Opinion articles, hoax

There are far more researches going on in this field to emphasize the role of fake news detection software or method in the real world. The base line remains same in all those including the challenges one may face during implementation of any such fake news detection mechanisms.

IV. STANDARD TOOLS AND DATA SETS

For analysing the functioning of any tool for achieving any task, some dataset is needed to verify whether the tool is working fine or not. Similarly, to get some dataset is a must that should contain real as well as fake news to check the accuracy of its findings. The data set should have these characteristics in them:

1. There should be real news in the data set, so the tool doesn't reject the news
2. There should be fake news to check whether the basic target is being hit by the tool.
3. The data set should contain subjectively a variety of news for the whole spectrum of fake to real news.
4. A criterion defining the percentage of fake or real news in a piece of news.
5. It would be an advantage only if the dataset may contain the real version of the fake news provided.

Considering the gaps with inside the preceding literature and the significance of expertise social media faux information associated with COVID-19, this observe attempts to reply the subsequent studies questions:

- RQ1: What are the famous COVID-19-associated subject matters of social media faux information?
- RQ2: What are the specific content material varieties of COVID-19-associated social media faux information?
- RQ3: What are the frequent reasserts of COVID-19-associated social media faux information?
- RQ4: What are the targets of COVID-19-associated social media faux information?
- RQ5: What are the insurance styles of COVID-19-associated social media faux information?

V. RESEARCH METHODS

Data supply: In this study, we analyzed COVID-19-associated social media faux information in India following a quantitative content material evaluation method. The faux information information had been collected from Alternative News (<http://altnews.in> accessed on 1 May 2020), an Indian fact-checking internet site. It works as a wing of the Pravda Media Foundation, a non-earnings organization, and run with the aid of using expert reporters and media specialists.

The International Fact-Checking Network (IFCN), part of Poynter Institute, certifies it with the aid of using studying six applicable aspects: organization, nonpartisanship and fairness, transparency of reassets, transparency of investment and organization, transparency of methodology, and open and sincere correction policy.

The internet site is likewise indexed withinside the database of The Reporters' Lab at Duke University



controlled with the aid of using Bill Adair and Mark Stencil. Bill Adair is likewise the founding father of PolitiFact (<http://politifact.com> accessed on 1 May 2020), a Pulitzer-winner nonprofit fact-checking internet site. To in addition confirm the internet site's credibility as a information supply, we studied its operational, strategic, and moral policies. It has 3 clearly-said editorial policies: (a) no political affiliations; (b) proof-primarily based totally fact-checking; (c) an in depth clarification of ways a declare is debunked.

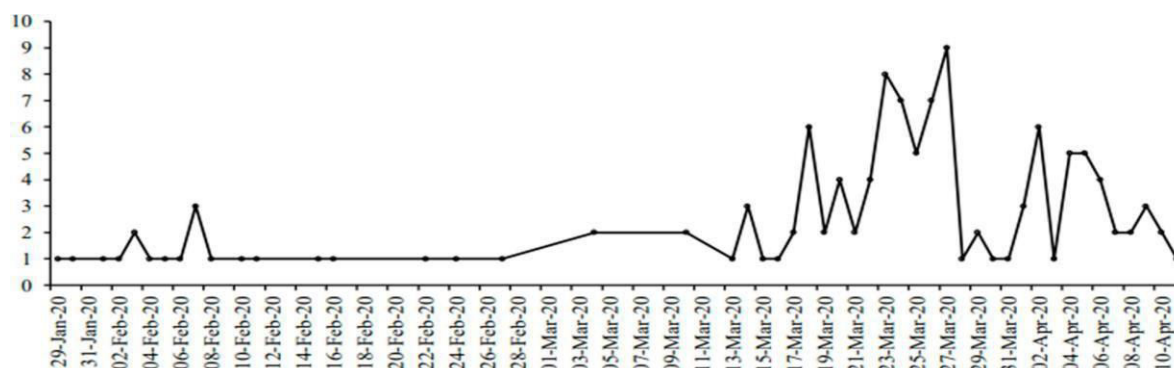
The following five methodologies to debunk a declare. First, choice of a declare to debunk. It debunks claims from more than one reassets, together with mainstream media, social media, politicians' claims, and famous public discourses. Case choice relies upon on 3 criteria: how viral is the declare (extent, reach, and spread), what's the supply of the declare (broadcaster, sharer, and discussants), and what's the nature of the declare (provocative, big have an impact on and impact). Second, studying the declare. It makes use of at the least seven strategies to confirm the records, which include studying the number one reassets, contacting accountable government and experts, and the usage of equipment like InVid. Third, the assessment of the claims.

Based on complete studies, the editorial board comes to a decision the reality fee of the records. When the records for fact-take a look at is doubtful or now no longer conclusive, the fact-checkers determine now no longer to offer a judgment, instead they point out it withinside the article. Fourth, writing the fact-take a look at. After a selection is made, they put together a user-pleasant however certain article at the records.

The articles additionally encompass the reassets of proof in order that readers can confirm the records with the aid of using themselves. Fifth, updating the articles. They continually hold their eyes for the applicable records to replace the maximum novel proof. Based on lawsuits and/or dependable proof, they renowned their mistakes and accurate them promptly. Previous research extensively utilized this fact-checking internet site as a supply in their studies information (Al-Zaman 2021; Kanozia et al. 2021).

The internet site has been debunking Indian faux information from April 2016 onward. Until April 2020, it debunked about 2028 faux information. Every article in this internet site debunks a unmarried faux information, such as some precise records: the statement/declare of the faux information followed via way of means of an in depth context, the reassets of the records along side links, screenshots, or contents (upon availability), and a selection defined in element sponsored up via way of means of evidence. This internet site became used because the information supply on this studies because of 3 reasons: (a) the comprehensiveness, wealthy faux information list, and popularity of the internet site make it an excellent supply for studies information; (b) social media structures regularly eliminate flagged and/or distorted records if it violates the structures' regulations in order that many portions of faux information can not be located via way of means of looking the structures (Mosseri 2017); (c) some research used fact-checking web sites as information reassets due to the fact those web sites' established information require much less attempt to smooth and put together for the very last analysis (Brennen et al. 2020; Avaaz 2019).

At first, the articles posted in this internet site among 29 January to eleven April 2020 have been studied. (This timeline has relevance with the COVID-19 scenario in India. The country's first COVID-19 case became detected on 30 January 2020 and on eleven April 2020, the quantity of instances elevated to 7529 with 242 dead, in keeping with the Ministry of Health and Family Welfare (MoHFW) of the Government of India.) The internet site debunked a hundred twenty five social media faux information immediately connected to the pandemic at some stage in this period. The 4 faux-information-inclined social media structures are Twitter, Facebook, YouTube, and WhatsApp. Figure 1 suggests that COVID-19 faux information have been choppy all through the time.





The range of faux information improved barely after 27 February however dropped after 10 March. It improved once more after sixteen March and fluctuates continuously earlier than achieving its top on 27 March (n = nine; 7.2%). Again, the range dropped starkly the following day, on 28 March (n = 1; 0.8%) (see Table 1). Before every other heavy fluctuation, the range reached the third-maximum on 2 April (n = 6; 4.8%). However, the curve indicates a decline in every day instances from nine April onward.

A new category was introduced as the aims of some fake news were unclear. It is to mention that unlike a few previous experimental studies, aim detection in this study was more subjective, depending on the coders' understanding of the claims of fake news, descriptions, and/or impacts. In this regard, Knapp's (1944) definition (i.e., positive rumor usually predicts wishful or positive outcomes while negative rumor describes undesirable or harmful outcomes) guided the coding to some extent. Only for RQ5, we set two codes: national and international.

National fake news only deals with national phenomena, whereas international fake news includes fake news that is internationally circulated, having any international connection with other countries, or refer something that is foreign/international. The coders at first examined 48% (n = 60) of the selected sample and found the coding reliable: the additional coding issues were resolved based on discussions and mutual consent.

Serial	Date	Frequency	Percent	Serial	Date	Frequency	Percent
1	27-Mar-23	9	7.2	26	10-Apr-23	2	1.6
2	23-Mar-23	8	6.4	27	29-Jan-23	1	0.8
3	24-Mar-23	7	5.6	28	30-Jan-23	1	0.8
4	26-Mar-23	7	5.6	29	1-Feb-23	1	0.8
5	18-Mar-23	6	4.8	30	2-Feb-23	1	0.8
6	2-Apr-23	6	4.8	31	4-Feb-23	1	0.8
7	25-Mar-23	5	4.0	32	5-Feb-23	1	0.8
8	4-Apr-23	5	4.0	33	6-Feb-23	1	0.8
9	5-Apr-23	5	4.0	34	8-Feb-23	1	0.8
10	20-Mar-23	4	3.2	35	10-Feb-23	1	0.8
11	22-Mar-23	4	3.2	36	11-Feb-23	1	0.8
12	6-Apr-23	4	3.2	37	15-Feb-23	1	0.8
13	7-Feb-23	3	2.4	38	16-Feb-23	1	0.8
14	14-Mar-23	3	2.4	39	22-Feb-23	1	0.8
15	1-Apr-23	3	2.4	40	24-Feb-23	1	0.8
16	9-Apr-23	3	2.4	41	27-Feb-23	1	0.8
17	3-Feb-23	2	1.6	42	13-Mar-23	1	0.8
18	4-Mar-23	2	1.6	43	15-Mar-23	1	0.8
19	10-Mar-23	2	1.6	44	16-Mar-23	1	0.8
20	17-Mar-23	2	1.6	45	28-Mar-23	1	0.8
21	19-Mar-23	2	1.6	46	30-Mar-23	1	0.8
22	21-Mar-23	2	1.6	47	31-Mar-23	1	0.8
23	29-Mar-23	2	1.6	48	3-Apr-23	1	0.8
24	7-Apr-23	2	1.6	49	11-Apr-23	1	0.8
25	8-Apr-23	2	1.6		Total	125	100

For RQ1, social media faux information associated with COVID-19 has seven dominant topics: health, religion and political, crime, entertainment, religious, and miscellaneous. Health- associated faux information has the very best frequencies (n = 84; 67.2%), accompanied via way of means of religion and political faux information (n = 21; 16.8%) with a large hole in-between (Table 2). These topics contain 84% of the overall faux information. Only 2 (1.6%) miscellaneous faux information is observed this is the bottom at the list.



Table 2. Themes of faux information.

Table 2. Themes of fake news.

Rank	Themes	Frequency	Percent	Cumulative %
1	Health	84	67.2	67.2
2	Religion & political	21	16.8	84
3	Political	9	7.2	91.2
4	Crime	3	2.4	93.6
5	Entertainment	3	2.4	96
6	Religious	3	2.4	98.4
7	Miscellaneous	2	1.6	100

For RQ2, faux information in social media has seven varieties of content material: textual content, image, audio, video, textual content and image, textual content and video, and textual content and image and video. Text and video (n = 59; 47.2%) is the maximum famous mixture of faux information contents, accompanied via way of means of some other mixture: textual content and image (n = 40; 32%) (Table 3). Both combos represent 79.2% of the overall contents. Photo as a content material kind has the bottom (n = 1; 0.8%) example at the list. Three different essential content material kinds also are much less famous: textual content (n = 14; 11.2%); audio (n = 6; 4.8%); and video (n = 3; 2.4%).

Table 3. Types of Contents.

Rank	Content Type	Frequency	Percent	Cumulative %
1	Text and Video	59	47.2	47.2
2	Text and Photo	40	32	79.2
3	Text	14	11.2	90.4
4	Audio	6	4.8	95.2
5	Video	3	2.4	97.6
6	Text and Photo and Video	2	1.6	99.2
7	Photo	1	0.8	100
	Total	125	100	

For RQ3, the 2 essential assets of faux information in social media are on line media and mainstream media. Of the 2 kinds, on line media (n = 118) by myself is accountable for 94.4% faux information, while mainstream media (n = 7) is accountable for simplest 5.6% of faux information (Table 4).

Table 4. Sources of faux information.

Rank	Source types	Frequency	Percent	Cumulative %
1	Online media	118	94.4	94.4
2	Mainstream media	7	5.6	100
	Total	125	100.0	

This variable distribution indicates that on line media is a much extra powerful faux information supply amid COVID-19 than mainstream media. In on line media, 4 social media systems produce maximum of the faux information: Twitter (n = 35), Facebook (n = 30), WhatsApp (n = 4), and YouTube (n = 3).

For RQ4, the goals of social media faux information associated with COVID-19 are of 3 kinds: negative; nice; and unknown. More faux information is observed negative (n = 79; 63.2%), while nice information is considerably lower (n = 28; 22.4%) (Table 5). The goals of 18 (14.4%) faux information are undetected.

VI.CONCLUSIONS

Main Objectives and Key Findings: This have a look at seeks to discover the themes, content material types, sources, coverages, and targets of COVID-19-associated social media faux information from India. A pattern of one hundred twenty five faux information became analyzed. We discovered that famous faux information fluctuates over the duration with a surge on the quilt of March 2020. Indian customers shared and



disseminated extra COVID-19 faux information while anxiety escalated, statistics have become scarce, and the call for statistics became higher. It will be a cause for this surge this is constant with the findings that the is rumors surge with anxiety and while a statistics vacuum is created. Moreover, it appears faux information reduced slowly after nine April. Two motives for this may be: (a) projects from the government and volunteers, which include the government social media companies (Facebook), and aid persons (doctors), to minimize faux information propagation (b) a higher glide of correct statistics in opposition to the distorted statistics, at the side of the expanded statistics intake price amongst public. Additionally explored that the expanded statistics intake price and faux information detection ability have a superb correlation, because of this that the extra the customers devour statistics, the much less the superiority of faux information might be. However, with the repeated fluctuation over the duration, this have a look at can't firmly kingdom that faux information might be reducing gradually.

The supply identity of faux information in social media results in an thrilling locating. Online media produce maximum of the faux information besides some from mainstream media. Moreover, the 4 social media platforms: Twitter, Facebook, WhatsApp, and YouTube, make contributions remarkably to the faux information manufacturing and dissemination. Of them, Twitter produces greater faux information, possibly because of its particular and short statistics dissemination capacity explored Facebook because the main social media platform that unfold maximum of the faux information. This result (i.e., on line media produces maximum of the faux information), helping the locating of additionally shows how essential on line media may be in phrases of faux information manufacturing and the way essential it's far to reveal social media to lessen the propagation and proliferation prescribed a comparable technique to this problem, i.e., filtering and tracking social media information and communication.

REFERENCES

1. Alimardani, Mahsa, and Mona Elswah. 2020. Online Temptations: COVID-19 and Religious Misinformation in the MENA Region.
2. Social Media + Society 6: 2056305120948251. [CrossRef]
3. Allcott, Hunt, and Matthew Gentzkow. 2017. Social Media and Fake News in the 2016 Election. *Journal of Economic Perspectives* 31: 211–36. [CrossRef]
4. Brennen, J. S., F. M. Simon, P. N. Howard, and R. K. Nielsen. 2020. Types, Sources, and Claims of COVID-19 Misinformation. London: University of Oxford.
5. Carlson, Matt. 2009. The reality of a fake image news norms, photojournalistic craft, and brian walski's fabricated photograph.
6. *Journalism Practice* 3: 125–39. [CrossRef]
7. Casero-Ripolles, Andreu. 2020. Impact of COVID-19 on the media system: Communicative and democratic consequences of news consumption during the outbreak. *El Profesional de La Información* 29. [CrossRef]
8. Funke, D., and D. Flamini. 2019. A Guide to Anti-Misinformation Actions around the World. Poynter. Available online: <http://poynter.org/ifcn/anti-misinformation-actions/> (accessed on 1 May 2020).
9. //poynter.org/ifcn/anti-misinformation-actions/ (accessed on 1 May 2020).
10. Gradon, K. 2020. Crime in the time of the plague: Fake news pandemic and the challenges to law-enforcement and intelligence community. *Society Register* 4: 133–48. [CrossRef]
11. Rodríguez, Pulido, C., B. Villarejo Carballido, G. Redondo-Sama, M. Guo, M. Ramis, and R. Flecha. 2020. False news around COVID-19 circulated less on Sina Weibo than on Twitter. How to overcome false information? *International and Multidisciplinary Journal of Social Sciences* 9: 107–28. [CrossRef]
12. Quandt, T., L. Frischlich, S. Boberg, and T. Schatto-Eckrodt. 2019. Fake News. In *The International Encyclopedia of Journalism Studies*. Edited by T. P. Vos, F. Hanusch, M. Geertsema-Sligh, A. Sehl and D. Dimitrakopoulou. Wiley Blackwell: vol. 114, pp. 1–6. [CrossRef]
13. Raj, A., and M. P. Goswami. 2020. Is fake news spreading more rapidly than COVID-19 in India? *Journal of Content, Community and Communication* 11: 208–20. [CrossRef]
14. Rosnow, R. L., J. H. Yost, and J. L. Esposito. 1986. Belief in rumor and likelihood of rumor transmission. *Language and Communication* 6: 189–94. [CrossRef]
15. Wheaton, Gracie Claire. 2018. Birthers, Hand Signals, and Spirit Cooking: The Impact of Political Fake News Content on Facebook Engagement during the 2016 U.S. Presidential Election. Master's thesis, Virginia Polytechnique Institute and State University, Blacksburg, VA, USA. Available online: <http://vtechworks.lib.vt.edu/handle/10919/89055> (accessed on 1 May 2020).
16. Wu, Liang, and Huan Liu. 2018. Tracing Fake-News Footprints. Paper presented at Eleventh ACM International Conference on Web Search and Data Mining-WSDM, Los Angeles, CA, USA, February 6–8; vol. 18, pp. 637–45. [CrossRef]
17. Zhou, Xinyi, and Reza Zafarani. 2020. A Survey of Fake News: Fundamental Theories, Detection Methods, and Opportunities. *ACM Computing Surveys* 53: 1–34. [CrossRef]



A Study on Artificial Intelligence in Libraries of Indian Society - In Overview

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ABSTRACT: This research paper explores the applications and benefits of artificial intelligence (AI) in libraries of Indian society. Artificial intelligence is one of the important areas of computer and data science allowing a machine to perform tasks in a way similar to a human performing them. AI improves user the rapid advances in technology, libraries are embracing to enhance their operation. This paper provides an overview of artificial intelligence technologies employed in library settings and discusses their impact on various library functions. AI is becoming increasingly prevalent in many applications, but it's not going to completely replace human operators, in the long run, AI is expected to enhance human abilities and be the dominant technology. The findings suggest that AI has the potential to revolutionize libraries in Indian society.

KEYWORDS: artificial intelligence (AI), Machine learning, Advantages vs Disadvantages and library Management

Introduction of AI in Indian Society

Artificial Intelligence (AI) is a rapidly evolving field that encompasses the development of intelligent machines capable of performing tasks that typically require human intelligence. In recent years, AI has gained prominence in various sectors globally, including India. The integration of AI technologies has the potential to revolutionize industries, improve efficiency, and address complex societal challenges.

IA the invention of computers, humans have been developing various approaches to increase operational speed and decrease physical size in diverse types of hardware and applications. While expanding the uses of computer systems, humans were interested in exploring whether a machine can think, work, and behave like a human. . In the Indian context, AI is being applied across diverse domains such as healthcare, agriculture, finance, education, and governance.

Concepts of AI and libraries of Indian society

1. Educational Institutions

- a) Academic institutions in India are incorporating AI into their curriculum to prepare students for the future job market.
- b) Research centres and libraries within educational institutions contribute to the advancement of AI through research publications, conferences, and collaborative projects.

2. Government Initiatives

- a) The Indian government has shown a growing interest in AI and has launched initiatives such as the National AI Mission to promote research, development, and adoption of AI technologies.
- b) Government libraries play a role in disseminating information about AI policies, regulations, and best practices to stakeholders.

3. Research and Development Centres

- a) India hosts numerous research and development centers focused on AI, where experts work on cutting-edge technologies, algorithms, and applications.
- b) These centres contribute to the creation of a knowledge base that can be shared with the broader society.

4. Corporate Sector

- i) Indian companies are increasingly integrating AI into their operations to enhance productivity and innovation.
- ii) Corporate libraries play a role in disseminating knowledge about AI applications, case studies, and best practices within their organizations.

5. Start-ups and Innovation Hubs

- i) The start-up ecosystem in India has witnessed a surge in AI-based enterprises working on innovative solutions across various industries.
- ii) Incubators, accelerators, and innovation hubs serve as libraries of knowledge, supporting start-ups in their AI endeavours.

6. Professional Associations

- i) Professional bodies and associations related to AI, machine learning, and data science provide a platform for networking, knowledge exchange, and skill development.



- ii) Libraries of resources, including journals, articles, and conference proceedings, contribute to the continuous learning of professionals in the field.

7. Public Awareness and Education

- i) Libraries, both physical and digital, contribute to raising public awareness about AI through accessible resources, workshops, and educational programs.
- ii) Ensuring that information about AI is readily available to the public helps in fostering informed discussions and ethical considerations.

The study and integration of AI into Indian society involve a collaborative effort across educational institutions, government bodies, research centres, corporate entities, start-ups, and professional associations. Libraries of knowledge, both physical and virtual, play a crucial role in disseminating information, fostering innovation, and facilitating the responsible development and adoption of AI technologies in the Indian context.

AI Applications in Library Management.

1. Information Discovery and Recommendation:

AI-powered algorithms can analyze user preferences, historical data, and contextual information to provide personalized recommendations, enhancing the discovery and retrieval of relevant resources. These recommendation systems can suggest books, articles, or multimedia materials based on users' reading history, interests, and user profiles, thus improving user satisfaction and engagement.

2. Cataloguing and Metadata Enhancement:

AI techniques, such as natural language processing (NLP) and machine learning, can automate the process of cataloguing and metadata creation. By analysing textual content and extracting relevant information, AI can enhance the accuracy and efficiency of cataloguing tasks, ensuring consistent and enriched metadata for library resources.

3. Chabot's and Virtual Assistants

AI-powered chatbots and virtual assistants can offer real-time assistance to library users. These automated systems can handle routine inquiries, provide information on library services and policies, assist with basic research queries, and offer guidance on resource discovery, freeing up librarians' time for more complex tasks and personalized interactions.

4. Collection Management and Preservation:

AI technologies, including image recognition and text analysis, enable efficient collection management and preservation. Automated systems can analyze the condition of physical materials, identify damaged items, suggest appropriate preservation techniques, and facilitate the digitization of rare or fragile materials.

APPLICATIONS OF ARTIFICIALLY INTELLIGENCE IN LIBRARIES

VARIOUS AREAS OF AI		USE AND APPLICATION
APPLICATION AND EXPORTATION	Library activities	Dialogue between staff and users Helping in realizing the need for an improvement in productivity Improve the quality of library services Improve the quality of information products
	Reference and services	RESEARCH: Used to teach students reference skills POINTER: Directs the users to the reference sources Online Reference Assistance (ORA) AMSWERMAN: Help users with reference questions on agriculture topics. PLEXUS: Referral tool used in Public Libraries
	Cataloguing	A human-machine interface, where the intellect effort is divided between the intermediary and the support system; An Expert System with full cataloguing capability linked into electronic publishing system, so that as a text is generated on-line.
	Classification	Coal SORT: Conceptual browser designed to serve either as a search or an indexing tool. BIOSIS: Uses a knowledgebase to assign documents to categories automatically
	Indexing	Med Index
	Acquisition	A subject bibliographer makes in selecting monographic
Application of Natural Language Processing	Library activities	To apply this is more specifically to searching databases such as online public access catalogues (OPAC) Use of natural language for Dialog database searches
Application of Pattern And Recognition	Library activities	Use in digital libraries, multimedia systems, geographic information systems, and collaborative computing to electronic commerce have created tremendous opportunities for information researchers.



		Focus on the user-friendly, graphical, & and seamless Human-Computer Interactions.
Library Robotics	Library activities	Comprehensive Access to Printed Material (CAPM) is to build a robotic, on-demand, and batch scanning system that will allow for real-time browsing of printed material through a web interface

Advantages and disadvantages of artificial intelligence

Artificial Intelligence (AI) in libraries, can offer several advantages and some potential disadvantages. It's important to note that the implementation and impact of AI can vary depending on the specific context and goals of a library. Here are some general advantages and disadvantages:

Advantages of AI

1. **Automated Cataloguing and Classification:** AI can assist in the efficient organization and classification of library resources, making it easier for users to locate materials.
2. **Enhanced Search and Retrieval:** AI-powered search engines can provide more accurate and relevant results, improving the user experience when searching for information within the library's collection.
3. **Personalized Recommendations:** AI algorithms can analyze users' preferences and behavior to offer personalized recommendations, helping users discover relevant materials they may not have considered.
4. **Virtual Assistants and Chatbots:** Implementing AI-driven virtual assistants or chatbots can enhance user engagement by providing instant assistance, answering common queries, and offering guidance on library services.
5. **Data Analytics for Decision-Making:** AI can analyze data on user behavior, resource utilization, and other metrics to provide insights that can inform decision-making processes, helping libraries optimize their services.
6. **Security and Fraud Detection:** AI can contribute to the security of library systems by detecting and preventing fraudulent activities, such as unauthorized access or the misuse of library resources.
7. **Accessibility Improvements:** AI technologies can be employed to enhance accessibility for individuals with disabilities, making it easier for them to access and utilize library resources.

Others advantages of AI

- Finished task faster than a human,
- Stressful and complex work completed easily,
- Difficult work done in a short period,
- Various functions can done at a time,
- Success ratio is high,
- Less errors in tasks and defects also,
- More efficiency in a short time,
- Less space, less size,
- Calculation of long-term and complex situations, and
- Discover unexplored things. i.e. outer space

Disadvantages of AI

1. **Privacy Concerns:** The collection and analysis of user data by AI systems may raise privacy concerns. Libraries need to establish robust privacy policies and safeguards to protect user information.
2. **Dependency on Technology:** Overreliance on AI systems may lead to a decline in traditional library skills and the human touch that librarians provide, potentially affecting the quality of user interactions.
3. **Cost of Implementation:** Implementing AI systems can be expensive, and smaller libraries may face challenges in terms of funding and resources required for adopting advanced technologies.
4. **Bias and Fairness Issues:** AI algorithms can inherit biases present in the data used to train them. If not carefully managed, this bias may lead to unfair or discriminatory outcomes, impacting the diversity and inclusivity of library services.



5. **Technical Challenges:** AI systems may face technical challenges, such as system errors, bugs, or the need for continuous updates and maintenance, which could disrupt library services if not managed effectively.
6. **User Resistance:** Some library users may be resistant to new technologies or prefer traditional methods, and the introduction of AI systems may lead to a disconnect with certain user demographics.

Other Dis-Advantages of AI

- ✓ Some time it can be misused leading to mass-scale destruction.
- ✓ Programme mismatch is sometime done opposite to the command.
- ✓ Human jobs affected.
- ✓ Unemployment problems increased.
- ✓ Creativity depends upon the programmer.
- ✓ Lacks the human touch.
- ✓ The younger generation becomes lazy.
- ✓ Require a lot of time and money and
- ✓ Technological dependency increased.

In this study conclusion, while AI in libraries can offer numerous benefits in terms of efficiency, user experience, and decision-making, it's essential to address potential challenges and ethical considerations to ensure a balanced and effective implementation.

Conclusion

Artificial intelligence (AI) is one of the important areas of computer and data science allowing a machine to perform tasks in a way similar to a human performing them. AI improves user the rapid advances in technology, libraries are embracing to enhance their operation. This paper provides an overview of artificial intelligence technologies employed in library settings and discusses their impact on various library functions. AI is becoming increasingly prevalent in many applications, but it's not going to completely replace human operators, in the long run, AI is expected to enhance human abilities and be the dominant technology. The findings suggest that AI has the potential to revolutionize libraries in Indian society.

References:

- **Bavakutty, M. Muhammed, Salih T. K,** and Mohamed Haneefa K. (2006), Research on library computerization. New Delhi: EssEss.
- **Bellman, R. (1978)**, An introduction to artificial intelligence: Can computers think? San Francisco: Boyd and Fraser Publishing Company.
- **Bishop, C.M. (2006)**, Pattern Recognition and Machine Learning, Springer, ISBN 978-0-387-31073-2
- **Charniak, E. and McDermott, D. (1985)**, Introduction to artificial intelligence. Reading: Addison-Wesley.
- **Dean, T., Allen, J. and Aloimonos, Y. (1995)**, Artificial intelligence: Theory and practice. New York: Benjamin Cummings
- **Ku. Chhaya A. Khanzode and Dr. Ravindra D. Sarode (2020)** Advantages and disadvantages of artificial intelligence and machine learning: a literature review, ISSN Print: 2277-3533 and ISSN Online: 2277-3584.
- **Mahesha G E and Dr. Kannikaparameshwari G.(2023)** A Study On Artificial Intelligence Libraries Of Indian Society, IJCRT | Volume 11, Issue 7 July 2023 | ISSN: 2320-2882.
- **McCarthy, John (2019)**, Artificial Intelligence Tutorial – It's your time to innovate the future, Dataflair Team, November 27, <https://data-flair.training/blogs/artificial-intelligence-ai-tutorial>
- **Tutorials Point (2021)**, Artificial Intelligence: Intelligent Systems, https://www.tutorialspoint.com/artificial-intelligence/artificial_intelligence_overview.htm [accessed on April 20 2020]
- **Winston, P. (1992)**, Artificial intelligence. Reading: Addison-Wesley. [accessed on April 23 2020]



A Review of the Development in the Field of Fiber Optic Communication Systems

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ABSTRACT: A Summary of the most recent advancements in fiber optic communication system research and development is provided in this document. The subject of optical fiber communication has experienced remarkable advancement in the past years. Low-latency wide bandwidth signal transmission is becoming essential for a number of applications, such as cloud computing, financial algorithm trading and the creation of next generation exaflop scale supercomputers. Because optical fibers provide the highest transmission capacity available, they are presently the preferred transmission medium in telecommunication networks for high bit rate, long distance transmission.

KEYWORDS: Applications, bandwidth, fiber optic, multiplexing, transmission, and telecommunications networks.

INTRODUCTION

Low-loss optical transmission fibers have undoubtedly played a pivotal role in the tremendous triumph of optical communications technology, which has fundamentally transformed our lives in several ways over the last four decades. The utilization of low-loss optical transmission fibers has unquestionably played a major role in the amazing development of optical communications technology. The fiber-to-the-home (FTTH) network that is now under planning in the telecommunications sector was proposed to use the so-called passive optical network. The usage of passive optical splitters was critical to the operation of this network. These splitters were made from single-mode fibres that are commonly used (SMFs). Even if FTTH didn't take off on a wide scale until decades later, research into the usage of components for telecom applications never stopped. Optical fibre communications underwent a revolution when the fibre optic amplifier was commercially released in the early 1990s. Optical impulses could travel hundreds of kilometres without regeneration with amplification [1]. Any communication system's performance is ultimately constrained by the bandwidth that is available and the signal-to-noise ratio (SNR) of the signal that is being received. The idea of channel capacity, which was established within the context of information theory [2], can be used to more formally state this restriction.

Under some conditions, optical underwater communication can be a helpful substitute for existing underwater technologies, particularly in areas with shallow, coastal, and fresh inland water. This method makes it feasible to get beyond all of the problems that arise with using acoustic communication and to make underwater monitoring systems widely used [3]. Both transmission capacity and the flexibility of optical network architecture can be significantly expanded with the help of wavelength division multiplexing (WDM) devices [4]. SINGLE-mode fiber-optic transmission media will be used in future telecommunications networks due to its high information capacity, evolving technology, and budgetary advantages. For these future optical networks, it would be ideal to have the capability of immediately processing data in the optical domain for multiplexing, demultiplexing, filtering, amplification, and correlation purposes. There are now several new classes of optical networks emerging [5]. For instance, optical signal processing-based code-division multiple access (CDMA) networks have just been released [6]-[13]. The optical fibres, which are widely used in telecommunications and are a very desirable transmission medium to establish links for T/Transfer [14], offer significantly greater performance than satellite links. This is due to the optical fibres' unparalleled symmetry in propagation in both directions.

A number of projects are focused on using optical fibres to transport either light that has been electrically modified by an atomic clock's signals [15]-[20] or a highly coherent optical carrier that an optical standard produces [21]-[23]. There are significant efforts being made worldwide to establish global fiber-optic networks for the exchange of T/Signals and the comparing of distant clocks.



The structure of the essay is as follows. The Evolution of Fiber Optics is the subject of Section II. Optical fibre is discussed in Section III. A review of recent developments in fibre optic communication is presented in section IV, and conclusions and discussion are presented in section V.

EVOLUTION OF FIBER OPTICS

Around 1975, the development of fiber-optic communication systems began.

The initial generation of lightwave systems employed GaAs semiconductor lasers and operated in the 0.8 m range. Such devices became commercially available in 1980 following a number of field trials conducted between 1977 and 1979 [24]. They could space repeaters apart by up to 10 kilometres because they functioned at a bit rate of 45 Mb/s.

Because it reduced the installation and maintenance expenses related to each repeater, the larger repeater spacing compared to a 1 km spacing of coaxial systems was a key driver for system designers.

Early in the 1980s, the second generation of fiber-optic communication systems were available, however due to dispersion in multimode fibres, the bit rate of these early systems was capped at under 100 Mb/s [25]. Utilizing single-mode fibres allowed for the removal of this restriction.

In a 1981 lab test, transmission of 2 Gb/s across 44 km of single-mode fibre was shown [15]. Commercially available systems soon after were introduced. Second- generation lightwave systems, with repeater spacing of roughly 50 km and bit rates of up to 1.7 Gb/s, were commercially available by 1987. In 1990, 2.5 Gb/s third- generation lightwave systems were made commercially available. These systems have a bit rate operating range of up to 10 Gb/s [26].

The best results are obtained when lasers running in a single longitudinal mode are paired with dispersion-shifted fibers. The drawback of third-generation 1.55- μ m systems is that they require periodic signal regeneration using electronic repeaters, which are typically spaced 60–70 km apart. Lightwave systems of the fourth generation use optical amplification to increase repeater spacing and wavelength-division multiplexing (WDM) to increase data rate.

Transmission across 11,300 km at a bit rate of 5 Gb/s had been demonstrated by 1996 [27] using real undersea cables, and commercial transatlantic and transpacific cable networks were also made accessible.

The goal of the fifth generation of fiber-optic communication systems is to increase the simultaneous operating wavelength range of a WDM system. The C band, or traditional wavelength window, spans the 1.53 to 1.57 μ m wavelength range. The L and S bands are the results of it being stretched on both the long- and short-wavelength sides, respectively. Signals in all three wavelength bands can be amplified using the Raman method. Additionally, a brand-new fibre known as dry fibre has been created, and it has the advantage of having minimal fibre losses throughout the full wavelength range of 1.30 to 1.65 μ m [28].

OPTICAL FIBER

An optical fibre is a cylindrical, high-purity fused silica glass waveguide that is built of low-loss materials. Total internal reflection is used to direct light along the fibre axis since the waveguide's core has a refractive index that is slightly higher than that of the cladding, the outside medium.

Light-based data transfer between locations can be accomplished through the use of fiber optics. Fiber optics is not an electrical technology, in contrast to copper. In a basic fiber optic system, light is carried by an optical fiber cable.

Electrical signals are converted into light signals by a transmitting device, and light signals are absorbed by a receiver and converted back into electrical signals. Like a local area network, a fiber optic system can be very basic or very expensive, depending on its needs (long-distance phone or cable television transport, for example). At example, a silicon photodetector, plastic fiber, a visible LED, and other simple electronic components might all be combined to form the system shown in Figure 1 at a relatively modest cost.

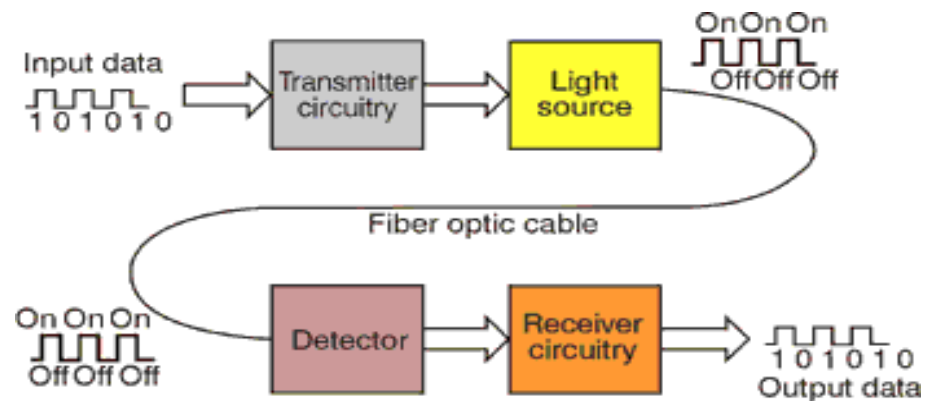


Figure 1: Basic fiber optic communication system [29]

Fiber optic communication can be divided into two groups:

Step Index 1 Single Mode, first

b. Multimode

2. Index, Guided Step Index: These fibres feature distinct cladding and core borders as well as well- defined indices of refraction. One refraction index is used throughout the entire core.

lone mode Index of Steps

A single light route or mode is permitted by a single- mode fibre, which has a core diameter of 8 to 9 microns.

Step-Index Multimode Fiber: The core diameter of multimode fibre is 50 or 62.5 microns (sometimes even larger). It supports several light modes or pathways.

Because some modes travel farther than others, they take longer to pass through the fibre, which results in modal dispersion.

The phrase "fibre graded-index" refers to the way in which the refractive index of the core gradually decreases as one gets away from its center. The increased refraction in the core slows down some light beams, but it also makes all light rays arrive at the receiving end almost simultaneously, reducing dispersion.

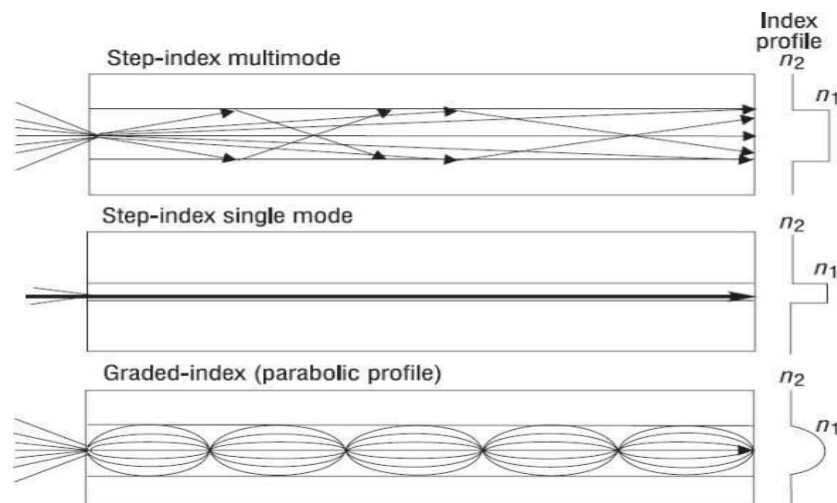


Figure 2: Optical Fiber Modes [30]

Advantages of Optical Fiber Communication:

a) *Enormous potential bandwidth:* The optical carrier frequency has a far greater potential transmission BW than metallic cable systems.

b) *Small size and weight:* Optical fiber has small diameters. Hence, even when such fibers are covered with a protective coating they are far smaller and lighter than corresponding copper cables.

c) *Electrical Isolation:* Optical fibers which are fabricated from glass or sometimes a plastic polymer are electrical insulators and unlike their metallic counterpart, they do not exhibit earth loop or interface problems. This property makes optical fiber transmission ideally suited for communication in electrically hazardous environments as fiber created no arcing or spark hazard at abrasion or short circuits.

d) *Signal security*: The light from optical fiber does not radiate significantly and therefore they provide a high degree of signal security. This feature is attractive for military, banking, and general data transmission i.e. computer networks application.

e) *Low transmission loss*: The technological developments in optical fiber over the last twenty years have resulted in optical cables which exhibit very low attenuation or transmission loss in comparison with the best copper conductors.

f) *Potential low cost*: The glass which provides the optical fiber transmission medium is made from sand. So, in comparison to copper conductors, optical fiber offers the potential for low-cost line communication. *The disadvantage of Optical Fiber Communication*:

a) It requires a higher initial cost in installation

b) Although the fiber cost is low, the connector and interfacing between the fiber optic cost a lot.

c) Fiber optic requires specialized and sophisticated tools for maintenance and repair [29]

Attenuation

Attenuation and pulse dispersion are the two most important characteristics of an optical fiber that influence the information-transporting capacity of a fiber optic communication system. The term "attenuation" refers to the decrease in signal power caused by absorption and scattering in a fiber optic waveguide. Attenuation is commonly expressed in dB/km.

REVIEW OF DEVELOPMENT IN FIBER OPTIC COMMUNICATION

Technologies, theoretical analyses, and experimental field tests for optical communications from and to high-altitude platforms were evaluated by Franz Fidler et al (HAPs). Both optical orbit-to-ground communications and optical inter-satellite links are already operational [32–34], albeit the latter are hampered by cloud cover [35], severe weather, and atmospheric turbulence [36]. Optical communications from or to high-altitude platforms (HAPs) are another topic of current research [37], [38]. HAPs are planes or airships that are positioned high above the clouds, usually between 17 and 25 kilometres, where the atmospheric impact on a laser beam is less severe than when the aircraft is above the earth directly [35]. As shown in Fig. 3, optical links are expected to act as broadband backhaul communication channels between HAPs, satellites, and ground stations if data from various sensors or

RF communication terminals aboard the HAP needs to be transferred or if a HAP serves as a data relay station.

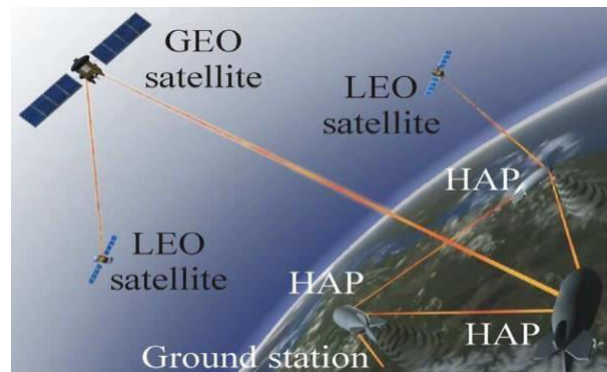


Fig. 3. Laser communication scenarios from HAPs.

Applications for optical fibre biosensors are presented in studies primarily from the previous ten years that Maria Espinosa Bosch et al. [39] evaluated. The uses of optical fibre biosensors in real samples are discussed in detail. The characterisation and optimization of flexible transducers with demultiplexing properties, appropriate for on-chip detection, were recently published by Llobera et al. [40].

Live human lung cells that can operate as a sensitizer for the detection of micro molar amounts of harmful substances are functionalized onto the surface of chalcogenide Te-As-Se fibres by Lucas et al. [41]. It first showed how the spectroscopic characteristics of chalcogenide fibres are impacted by the hydrophobic behaviour of chalcogenide glass. Naughton and others [42] discussed the creation of a fibre optic sensor based on immobilised nitrophenol that might be used for ongoing OH radical production monitoring. An optical affinity sensor was developed by Misiakos et al. [43] based on a monolithic optoelectronic transducer that incorporated thin optical fibres (silicon nitride) with self-aligned light-emitting diodes (LED) and photodetectors (silicon p/n junction) on the silicon die.

The first experimental trial of fiber-based wavelength division multiplexed data transmission at almost (99.7%) the speed of light in a vacuum was carried out by F. Poletti et al. [44].

As seen in Figure 4, Jing Zhou et al. [45] provided a thorough investigation of the security aspects of the physical layer of the OICL, or the all-fiber communication networks infrastructure.

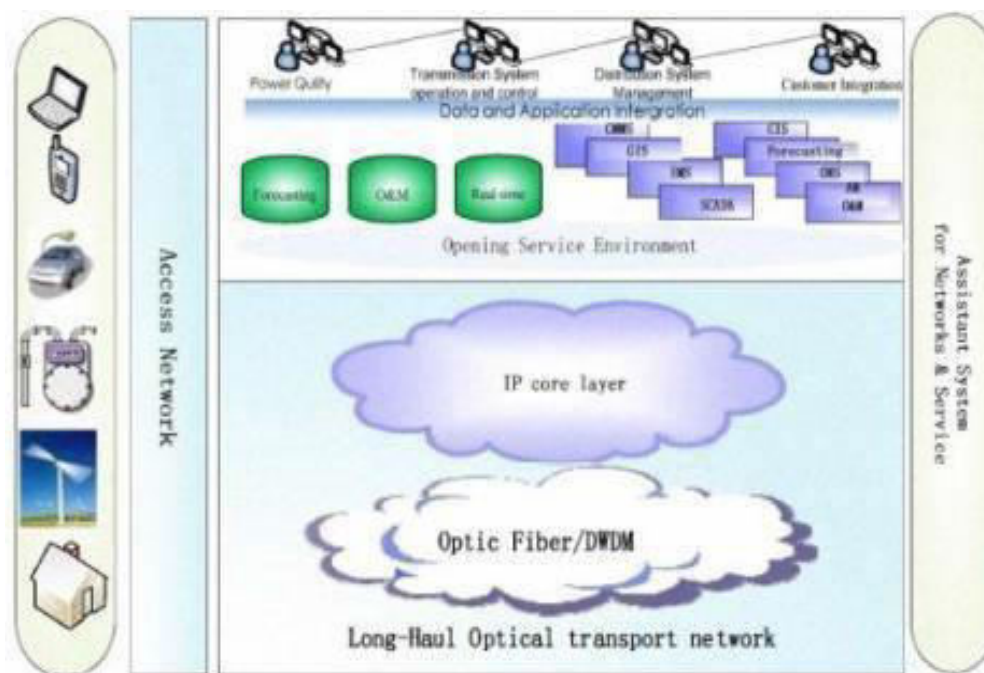
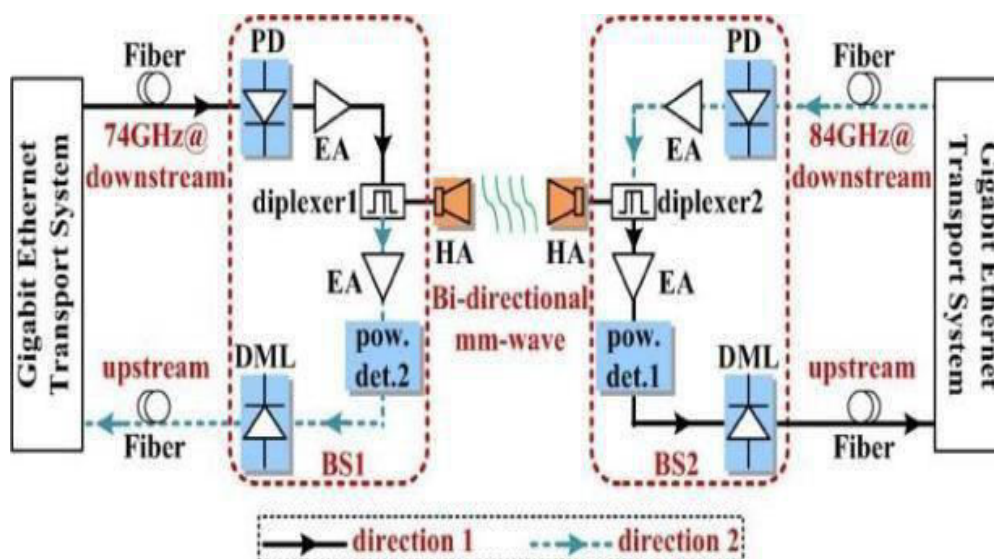


Fig.4. Framework of the optc-based information communication [45]

The first proposal and experimental demonstration of mm-wave generation in the E-band based on the photonics generation technique was made by Xinying Li et al. [46]. A bidirectional full-duplex optical/wireless integration system in the E-band with 1.5-m wireless delivery was also experimentally demonstrated by the team. In this system, 2- and 2.5-Gb/s error-free OOK signals are independently carried by 74- and 84-GHz mm-wave carriers and simultaneously transmitted in two opposing directions.

Additionally, there is no discernible difference between using an external cavity laser (ECL) with a line width less than 100 kHz or a distributed feedback laser (DFB) with a line width less than 5 MHz.

Fig. 5. Principle for the bidirectional full-duplex optical/wireless integration system in the E-band.



EA: electrical amplifier, PD: photodetector, pow. det.: power detector, WG: waveguide, HA: horn antenna, DML: directly-modulated laser, BS: base station[46]

Lijia Zhang et al. [47] A novel multi-amplitude minimum shift keying (MAMSK) orthogonal frequency division multiplexing (OFDM) signal was proposed for a 60-GHz radio-over-fiber (RoF) access system. Because of the faster roll-off side-lobe, it can increase an OFDM signal's tolerance to frequency offset. In the experiment, a 3.21-Gb/s 2AMSK-OFDM signal is successfully transmitted over a 22 km single mode fibre (SMF) and a 5 m air link, as shown in figure 6.

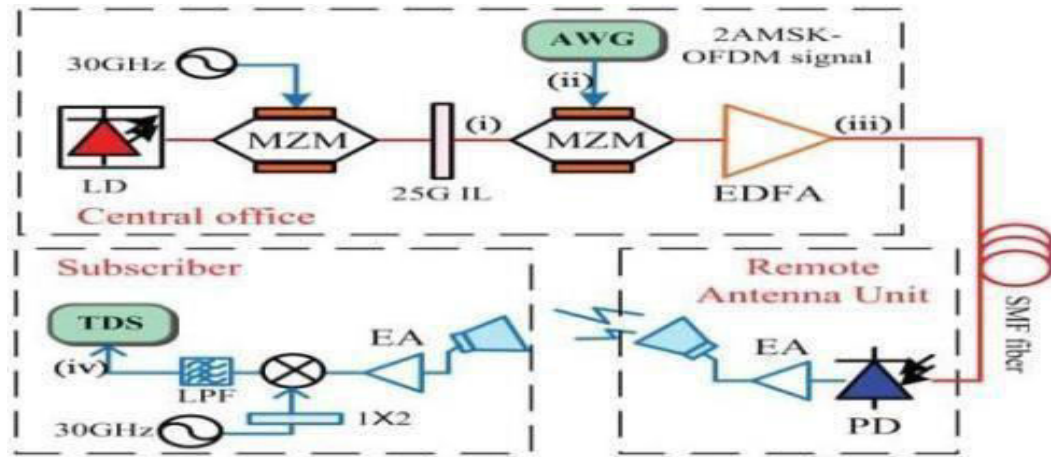


Fig. 6. Experimental setup of the proposed scheme (MZM: Mach-Zehnder

Modulator, PD: photodiode. EA: electrical amplifier. LPF: low pass filter).[47]

A straightforward fibre optical sensor system for measuring the refractive index (RI) was proposed by Wei Xu et al. [48]. It only had one mechanical 12 optical switch that was driven by the driving voltage provided to it, one 22 optical coupler with two fibre sensing ends, and one optical source. Figure 7 shows a schematic diagram of the RI sensor system based on the 1 to 2 optical switch.

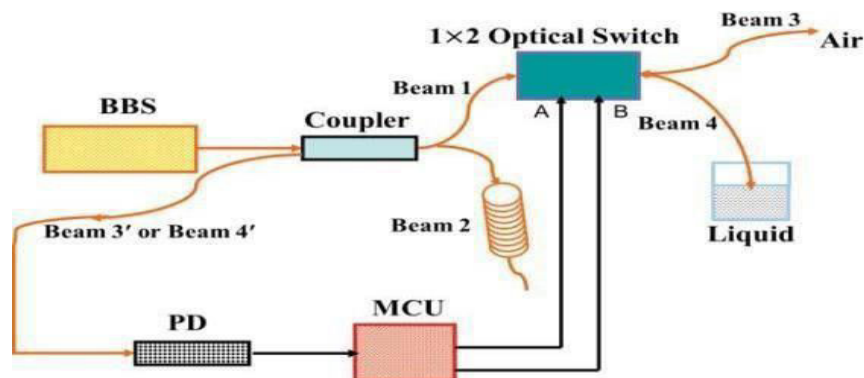


Fig.7. Schematic diagram of RI sensor system based on the 1 × 2 optical switch [48].

According to Guillermo et al. [49], an all-fiber comb- filter based on concatenated tapers and a Mach-Zehnder interferometer is described. For dense-wavelength- division-multiplexed systems [50]–[53], multi-wavelength fibre lasers [54], and metrological measurements, ALL-FIBER comb filters are appealing and practical components.

The perfect difference sets were introduced by Chi-Shun et al. [55] who also suggested using these sets to create the signature codes for a synchronous fiber-optic CDMA system.

CONCLUSIONS AND DISCUSSION

This paper's main goal is to review the most recent advancements in fibre optic communication research and technology.



A significant component of the telecommunications infrastructure is fibre optics. It is best for gigabit and beyond transmission due to its high bandwidth capacity and low attenuation features.

The many fibre kinds and their uses, light sources and detectors, couplers, splitters, wavelength-division multiplexers, and cutting-edge equipment utilised in the most recent high-bandwidth communication systems have all been discussed.

Because they can easily be integrated and miniaturised for the determination of various target compounds in a wide variety of application fields, such as industrial process and environmental monitoring, food processing, and clinical applications, fiber-optic biosensors will play a significant role in the development of biosensors. Numerous fibre optic applications that have recently been created have been discussed.

Over the past five years, the fibre optics sector has experienced exponential expansion. Analysts predict that this sector will expand significantly for the remainder of this decade and beyond.

REFERENCES

- [1] Ming-Jun Li, Xin Chen, Daniel A. Nolan, Ji Wang, James A. West, and Karl W. Koch, —Specialty fibers for optical communication systems| Optical Fiber Telecommunications V A: Components and Subsystems, 2008, Elsevier.
- [2] C. E. Shannon, —A mathematical theory of communication,| Bell Syst. Tech. J., vol. 27, pp. 379–423, 623–656, 1948.
- [3] Jian Chao Li & Dennis R. Alexander, —Propagation of ultra short laser pulses through Waterl, Optics Express, Vol. 15(4), pp.1939- 1946, February 2007.
- [4] M. Nishida, A. Rostami, —FWM minimization in WDM optical communication systems using the asymmetrical dispersion- managed fibers| Optik 123 (2012) 758– 760
- [5] X. Wang and K. Kitayama, "Analysis of beat noise in coherent and incoherent time-spreading OCDMA," J.Lightwave Technol 22, 2226-2235, (2004).
- [6] T. H. Shake, "Confident performance of -encoded optical CDMA", J. Lightwave Technol.23, 1652- 1663, (2005).
- [7] Antonio Mendez Senior Member, IEEE, Robert M. Gagliardi, Fellow, IEEE, Vincent J.Hernandez J."Design and performance analysis of Wavelength/Time (WIT) matrix codes for optical CDMA". Journal of lightwave technology Vol.21November 2003.
- [8] D. E. Leaird, Z Jiang, and A. M. Weiner, —Experimental investigation of security issues in OCDMA: a code-switching scheme", Electron. Lett.41, 817-819, (2005).
- [9] X. Wang, N. Wada, T. Miyazaki, and K. Kitayama, "Coherent OCDMA system using DPSK data format with balanced detection", IEEE Photonic Technol. Lett. 18, 826-828, (2006).
- [10] Stock and E. H. Sargent, "The role of optical CDMA in access networks", IEEE Communication Magazine40, 83- 87 (2002).
- [11] Z. Gao, X Wang, N. Kataoka and N. Wada, —Demonstration of time-domain spectral phase encoding/DPSK data modulation using single phase modulator", presented in LEOS Summer Topical 2009, New port, CA, USA, 2009.
- [12] Z. Jiang, D. Seo, S. Yang, D. E. Leaird, R. Y.Roussev, C. Langrock, M. M. Fejer, and A. M.Weiner, "Four-user 10-Gb/s spectrally phase-codedO-CDMA system operating at - 30 fJ/bit" IEEE Photonics Technol. Lett., 17, 705-707, (2005).
- [13] Xu Wang and Naoya Wada "Reconfigurable Time Domain Spectral Phase Encoding/Decoding Scheme Using Fibre Bragg Gratings for Two-dimensional Coherent OCDMA", ECOC'08, P.3. I I, September Brussels, Belgium, 2008.
- [14] D. Piester and H. Schnatz, —Novel techniques for remote time and frequency comparisons,| PTB-Mitteilungen/Special Issue, vol. 119, no. 2, pp. 33–44, 2009
- [15] O. Lopez, A. Amy-Klein, C. Daussy, C. Chardonnet, F. Narbonneau,M. Lours, and G. Santarelli, —86-km optical link with a resolution of 2×10^{-18} for RF frequency transfer,| Eur. Phys. J. D, vol. 48, no. 1, pp. 35–41, Jun. 2008.
- [16] M. Amemiya, M. Imae, Y. Fujii, T. Suzuyama, and S. Ohshima,—Time and frequency transfer and dissemination methods using optical fiber network,| in Proc. IEEE Int. Freq. Control Symp. Expo., 2005, pp. 914–918.
- [17] M. Amemiya, M. Imae, Y. Fuiji, T. Suzujyama, and S. Ohshima, —Simple time and frequency dissemination method using optical fiber network,|IEEE Trans. Instrum. Meas., vol. 57, no. 5, pp. 878– 883, May 2008.



- plication of high altitude platform (HAP) systems in future telecommunication networks,|| in Proc. 10th Signal Process. Space Commun. 2008, pp. 1–6.
- [18] María Espinosa Bosch 1, Antonio Jesús Ruiz Sánchez 2,Fuensanta Sánchez Rojas 3,* and Catalina Bosch Ojeda 3,
—Recent Development in Optical Fiber Biosensors|| Sensors 2007, 7, 797-859
- [19] Llobera, A.; Wilke, R.; Bu_tgenbach, S. Optimization of poly(dimethylsiloxane) hollow prisms for optical sensing. Lab on a Chip - Miniaturisation for Chemistry and Biology 2005, 5, 506- 511.
- [20] Lucas, P.; Solis, M. A.; Coq, D. L.; Juncker, C.; Riley, M. R.; Collier, J.; Boesewetter, D. E.; Boussard-Ple_del, C.; Bureau, B. Infrared biosensors using hydrophobic chalcogenide fibers sensitized with live cells. Sensors and Actuators, B: Chemical 2006, 119, 355-362.
- [21] Naughton, D. P.; Grootveld, M.; Blake, B. R.; Guestrin, H. R.; Narayana Swamy, R. An Optical Hydroxyl Radical Sensor. Biosensors and Bioelectronics 1993, 8, 325-329.
- [22] Misiakos, K.; Kakabakos, S. E.; Petrou, P. S.; Ruf, H. H. A monolithic silicon optoelectronic transducer as a real-time affinity biosensor. Analytical Chemistry 2004, 76, 1366-1373.
- [23] F. Poletti*, N. V. Wheeler, M. N. Petrovich, N. Baddela, E. Numkam Fokoua, J. R. Hayes, D. R. Gray, Z. Li, R. Slavík and D. J. Richardson, —Towards high-capacity fibre-optic communication sat the speed of light in vacuum|| NATURE PHOTONICS | VOL 7 | APRIL 2013
- [24] ling Zhou, Xi Chen, Ziyang Zhao, lianqi Li, —Research in the security of optic-based information communication architecture for next-generation power system applications| 2010 International Conference on Power System Technology



Exploring Artificial Intelligence on Manpower Planning and Practice: A Road Map to Success

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ABSTRACT: The textile industry, with its intricate workforce dynamics, stands at the intersection of tradition and technological advancement. This study explores the integration of Artificial Intelligence (AI) in manpower planning and practices within spinning mills. The adoption of AI technologies in human resource management offers the promise of optimizing workforce efficiency, improving decision-making processes, and enhancing overall operational performance. However, this transition is not without challenges. The study delves into the multifaceted impact of AI on manpower planning in spinning mills, considering factors such as data quality, resistance to technological adoption, cost implications, and the ethical dimensions of AI-driven decision-making. It examines the complexities of the spinning mill workforce, encompassing diverse skill sets, roles, and interpersonal dynamics, and evaluates the feasibility of developing AI models that accurately capture and predict these intricate nuances. Moreover, the research sheds light on the potential barriers faced by spinning mills in integrating AI with existing systems, emphasizing the need for a seamless transition. It also highlights the importance of continuous monitoring and evaluation of AI models, recognizing the dynamic nature of the textile industry and the necessity for adaptive solutions. Privacy concerns and ethical considerations surrounding the use of AI in handling sensitive employee data are addressed, emphasizing the need for robust privacy frameworks. The study underscores the significance of fostering a comprehensive understanding of AI capabilities and limitations among decision-makers and workforce planners to facilitate successful implementation. The research aims to inform industry practitioners, policymakers, and academics about the potential benefits and challenges associated with the integration of AI in spinning mills, ultimately fostering a more informed and strategic approach to workforce management in the evolving landscape of the textile industry. In conclusion, the advent of AI in manpower planning and practice has ushered in a transformative shift, offering organizations unprecedented insights and tools to optimize their workforce. While presenting immense opportunities for efficiency and strategic decision-making, it necessitates a thoughtful and ethical approach to ensure a harmonious integration with existing practices and values.

KEYWORDS: Privacy concerns and ethical considerations, workforce dynamics, Cost of Implementation, Data Quality and Availability, Dynamic Nature of the Textile Industry and Artificial Intelligence, spinning Mill and manpower Planning and Practice.

I.INTRODUCTION

The rate and manner in which a country or civilization advances have been significantly shaped by the competence and determination of its people. The optimal use of abundant natural resources is another crucial topic. Effective organization and control of human resources should be the primary focus in any endeavor to achieve high operational standards and optimal functional progress in the appropriate areas of commercial excellence. In essence, the economic and commercial prosperity and dominance have been achieved via the active and resolute interaction between humans and the natural environment. The optimal and enhanced functional efficiency of any worker, whether they are ordinary or specialized, is influenced by their mental constitution, physical well-being, psychological mindset, and surrounding circumstances. The human resource is the most crucial asset in a business since motivated human resource is the sole means to effectively exploit all other natural resources. Investing time, money, and effort in it is necessary because it yields positive outcomes by harnessing the boundless potential of human resources, which can be developed to



an indefinite degree. The use of artificial intelligence in textile technology remains limited, especially in highly industrialized nations. The use of AI technology has significant promise to address productivity and quality control challenges in textile businesses in poor nations. The use of AI technology in the textile sector is becoming evident, as the ability to swiftly and effectively address intricate issues is becoming crucial for maintaining a competitive edge. The textile business is characterized by its reliance on manual labor, with a significant portion of tasks, such as manufacturing and quality control, being primarily performed by human workers. AI innovation aims to build solutions that enhance efficiency and effectiveness in various processes. Artificial intelligence (AI) may enhance the efficiency and precision of these fundamental acts using advanced technology, therefore addressing issues and reducing the need for labor-intensive tasks.

II.BACKGROUND OF THE STUDY

The textile manufacturing industry is renowned for its labor-intensive characteristics, necessitating substantial investment in fixed capital. The process encompasses a wide range of product designs and materials, with manufacturing numbers that might vary significantly. The sector is very competitive and puts a significant focus on the quality of products. To fulfil these needs, it is imperative to convert labor-intensive processes into automated processes using computers, models, digital components, and artificial intelligence (AI). AI is an academic field that focuses on the development and examination of computational entities that demonstrate intelligent behavior. This notion delineates several applications of artificial intelligence (AI) in the textile manufacturing industry. Furthermore, it includes many types of artificial intelligence, such as expert systems, neural networks, fuzzy logic, genetic algorithms, and other approaches used in the textile and garment manufacturing sector. The textile industry in developed countries has started using artificial intelligence (AI) techniques to its advantage. The textile industry and academic organizations have seen the promise of these methods, especially in areas such as fabric inspection and planning in garment production. Even little improvements in performance may lead to substantial cost advantages. Artificial intelligence (AI) may be used in several phases of textile production, such as assessing fiber quality, predicting yarn properties, analyzing fabric defects, and forecasting dye recipes. AI may be used uniformly throughout all stages (preproduction, production, and postproduction) of textile manufacturing.

III.INDUSTRY 4.0 REVOLUTION IN TEXTILE INDUSTRY

The advent of Industry 4.0 marks a transformative era for the textile industry, ushering in a revolution that fundamentally reshapes the way textiles are produced, processed, and managed. In the textile industry, smart machines equipped with sensors and connected through the Internet of Things (IoT) facilitate real-time monitoring and control of production processes. This not only enhances efficiency but also allows for predictive maintenance, reducing downtime and optimizing resource utilization. Furthermore, the use of advanced analytics and big data in the textile industry under Industry 4.0 enables data-driven decision-making. Manufacturers can gain valuable insights into market trends, consumer preferences, and supply chain dynamics, fostering a more agile and responsive production ecosystem. Automation, robotics, and artificial intelligence play pivotal roles in this paradigm shift, streamlining operations, reducing errors, and increasing overall productivity. One of the hallmarks of Industry 4.0 in the textile sector is the concept of the smart factory. Through interconnected systems, production facilities become intelligent, adaptable, and capable of self-optimization. This not only enhances operational efficiency but also allows for greater customization in textile production to meet diverse market demands. Additionally, the integration of smart textiles and wearable technology into the manufacturing process exemplifies the convergence of traditional textile craftsmanship with cutting-edge technology. However, this industrial revolution comes with its own set of challenges, including the need for up skilling the workforce to operate and maintain advanced technologies, addressing cybersecurity concerns, and ensuring a smooth transition from conventional to smart manufacturing practices. Nonetheless, the Industry 4.0 revolution in the textile industry holds immense potential for fostering innovation, sustainability, and competitiveness, positioning the sector at the forefront of the global digital transformation.

IV.APPLICATION OF AI IN TEXTILE INDUSTRY

Artificial intelligence (AI) has several applications in textile manufacturing, including the assessment of fiber quality, forecasting yarn characteristics, identifying fabric defects, and predicting dye recipes. AI may be used throughout all phases of garment manufacture, including preproduction, production, and postproduction processes. Computer vision and digital image processing have diverse applications in numerous sectors and



automated industrial processes. Within the textile business, the identification of fabric defects is seen as a difficult undertaking, since the quality and cost of textile products rely on the efficiency and efficacy of automated defect detection. Historically, statistical procedures such as statistical clustering and regression were the main approaches used to identify trends. Currently, artificial intelligence approaches are surpassing conventional statistical techniques in several instances. The textile industry and academic institutes have begun to see the promise of these approaches, particularly in areas such as fabric inspection and planning in garment manufacture. Even little increases in performance may result in significant cost benefits. The use of additive manufacturing in garment technology has the advantage of facilitating the creation of fashion designs and producing remarkable items for the fashion sector, including garments, ornaments, and meshes. This technology is affording designers a significant degree of flexibility in terms of geometric design.

V. RESEARCH PROBLEM

In general, human people are not self-referential resources. Assuming this to be true, it would imply that nations with larger populations would have seen the greatest advantages. Human resources reach their greatest potential when they learn both practical skills and a suitable mindset. Without the necessary growth, human beings may become burdens at both the individual and societal levels. In emerging nations such as India, the human elements of production are the only accessible supply without any shortage. However, the only concern is how well the source is being used. The primary objective of every company firm is to generate profit. Profit successes are contingent upon the quality of products, sales growth, and competitive pricing. However, all of these aspects revolve on the manufacturing process. Competent staff may enhance the efficiency of the manufacturing process. Hence, all management entities priorities the social, legal, and economic well-being of their employees. Training is a systematic procedure that include modifying workers' knowledge, abilities, attitudes, and behavior via the use of instructions, demonstrations, practice sessions, and other educational techniques. The first stage of any training function is the process of identifying the training needs, which involves determining the specific areas where training is required. It is crucial to perform this preparatory step before organizing and choosing any training plan. Indian businesses benefit from abundant access to raw materials, cost-effective labour, and modest technological capabilities, enabling them to effectively compete in global markets. However, it is afflicted by a significant deficiency of adequately qualified and competent workforce. India has significant potential in global commerce, if it can adhere to international standards. Merely improving the technology is insufficient; it is essential to provide scientific training and development for the workforce. The significance of personnel management becomes apparent when one acknowledges the reality that a corporation's life and development are dependent upon its workforce. Therefore, this research aims to evaluate the methods of managing human resources in terms of recruiting, training and development, rewards, benefits, incentives, welfare measures, employer-employee interaction, employee perception, and challenges in manpower planning

VI. RESEARCH OBJECTIVES

1. To understand the Application of AI in textile industry spinning mills.
2. To examine the workforce strategies pertaining to manpower planning, recruiting, training, and development,
3. To outline the Industry 4.0 Revolution in Textile Industry.
4. To evaluate the workers' perception of the manpower planning and methods in spinning mills.

VII. RESEARCH DESIGN AND METHODS

The researchers gathered necessary primary data by conducting in-depth interviews with the personnel, using extensive interview schedules. Prior to developing the interview schedule, the 150 respondents of the spinning mills were selected in order to have a comprehensive understanding of the personnel planning and procedures in Dindigul District through simple random Technique. The researcher further encountered many workers and several trade union officials. The researcher developed the questionnaire based on the obtained information and the study's goals. The schedule was completed after completing a pre-test. In addition, secondary data were gathered from various sources such as books, papers, journals, government directives, and unpublished documents. The researchers used a proportionate stratified random sampling



approach to pick samples from various job positions, including office personnel, supervisors, technical staff, and laborer.

VIII.ANALYSIS, PRESENTATION AND RESULTS

Manpower management practices in the Mills: Issues

The integration of Artificial Intelligence (AI) into manpower planning and practices within spinning mills carries profound implications for the textile industry. Firstly, the adoption of AI technologies can lead to enhanced efficiency in workforce management, allowing spinning mills to align their human resources with dynamic market demands more effectively. This, in turn, may result in improved production processes and responsiveness to changing industry trends. Additionally, the implementation of AI-driven systems has the potential to streamline decision-making processes related to recruitment, skill development, and performance evaluation. By leveraging advanced algorithms, spinning mills can make data-informed decisions that optimize resource allocation and contribute to a more agile and responsive organizational structure. The respondents are asked to share their opinion level of importance to given to the reasons in a 5 point Likert scale. The ranked tested by framing the following hypothesis.

H0: There is no significant variance in the mean ranks of various Manpower management practices Table 1
Manpower management practices in the Mills: Issues

Parameters	Mean	Std. Deviation	Mean Rank
Complex Workforce Dynamics	2.75	1.651	3.98
Continuous Monitoring and Evaluation	2.98	1.564	4.01
Cost of Implementation	2.17	1.451	3.25
Data Quality and Availability	3.76	1.239	4.18
Dynamic Nature of the Textile Industry	3.98	1.365	4.57
Integration with Existing Systems	2.22	1.541	3.29
Privacy Concerns	2.01	1.283	3.15
Resistance to Technological Adoption	2.35	1.134	3.42

N	150
Kendall's Coefficient of Concordance	0.009
Chi-Square	10.457
Difference	7
Sig.	0.176



Dynamic Nature of the Textile Industry (4.57) was ranked first by the respondents. The textile industry, including spinning mills, is subject to rapid changes in market demands, technology, and economic conditions. AI models for manpower planning may need to adapt quickly to these changes, posing a challenge in maintaining accuracy and relevance over time. Data Quality and Availability (4.18): Effective implementation of artificial intelligence (AI) in manpower planning relies on high-quality and comprehensive data. Spinning mills may face challenges in obtaining accurate and up-to-date data on workforce demographics, skills, and performance. Resistance to Technological Adoption (3.42): The introduction of AI technologies in spinning mills may encounter resistance from the existing workforce. Lack of awareness, fear of job displacement, or skepticism about AI's ability to enhance human resource practices could impede successful integration. Cost of Implementation: (3.25) Implementing AI systems for manpower planning involves significant upfront costs, including technology acquisition, training, and infrastructure development. Small or financially constrained spinning mills may find it challenging to invest in these technologies. Complex Workforce Dynamics (3.98): Spinning mills often have a diverse workforce with varying skills, roles, and responsibilities. Developing AI models that accurately capture and predict the complex dynamics of the workforce, including skill variations and interpersonal relationships, can be challenging. Ensuring ethical AI practices in manpower planning is crucial to prevent discrimination and promote fairness. Integration with Existing Systems: (3.29) Spinning mills may already have established human resource management systems in place. Integrating AI solutions seamlessly with existing software and processes requires careful planning to avoid disruptions and ensure compatibility. Privacy Concerns (3.15): AI systems often require access to sensitive employee data. Ensuring data privacy and compliance with regulations becomes a critical consideration, and failure to address privacy concerns may lead to legal and ethical challenges. The calculated Chi-Square value (10.457) for the degree of freedom 7 is not significant. The p value is 0.176 which is not significant at 5% level. The result shows that the ranks given for the various reasons for manpower management practices in the Mills the various issues is not significantly varying.

Table 2: Causes for grievances

Nature	N	Mean	Std. Deviation	Std. Error
Performance management	54	22.5681	4.21032	0.78961
Employee engagement	30	20.3258	3.65721	0.45873
Recruitment	66	21.5124	4.36576	0.56872
Total	150	21.8965	4.15874	0.46587

Performance management (22.5681) have a higher average efficiency score, Recruitment (21.5124) or Employee engagement (20.3258). India has a great abundance of human resources. Human resources are a very perishable asset, making it impossible to preserve them for an extended duration. The outcome of an organization is determined by the proficient and productive exploitation of the many resources at its disposal. However, in India, the use of human resources is significantly suboptimal. Numerous companies are unable to accomplish their objectives. The management of human resources and the implementation of effective strategies are crucial aspects of spinning mills, which heavily rely on manual work. If the management of human resources is ignored or mishandled, the company is unlikely to thrive and may even face failure. Organizations must adapt their working methods via Human Resource Development (HRD) in order to effectively respond to the evolving environment. HRD systems focus on enhancing the capacity and skills of individuals inside enterprises. These empowering qualities may be cultivated in an environment that fosters initiative, trust, and transparency, and independence, willingness to take risks, teamwork, and dedication to work. The HRD concept posits that it is the duty of senior management to cultivate an environment conducive to growth and ensure that the workplace is pleasurable. This, in turn, motivates individuals to perform optimally for the organization, while also experiencing a feeling of fulfilment and personal development.



Table 3: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	51.321	2	26.326	2.896	0.075
Within Groups	1125.181	147	9.1125		
Total	1176.502	149			

For 2 degrees of freedom, the total of the squares is 51.321 whereas the mean square is 26.326. The analysis indicates that the difference in the mean score (7.5% difference) between the different Causes for grievances is not statistically significant. The most crucial resource is personnel, since qualified people resources can optimize the use of all other resources. The recognition of the correlation between employer-employee outcomes greatly affects how organizations handle their relationship with employees and how they comprehend, tackle, and shape employees' attitudes and behavior by devising and executing efficient workforce management strategies.

IX.DISCUSSION

The spinning mills within the textile industry are confronted with a dynamic and intricate workforce landscape, characterized by diverse skill sets, varying roles, and evolving market demands. The traditional approaches to manpower planning and practices may fall short in addressing the complexities of this sector. As the textile industry progresses into the era of Industry 4.0, the potential benefits of Artificial Intelligence (AI) in optimizing manpower planning and practices become apparent. However, this transition is not devoid of challenges. The problem at hand revolves around understanding the impediments and limitations faced by spinning mills in effectively incorporating AI into their human resource management strategies. Issues such as the quality and availability of data, resistance from the existing workforce towards technological adoption, the substantial costs associated with AI implementation, and the ethical dimensions of AI-driven decision-making pose significant hurdles. Furthermore, the dynamic nature of the textile industry necessitates a careful examination of how AI can adapt to rapid changes in market conditions. This study seeks to address these challenges and gaps in the existing approaches to manpower planning in spinning mills, aiming to provide insights that can guide the successful integration of AI technologies for enhanced workforce efficiency and strategic decision-making. Furthermore, the successful incorporation of AI in manpower planning can lead to significant cost savings over the long term. Automation of routine tasks, predictive analytics for demand forecasting, and optimized scheduling can contribute to resource efficiency and reduce operational expenses. From an employee perspective, the adoption of AI may necessitate up skilling and reskilling initiatives to align the workforce with the demands of AI-driven technologies. This implies a shift in workforce development strategies, highlighting the need for continuous learning and adapting to technological advancements. However, the implications also extend to ethical considerations. The use of AI in decision-making processes raises questions about fairness, bias, and transparency. Spinning mills must establish robust ethical frameworks to ensure that AI applications in manpower planning align with principles of equity, diversity, and inclusion.

X.IMPLICATION FOR THE STUDY

The advent of Artificial Intelligence (AI) has had a profound influence on the planning and implementation of human resources, introducing a new era of effectiveness and strategic management of the workforce. An important consequence of AI is its capacity to rapidly analyze large volumes of data, allowing organizations to make well-informed choices about their workforce. Machine learning algorithms have the capability to detect and analyze patterns and trends in employee performance, enabling businesses to get insights into the specific talents and attributes that lead to success inside the organization. Employing a data-driven strategy enables firms to estimate future labour demands more accurately, so enabling them to match their staff with strategic objectives. Furthermore, artificial intelligence has revolutionized recruiting procedures by automating mundane activities like resume evaluation and applicant pairing. Not only does this result in time savings, but it also decreases prejudice, since AI systems may be specifically programmed to priorities relevant credentials and experience. Through the process of optimizing recruiting, organizations may effectively construct teams that are both diverse and highly talented in a more efficient manner. In the realm of practice, artificial intelligence has completely transformed the way talent management and employee development are approached. AI systems may provide personalized



feedback and recommend specific training programmers by constantly monitoring and analyzing the performance of individuals and teams. This not only boosts employee involvement but also guarantees that skill development is in line with organizational goals. Nevertheless, the incorporation of AI in workforce planning also presents difficulties. Organizations must modify their culture and provide resources to train personnel in order to collaborate effectively with AI technology. Furthermore, it is crucial to give serious thought to ethical concerns related to data privacy and the possibility of algorithmic biases.

XI.CONCLUSION

In conclusion, the implications of introducing AI in manpower planning and practices in spinning mills are far-reaching. While it holds the promise of increased efficiency and competitiveness, careful attention must be paid to ethical considerations, workforce development, and the potential socio-economic impacts of technological advancement within the textile industry. Successfully navigating these implications will be pivotal for spinning mills as they embrace the transformative potential of AI in the evolving landscape of modern manufacturing [15]. The primary study domains in the subject of artificial intelligence include theorem proving, pattern recognition, computer vision, natural language communication, and the discovery of regularities via training. Artificial intelligence approaches and algorithms enhance planning systems by including expert rules that consider the unique aspects of technology and manufacturing processes [6]. The use of artificial intelligence will greatly enhance the operational planning system, resulting in a reduction in the time required to create optimum or acceptable production schedules. The presence of stochastic events in the manufacturing process enables prompt response to fluctuations and adjustments in the initial data. It is feasible to integrate artificial planning approaches and algorithms into production management systems to execute planning functions. Undoubtedly, the most valuable resource of every organization resides in the inherent capabilities of its personnel. The analysis of the chosen spinning mills reveals a consistent decrease in the number of employees, especially laborers, during the reviewed time [10]. However, it has been seen that staff expenses have risen. Hence, the research indicates that the spinning mills are undergoing modernization and have implemented advanced spinning machinery [8]. The recruitment of senior personnel such as administrative workers and technicians might potentially contribute to the rise in personal expenses. Furthermore, the evolving economic landscape presents fresh obstacles for workforce administration [4]. The chosen spinning mills suffer from insufficient workforce management and are in need of a comprehensive overhaul. Simultaneously, it is important to include trade unions in developing methods that enhance personnel planning and practices, ultimately leading to improved productivity and performance.

REFERENCES

1. Bhardwaj G., Singh S.V., Kumar V An empirical study of artificial intelligence and its impact on human resource functions 2020 International Conference on Computation, Automation and Knowledge Management (ICCAKM), IEEE (2020), pp. 47-51.
2. Chakraborty S.C., Bhatt V., Chakravorty T. Impact of IoT adoption on agility and flexibility of healthcare organization, International Journal of Innovative. Technology. Explor. Eng., 8 (11) (2019), pp. 2673-2681
3. Goyal C., Patwardhan M. Strengthening work engagement through high-performance human resource practices, Int. J. Product. Perform. Manag., 70 (8) (2021), pp. 2052-2069
4. Gupta P., Fernandes S.F., and Jain M. Automation in recruitment: a new frontier, J. Inf. Technol. Teach. Cases, 8 (2) (2018), pp. 118-125.
5. Jai, Q., Guo, Y., Li, R., Li, Y. and Chen, Y. (2018), "A conceptual artificial intelligence application framework in human resource management", ICEB 2018 Proceedings (Guilin, China), Vol. 91.
6. Malik, A., Budhwar, P. and Srikanth, N.R. (2020), "Gig economy, 4IR, and artificial intelligence: Rethinking strategic HRM", Human and Technological Resource Management (HTRM): New Insights Into Revolution 4.0, pp. 75-88.
7. Merdiaty, N., Omar, K., Saputra, J. and Bon, A.T. (2021), "A review of resilience and well- being in human resource management perspective literature", 11th Annual International Conference on Industrial Engineering and Operations Management, Singapore, March 7- 11, pp. 4135-4149.
8. Mikalef, P. and Gupta, M. (2021), "Artificial intelligence capability: conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance", Information and Management, Vol. 58 No. 3, 103434.
9. Qamar, Y., Agrawal, R.K., Samad, T.A. and Jabbour, C.J.C. (2021), "When technology meets people: the interplay of artificial intelligence and human resource management", Journal of Enterprise Information



- Management, Vol. 34 No. 5, pp. 1339-1370.
10. Stone D.L., Deadrick D.L., Lukaszewski K.M., Johnson R. The influence of technology on the future of human resource management, Human Resource. Management. Rev., 25 (2) (2015), pp. 216-231.
 11. Strohmeier, S. and Piazza, F. (2015), "Artificial intelligence techniques in human resource management—a conceptual exploration", Intelligent Techniques in Engineering Management: Theory and Applications, pp. 149-172.
 12. Subramaniam A., Smith-Jackson T.L., Heidel R.E. Artificial intelligence in workplace ergonomics: A review of current trends and future research directions, Journal of Occupation. Health Psychology, 26 (2) (2021), pp. 135-146
 13. Vrontis D., Christofi M., Pereira V., Tarba S., Makrides A., Trichina E. Artificial intelligence, robotics, advanced technologies and human resource management: A systematic review, Int. J. Hum. Resource. Management. 33 (6) (2022), pp. 1237-1266.
 14. Vinodh, S., Antony, J., Agrawal, R. and Douglas, J.A. (2021), "Integration of continuous improvement strategies with Industry 4.0: a systematic review and agenda for further research", The TQM Journal, Vol. 33 No. 2, pp. 441-472.
 15. Zeng, H. (2020), "Adaptability of artificial intelligence in human resources management in this era" International", Journal of Science, Vol. 7 No. 1, pp. 271-276.



Artificial Intelligence and Its Significance in Language Learning

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ABSTRACT: Artificial Intelligence is one of the most significant breakthroughs in computer science and a game-changing technology that focuses on building a future that will change every aspect of life. AI has been extensively employed in fields like Fintech, marketing, healthcare, legal, media, education, agriculture, cybersecurity, eCommerce and many more. A collaborative method based on computer science, mathematics, linguistics and psychology is used in machines to imitate human tasks. AI is competent enough to reason and solve problems. Learning in the classroom is an essential aspect of a student's life. However, the devastation caused by the outbreak of the pandemic in 2019 brought forth a revolution in teaching methodology. Online learning took us by storm. In no time AI made its way into the education realm. Language is an effective means of communication, in addition to that it is crucial for building and sustaining relationships with others. With globalisation knowing a foreign language would be an added advantage for anyone. The word foreign itself suggests that it is not with our own, whereas the first language can be learnt or acquired in a social environment. Learning a foreign language can be challenging. Not everyone is cognitively well equipped. AI is a boon for language learners. Using AI technology in learning has become popular among employees and students. This is because of its flexibility, better time management and widespread use of electronic technology in education. Based on this, the aim of this study focuses on how artificial intelligence becomes epochal in the language learning process.

KEYWORDS: Artificial Intelligence; digital technology, AI applications; foreign language learning;

I. INTRODUCTION

Artificial intelligence, according to Coppin (2004), is the ability of machines to adapt to new situations, deal with emerging situations, solve problems, answer questions, device plans, and perform various other functions that require some level of intelligence typically evident in human beings (p.4). Large volumes of data are processed by AI systems to function. They examine the data to find trends and correlations, which they use to forecast possible outcomes. For example, a chatbot programmed on textual examples can learn to have human-to-human interactions. The ability for AI systems to produce writing, photos, music and other types of media that keep getting more effective rapidly is made feasible by developments in AI approaches. Artificial intelligence has emerged as a transformative technology with the potential to revolutionize various fields, including language learning.

With the dramatic increase in the use of artificial intelligence across different domains, its impact on language-learning apps cannot be neglected (Pikhart, 2020). Artificial Intelligence technology has the power to empower foreign language education by boosting the development of learning apps and websites (Zhang, 2020).

Customized language learning is a crucial component of AI language learning systems. By incorporating artificial intelligence tools, language learning apps can provide enhanced features and capabilities that significantly improve the learning experience for students (Pikhart, 2020). AI algorithms generate personalised learning courses according to the learner's interests and progress. To enhance the microstructure of human education, this human-centred method integrates multidisciplinary research. AI has been used in language learning applications to facilitate effective choices in areas like exercise selection, feedback and hinting, review scheduling and lesson selection.

Beyond customised learning plans, AI plays a bigger part in language acquisition through engaging and participatory encounters. Real-time conversations with native speakers and cross-cultural exchange foster a deeper understanding of language.

II. INTELLIGENT TUTORING SYSTEM

The Intelligent Tutoring System (ITS) with AI is a cutting-edge learning platform that uses AI to give students individualized and flexible learning opportunities. By analysing user actions and existing resources, ITS differs from other educational systems such as Computer-Aided Instruction. Computer-aided instruction cannot generally monitor the learner's solution step and provide instant help (Alkhatlan & Kalita, 2019). This restriction is



a major benefit of ITS since it allows immediate support and guidance which enhances learning results. It also allows each student's learning experience to be tailor-made by using AI algorithms. These systems recognize the learning styles and modify the subject matter of training. This kind of individualized instruction promotes a deeper comprehension and student involvement. Apart from creating one-on-one learning experiences ITS continuously evaluates the student's progress and modifies the learning approach.

III.APPLICATION OF AI IN LANGUAGE LEARNING AND TEACHING CHATBOTS

With so many advantages for students and teachers alike, chatbots have become a very potential technology in language learning and teaching. They can assist language learners in improving their command of their language and advancing their level of competence by giving them fast individualised feedback. Furthermore, by replicating real-life discussions, chatbots can produce a more dynamic and captivating learning environment. With the use of this technology, students may use what they have learned in real-world situations, which increases their interest and trust in them. Moreover, chatbots can alleviate the workload of language instructors by freeing up their time from answering repetitive questions and providing immediate assistance to students (Wollny et al., 2021). Overall, the integration of chatbots in language teaching has the potential to enhance learning outcomes, increase learner engagement, and optimize teaching resources (Belda-Medina & Calvo-Ferrer, 2022).

IV.GENERATIVE AI

Artificial Intelligence technology known as "Generative AI" is capable of producing text, images, audio and synthetic data among other kinds of content. The ease of use of new interfaces that enable the creation of excellent text, pictures and movies in a couple of seconds serves as a driving force behind the recent excitement surrounding generative AI.

Machine Translation

There are different styles of language learners such as auditory, kinesthetic, visual, reading and writing, and linguist etc. Auditory learners love to learn through sounds, kinesthetic learners love to move around while learning, and visual learners learn through images and photo cards or flashcards. However, this reading/writing learner is likely to learn by reading and writing them down. Translation activities will come in handy for them. Neural machine translation is one example of an AI technology that helps language learners interestingly. The machine-translated text will generate a bad model for the students to identify and correct errors which will allow them to enhance their verbal skills and make them more linguistically proficient.

AI is a major factor in the speeding up of the language learning process since it is impacting the way teachers and learners learn. Personalised learning material, prompt feedback, and need-based customization will help students thrive.

Role of AI in Assessing Language Proficiency

AI has shown to be useful not just in aiding language acquisition but also in evaluating linguistic ability. Assessment systems driven by AI can appraise several facets of language proficiency. These technologies provide thorough and precise evaluations by analysing language usage, understanding, and fluency using intricate algorithms.

Speed

One major benefit of assessing language proficiency by AI is its capacity to provide learners with fast feedback. Accurate and reliable results will be attained within minutes even with complex responses. The test can be conducted for hundreds, thousands or lakhs of students, the result can be received instantly. This immediate assessment helps learners to monitor their development and to set their goals of reaching proficiency on an achievable scale.

Flexibility

AI makes it possible to create customised tests that can alter their level of difficulty in response to a learner's achievement. With its individualised methods, tests are customised to each student's level of ability. Tests are also can be conducted anytime that is convenient for the learners.

Impartial

Another significant in AI-based assessment is it is free from bias. There is no prejudice in AI system scoring. Unlike humans, it does not experience fatigue or mood swings. AI remains truthful when humans are more forgivable or severe sometimes. Human grading and assessment may be hindered by the possibility of



subjectivity and a lack of consistency. AI assessment ensures uniform standardised scoring while being objective (Jiang et al. 2023).

Moreover, the development of AI has made it possible to offer language tests widely, to students from various socioeconomic backgrounds and geographical locations. By eliminating barriers language competence examinations are available to a broad and international audience.

V.CONCLUSION

The application of AI to language acquisition has enormous potential to completely transform the experience of foreign language learners. AI has a huge ability to change language learning since it can make tests more accurate and create individualized, captivating learning environments. AI has the potential to revolutionize language learning by making it more comprehensive, adaptive, and accessible for learners worldwide (Shadiev & Yang, 2020).

Overall, AI has the power to completely transform language learning by rendering it more all- encompassing, flexible and available to students anywhere. The swift progress of AI is an exciting new phase that experiences a significant breakthrough and progress in language acquisition.

REFERENCES

1. Coppin, B. (2004). *Artificial intelligence illuminated*. https://openlibrary.org/books/OL8037189M/Artificial_Intelligence_Illuminated
2. Pikhart, M. (2020). Intelligent information processing for language education: The use of artificial intelligence in language learning apps. *Procedia Computer Science*, 176, 1412–1419. <https://doi.org/10.1016/j.procs.2020.09.151>
3. Zhang, X. (2020). The application research of artificial intelligence and big data analysis technology in university foreign language teaching. *Journal of Physics: Conference Series*, 1684(1), 012022. <https://doi.org/10.1088/1742-6596/1684/1/012022>
4. Alkhatlan, A., & Kalita, J. (2019). Intelligent Tutoring Systems: A Comprehensive Historical Survey with Recent Developments. *International Journal of Computer Applications*, 181(43), 1–20. <https://doi.org/10.5120/ijca2019918451>
5. Wollny, S., Schneider, J., Di Mitri, D., Weidlich, J., Rittberger, M., & Drachsler, H. (2021). Are we there yet? - A Systematic Literature review on chatbots in education. *Frontiers in Artificial Intelligence*, 4. <https://doi.org/10.3389/frai.2021.654924>
6. Belda-Medina, J., & Calvo-Ferrer, J. R. (2022). Using chatbots as AI conversational partners in language learning. *Applied Sciences*, 12(17), 8427. <https://doi.org/10.3390/app12178427>
7. Jiang, Z., Xu, Z., Pan, Z., He, J., & Xie, K. (2023). Exploring the role of Artificial intelligence in facilitating assessment of writing performance in second language learning. *Languages*, 8(4), 247. <https://doi.org/10.3390/languages8040247>
8. Shadiev, R., & Yang, M. (2020). Review of Studies on Technology-Enhanced Language Learning and Teaching. *Sustainability*, 12(2), 524. <https://doi.org/10.3390/su12020524>



A Study on Application of Artificial Intelligence in the Field of Green Human Resource Management

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ABSTRACT: Using traditional business methods to run a business is a difficult undertaking in the present competitive world. Information technology advancements have a significant impact on the procedures and practices of human resource management. Right now, every company is working to create the ideal environmentally conscious company. As a result, the idea of "green HRM" is starting to play a bigger role in the integration of corporate environmental management with HRM. Improvisation is enabled by the new technology known as artificial intelligence (AI). It serves as a tool to improve every industry's performance and production. Additionally, it helps the company engage its workforce, recruit new employees, and train and develop existing staff while using fewer resources and having a smaller overall environmental effect. Artificial intelligence can be applied in the area of Human Resource policies, procedures, and intensify the effectiveness of Green Human Resources Management. This study explains how the AI works in Green HRM practices and process. This study was done through secondary data by referring to various related articles and Journals.

KEYWORDS: Artificial intelligence, Green HRM, Environment, Technology, Productivity .

I.INTRODUCTION

In the fast moving business world we witness that the nature of job keeps changing. Most of the manual jobs are have vanished and intellectual jobs have replaced the manual jobs. Labour based industries have been replaced by knowledge based industries. Technology and innovation makes the world a worldwide global village.

Artificial Intelligence (AI) is the division of computer science which is otherwise called Machine intelligence. It refers to the stimulation of mankind intelligence in machines that are programmed to think like human and mimic their action. The phrase artificial intelligence (AI) refers to a machine that demonstrates mental abilities similar to those of a human, such as speech recognition, problem solving, and learning. Artificial intelligence (AI) has a wide range of applications in the business world, where it must increase productivity and automate operations to create efficient workflow. AI will eventually replace some human employment.

The AI based Green HRM is also the emerging trend to conserve environmental resources, which results in ensuring environmental sustainability, which in turn paves way for development in business and to increase the productivity. Green HRM ensures using of HRM policies to promote efficient utilization of Green Resources within the business premises. It involves two essential elements environmental- friendly HR policies and preservation of Knowledge capital.

II.APPLICATIONS OF AI

EXPERT SYSTEMS: These are devices or programmes that give users guidance and explanation.

SPEECH RECOGNITION: Certain AI-based speech recognition systems are capable of understanding spoken words and being able to hear and articulate sentences as a human speaks to it. such as Google Assistant and Siri.

GAMING: AI is essential to gaming because it allows machines to consider a vast array of possible locations based on in-depth strategic game expertise. For instance, chess. N-queens issues, and so on.

HAND WRITING RECOGNITION:- The handwriting recognition software reads the text written on paper and recognize the shapes of the letters and converts it into editable text.

INTELLIGENT ROBOTS: Robots are able to perform the instructions given by a human.

NATURAL LANGUAGE PROCESSING: - Interact with the computer that understands natural language spoken by humans.



GREEN HUMAN RESOURCE MANAGEMENT: In the corporate world, the term "green HRM" is currently in vogue and is becoming more and more significant over time. The increasing global awareness of environmental management and sustainable development has led to a surge in research works on Green HRM in recent times. The notion of "green HRM" encompasses not just environmental awareness but also the organization's and the employees' social and economic well-being in the long run.

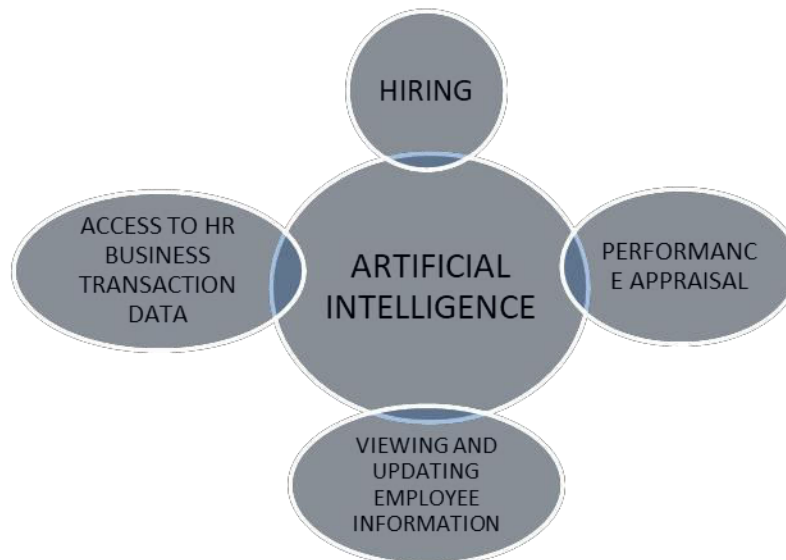
III. UTILISATION OF AI IN GREEN HRM

Artificial intelligence (AI) is essential to green human resource management (HRM) since it uses Chatbot agnostic solutions and algorithms, which lessen the strain of HR managers. The entire hiring, selecting, training, and development process, among other processes, is connected to artificial intelligence based on the algorithms.. Green Human resource reduces work load and it create more interest for the employee towards work. It reduces the scope of manual work and paper work and it make easy for the HR manager to do his tasks easily, it enables the selecting candidates based upon their resume and information provided in the resume automatically, so it reduces workload of HR Manager. Thus AI is an emerging trend in every organization's Human resource department.

An app named ASKDEXTER was recently used by an IT services company in Bangalore to manage its workforce of over twenty thousand workers. The internal chatbot that runs on the cloud and does a lot of HR tasks. It responds to questions from staff members about leave and corporate regulations. It specializes in providing a summary of job vacancies, potential job openings, and the desired skill set of an individual.

AI software is used by PepsiCo, a food and beverage corporation with retail sales, to locate and interview people for open positions in Russia. The software has the ability to automatically scan resumes from job sites and contact applicants who meet the required credentials. Its 10,000 simultaneous call capabilities minimize the environmental effect of travel and also cut down on the amount of paperwork required for conducting job interviews. This aids in the organization's adoption of Green HRM.

IV. MODEL EXPLAINING THE RELATIONSHIP OF AI WITH GREEN HRM:



VIEWING AND UPDATING EMPLOYEE INFORMATION:-A worker's personal information, such as address, emergency contacts, work details, available vacation days, the status of vacation requests that have been approved, and approved HR business data, can be viewed and updated by the worker.

TEAM TRAINING: By using skill-gap evaluations, team managers can organize digital training sessions for their members. Managers and staff can monitor their training progress with the use of conversational AI.

HIRING PROCEDURE: Artificial intelligence (AI) is faster than human at parsing and screening resumes based on the necessary profile.

ACCESS TO HR BUSINESS TRANSACTION DATA: - HR Managers can access employee data per authorization, e.g., an employee's job history, team information or performance rating. Conversational AI also can bring analytical



and key performance indicator information, e.g., head count, top performers and pending transaction requests — just by asking chatbots.

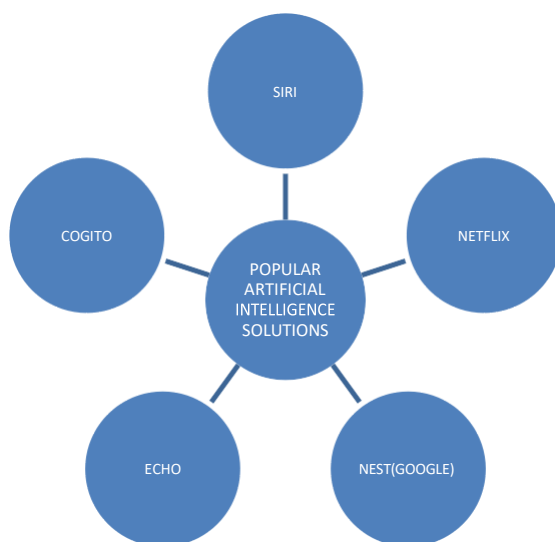
PERFORMANCE APPRAISAL: - Advanced software and data analytics enables assessing employees' performance on daily basis and not quarterly or half yearly. Appraisal is a continuous process and it should not be done on yearly.

OPERATION: - Various chat rooms and chat boards are available to resolve many queries of employee and various apps are introduced to generate instant solutions for employees and also for customers. Almost all parts of HR Activities are managed by technology development.

AUTOMATION OF REPETITIVE, LOW-VALUE TASKS:- AI presents an opportunity for HR to automate repetitive, low value tasks and to increase focus on more strategic work. In general HR services include a large amount of time spent on standard onboarding processes for new employees, employee requests, and basic benefits management. Saving time in those areas can help HR teams do more creative and strategic work for the success of the company.

As per the current survey , more than 20% of the HR compliance is calculated by Green HRM and it is analysed that the chances of error is reduced to minimum in case of using technology and percentage of human error is more.

V.AI BASED SOLUTIONS IN USE



SIRI: - It is the most popular personal assistant offered by Apple company in iPhone and iPad. The friendly female voice-activated assistant interacts with the user on a daily routine. The voice assists us to find information, get directions, send messages, make voice calls, open applications etc. Siri uses machine learning technology in order to get smarter and is capable of understanding natural language questions and requests.

NETFLIX:- It is widely famous content-on-demand service that uses predictive technology to offer recommendations on the basis of consumers' reaction, interests, choices and behavior. It examines a number of records to recommend movies based on users previous liking.

NEST (GOOGLE):- It is a successful artificial intelligence startups and it was acquired by Google in 2014. The Nest Learning Thermostat uses behavioral algorithms to save energy based on user's behavior and schedule. It is a combination of both AI and Bluetooth low-energy.

ECHO: - It was launched by Amazon, which is getting smarter and adding new features. It is the revolutionary product which can help users to search the web for information, it schedule appointments, control lights, switches, reads audio books , reports about traffic and weather, gives information on local business, and more using the Alexa Voice Service.

COGITO:- It originally Co-founded by Dr. Sandy and Joshua , which is one of the best examples of the behavioral version to improve the intelligence of customer support representatives, currently in the market. This is AI solutions which analyzes the human voice and provides real-time guidance to enhance behavior.



VI.CONCLUSION

In the field of green human resource management, the use of intelligence software decreases bias and automates tedious tasks, freeing up more time for interpersonal communication. AI-based HR solutions offer a great potential to increase worker productivity and develop HR specialists into more informed advisors who improve worker performance. AI in green HRM has greater benefits if it is used with greater thought and concern for both the organization and the employee.

REFERENCES

1. Shella Lmc groven (2018) AI of HR opportunities and functions, Published in 2018.
2. Edge Admin (2017) Artificial Intelligence in HR, published in Analytic India Magazine, July 17th, 2017.
3. Eva wislow (2017) Top ways to use artificial intelligence in HR, October 24th 2017
4. Nicastro, D. (2018). 7 Ways Artificial Intelligence is Reinventing Human Resources.
5. CMS Pay, V. B. (2018). How Artificial Intelligence Is Reinventing Human Resources. Entrepreneur
6. M.I. Jordan and T.M. Mitchell, "Machine learning Trends, perspectives and prospects, "science, Vol.349, no. 6245 pp255-260.
a. <http://science. Scienceemag.org/content/349/6245/255.short>,2015
7. Josh Bersin(2018) Artificial Intelligence in HR , June16th 2018.
8. Peter(2018) The impact of AI in HR function, Published in Institute of employment studies , November 2018.
9. Prachant Srivastav(2018) Impact of AI on strategic HR Decision Making April 6th , 2018.
10. Dr. Surabhi Jain(2018) HRM and AI March,3rd 2018.\
11. Sarah Fister gale(2019) AI coming and HR is not Prepared, January 4th 2019.
12. Srinivasan, "Artificial intelligence methodologies for agile refining : An Overview" Knowledge and Information systems vol.12, no.2, pp.129-145,2007



Zero-Shot and Few-Shot Green AI for rare and All Cancer Types

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ABSTRACT: Combining zero-shot and few-shot learning into the Green AI paradigm is changing the future of cancer research, and by providing a new avenue of approach, it can be applied to rare and common cancers alike. Conventional models of artificial intelligence are highly dependent on large and labeled datasets, both of which are unavailable in rare cancers. In comparison, zero-shot and few-shot paradigms use transfer learning, meta-learning, and generative models to make correct predictions with little data, thus lowering the computational and environmental cost of traditional training.

The intersection of sustainability and precision medicine is not only the way to expand diagnostic reach, but also to meet the moral requirements of equal-access healthcare. Additionally, the inclusion of multimodal sources of data that span genomics to medical imaging enhances the flexibility of such models. This article expounds on the methodology, clinical implications, and future directions of zero-shot and few-shot Green AI with an emphasis on transformative potential to provide inclusive, energy-saving, and globally scalable cancer care.

KEYWORDS: Zero-shot learning, Few-shot learning, Green AI, Cancer research, Transfer learning, Meta-learning, Generative models, Precision medicine.

I. INTRODUCTION

Cancer is considered to be one of the most complicated and diverse diseases worldwide since it causes about 10 million deaths per year, as reported by the World Health Organization (WHO, 2022). Although major achievements have been recorded in terms of early diagnosis, treatment and survivability of common cancers, including breast, lung, and colorectal, rare cancer still remains very problematic to clinicians as well as researchers. The rare cancers, which comprise approximately 25 percent of all cancers, usually receive minimal research and development attention with little clinical information available, incomplete research studies and little effort to devise specific diagnostic methods. This gap shows that there is an urgent requirement of innovative methods that can be applicable to different forms of cancers, including those where data is limited.

Machine learning (ML) and more broadly Artificial Intelligence (AI) has become a disruptive technology in oncology, driving developments in tumor classification and the discovery of biomarkers, as well as individual treatment planning. Nevertheless, most of the current AI models are data-intensive in that they need substantial annotated datasets to be reliable. Such use of large amounts of data is a drawback in the setting of rare treatment cancers where the sample of patients and quality imaging or genomic data are limited. As a solution to this shortcoming, zero-shot learning and few-shot learning have become a matter of growing interest. Zero-shot learning is the ability of models to classify / infer the result of unseen categories by applying semantic relationships, whereas few-shot learning is the ability of models to adjust to new tasks with just a small number of training examples. Such paradigms provide a good direction to address the challenges of data scarcity and move towards inclusive cancer research.

Simultaneously, the growing computational cost of training large-scale AI models only brings up the new issue of environmental sustainability. The conventional deep learning systems have a tendency to consume energy-emitting resources, which casts doubt on the environmental impact of AI-based health technologies. The idea of Green AI as the movement towards efficient, sustainable and resource conscious machine learning has become more and more topical. Green AI is, in this respect, focused on improving both accuracy and generalization in addition to computational efficiency, in such a way that innovations in cancer diagnostics and treatment do not impact negatively upon the environment.



This study examines the application of zero-shot and few-shot learning to the concept of Green AI, and how it can be applied to rare and common cancers. Placing such an inquiry at the nexus of sustainable AI practices and data-efficient learning concepts, the discussion is to shed light on how the next-generation algorithms will allow cutting down the disparities in diagnostics, improving clinical decision-making, and promoting equal access to cancer care on an international scale.

II. FOUNDATIONS OF ZERO-SHOT AND FEW-SHOT LEARNING

Artificial Intelligence (AI) has proved to be particularly effective in the field of healthcare, especially in the detection of cancer, prognosis, and individual treatment. Nevertheless, traditional machine learning methods typically need large, annotated datasets which are not always accessible- particularly with rare cancer types. To attain this challenge, zero-shot and few-shot learning methodologies have become promising solutions. These paradigms use transferability, generalization, and semantic representation to make successful predictions with little or no labeled training data. Here, the conceptual, mechanism, and methodological developments of zero-shot and fewer-shot learning are discussed, and their applicability to cancer research is demonstrated.

2.1 Defining Zero-Shot Learning (ZSL)

Zero-shot learning (ZSSL) can be defined as the capability of an AI model to identify and categorize data that belong to categories unknown to the model, i.e. not seen during training. ZSL uses semantic knowledge via auxiliary information, e.g. textual description, semantic embedding, or ontology instead of labeled datasets. In cancer research, this would imply a system that has been trained on standard cancers (e.g., breast or lung) could hypothetically learn to discriminate features of rare cancers (e.g., Merkel cell carcinoma) by correlating biomedical information and overlapping spaces of features.

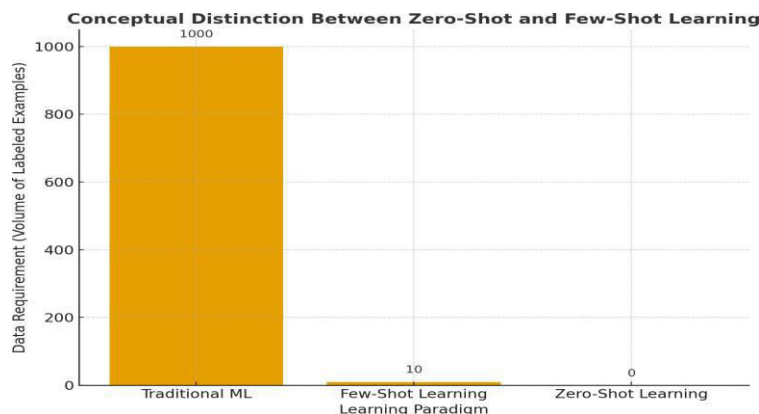


Fig 1: The graph above visually conveys the efficiency spectrum, helping readers understand how ZSL and FSL reduce dependence on large annotated datasets in medical AI.

2.2 Defining Few-Shot Learning (FSL)

Few-shot learning (FSL) focuses on scenarios where only a limited number of annotated examples per class are available. Unlike ZSL, FSL provides the model with some labeled data albeit insufficient for traditional training. Techniques such as meta-learning, prototypical networks, and model fine-tuning are employed to generalize effectively. In oncology, FSL is critical for rare subtypes of common cancers where only a handful of annotated scans or patient cases are available.

2.3 Core Mechanisms of ZSL and FSL

Both paradigms operate on advanced representation learning. ZSL typically leverages semantic embedding spaces derived from natural language processing (e.g., word embeddings, biomedical ontologies) to create mappings between unseen and seen categories. In contrast, FSL employs meta-learning strategies, such as learning-to-learn frameworks, which allow models to adapt quickly with minimal labeled data. In oncology, combining imaging modalities with textual medical records enhances the adaptability of these methods.

2.4 Technical Approaches and Architectures



Key techniques driving ZSL and FSL include:

- A. Transfer Learning: Utilizing pre-trained models on large datasets (e.g., ImageNet or biomedical corpora) to adapt to oncology tasks.
- B. Prototypical Networks: Learning generalized prototypes for each cancer type from very few examples.
- C. Graph Neural Networks (GNNs): Mapping cancer-related knowledge graphs for relational reasoning.
- D. Generative Models (GANs, VAEs): Synthesizing additional training samples for rare cancers to reduce data imbalance.

These technical strategies demonstrate how AI can be both data-efficient and computationally sustainable, aligning with principles of green AI.

2.5 Relevance to Green AI and Cancer Research

ZSL and FSL inherently reduce computational burden by minimizing the need for extensive retraining on large datasets. This efficiency not only saves energy but also democratizes cancer research by making advanced diagnostic models accessible in resource-constrained healthcare environments. Moreover, their adaptability ensures that both rare and common cancer types benefit from equitable AI-driven advancements.

2.6 Challenges and Limitations

Despite their promise, ZSL and FSL face obstacles in real-world deployment. ZSL often suffers from the “domain shift” problem, where unseen categories differ too drastically from the training set. FSL, meanwhile, is sensitive to noisy or mislabeled data, which is common in heterogeneous cancer datasets. Further, the interpretability of predictions remains a key issue in clinical adoption, as oncologists demand transparent AI reasoning for patient safety.

In sum, the foundations of zero-shot and few-shot learning represent a paradigm shift in how AI systems are designed to overcome data scarcity in oncology. By leveraging semantic representation, meta-learning, and generative augmentation, these approaches address challenges in diagnosing both rare and prevalent cancers. While technical and ethical hurdles remain, the integration of ZSL and FSL with green AI principles offers a sustainable, inclusive, and transformative pathway for cancer research and clinical practice.

III. GREEN AI PRINCIPLES IN CANCER RESEARCH

Artificial intelligence (AI) has revolutionized cancer research through applications in diagnosis, treatment planning, and drug discovery. However, conventional deep learning approaches rely heavily on large datasets and computationally intensive models, which demand significant energy and hardware resources. These high requirements pose both environmental and economic challenges, especially in resource-constrained healthcare settings. To address these concerns, the concept of Green AI has emerged, focusing on energy-efficient, sustainable, and equitable AI solutions. In the context of cancer research, Green AI is particularly relevant because it enables scalable innovations without exacerbating the carbon footprint, while also ensuring that rare and common cancer types benefit equally. This section outlines the foundational principles of Green AI in cancer research, exploring methodologies, applications, and future opportunities.

3.1 Energy Efficiency in AI Model Training

One of the central tenets of Green AI is minimizing the energy costs associated with model development. Training large-scale models like transformer architectures often consumes massive electricity, equivalent to the lifetime carbon emissions of multiple cars. In cancer research, this issue is compounded when institutions attempt to train separate models for different cancer types. Green AI advocates for techniques such as:

- A. Model compression and pruning to eliminate redundant neural connections.
- B. Knowledge distillation, where smaller, efficient models learn from larger pre-trained systems.
- C. Hardware optimization, including specialized chips (e.g., GPUs/TPUs) designed for low-energy tasks.

These methods ensure that high-performance cancer detection models can be trained with reduced environmental impact, without compromising diagnostic accuracy.



3.2 Data Efficiency and Zero-Shot/Few-Shot Learning

Cancer datasets are often imbalanced: common cancers like breast or lung cancer have millions of samples, while rare cancers may have only a few hundred documented cases. Green AI principles emphasize data-efficient learning, where models are designed to perform well without relying on massive datasets.

Zero-shot and few-shot methods leverage pre-trained general models to recognize novel cancer types with minimal data input. This aligns with Green AI by reducing the need for constant retraining on large datasets, thereby conserving computational resources.

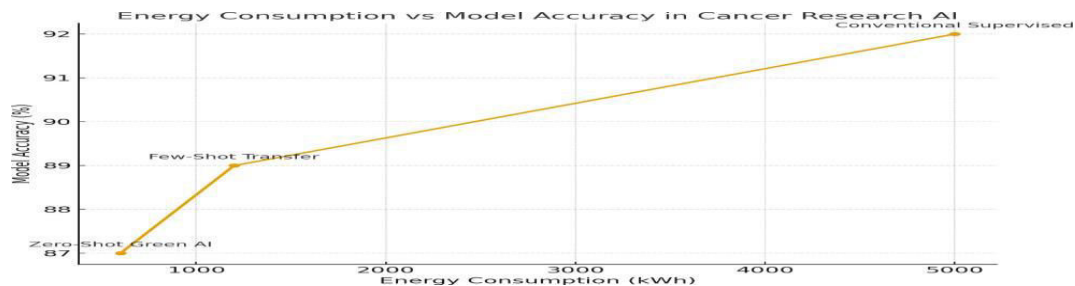


Fig 2: The graph above illustrates that the Green AI models achieve comparable accuracy to conventional training while consuming significantly less energy.

3.3 Multi-Modal and Shared Learning Approaches

Another principle of Green AI in cancer research is maximizing resource use through multi-modal integration and shared learning frameworks. Instead of training separate models for histopathology, genomics, and imaging data, Green AI promotes integrated systems that learn from multiple data types simultaneously.

This avoids duplication of computational processes, reduces storage needs, and enhances predictive performance by synthesizing diverse cancer-related data. Shared models across institutions also minimize redundant training runs, aligning with sustainability goals.

Table 1. Comparative Analysis of Energy Efficiency and Applicability of AI Approaches in Cancer Research

Approach	Energy Requirement (Est. kWh)	Data Utilization	Applicability	Advantages	Limitations	Example in Cancer Research
Conventional Deep Learning	Very High (>5000 kWh training)	Requires large datasets	Common cancers only	High accuracy with big data	Not feasible for rare cancers, high carbon footprint	Breast cancer histopathology models
Few-Shot Learning	Medium (500–1500 kWh)	Small labeled datasets	Rare and common cancers	Efficient, balanced resource use	Dependent on pre-trained models	Pancreatic cancer classification with few samples
Zero-Shot Learning	Low (200–800 kWh)	Minimal/No labeled data	Rare cancers	Generalizable, highly energy-efficient	May underperform in domain-specific tasks	Identifying rare sarcomas using transfer learning
Multi-Modal Shared Models	Medium to High (1000–3000 kWh)	Diverse (genomics, imaging, clinical records)	Both rare and common cancers	Robust predictions, reduced duplication	Integration complexity	Integrative oncology models



This comparative table highlights how Green AI principles significantly reduce energy usage and improve inclusivity across cancer research domains.

3.4 Sustainable Deployment and Clinical Integration

Green AI not only addresses model training but also the **deployment** stage in clinical environments. Lightweight AI models can be deployed on standard hospital infrastructure, making them accessible in low- and middle-income countries (LMICs). Edge computing and cloud-optimized deployment also reduce dependency on centralized, energy-hungry data centers. Furthermore, continuous model updates using federated learning ensure adaptability without repetitive retraining from scratch, reinforcing both sustainability and privacy.

3.5 Equity and Global Accessibility

Sustainability in cancer research extends beyond energy considerations to equity and accessibility. Rare cancers are disproportionately underrepresented in AI datasets, leading to diagnostic inequities. Green AI facilitates equitable healthcare by making advanced diagnostic tools less resource-intensive and more accessible across diverse healthcare settings. By emphasizing inclusivity, Green AI ensures that both rare and common cancer types benefit from computational advancements, thereby aligning with the broader goals of global health equity. In sum, Green AI principles redefine how artificial intelligence can be applied to cancer research, balancing technological advancement with environmental sustainability and equity. By focusing on energy efficiency, data efficiency, shared learning, sustainable deployment, and equitable access, Green AI provides a roadmap for future cancer diagnostics and treatment strategies. These principles ensure that AI-driven oncology can advance in ways that are not only innovative but also environmentally responsible and globally inclusive.

IV. APPLICATION TO RARE CANCER TYPES

Rare cancers, which comprise about 20-25 percent of all cancer diagnoses in all parts of the world, are a challenge to both clinicians and researchers. In contrast to more frequent cancers, including breast, lung or colorectal cancer, rare cancers usually have limited datasets, disjointed research projects and lack clinical trial evidence. This scarcity of data renders the training of traditional deep learning models very inefficient and even impossible at times. A promising way to tackle these gaps is zero-shot and few-shot learning models guided by Green AI principles and can be used to produce diagnostic and predictive performance in limited data situations.

There is a lack of prevalence data on rare cancers, and this poses a challenge in the same manner that lack of prevalence data creates a challenge in epidemiological studies of rare diseases

4.1 Data Scarcity and the Challenge of Rare Cancers.

The inherent problem with the research of rare cancers is a lack of labeled data. Conventional machine learning methods need thousands of annotated samples to have confidence in the accuracy, and many cancers (sarcomas, mesotheliomas, or some pediatric tumors) do not have these. This issue is alleviated in zero-shot and few-shot models that learn with little or no task-specific data. Knowledge transfer with related types of cancer or general biomedical corpora can allow such models to produce meaningful predictions with a significantly reduced number of resources.

4.2 Zero-Shot Diagnostic of Rare Cancers.

Zero-shot learning will find special use in detecting cancers that are hardly recorded. A model that has been trained on general histopathology and imaging data can, as an example, be prompted by text or ontological descriptions to identify features of an untrained rare cancer category. Such models utilize semantic embeddings which are typically trained on large-scale biomedical ontologies such as UMLS (Unified Medical Language System) to cross the underrepresentation gap between well-studied and underrepresented cancers. This allows clinicians to obtain AI-assisted predictions even of cancer types that the system had never observed directly.

4.3 Few-Shot Learning and Transferable Representations

Few-shot learning provides an alternative approach where limited case samples, sometimes as few as five to ten, are sufficient to fine-tune pre-trained models. By drawing upon prior knowledge from more prevalent cancers, the system adapts to rare cancer features. This adaptability is especially crucial in genomic-based prediction models, where transfer learning allows shared patterns of mutation or expression to inform predictions in rare cancers with limited sequencing data. In addition, meta-learning frameworks can generalize across small sample



tasks, making them particularly suited for rare cancer diagnostics and prognosis.

4.4 Multimodal Integration for Rare Cancer Analysis

Rare cancers often require more than imaging for accurate diagnosis. Incorporating multimodal data such as radiology, genomics, proteomics, and clinical text can significantly improve model robustness. Zero-shot and few-shot techniques are adept at fusing these data types, enabling predictions that remain reliable despite small sample sizes. For example, combining limited pathology slides with textual case reports enhances classification accuracy while maintaining energy-efficient training in line with Green AI objectives.

4.5 Case Examples and Pilot Studies

Early pilot studies have demonstrated the feasibility of these methods. For instance, rare brain tumors such as ependymomas have shown improved diagnostic outcomes using few-shot learning models trained on limited MRI scans. Similarly, zero-shot approaches applied to sarcoma subtypes have provided clinicians with decision support tools in contexts where annotated histological data are scarce. While most of these studies remain experimental, they highlight the practical utility of combining advanced AI paradigms with sustainable computing practices.

4.6 Limitations and Challenges Specific to Rare Cancers

Despite their promise, the application of zero-shot and few-shot Green AI to rare cancers is not without obstacles. Model interpretability remains a key concern, as clinicians require transparent outputs to trust AI-driven predictions in rare and life-threatening cases. Furthermore, the lack of standardized global datasets for rare cancers limits the transferability of models across institutions. Computational resource constraints in developing regions also pose barriers, though Green AI techniques help mitigate these issues by prioritizing energy-efficient architectures.

In sum, the application of zero-shot and few-shot Green AI to rare cancers represents a significant advancement in precision oncology. By overcoming the data scarcity problem, these methods enable diagnostic and prognostic tools that are both resource-efficient and clinically valuable. Integrating multimodal approaches, semantic embeddings, and transfer learning creates opportunities to extend the benefits of AI to underrepresented cancer populations. While challenges remain in interpretability, dataset standardization, and clinical integration, the trajectory suggests that these innovative methods will play a pivotal role in advancing rare cancer research and improving patient outcomes.

V. APPLICATION TO COMMON CANCER TYPES

In the detection, classification and prognosis of typical cancers including breast, lung, colorectal, prostate and skin cancer, artificial intelligence has already shown high potential. Nevertheless, more traditional AI systems commonly demand high amounts of well-labeled training data and significant amounts of computational resources, and this may pose a barrier to scalability, sustainability, and accessibility. When architecturally integrated as part of Green AI principles, zero-shot and few-shot learning frameworks provide a new direction to improve the quality of diagnostic results and at the same time decrease the amount of computational resources. In this section, we look at how such approaches can be effectively used in a broad range of the most common types of cancer.

5.1 Breast Cancer Detection and Classification.

Breast cancer is one of the most common cancers that have been diagnosed across the world and a cause of cancer death among women. The image-based diagnosis relies on mammography, ultrasound, and histopathological imaging but requires the domain knowledge as well as enormous labeled data to be correctly interpreted. Limited number of annotated samples Few-shot learning models allow the recognition of malignant and benign patterns, which is why they are suitable in the areas in which full datasets are uncommon. Moreover, there is the opportunity to use zero-shot frameworks to classify unseen tumor subtypes by using semantic embeddings of medical ontologies and, in this way, enhance the detection of underresearched variants, e.g., triple-negative breast cancer.

5.2 The Screening and Early Diagnosis of Lung Cancer.

There are serious difficulties in the diagnosis of lung cancer at an early stage as nodules are barely visible on CT images and tumor development is heterogeneous. Sparsely-learned few-shot models with scarce annotated CT data



can extrapolate to new patient populations, and avoid large-scale retraining. Zero-shot learning is possible with the help of natural language-based embeddings that allow automated classification of rare imaging patterns that can be missed by radiologists. When incorporated into Green AI pipelines, the reduced energy overheads of these models during volumetric CT scan processing allow it to scale to large-scale national screening programs.

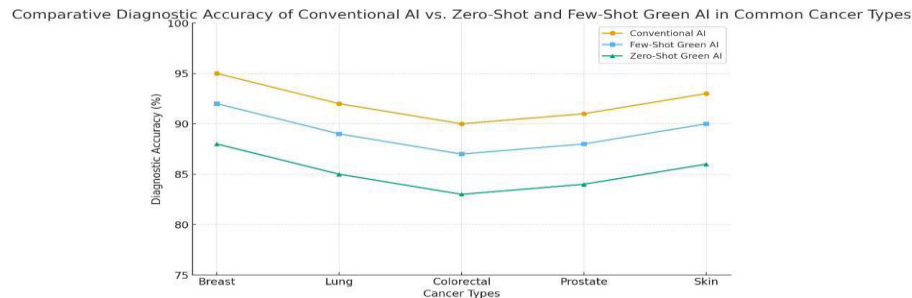


Fig 3: The graph above compares the diagnostic accuracy across cancer types for Conventional AI, Few-Shot Green AI, and Zero-Shot Green AI.

5.3 Colorectal Cancer Prediction and Screening

Colorectal cancer is frequently diagnosed through colonoscopy and biopsy procedures, both of which generate large image and pathology datasets. Traditional AI systems excel when vast data is available, yet such resources are not always equitably distributed. Few-shot learning algorithms allow predictive models to generalize polyp detection across diverse endoscopic imaging devices with minimal retraining. Zero-shot learning, on the other hand, enables the recognition of novel lesion categories by aligning textual medical knowledge with image embeddings. This minimizes data annotation costs while enhancing screening accessibility in underserved healthcare systems.

Table 2: Comparative Applications of Zero-Shot and Few-Shot Green AI in Common Cancer Types

Cancer Type	Primary Diagnostic Modality	Conventional AI Limitations	Few-Shot Application	Zero-Shot Application	Green AI Benefits	Clinical Integration Potential
Breast	Mammography, ultrasound, histopathology	Requires large annotated datasets for subtype classification; limited generalization across imaging centers	Learns tumor classification from limited annotated mammograms, improving detection in data-scarce regions	Identifies rare subtypes (e.g., triple-negative) using semantic embeddings without retraining	Lower computational demand; reduces dataset annotation costs	Scalable for community-level breast screening programs
Lung	CT scans, X-ray imaging	Computationally expensive for volumetric scans; difficulty detecting small nodules	Detects lung nodules with minimal annotated scans, enabling early diagnosis	Recognizes unseen nodule types by aligning clinical descriptors with image features	Energy-efficient CT scan processing for national screening initiatives	Integration into large-scale lung cancer screening systems



Colorectal	Colonoscopy, biopsy, pathology slides	Dependent on large training datasets; device-specific variability	Generalizes polyp detection across diverse endoscopy	Recognizes novel lesion categories from medical ontologies	Reduces annotation costs and harmonizes multi-center datasets	Supports screening in low-resource settings
		limits transferability	devices with few samples	and imaging data		with limited imaging archives
Prostate	MRI, histopathology	High variability in MRI protocols; conventional models lack adaptability	Adapts across imaging protocols, enabling consistent diagnosis with limited data	Links radiology descriptors with pathology ontologies for tumor grading	Lower computational load during MRI sequence analysis	Clinical decision support for urologists and oncologists
Skin	Dermatoscopic imaging, mobile phone imaging	Requires millions of images; bias across skin tones	Identifies skin lesions across demographic variations with limited labeled data	Detects rare lesion morphologies using dermatological ontologies	Lightweight, mobile-friendly deployment; reduced carbon footprint	Suitable for mobile apps and rural dermatology clinics
Cervical	Pap smear cytology, HPV DNA testing	Data scarcity in low-resource regions; conventional AI requires extensive labeling	Learns cytology classification with minimal local datasets	Leverages global cervical cancer knowledge bases for unseen variations	Minimizes energy consumption in digital cytology workflows	Can be integrated into telemedicine platforms for women's health
Liver	Ultrasound, MRI, biopsy	Limited generalization across populations; data annotation is costly	Detects early hepatocellular carcinoma with few annotated ultrasound scans	Identifies rare tumor phenotypes by aligning textual and image features	Energy-efficient pipelines suitable for hospital radiology systems	Supports early detection in regions with high hepatitis-related cancer rates

5.4 Prostate Cancer Imaging and Histopathology

Prostate cancer diagnosis often relies on magnetic resonance imaging (MRI) and histopathological slides, both of which require specialized interpretation. Few-shot approaches can adapt to varying imaging protocols across hospitals, thus facilitating consistent detection without retraining massive models. Zero-shot learning enhances tissue characterization by linking radiology descriptors with pathology knowledge bases, enabling more nuanced tumor grading. Importantly, embedding these methods within Green AI practices ensures reduced computational loads during MRI sequence processing, which is often resource-intensive.

5.5 Skin Cancer and Dermatological Imaging

Skin cancer, particularly melanoma, is one of the most visually diagnosed cancers and has seen extensive use of AI-based dermatological imaging tools. However, training robust models typically requires millions of labeled



dermatoscopic images, which may not be available across all populations. Few-shot learning empowers diagnostic systems to identify skin lesions with minimal data from new demographic groups, reducing bias against underrepresented skin tones. Zero-shot models further enhance versatility by linking dermatological ontologies to visual data, thereby improving the ability to detect unusual or rare lesion morphologies. These techniques, combined with energy-efficient Green AI pipelines, enable mobile and cloud-based diagnostic tools suitable for both rural and urban healthcare settings.

5.6 Integrated Benefits Across Common Cancer Types

When applied collectively, zero-shot and few-shot frameworks provide several advantages for common cancer types:

- Enhanced generalizability across diverse patient cohorts
- Reduced reliance on large-scale labeled datasets
- Lower computational and energy demands in alignment with Green AI principles
- Improved accessibility of diagnostic support tools across varied healthcare infrastructures

In sum, the application of zero-shot and few-shot Green AI to common cancer types represents a transformative shift in diagnostic medicine. While conventional AI thrives on vast datasets and high computational costs, these alternative approaches prioritize adaptability, inclusivity, and sustainability. By embedding efficiency and flexibility into screening for breast, lung, colorectal, prostate, and skin cancers, Green AI ensures that both high-prevalence and resource-constrained healthcare systems can benefit. Ultimately, these innovations hold the potential to democratize cancer detection and treatment, balancing performance with environmental and ethical considerations.

VI. TECHNICAL APPROACHES AND METHODOLOGIES

The integration of Zero-Shot and Few-Shot Green AI in oncology relies on advanced methodologies designed to address the dual challenges of data scarcity and computational sustainability. Unlike traditional deep learning, which demands massive annotated datasets and extensive energy consumption, these approaches optimize learning efficiency and broaden applicability across both rare and common cancer types. This section outlines the principal technical methodologies, emphasizing their relevance to clinical oncology, while also incorporating computational sustainability under the framework of Green AI.

6.1 Transfer Learning for Oncology Applications

Transfer learning enables models pre-trained on large general datasets to be adapted for specialized cancer tasks. For example, a model trained on millions of medical images can be fine-tuned with minimal data to classify rare tumor subtypes. This method significantly reduces the demand for training resources and shortens the model development cycle. It also ensures that even rare cancers, where labeled data is limited, benefit from insights gained in broader medical or biological contexts.

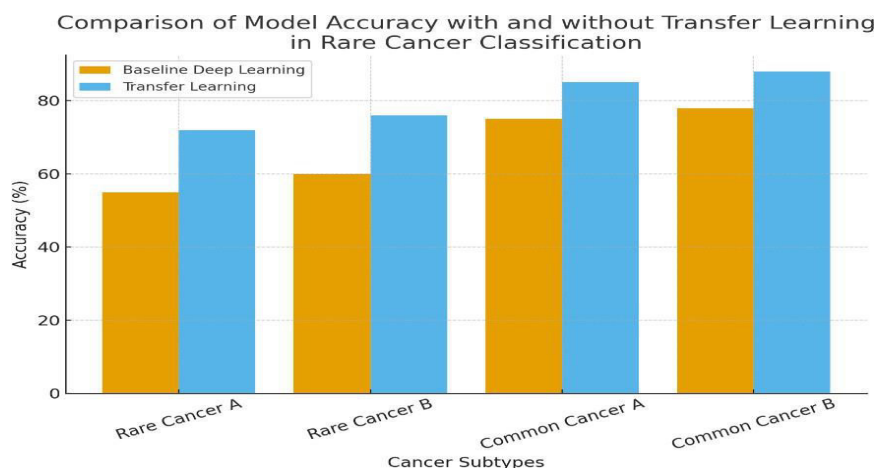


Fig 4: the graph above shows how transfer learning significantly boosts accuracy for both rare and common cancer subtypes.



6.2 Meta-Learning and Few-Shot Adaptation

Meta-learning, often referred to as "learning to learn," equips models with the ability to generalize from small data samples by identifying higher-level patterns. In oncology, meta-learning algorithms such as Model-Agnostic Meta-Learning (MAML) are used to quickly adapt to new cancer types with only a handful of labeled examples. This reduces the burden on clinicians to collect large datasets and supports equitable research across both resource-rich and resource-poor contexts.

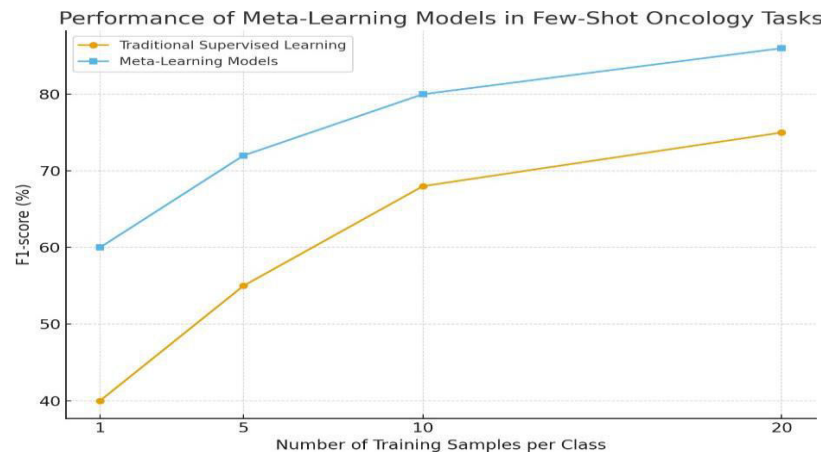


Fig 5: the graph above shows how meta-learning achieves higher F1-scores compared to traditional supervised learning, especially when only a few samples per class are available.

6.3 Generative Models and Data Augmentation

Generative models, including Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), are powerful tools for addressing data scarcity. These models can synthetically generate histopathological images, genomic sequences, or radiology scans to supplement real-world datasets. Data augmentation enhances model robustness, reduces bias, and provides diverse scenarios for training. Importantly, when implemented under Green AI principles, generative models are optimized to minimize energy overhead.

Table 3: Comparison of Generative Approaches for Rare Cancer Data Augmentation

Method	Application	Advantages	Limitations
GANs	Synthetic histopathology image generation	High fidelity, diverse outputs	Risk of artifacts, high compute demand
VAEs	Genomic sequence modeling	Captures latent structure, interpretable	Lower realism in images
Diffusion Models	Radiology image synthesis	Stable training, realistic detail	Computationally expensive
Hybrid Models	Multi-modal cancer data augmentation	Integrates imaging + genomics	Complex implementation

6.4 Multimodal Learning Approaches

Cancer diagnosis and treatment often require analyzing heterogeneous data sources, including imaging (CT, MRI), genomic sequences, pathology slides, and clinical records. Multimodal learning integrates these data streams into a unified model, allowing for a holistic understanding of cancer progression. Zero-shot and few-shot techniques are particularly valuable here, enabling cross-modal transfer of knowledge for instance, learning from genomic data to improve radiology-based predictions. This integration enhances both diagnostic accuracy and treatment personalization.

6.5 Knowledge Graphs and Ontology-Driven Learning

Knowledge graphs and ontologies represent structured biomedical information that can be leveraged in low-data contexts. By embedding domain-specific relationships (e.g., gene–cancer associations, treatment–outcome pathways),



AI models gain contextual understanding that improves generalization. Zero-shot inference benefits significantly from these semantic representations, as the model can map unseen cancer types to known biological structures and relationships.

6.6 Energy-Efficient Architectures (Green AI Integration)

Green AI emphasizes the balance between model performance and environmental sustainability. Techniques such as model pruning, quantization, and federated learning are used to reduce computational cost while preserving accuracy. In cancer research, where large hospitals and research centers may face energy constraints, such optimizations ensure broader adoption of AI tools. Federated learning, in particular, allows collaborative model training across institutions without centralized data collection, maintaining privacy and reducing resource expenditure.

In sum, the technical landscape of Zero-Shot and Few-Shot Green AI in cancer research demonstrates the convergence of advanced machine learning methodologies with sustainable computing practices. Transfer learning, meta-learning, generative modeling, multimodal integration, and ontology-driven learning collectively address the limitations of scarce data in rare cancers. Meanwhile, energy-efficient architectures ensure these advances remain environmentally sustainable and widely accessible. Together, these methodologies form the foundation for scalable, inclusive, and ethical AI applications in oncology.

VII. ETHICAL AND CLINICAL CONSIDERATIONS

Oncology artificial intelligence (AI) specifically zero-shot and few-shot green AI models hold potential transformational value in rare and common cancer. But a combination of these approaches to clinical practice must be approached with seriousness to ethical and clinical concerns. These issues are not only technical, but are overall questions of patient safety, fairness, trust and sustainability. It is very important to deal with them systematically in order to make sure that AI innovations do serve various people equally and limit the number of unwanted effects.

7.1 Privacy and Data Security of patients.

Patient data protection is one of the most significant ethical issues when it comes to AI application to the healthcare industry. There are usually sensitive genomic data, imaging history, and clinical histories in cancer datasets that may cause privacy violations when not properly handled. The models used in transfer learning and few-shot embeddings usually do not concern the information of data provenance or unintentional information leakage. It is necessary to comply with regulatory frameworks like the HIPAA, GDPR, and new African Union data protection protocols. Furthermore, federated learning and privacy-enhancing techniques, including homomorphic encryption, are being investigated to achieve a tradeoff between utility and confidentiality of data.

7.2 Bias, Fairness, and Equity

Models of AI may unwittingly exacerbate health inequity when trained on biased data sets, which disproportionately represent some population groups. The disadvantage of rare cancers already exists because of the lack of data, and the concept of the zero-shot learning can be overfitting to the trends observed in majority groups and leaving marginalized individuals under-served. To be fair, there must be a conscious effort at inclusion of various datasets in terms of ethnicity, geography and socioeconomic backgrounds. Representation should be a priority in clinical trials to reduce algorithmic difference.

Table 4. Ethical Risks and Mitigation Strategies in Zero-Shot and Few-Shot Green AI for Cancer

Ethical Concern	Clinical Impact	Mitigation Strategy
Data Privacy & Security	Risk of patient identity breaches	Federated learning, encryption, anonymization
Algorithmic Bias	Unequal diagnostic accuracy across populations	Diverse training data, fairness audits
Transparency & Explainability	Reduced clinician trust, hindered adoption	Explainable AI (XAI), interpretable models
Energy Consumption	Unsustainable deployment in clinical settings	Green AI optimization, efficient hardware
Informed Consent	Patients unaware of AI-driven decision support	Clear consent protocols, patient education



7.3 Transparency and Explainability

For AI to gain acceptance in oncology, transparency is paramount. Zero-shot and few-shot models are often built on complex deep learning architectures, which are perceived as “black boxes.” This opacity makes it difficult for clinicians to validate the reasoning behind a model’s output. Explainable AI (XAI) approaches such as attention maps in medical imaging or feature attribution in genomic analysis can bridge this gap, improving trust and accountability.

Regulatory bodies like the U.S. FDA and European Medicines Agency are beginning to emphasize interpretability as a prerequisite for clinical approval.

7.4 Clinical Validation and Safety

No matter how theoretically advanced, AI models must undergo rigorous validation before clinical deployment. Rare cancers pose additional challenges due to limited case studies and heterogeneous disease presentations. Few-shot learning methods may provide rapid adaptability, but their performance must be benchmarked against established diagnostic and prognostic tools. Clinical trials, multi-center validations, and real-world evidence gathering are indispensable.

Furthermore, safety concerns extend to false positives and negatives, which can lead to overtreatment or delayed care. Establishing robust fail-safe mechanisms and clinician oversight is critical.

7.5 Informed Consent and Patient Autonomy

Patients must be fully informed when AI-driven tools are integrated into their diagnosis or treatment planning. This includes explaining the role of the model, its limitations, and the degree of human oversight. Informed consent frameworks need to evolve to reflect AI-mediated care, ensuring that patients retain autonomy in decision-making. The ethical principle of respect for persons dictates that patients should have the right to opt out of AI involvement without compromising the quality of their care.

7.6 Sustainability and Green AI Ethics

Green AI adds an additional ethical dimension: ensuring that computational efficiency does not come at the expense of accuracy or fairness. Energy-hungry AI models can exacerbate inequities, especially in low-resource settings where computational infrastructure is limited. Thus, sustainable design should not only minimize environmental impact but also align with equitable access goals, enabling global deployment in both high- and low-income healthcare systems.

In sum, ethical and clinical considerations form the backbone of responsible AI integration in oncology. Issues of privacy, fairness, transparency, validation, patient autonomy, and sustainability must be prioritized to ensure that zero-shot and few-shot green AI approaches genuinely advance cancer care without deepening disparities or eroding trust. By embedding ethical reflection into model design and clinical workflows, researchers and clinicians can create a foundation for AI systems that are not only innovative but also just, safe, and sustainable.

VIII. FUTURE DIRECTIONS AND RESEARCH GAPS

The integration of zero-shot and few-shot Green AI approaches into oncology is still in its early stages. While these methods hold transformative potential in diagnosing, classifying, and personalizing treatment for both rare and common cancer types, several avenues remain underexplored. Future research must not only advance the technical frontiers of these models but also address the systemic, ethical, and infrastructural challenges that currently hinder widespread clinical adoption. The following subsections outline critical directions and gaps that must be considered to ensure Green AI achieves sustainable impact in cancer research and treatment.

8.1 Advancing Model Generalization Across Cancer Types

One of the foremost research gaps is the limited ability of current models to generalize effectively across diverse cancer subtypes, particularly rare ones with extremely low incidence rates. While zero-shot learning allows for predictions without prior examples, many models still struggle to capture the biological heterogeneity of cancer. Future research must prioritize designing frameworks that integrate diverse multimodal data including genomics, radiomics, histopathology, and clinical text to enable more robust generalization. Developing domain-invariant feature representations and cross-cancer transfer learning mechanisms will also be central to this agenda.



8.2 Improving Data Efficiency and Sustainability

Although Green AI emphasizes reducing computational costs, existing few-shot frameworks often require pretraining on massive datasets, which indirectly undermines sustainability. There is a pressing need to design lightweight architectures and training protocols that minimize carbon footprints without compromising performance. Approaches such as parameter-efficient fine-tuning, knowledge distillation, and federated learning hold promise in reducing redundancy. Furthermore, benchmarking the “energy efficiency” of cancer AI models, alongside accuracy, will ensure sustainability metrics become part of mainstream evaluation.

8.3 Enhancing Interpretability and Clinical Trust

Another major research gap concerns interpretability. Clinicians often hesitate to adopt AI tools whose reasoning processes remain opaque, particularly in life-critical contexts like cancer diagnosis. Future research must emphasize explainable zero-shot and few-shot models that provide not only predictions but also clinically relevant rationales. Visualization techniques, counterfactual explanations, and biologically informed model designs can bridge the gap between computational predictions and human clinical judgment. Without this, trust and adoption in clinical environments will remain limited.

8.4 Addressing Bias and Data Inequality

Bias in cancer AI is a well-documented concern, especially when models are trained predominantly on data from high-resource settings. Rare cancer types and populations from low- and middle-income regions are systematically underrepresented, exacerbating global health inequities. Research must prioritize developing bias-mitigation strategies, including synthetic data generation for underrepresented cancers, balanced sampling, and fairness-aware model training. In addition, greater international collaboration and open-access data repositories will be essential to create more equitable cancer AI systems.

8.5 Integration with Personalized and Precision Oncology

New trends in oncology are shifting toward personalized treatment regimens, wherein therapies are based on genetic and molecular signatures. Green AI combined with zero-shot and few-shot learning may serve as the basis to advance personalized oncology to rare cancers, where such large-scale clinical trials are not feasible. The use of few-shot models should be investigated to understand how to learn treatment response patterns using only a small amount of data and update quickly to new molecular markers. This entails increased coordination between the computational sciences and translational oncology.

8.6 Collaboration and Governance structures across institutions.

The nature of cancer research requires well-established collaboration models that are not limited to institutions. Nevertheless, data silos, regulatory disparities, and IP limitations are not addressed. In the future, the way to go should be federated learning networks where the models can be trained on decentralized datasets without jeopardizing patient privacy. Governance models should also change together with the technical frameworks to develop ethical standards on how Green AI is applied in oncology, with transparency, accountability, and fair benefit-sharing.

To conclude, the future of zero-shot and few-shot Green AI in cancer research is finding a balance between technical innovation and sustainability, equity and clinical practicability. The long-term success of such models will depend on further advancement of generalization, interpretability, and bias reduction and the compatibility of such models with environmental sustainability practices. What is more critical is that strong interaction among technologists, oncologists, ethicists, and policymakers is needed to develop experimental innovations into clinical applications. The process of filling these research gaps will not only speed up the breakthrough in rare and common cancer but also make sure that Green AI will help achieve world health equity.

IX. CONCLUSION

Zero-shot and few-shot Green AI methods applied to cancer research constitute a paradigm shift in the ways oncology can address not only rare cancers but common ones. Using learning techniques with minimum data, these frameworks offer inimitable means of closing the divide between conventional machine learning specifically in situations of rare cancers that have limited clinical history. Simultaneously, the focus on the principles of Green AI makes sure that such innovations are developed in the energy-efficient, sustainable, and ethically responsible way.



This research has shown how zero-shot and few-shot approaches can be used to promote greater equity in diagnostic and therapeutic innovation, efficiency in high-scale screening to detect common cancers, and innovation in personalized oncology. Although these strengths exist, there are still important limitations, especially in terms of generalization across cancer types, better interpretability to enable clinical use and reduction of bias due to unequal representation of data.

The upcoming research should therefore address these gaps by interdisciplinary collaboration, sustainable computational practices and incorporation of ethical and governance frameworks. Zero-shot and few-shot Green AI can transform cancer research and treatment by bringing together technical creativity with clinical goodwill, openness, and equitability. The successful implementation of such approaches will not only enable oncology to move forward but will also establish the precedent in terms of introducing artificial intelligence responsibly and inclusively into the global health challenge.

REFERENCES

1. Badawi, M., Abushanab, M., Bhat, S., & Maier, A. (2024). Review of Zero-Shot and Few-Shot AI Algorithms in The Medical Domain. *arXiv preprint arXiv:2406.16143*.
2. Iloanusi, N. J. R., Ukah, N. J., & Nweke, A. C. Next-Generation Biological Biosensors for Trace Explosive Detection.
3. Lilhore, U. K., Kumar, A., Simaiya, S., Vyas, N., & Dutt, V. (Eds.). (2024). *Applying Machine Learning Techniques to Bioinformatics: Few-Shot and Zero-Shot Methods: Few-Shot and Zero-Shot Methods*. IGI Global.
4. Guo, F. M., & Fan, Y. (2022). Zero-shot and few-shot learning for lung cancer multi-label classification using vision transformer. *arXiv preprint arXiv:2205.15290*.
5. Li, T., Shetty, S., Kamath, A., Jaiswal, A., Jiang, X., Ding, Y., & Kim, Y. (2024). CancerGPT for few shot drug pair synergy predictions using large pretrained language models. *NPJ Digital Medicine*, 7(1), 40.
6. Sachar, D. (2025, May). Optimizing Transaction Fraud Detection: A Comparative Study of Nature-Inspired Algorithms for Feature Selection. In *2025 Systems and Information Engineering Design Symposium (SIEDS)* (pp. 392-397). IEEE.
7. Alur, V. V. (2021). *Detection of melanoma cancer using few-shot learning*. The University of Toledo.
8. Nilforoshan, H., Moor, M., Roohani, Y., Chen, Y., Šurina, A., Yasunaga, M., ... & Leskovec, J. (2023). Zero-shot causal learning. *Advances in Neural Information Processing Systems*, 36, 6862-6901.
9. Sachar, D. (2025, May). Enhanced Machine Learning Approaches for Network Intrusion and Anomaly Detection. In *2025 Systems and Information Engineering Design Symposium (SIEDS)* (pp. 426-431). IEEE.
10. Krenzer, A., Heil, S., Fitting, D., Matti, S., Zoller, W. G., Hann, A., & Puppe, F. (2023). Automated classification of polyps using deep learning architectures and few-shot learning. *BMC Medical Imaging*, 23(1), 59.
11. Oni, O. Y., & Oni, O. (2017). Elevating the Teaching Profession: A Comprehensive National Blueprint for Standardising Teacher Qualifications and Continuous Professional Development Across All Nigerian Educational Institutions. *International Journal of Technology, Management and Humanities*, 3(04).
12. Adebayo, I. A., Olagunju, O. J., Nkansah, C., Akomolafe, O., Godson, O., Blessing, O., & Clifford, O. (2019). Water-Energy-Food Nexus in Sub-Saharan Africa: Engineering Solutions for Sustainable Resource Management in Densely Populated Regions of West Africa.
13. Kumar, K. (2020). Using Alternative Data to Enhance Factor-Based Portfolios. *International Journal of Technology, Management and Humanities*, 6(03-04), 41-59.
14. Vethachalam, S., & Okafor, C. Architecting Scalable Enterprise API Security Using OWASP and NIST Protocols in Multinational Environments For (2020).
15. Adebayo, I. A., Olagunju, O. J., Nkansah, C., Akomolafe, O., Godson, O., Blessing, O., & Clifford, O. (2020). Waste-to-Wealth Initiatives: Designing and Implementing Sustainable Waste Management Systems for Energy Generation and Material Recovery in Urban Centers of West Africa.
16. Kumar, K. (2020). Innovations in Long/Short Equity Strategies for Small-and Mid-Cap Markets. *International Journal of Technology, Management and Humanities*, 6(03-04), 22-40.
17. Vethachalam, S., & Okafor, C. Accelerating CI/CD Pipelines Using .NET and Azure Microservices: Lessons from Pearson's Global Education Infrastructure For (2020).
18. Kumar, K. (2021). Alpha Persistence in Emerging Markets: Myths and Realities. *International Journal of Technology, Management and Humanities*, 7(03), 27-47.
19. Shaik, Kamal Mohammed Najeeb. (2025). SDN-based detection and mitigation of botnet traffic in large-scale networks. *World Journal of Advanced Research and Reviews*. 10.30574/wjarr.2025.25.2.0686.
20. Arefin, S., & Zannat, N. T. (2024). The ROI of Data Security: How Hospitals and Health Systems Can Turn



- Compliance into Competitive Advantage. *Multidisciplinary Journal of Healthcare (MJH)*, 1(2), 139-160.
21. Ashraf, M. S., Akuthota, V., Prapty, F. T., Sultana, S., Riad, J. A., Ghosh, C. R., ... & Anwar, A. S. (2025, April). Hybrid Q-Learning with VLMs Reasoning Features. In *2025 3rd International Conference on Artificial Intelligence and Machine Learning Applications Theme: Healthcare and Internet of Things (AIMLA)* (pp. 1-6). IEEE.
22. Shuvo, M. R., Debnath, R., Hasan, N., Nazara, R., Rahman, F. N., Riad, M. J. A., & Roy, P. (2025, February). Exploring Religions and Cross-Cultural Sensitivities in Conversational AI. In *2025 International Conference on Artificial Intelligence and Data Engineering (AIDE)* (pp. 629-636). IEEE.
23. Sultana, S., Akuthota, V., Subarna, J., Fuad, M. M., Riad, M. J. A., Islam, M. S., ... & Ashraf, M. S. (2025, June). Multi-Vision LVMs Model Ensemble for Gold Jewelry Authenticity Verification. In *2025 International Conference on Computing Technologies (ICOCT)* (pp. 1-6). IEEE.
24. Riad, M. J. A., Roy, P., Shuvo, M. R., Hasan, N., Das, S., Ayrin, F. J., ... & Rahman, M. M. (2025, January). Fine-Tuning Large Language Models for Regional Dialect Comprehended Question answering in Bangla. In *2025 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS)* (pp. 1-6). IEEE.
25. Kumar, K. (2021). Comparing Sharpe Ratios Across Market Cycles for Hedge Fund Strategies. *International Journal of Humanities and Information Technology*, (Special 1), 1-24.
26. Vethachalam, S. (2021). DevSecOps Integration in Cruise Industry Systems: A Framework for Reducing Cybersecurity Incidents. *SAMRIDDHI: A Journal of Physical Sciences, Engineering and Technology*, 13(02), 158-167.
27. Kumar, K. (2022). How Institutional Herding Impacts Small Cap Liquidity. *Well Testing Journal*, 31(2), 97-117.
28. Arefin, S., & Zannat, N. T. (2025). Securing AI in Global Health Research: A Framework for Cross-Border Data Collaboration. *Clinical Medicine And Health Research Journal*, 5(02), 1187-1193.
29. Kumar, K. (2022). Investor Overreaction in Microcap Earnings Announcements. *International Journal of Humanities and Information Technology*, 4(01-03), 11-30.
30. Shaik, Kamal Mohammed Najeeb. (2024). Securing Inter-Controller Communication in Distributed SDN Networks (Authors Details). *International Journal of Social Sciences & Humanities (IJSSH)*. 10. 2454-566. 10.21590/ijtmh.10.04.06.
31. Sanusi, B. Design and Construction of Hospitals: Integrating Civil Engineering with Healthcare Facility Requirements.
32. Arefin, N. T. Z. S. (2025). AI vs Cyber Threats: Real-World Case Studies on Securing Healthcare Data.
33. Vethachalam, S. (2024). Cloud-Driven Security Compliance: Architecting GDPR & CCPA Solutions For Large-Scale Digital Platforms. *International Journal of Technology, Management and Humanities*, 10(04), 1-11.
34. Hasan, N., Riad, M. J. A., Das, S., Roy, P., Shuvo, M. R., & Rahman, M. (2024, January). Advanced retinal image segmentation using u-net architecture: A leap forward in ophthalmological diagnostics. In *2024 Fourth International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT)* (pp. 1-6). IEEE.
35. Arefin, N. T. Z. S. (2025). Future-Proofing Healthcare: The Role of AI and Blockchain in Data Security.
36. Onoja, M. O., Onyenze, C. C., & Akintoye, A. A. (2024). DevOps and Sustainable Software Engineering: Bridging Speed, Reliability, and Environmental Responsibility. *International Journal of Technology, Management and Humanities*, 10(04).
37. Riad, M. J. A., Debnath, R., Shuvo, M. R., Ayrin, F. J., Hasan, N., Tamanna, A. A., & Roy, P. (2024, December). Fine-Tuning Large Language Models for Sentiment Classification of AI-Related Tweets. In *2024 IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE)* (pp. 186-191). IEEE.
38. Kumar, K. (2022). How Institutional Herding Impacts Small Cap Liquidity. *Well Testing Journal*, 31(2), 97-117.
39. Shaik, Kamal Mohammed Najeeb. (2024). SDN-BASED TRAFFIC ENGINEERING FOR DATA CENTER NETWORKS: OPTIMIZING PERFORMANCE AND EFFICIENCY. *International Journal of Engineering and Technical Research (IJETR)*. 08. 10.5281/zenodo.15800046.
40. Arefin, M. A. O. S. (2025). Advancements in AI-Enhanced OCT Imaging for Early Disease Detection and Prevention in Aging Populations.
41. Roy, P., Riad, M. J. A., Akter, L., Hasan, N., Shuvo, M. R., Quader, M. A., ... & Anwar, A. S. (2024, May). Bilstm models with and without pretrained embeddings and bert on german patient reviews. In *2024 International Conference on Advances in Modern Age Technologies for Health and Engineering Science (AMATHE)* (pp. 1-5). IEEE.
42. Kumar, K. (2023). Dynamic Asset Allocation in an Inflationary Macro Regime. *International Journal of Technology, Management and Humanities*, 9(02), 1-21.



43. Shaik, Kamal Mohammed Najeeb. (2022). Security Challenges and Solutions in SD-WAN Deployments. *SAMRIDDHI A Journal of Physical Sciences Engineering and Technology*. 14. 2022. 10.18090/samriddhi.v14i04..
44. SANUSI, B. O. (2022). Sustainable Stormwater Management: Evaluating the Effectiveness of Green Infrastructure in Midwestern Cities. *Well Testing Journal*, 31(2), 74-96.
45. Kumar, K. (2023). Position Sizing Models for Long/Short Portfolios: Conviction vs. Risk Budgeting. *International Journal of Humanities and Information Technology*, 5(04), 13-34.
46. Titoriya, A. K., Singh, M. P., & Singh, A. K. (2025). Mtunet++: Explainable few-shot medical image classification with generative adversarial network. *Multimedia Tools and Applications*, 84(11), 9219-9239.
47. Sun, J., Wei, D., Wang, L., & Zheng, Y. (2022, September). Lesion guided explainable few weak-shot medical report generation. In *International Conference on Medical Image Computing and Computer-Assisted Intervention* (pp. 615-625). Cham: Springer Nature Switzerland.
48. Quan, H., Li, X., Hu, D., Nan, T., & Cui, X. (2024). Dual-channel prototype network for few-shot pathology image classification. *IEEE Journal of Biomedical and Health Informatics*, 28(7), 4132-4144.
49. Ying, H., Lia, Y., & Fu, Z. (2025). Domain Adaptation and Generalization Using Foundation Models in Healthcare Imaging. *Available at SSRN 5345726*.
50. Sushil, M., Zack, T., Mandair, D., Zheng, Z., Wali, A., Yu, Y. N., ... & Butte, A. J. (2024). A comparative study of large language model-based zero-shot inference and task-specific supervised classification of breast cancer pathology reports. *Journal of the American Medical Informatics Association*, 31(10), 2315-2327.
51. Sushil, M., Zack, T., Mandair, D., Zheng, Z., Wali, A., Yu, Y. N., ... & Butte, A. J. (2024). A comparative study of large language model-based zero-shot inference and task-specific supervised classification of breast cancer pathology reports. *Journal of the American Medical Informatics Association*, 31(10), 2315-2327.
52. Tang, X., Zou, A., Zhang, Z., Li, Z., Zhao, Y., Zhang, X., ... & Gerstein, M. (2023). Medagents: Large language models as collaborators for zero-shot medical reasoning. *arXiv preprint arXiv:2311.10537*.
53. Ding, T., Wagner, S. J., Song, A. H., Chen, R. J., Lu, M. Y., Zhang, A., ... & Mahmood, F. (2024). Multimodal whole slide foundation model for pathology. *arXiv preprint arXiv:2411.19666*.
54. Zhu, F., Zhang, Y., Chen, L., Qin, B., & Xu, R. (2024). Learning to describe for predicting zero-shot drug-drug interactions. *arXiv preprint arXiv:2403.08377*.
55. Bartels, S., & Carus, J. (2025). From text to data: Open-source large language models in extracting cancer related medical attributes from German pathology reports. *International Journal of Medical Informatics*, 203, 106022.
56. Liu, X., Liu, H., Yang, G., Jiang, Z., Cui, S., Zhang, Z., ... & Wang, G. (2025). A generalist medical language model for disease diagnosis assistance. *Nature medicine*, 31(3), 932-942.
57. Marzullo, A., & Ranzini, M. B. M. (2024). Exploring Zero-Shot Anomaly Detection with CLIP in Medical Imaging: Are We There Yet?. *arXiv preprint arXiv:2411.09310*.
58. Xu, J., Lo, S. Y., Safaei, B., Patel, V. M., & Dwivedi, I. (2025). Towards zero-shot anomaly detection and reasoning with multimodal large language models. In *Proceedings of the Computer Vision and Pattern Recognition Conference* (pp. 20370-20382).
59. Zhou, X., Sun, L., He, D., Guan, W., Wang, R., Wang, L., ... & Xie, W. (2024). A knowledge-enhanced pathology vision-language foundation model for cancer diagnosis. *arXiv preprint arXiv:2412.13126*.



A Comprehensive Survey of Image Compression Techniques and a Novel Approach for Efficient Image Retrieval

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ABSTRACT: This paper presents a thorough survey of existing image compression techniques, with a specific emphasis on transcending the limitations associated with traditional methods such as JPEG and PNG compression. In addition, we propose an innovative neural network (NN) based approach for image compression, focusing on a streamlined strategy for faster image retrieval. It is important to note that the suggested NN-based approach is presented as a conceptual proposal and has not been empirically tested in this study.

I. INTRODUCTION

Image compression plays a pivotal role in various applications, ranging from multimedia content delivery to remote sensing and medical imaging. Traditional compression standards like JPEG and PNG have served as benchmarks, but their limitations in preserving fine details and adapting to diverse content types have motivated researchers to explore alternative approaches.

II. EXISTING TECHNIQUES

JPEG Compression:

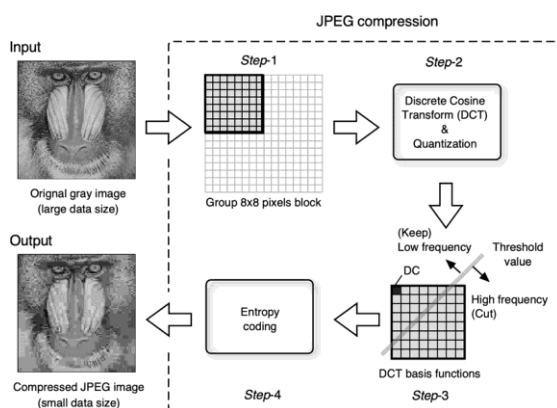
Overview: JPEG (Joint Photographic Experts Group) is a widely adopted standard for image compression. It employs a lossy compression algorithm that reduces file sizes by discarding some of the image information.

Algorithm Details:

JPEG uses discrete cosine transform (DCT) to transform image data from spatial domain to frequency domain. The transformed data is quantized, allowing for the removal of less perceptually significant information. Entropy coding, typically Huffman coding, is applied to further compress the quantized data.

Advantages:

Widely supported and compatible across various platforms. Good compression ratios for natural images.



Limitations:

Loss of fine details due to the lossy nature of compression. Less effective for images with sharp edges or text.

PNG Compression:

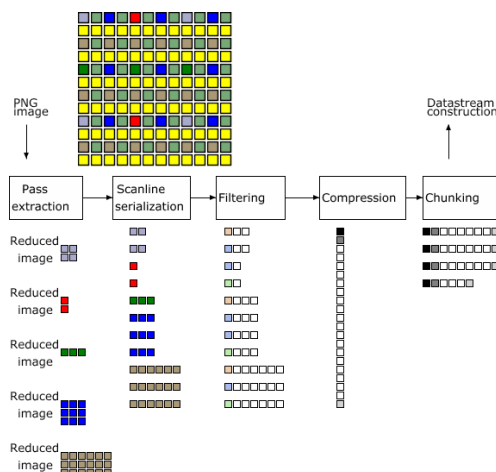
Overview: PNG (Portable Network Graphics) is a popular format known for its lossless compression, making



it suitable for preserving image quality without sacrificing information.

Algorithm Details:

Uses a combination of predictive filtering and entropy coding. Employs DEFLATE algorithm for compression, which includes LZ77-based compression and Huffman coding.



Advantages:

Lossless compression, ensuring no quality loss in the compressed image. Supports transparency and a wide range of color depths.

Limitations:

Larger file sizes compared to lossy compression methods like JPEG. Less efficient for compressing natural images with smooth gradients.

Neural Network Compression:

Overview: Neural network-based image compression represents a more recent approach that leverages deep learning techniques to overcome the limitations of traditional methods.

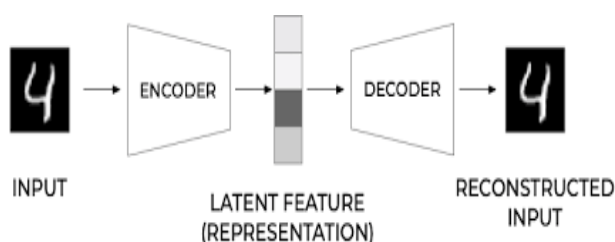
Algorithm Details:

Typically involves an encoder-decoder architecture.

The encoder compresses the input image into a lower-dimensional representation (latent space). The decoder reconstructs the compressed image from the latent space representation.

Advantages:

Potential for better preservation of fine details and adaptability to diverse content types. Ability to learn complex features and patterns in data.



Limitations:

Computational resources required for training and inference. Trade-offs between compression ratios, computational cost, and image retrieval speed. Understanding these existing techniques provides a foundation for evaluating the proposed NN-based approach and its suggested strategy for faster image retrieval in the context of image compression. Each technique has its strengths and weaknesses, and the proposed approach aims to address some of the limitations while offering potential advantages in terms of compression efficiency and adaptability.



III. PROPOSED NN-BASED APPROACH

The suggested NN-based approach introduces a novel architecture with specialized layers, including the Down-sampling Layer, Gradient Mixing Module, YUV Transformation Layer, and Feature Preservation Module. Trained on a diverse dataset, the NN generalizes compression strategies, offering advantages such as efficient reduction in image bit-depth and preservation of essential visual features. This adaptability positions the proposed approach as a versatile solution for various multimedia applications.

Suggested Strategy for Faster Image Retrieval:

To enhance the proposed NN-based image compression, we suggest a streamlined strategy for faster image retrieval. Instead of employing a deep model that compresses to latent dimension once and decompresses images from and to latent features in every call, our proposed method involves compressing the file directly into an image. It is important to note that this strategy is presented as a conceptual proposal and has not been empirically tested in this study.

Compression ratio of existing methods:

Method	Ratio	loss
Jpeg	10:1	10-15%
Png	2:1	0-5%
Neural Network	20:1	10-20%

Compression Ratio of a few NN-Based models:

While jpeg and png format of compression can format images without losing much quality but neural network based approach produces a noisy image.

Limitations of the Suggested Approach:

While the suggested approach may provide cost-effective image retrieval and a higher image compression ratio compared to traditional standards, the trade-off, however, is an extended compression time, and increased computational resources during the compression. Careful consideration of hardware capabilities is necessary for optimal performance.

IV. CONCLUSION

This paper provides a comprehensive survey of existing image compression techniques, highlighting the limitations of traditional methods. The proposed NN- based approach and the suggested strategy for faster image retrieval offer a novel perspective for future research in image compression. It is important to emphasize that the suggested approach is presented as a conceptual proposal, and further empirical testing is required to validate its effectiveness.

	bmshj2018-factorized-msssim-6			b2018-gdn-128-4			mbt2018-mean-msssim-5		
	SSIM	PSNR	N_compression	SSIM	PSNR	N_compression	SSIM	PSNR	N_compression
1.png	0.968	34.46	0.244	0.966	34.94	0.313	0.959	33.93	0.15
2.png	0.973	36.02	0.225	0.972	37.12	0.283	0.965	34.96	0.131
3.png	0.97	34.63	0.236	0.969	35.47	0.309	0.962	33.9	0.143
4.png	0.97	34.72	0.237	0.969	35.55	0.308	0.962	33.99	0.143
5.png	0.969	34.32	0.239	0.968	35.29	0.307	0.961	33.63	0.145
6.png	0.971	34.79	0.227	0.969	35.44	0.281	0.965	34.3	0.131
7.png	0.972	34.62	0.226	0.97	35.29	0.283	0.966	33.99	0.13
8.png	0.971	34.82	0.234	0.968	35.31	0.295	0.965	34.32	0.139
9.png	0.971	37.47	0.208	0.976	38.42	0.261	0.97	36.45	0.112
10.png	0.972	35.35	0.226	0.97	35.99	0.287	0.965	34.78	0.131
Average:	0.9707	35.12	0.2302	0.9697	35.882	0.2927	0.964	34.425	0.1355

REFERENCES

1. <https://medium.com/deelvin-machine-learning/image-compression-convolutional-neural-networks-vs-png-4d19729f851c>
2. <https://arxiv.org/pdf/1904.03567v2.pdf>



3. https://www.researchgate.net/publication/357037859_Image_Compression_Using_Neural_Networks_A_Review
4. S. Susan, P. Agrawal, M. Mittal, and S. Bansal, "New shape descriptor in the context of edge continuity," CAAI Transactions on Intelligence Technology, vol. 4, no. 2, pp. 101–109, 2019.
5. L. Amelio and A. Amelio, "Classification methods in image analysis with a special focus on medical analytics," in Machine Learning Paradigms, pp. 31–69, Springer, Basel, Switzerland, 2019.
6. F. Riaz, S. Jabbar, M. Sajid, M. Ahmad, K. Naseer, and N. Ali, "A collision avoidance scheme for autonomous vehicles inspired by human social norms," Computers & Electrical Engineering, vol. 69, pp. 690–704, 2018.
7. <https://towardsdatascience.com/ai-based-image-compression-the-state-of-the-art-fb5aa6042bfa>
8. <https://arxiv.org/pdf/2111.06707v1.pdf>
9. <https://www.adobe.com/creativecloud/file-types/image/comparison/jpeg-vs-png.html>



Examine the Effects of Artificial Intelligence on Talent Acquisition in A Comprehensive Study

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ABSTRACT:

Engaging with the talent pool and converting candidates into applicants is effectively facilitated through talent sourcing. Machine learning, notably utilizing tools like neuro-linguistic programming (NLP) and automated assessments, has become a trend to address recruitment challenges. A significant 80% of executives strongly believe that deep learning enhances the efficiency of candidate screening. Currently, only 20% of global start-ups use artificial intelligence (AI) in their processes, a number expected to increase by 35%. This study delves into the impact of AI in the recruitment process, considering metrics such as application completion rate, number of candidates per filled position, and cost per hire. The analysis aims to understand the influence of AI in various phases of the hiring process within organizations.

INTRODUCTION

Global leaders strategically leverage AI to mine professional social sites and academic information, effectively identifying the talent pool required for specific positions. Utilizing multiple job posting channels and employee referrals remains key in candidate sourcing. This study highlights the impactful role of AI in the hiring process, creating a competitive advantage in the market and generating tangible positive outcomes. The paper aims to showcase how AI has revolutionized the selection process, fostering innovative engagement with applicants. AI serves as a pathway to engage top talent and enhance business value.



According to Bain and Company, effectively managing employment practices involves addressing challenges in embracing digital trends. Globally, employees widely believe that digital technologies can optimize their performance and bridge talent acquisition gaps. The adoption of AI aids in assessing workforce planning, establishing structured procedures, and identifying metrics for improved performance and increased hiring accuracy. In the era where a recruiter's decision-making ability is pivotal for creating business value, AI proves invaluable in coping with disruption and streamlining the talent lifecycle. AI's capabilities enable precise assessments and enhance prioritization for job acquisitions. A particularly distinctive application of AI in recruitment lies in sound compensation planning, optimizing pay decisions, and fostering transparency in managerial decision-making processes.

AI gains momentum by focusing on hiring smarter candidates and emphasizing strategic planning. This application of AI proves time-saving for talent sourcing professionals as they can design key performance indicators aligned with business objectives, establishing core competencies at the organizational level. Beyond these features, AI introduces a new dimension to reducing employee attrition and formulating strategies to address high-priority challenges.



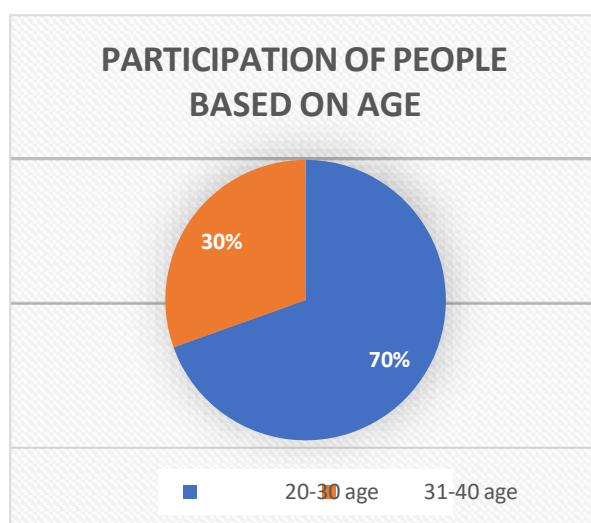
RESEARCH FINDINGS

AI serves as the foundation for establishing ethical human resource systems, effectively addressing bias and enhancing performance measures in the hiring process. Furthermore, AI offers accurate predictions, assisting recruitment heads in identifying potential candidates by analyzing facial expressions and body language. AI-based systems evaluate resumes, identifying relevant keywords and ensuring unbiased shortlisting while detecting fraudulent applications.

The integration of AI in hiring activities, driven by technological advancements, has expanded job opportunities globally, alleviating employment shortages. Data-driven businesses face challenges in employee retention and AI adoption enables talent acquisition leaders to automate repetitive tasks, enhancing efficiency. Online interviews utilizing AI, analysing facial expressions, bring convenience to both applicants and interviewers. The study examines the effects of artificial intelligence on talent acquisition in a comprehensive study. Primary research: Primary data was collected with a sample size of 1,000

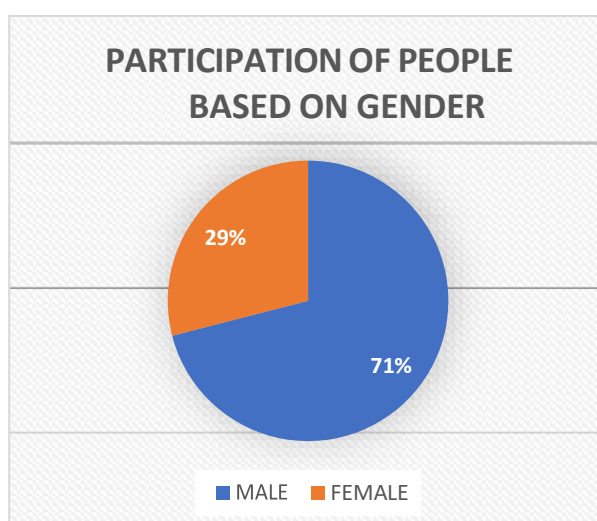
The age group:

The survey reflects diverse participation across age groups, with the 20-30 age bracket constituting the majority at 65.74%, followed by the 31-40 age group with a participation rate of 28.8%. Notably, respondents from age groups beyond 40 also contributed their opinions. In terms of gender distribution, the data indicates a majority of male respondents at 71%, with females comprising 29%.



Gender:

The data reveals a majority of male respondents at 71%, with females comprising 29%. To put it into perspective, out of 1000 participants, 710 were male, and 290 were female.





Academic qualification/profession:

In terms of the academic qualification and professions of survey participants, the data indicates that postgraduates constitute the majority at 41%, closely followed by working professionals at 39%. Additionally, 16% of respondents hold a graduate degree, while the remaining 4% identify as homemakers.

Benefits of implementing AI in talent acquisition:

The majority of respondents express the view that integrating AI into hiring processes will lead to a reduction in man-hours, allowing more time for critical tasks. Additionally, respondents believe that implementing AI can significantly enhance the quality of candidates and optimize recruitment costs. The benefits of AI in talent acquisition, with 36% indicating a reduction in time-to-hire, 27% emphasizing improved candidate quality, and 23% highlighting cost reduction. The remaining 12% focus on the advantages of AI in onboarding processes.

The core barriers to adopting AI in talent sourcing:

According to the data, the prevailing view is that the primary concern hindering AI adoption is the lack of relevant skills to comprehend its patterns and flow, closely followed by budgetary constraints. The consensus is that high-quality inputs during the training of datasets are crucial for obtaining desired high-quality outputs. In talent sourcing, 41% highlight the absence of skilled HR professionals as a significant barrier, while 22% express concerns about budget limitations. Additionally, 20% identify challenges in consistently providing high-quality data, while the lack of accurate evaluation (13%) and high risk (4%) are also acknowledged as barriers.

The possible drawbacks associated with implementing AI in talent acquisition:

As per the data, opinions highlight reliability as a critical concern to address before implementing AI. The consensus is that AI, limited to identifying specific patterns, may face challenges in reliability, particularly when deviations occur beyond programmed instructions. The emphasis lies in acknowledging the potential limitations of AI in handling variations beyond predefined patterns.

Imparting AI in training employees:

The prevailing viewpoint suggests that providing training through AI yields significant benefits for organizations, citing the effectiveness of automated assessments in scrutinizing the workforce. Concerns about bias in people-centric evaluations are noted. An overwhelming 94% express agreement on the benefits of AI-based training, with a contrasting 6% dissenting from the presented question.

Satisfaction of AI in the hiring process:

Leveraging AI for scheduling the hiring process not only meets your candidate selection criteria but also effectively cuts down recruitment costs. The majority of respondents express a consensus that integrating AI into hiring processes substantially lowers recruitment expenses and greatly enhances the ability to select the ideal candidate. Approximately 80% convey satisfaction with the implementation of AI in the hiring process, while the remaining 20% express dissatisfaction.

CONCLUSION

Respondents highlight key AI applications in hiring, emphasizing social candidate discovery, job market forecasting, and resume filtering. However, concerns are raised about AI's reliability due to its limited ability to surpass programmed instructions and identify diverse patterns. A significant hurdle to AI adoption is the lack of relevant skills for understanding its usage and addressing complex issues. Organizations are urged to consistently provide high-quality data for optimal AI performance. Leveraging AI in talent sourcing is recommended for cost-effective, unbiased recruitment, enabling quick identification of skilled individuals based on job descriptions.

REFERENCES

- [1] U. K. S. Rajesh and A. Rakesh, "The impact of artificial intelligence in talent acquisition lifecycle of organizations," *International Journal of Engineering Development and Research*, vol. 6, no. 2, pp. 709–717, 2018.
- [2] D. Herremans, "aiSTROM-a roadmap for developing a successful ai strategy," *IEEE Access*, vol. 9, pp. 155826–155838, 2021, Doi: 10.1109/ACCESS.2021.3127548.
- [3] O. Ore and M. Sposato, "Opportunities and risks of artificial intelligence in recruitment and selection," *International Journal of Organizational Analysis*, vol. 30, no. 6, pp. 1771–1782, Jun. 2022, doi: 10.1108/IJOA-07-2020-2291.



- [4] J. FraiJ and V. László, “A literature review: artificial intelligence impact on the recruitment process,” *International Journal of Engineering and Management Sciences*, vol. 6, no. 1, pp. 108–119, May 2021, doi: 10.21791/IJEMS.2021.1.10.
- [5] S. Mehrotra and A. Khanna, “Recruitment through AI in selected Indian companies,” *Metamorphosis: A Journal of Management Research*, vol. 21, no. 1, pp. 31–39, Jan. 2022, doi: 10.1177/09726225211066220.
- [6] A. L. Hunkenschroer and C. Luetge, “Ethics of AI-enabled recruiting and selection: a review and research agenda,” *Journal of Business Ethics*, vol. 178, no. 4, pp. 977–1007, Feb. 2022, doi: 10.1007/s10551-022-05049-6.
- [7] P. Will, D. Krpan, and G. Lordan, “People versus machines: introducing the HIRE framework,” *Artificial Intelligence Review*, vol. 56, no. 2, pp. 1071–1100, May 2023, doi: 10.1007/s10462-022-10193-6.
- [8] P. van Esch, J. S. Black, and D. Arli, “Job candidates’ reactions to AI-enabled job application processes,” *AI and Ethics*, vol. 1, no. 2, pp. 119–130, Nov. 2021, doi: 10.1007/s43681-020-00025-0.
- [9] A. Verma, K. Lamsal, and P. Verma, “An investigation of skill requirements in artificial intelligence and machine learning job advertisements,” *Industry and Higher Education*, vol. 36, no. 1, pp. 63–73, Feb. 2022, doi: 10.1177/0950422221990990.
- [10] G. Volkmar, P. M. Fischer, and S. Reinecke, “Artificial intelligence and machine learning: exploring drivers, barriers, and future developments in marketing management,” *Journal of Business Research*, vol. 149, pp. 599–614, Oct. 2022, Doi: 10.1016/j.jbusres.2022.04.007.
- [11] P. M. Gilch and J. Sieweke, “Recruiting digital talent: The strategic role of recruitment in organisations’ digital transformation,” *German Journal of Human Resource Management*, vol. 35, no. 1, pp. 53–82, Sep. 2021, doi: 10.1177/2397002220952734.
- [12] A. Mazurchenko and K. Maršíková, “Digitally-powered human resource management: Skills and roles in the digital era,” *Acta Informatica Pragensia*, vol. 8, no. 2, pp. 72–86, Dec. 2019, doi: 10.18267/j.aip.125.



Artificial Intelligence in Share Market

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ABSTRACT: The application of Artificial Intelligence (AI) in financial investment has been a focus since the 1990s, it was advanced in paralleling technology. This study systematically reviews 2326 papers from Scopus (1995-2019) categorizing them into portfolio optimization, AI-based stock market prediction, financial sentiment analysis, and combined approaches. Each category spans initial research to contemporary applications. The overview suggests sustained interest, with literature evolving to be more specific and comprehensive. This paper is about identifying what is share market and its span with Artificial Intelligence.

INTRODUCTION

AI-based stock trading involves the automated execution of buying and selling shares through technology programmed to emulate human decision-making, ensuring enhanced precision and speed. Currently, AI-driven tools are actively employed for predicting trends in the stock market.

In the realm of computational finance, there is a growing emphasis on the utilization and exploration of AI techniques in financial investments. Despite the fact that a significant portion of hedge fund trades is currently automated by computers, approximately 90% of these operations adhere to a pre-programmed procedure [12]. This underscores the ongoing potential for further development in the application of artificial intelligence within the financial sector.

AI finds application in finance across three main areas: optimizing financial portfolios, predicting future asset prices or trends, and analyzing sentiment from news or social media comments. Despite the distinct characteristics of each area, some studies propose combining techniques from these domains. Other computational finance studies cover dynamic system control in financial markets [8], analysis of investor behavior [77], network analysis [37], [82], and clustering financial assets [1]. [98] explores the correlation between calibrated options' volatility and movements in futures prices in the Taiwan stock market, revealing a correlation of approximately -0.9 and suggesting the use of options' volatility for futures price prediction.

This study examines the evolution of each of these domains from their inception to their current state-of-the-art progress. To achieve this, a selection of artificial intelligence works published from 1995 to 2019 was gathered for thorough analysis and comparison.

OVERVIEW

The examination of works focusing on the application of artificial intelligence to financial investments relies on a selection of documents sourced from Scopus. The query, conducted on May 27, 2020, yielded a total of 2326 documents, encompassing both journal and conference papers published between 1995 and 2019.

Table 1 highlights the most cited papers on Artificial Intelligence applied to financial investments, ranging from the oldest in 2000 [13] to the most recent in 2015 [63]. This indicates that the research area is relatively recent and is progressively garnering attention. Notably, among the papers listed in Table 1, none are more recent than 2015, as expected. This is due to the limited time for newer papers to be studied by other researchers, and recent works tend to exhibit more specialized focus.



OBJECTIVES

10 Most Popular Expensive Shares in India :

AI algorithms execute trades in milliseconds, enabling investors and financial institutions to seize opportunities arising from tiny price discrepancies. The incorporation of AI in stock market trading tools enhances their capability to swiftly analyze market data, facilitating trades with exceptional speed and increased precision.

Why Should You Consider Investing in the Most Expensive Shares in India? Highest Priced Share in India: An Overview

1. MRF Ltd
2. Honeywell Automation India
3. Page Industries Ltd
4. Shree Cement
5. 3M India Ltd
6. Abbott India Ltd
7. Nestle India Ltd
8. Bosch Ltd
9. Procter & Gamble Hygiene and Health Care Ltd
10. Lakshmi Machine Works Ltd

Making investment decisions based solely on a stock's price tag can be a significant error. While these high-priced shares in India may not be feasible for bulk purchases, their potential profits are worth considering. In the stock market, the emphasis should not solely be on the quantity of shares but rather on their capacity to yield substantial returns. Therefore, investing in India's most expensive stocks can prove to be a lucrative venture. Nevertheless, it is imperative for investors to conduct thorough research and/or seek guidance from their financial advisor before making any investment decisions.

We utilize two datasets for our analysis. The first dataset consists of 35 prominent U.S. stocks listed on the NYSE and NASDAQ, chosen based on their highest options trading volume in March 2003. This sample covers the period from April 17, 2003, to April 17, 2013. The second dataset, discussed in more detail in Subsection 4.3, is derived from prosecuted cases of illegal insider trading in the U.S. It includes 36 stocks and spans from January 1, 1999, to August 30, 2014. We acquire intraday trade and quote data for both sets of stocks.

Company Name	Sub-Sector	Market Cap (in Cr)	PE Ratio	1-Year ROI	Share Price
MRF Ltd	Tires & Rubber	₹58,352	53.35	29.84%	₹1,40,997.25
Honeywell Automation India Ltd	Information Technology	₹33,073	80.69	27.93%	₹37,847.3
Page Industries Ltd	Textiles, Apparel & Luxury Goods	₹42,082	80.29	16.74%	₹36,638.15
Shree Cement Ltd	Cement	₹95,531	68.85	11.20%	₹27,493.75
3M India Ltd	Industrials	₹38,405	63.33	24.35%	₹33,527.7
Abbott India Ltd	Health Care	₹54,690	48.88	22.36%	₹25,481.4
Nestle India Ltd	Consumer Staples	₹2,41,232	81.47	21.88%	₹2,462.9
Bosch Ltd	Auto Components	₹67,286	38.9	31.20%	₹22,774.8
Procter & Gamble Hygiene and Health Care Ltd	FMCG	₹56,190	76.5	0.49%	₹17,048.15
Lakshmi Machine Works Ltd	Industrial Machinery	₹14,309	32.02	27.44%	₹13,357.2

BENEFITS OF SHARE MARKET IN AI

Efficient Data Analysis: AI algorithms excel at swiftly analyzing extensive financial data, uncovering patterns and trends that might elude traditional methods. This capability empowers investors to make more insightful decisions when navigating the complexities of financial markets.

Advanced Trading Strategies: AI has the capacity to formulate and refine trading strategies by



continuously adapting to real-time market conditions. This involves optimizing trading parameters, effectively managing risks, and promptly adjusting strategies in response to evolving market dynamics.

Automation and Swift Execution: AI-driven trading systems demonstrate exceptional speed in executing trades, seizing market opportunities within milliseconds. The implementation of automation reduces dependence on manual intervention, ensuring trades are executed promptly and efficiently.

Effective Risk Management: AI models exhibit proficiency in assessing and managing risks by leveraging insights from historical data and current market conditions. This allows AI algorithms to anticipate potential risks and implement strategic risk mitigation measures.

Sophisticated Predictive Analytics: AI technologies, particularly machine learning, showcase their ability to forecast market trends and predict price movements accurately. This empowers traders and investors with valuable insights, facilitating well-informed decision-making in dynamic financial environments.

How people think about Share Market :

These courses provide comprehensive education, offering a well-rounded grasp of the functioning of the stock market. Attendees can participate in seminars that concentrate on specific facets of the stock market, such as 'mastering intraday trading' or 'identifying secure stocks.'

Wealth Accumulation Opportunity: Some perceive the stock market as a prime avenue for accumulating wealth. They consider it a chance to invest funds and potentially garner returns through capital appreciation and dividends.

Risk and Volatility: Others view the stock market as inherently volatile and uncertain. They might be reluctant to invest due to worries about market unpredictability, economic instabilities, and the potential for financial setbacks.

Extended Investment Horizon: Many investors embrace a prolonged outlook, regarding the stock market as a means to build wealth over an extended period. They concentrate on the historical trajectory of market growth despite momentary fluctuations.

Speculation and Short-Term Transactions: Some individuals see the stock market as a forum for speculation and engaging in short-term transactions. They partake in the buying and selling of stocks based on market trends, news, and short-term price movements.

Financial Literacy: Investors with a robust understanding of financial markets perceive the stock market as a space to apply their knowledge. They may actively oversee their portfolios, make well-informed investment choices, and stay abreast of market trends.

Index Investing: The idea of index investing, especially through index funds or exchange-traded funds (ETFs), has become widely accepted. Investors might perceive the stock market as a means to engage in comprehensive market growth with reduced management fees.

Psychological Influence: People's emotions frequently wield substantial influence in shaping their outlook on the stock market. Fear and greed can impact decision-making, resulting in emotional responses to market fluctuations.

Learning Opportunities: The stock market is regarded by some as an educational arena. It offers chances for individuals to gain insights into finance, economics, and investment strategies.

Recent advancements in AI for stock market prediction have transformed the landscape, providing investors and financial institutions with powerful tools to navigate the complexities of the dynamic financial world.

1.Natural Language Processing (NLP):

- Natural Language Processing has become a pivotal tool in predicting stock prices. Advanced NLP algorithms excel at extracting actionable insights from vast datasets, enabling investors and financial institutions to sift through information and concentrate on crucial data points for precise market predictions.

2.Sentiment Analysis:

- AI-driven systems now excel in analyzing real-time data from various sources, including news articles, financial reports, and social media conversations. Sentiment analysis, powered by AI, allows investors and financial institutions to gauge market sentiment accurately. This capability aids in making informed predictions based on the



analysis of sentiments expressed across different platforms.

3. High-Frequency Trading (HFT):

- AI has emerged as the dominant force in high-frequency trading, offering unparalleled accuracy in predicting stock prices. AI algorithms employed in HFT execute trades within milliseconds, providing investors and financial institutions the ability to capitalize on minute price discrepancies. The integration of AI in stock market trading tools enhances their capacity to swiftly analyze market data and execute trades with remarkable speed and precision.

Current trends in Share market :

1. Technology Sector Dominance:

- Technology stocks, particularly in areas like artificial intelligence, cloud computing, and e-commerce, were experiencing significant growth.

2. Renewable Energy and ESG Investing:

- There was a growing interest in companies involved in renewable energy and sustainable practices, reflecting a broader trend towards Environmental, Social, and Governance (ESG) investing.

3. Healthcare Innovation:

- The healthcare sector, especially companies involved in biotechnology, pharmaceuticals, and telemedicine, was attracting attention due to ongoing innovation and the global focus on healthcare.

4. Cryptocurrency and Blockchain:

- Interest in cryptocurrencies and blockchain technology continued to grow, with some investors diversifying their portfolios into digital assets.

5. Remote Work and Technology Solutions:

- Companies providing solutions for remote work, digital collaboration, and cybersecurity were benefiting from the shift towards more flexible work arrangements.

6. Global Economic Recovery:

- Markets were influenced by efforts towards global economic recovery, with attention on economic indicators, stimulus measures, and central bank policies.

7. Volatility and Uncertainty:

- Despite positive trends, there was ongoing volatility and uncertainty, influenced by factors such as the COVID-19 pandemic, geopolitical events, and economic data releases.
-

CONCLUSION

In conclusion, the incorporation of Artificial Intelligence (AI) into the stock market has undergone a revolutionary transformation in financial trading and investment practices. AI technologies, including machine learning algorithms and predictive analytics, empower market participants to swiftly analyze extensive datasets, recognize patterns, and make decisions driven by data at unprecedented speeds. This has resulted in heightened operational efficiency, a decrease in human errors, and an overall improvement in the dynamics of the market.

Moreover, the integration of AI has spurred the emergence of algorithmic trading, where automated systems execute trades based on predefined criteria. This not only accelerates trade execution but also plays a pivotal role in fostering increased liquidity and refining overall market dynamics.

REFERENCES

1. Shock Events: The Impact of News Media and Communication Strategies on Listed Companies' Share Price - Fandella, Paola ; Ceccarossi, Guido Luigi - 2022
2. Share price reactions to advertising announcements and broadcast of media events – G Filbeck, X Zhao, D Tompkins...Managerial and Decision Economics - November 2008
3. The Analysis of World Events and Stock Prices - Victor Niederhoffer , The Journal of Business - , 1971 - The University of Chicago Press
4. A study on impact of quarterly financial result on stock price - Payal Nareshbhai Joshi, Nisarg Shah & others , 2019 JETIR March 2019, Volume 6, Issue 3
5. www.moneycontrol.com
6. www.nseindia.com



The Evolution of AI Applications in the Gaming Industry: Revolutionizing User Experience

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ABSTRACT: This article investigates the revolutionary impact of Artificial Intelligence (AI) in the gaming business, diving into its various applications and the evolution of user experiences. From AI-driven generative content generation to improved gameplay dynamics, customization, and cutting-edge visual aesthetics, the combination of AI with gaming has redefined industry standards. The story explores the impact of AI on gaming, including obstacles, future potential, and ethical concerns. As we explore the interface of AI and gaming, a compelling portrait emerges: one in which innovation and technology come together to create immersive, dynamic, and personalized gaming environments.



INTRODUCTION

In the ever-changing world of entertainment and technology, the gaming business is a trailblazer, constantly pushing the boundaries of innovation. Within this ever-changing world, Artificial Intelligence (AI) has emerged as a disruptive catalyst, transforming the gaming experience in ways previously inconceivable. As a powerful technology capable of imitating human-like intelligence and decision-making, AI has established a solid foothold in various aspects of gaming, profoundly affecting how games are made, played, and perceived. This article goes into the various applications of AI in the gaming business. Investigating its enormous impact on procedural content creation, gameplay dynamics, customization, visual aesthetics, and the overall desire for a more safe and engaging gaming environment. Join us on a journey into the virtual realms where AI and gaming meet, exposing a tapestry of innovation that has transformed the very essence of interactive entertainment..

Various roles of Artificial Intelligence in Video games

The gaming industry has been at the forefront of innovation, consistently pushing boundaries to enhance user experiences. Among the myriad of technological advancements, Artificial Intelligence (AI) has emerged as a game-changer, transforming the landscape of gaming in unprecedented ways. With its ability to simulate human-like intelligence and decision-making, AI has found extensive applications across various facets of gaming, redefining gameplay, immersion, and personalization for gamers worldwide.

AI-Powered Procedural Generation: One of the key areas where AI has made a significant impact is procedural content generation. Game developers leverage AI algorithms to generate vast, dynamic, and procedurally generated worlds, levels, terrains, and even narratives. This not only reduces



development time but also ensures unique and diverse gaming experiences with limitless possibilities. Games like "No Man's Sky" exemplify this approach, offering players an entire universe to explore, created algorithmically¹

- **Enhanced Gameplay and Realism:** AI's role in gaming extends to improving



non-player character (NPC) behavior, making in-game entities more intelligent and responsive. Machine learning algorithms enable NPCs to adapt to players' strategies, creating challenging and dynamic gameplay experiences. Titles like "The Last of Us Part II" utilize AI to render more realistic NPC interactions, fostering immersive storytelling and emotional depth.²



7. **Personalized Gaming Experience:** AI-driven personalization has become a cornerstone of modern gaming. Through data analytics and machine learning, gaming companies analyze player behavior to tailor in-game experiences. This includes recommending content, adjusting difficulty levels, or offering personalized challenges, enhancing user engagement and retention. Platforms like Steam and PlayStation Network use AI to curate game recommendations based on players' preferences and gaming history.³



- **AI-Powered Visuals and Graphics:** AI has revolutionized graphics rendering, enabling developers to create stunning visuals and realistic environments. Technologies like NVIDIA's DLSS (Deep Learning Super Sampling) use AI to upscale lower-resolution images in real-time, delivering sharper and more detailed graphics without compromising performance. This technology significantly enhances visual fidelity in games like "Cyberpunk 2077" and "Death Stranding."⁴



- **Fraud Detection and Player Safety:** AI algorithms play a vital role in ensuring fair gameplay by detecting cheating, fraudulent activities, and toxic behaviors within gaming communities. By analyzing patterns and anomalies in player behavior, AI systems can swiftly identify and mitigate cheating instances, creating a safer and more enjoyable environment for all players.⁵
- **Future Prospects and Challenges:** As AI continues to evolve, its impact on the gaming industry is poised to grow further. Advancements in AI-driven procedural generation, enhanced realism through neural networks, and the integration of AI-powered virtual assistants for in-game guidance are just a few areas of exploration. However, ethical considerations, such as data privacy, AI biases, and the balance between AI-driven challenges and player enjoyment, pose challenges that developers must navigate as they embrace AI technologies.⁶



PAST, PRESENT AND FUTURE

Artificial Intelligence have been used in computer-based games since 1950s. Nim (1951) was a turn-based games in which the AI has been stated to win frequently against human-players. Early versions of chess and checkers in 1950s and 1960s also utilized AI as game mechanics. In 1970s, “Space invaders” made use of dynamic difficulty level, and in 1980s “Pac-man” gained mainstream success for its gameplay where the player guides the entity through mazes. Dragon Quest 4 in 1990s allowed players to set the AI battle interaction of supporting characters to generate optimal strategies for success and experimentation regarding battle strategies. The popularity of sports games in 1980s and 1990s cab be accounted to the better implementation of AI in those games, ultimately leading to enhanced immersion and recreation. The video games in early 21st century like – Half Life 2, S.T.A.L.K.E.R, Halo, StarCraft 2and Gears of War, introduced new mechanics in games like cover-based shooting, co-ordinated attacks by enemy AI and better response to situation by allied NPCs controlled by AI. Modern video games like “Shadow of War” make use of “Nemesis System” governed by AI, where the NPCs remember the earlier actions done by the player and react accordingly. Other modern games like – Red Dead Redemption 2, Bioshock Infinite, Alien: Isolation are renowned for brilliantly implemented AI within their game world.

CONCLUSION

In conclusion, AI's integration into the gaming industry has revolutionized how games are created, played, and experienced. Its applications span across various aspects, from enhancing visuals and gameplay to delivering personalized experiences. As technology advances, the synergy between AI and gaming will continue to shape the future, promising more immersive, diverse, and engaging experiences for gamers worldwide.

REFERENCES

1. Togelius, J., & Nelson, M. J. (2010). Procedural Content Generation in Games. A textbook providing insights into procedural content generation
2. Liapis, A., Yannakakis, G. N., & Togelius, J. (2013). Sentient Sketchbook: Computeraided Game Level Authoring. Research on adaptive game design and NPC behaviour.
3. Nacke, L., Drachen, A., & Goebel, S. (2011). Towards determining the optimal difficulty level in video games. A study on personalized difficulty levels.
4. NVIDIA Deep Learning Super Sampling (DLSS) documentation for technical details on AI-enhanced graphics.
5. Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining “gamification”. Research on player safety and anti-cheating measures.
6. Yannakakis, G. N., & Togelius, J. (2018). Artificial Intelligence and Games. A comprehensive book discussing AI applications in games and future directions.



AI in Healthcare

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ABSTRACT: Artificial intelligence has become one of the most significant part in our day to day life. The emergence of AI has transformed the health care field innovative making it efficient for both the doctor and the patient. In the case of diagnostic imaging, AI can identify patterns and other indicators, improving it appearance and speed. In terms of patient care AI is definitely playing vital role providing the doctors with real time data of the patient which place a major role. The application of robotics system in the hospital which enhanced various healthcare processes like using 3D visualization and advance instruments to perform minor surgery. While this AI technology holds immense potential there are still many challenges and advancements that are addressed. As this technology updates AI in healthcare makes it personalized and patient centered care.

KEYWORDS: Healthcare, Patient, Real-time data, Personalized, Patient centered, Hospital.

INTRODUCTION

In healthcare AI has increased the accuracy and the availability of data. The implication of artificial intelligence in healthcare sent a great impact across the healthcare system globally. There is an active discussion where doctors will be replaced by AI doctors in the future. This AI system is widely implemented in the field of diagnostic, decision support system, patient care monitoring, robotics, personalized medicine, drug discovery, clinical trials, surgery etc., Here in the case of artificial intelligence we have both advantages and disadvantages implementing them. The application of AI health care is not futuristic topic as the present reality is replacing and experimenting them in the field of healthcare.

Historically, healthcare is way more intense process which is carried forward with lots of limitations. As the emergence of clinical data, the processes have become much more efficient. After the implementation of artificial intelligence in healthcare, these algorithms have created personalized treatment plans out looking all the traditional practices.

SCOPE

AI in healthcare has a wide range of potential which significantly impact on the various aspects of healthcare system. Here are some of the places where AI is widely developed,

Diagnostic and imaging- AI is used in the place of X-Ray and scans where the accuracy and early reduction and diagnosis are taken place.

Treatment and personalized medicine- AI is widely used in the drug discovery process which helps in finding the components faster and accurate, at the same time its cost efficient and less time consuming.

Administrative work- Since, AI software is used in the hospital's site. Booking for the appointment and answering queries are made by AI themselves which makes the process quick and easy accessible.

Robotics in surgery- As the use of AI is rapidly increasing the introduction of AI robots to perform minimal surgery is enhancing the surgical outcomes.

DIAGNOSTICS

The application of AI in diagnosis provides great advantage to both the patient and the doctor. As the health care system is changing rapidly, the doctors and the specialist are constantly facing new challenges and responsibilities. AI in diagnosis paved much more advantages like, the medical specialist are limited and are not available for 24 / 7 but AI can do the diagnosis and the outcome will be much more accurate. This AI is used in the diagnosing process where the identification of the disease is much more easier The AI can be so accurate where the X-ray and scans are precise, and the disease affected area can be treated quickly and effectively this diagnostic system are operated by the doctors manually despite the potential shown by the AI components in diagnosis until today, through the algorithms that use to identify various disease.



DECISION SUPPORT SYSTEM

In healthcare the introduction of AI in the decision support system has great potential in significantly enhancing the clinical decision making and empowering the patient's outcome. The decision support system supports the diagnostic through the AI powered CDSS assist health professionals in diagnosing the disease by the patient data, and other medical reports. CDSS provides treatment recommendations by analysing the patient records. The AI helps in risk prediction. the AI algorithm analysis the patients data and predicts the risk involved in the health condition or the outcome of taking up the treatment .the decision support system in AI personalised the medication for the patient based on their health condition. Since the radiology and imaging are accurate it is easy for the doctors to analyse the patient condition more precisely. The integration of AI in decision support system in healthcare develops the ability of professionals to make clear decisions leading to better patient care.

PATIENT CARE MONITORING

AI plays a pivotal role in patient care monitoring, where it enhances the quality of healthcare provided to the patient. The patient care monitoring is done through small device that are wearable. This monitors the patient's vital signs to make sure that the patient is recovering properly. AI can identify diseases quickly so the treatments can be provided before any complication arises. Using the AI system the patient's medicinal intake are being watched and are reminded if they forget to take them. The chat bots and virtual health assistant provide answers to all the queries that are raised by the patient. The AI facilitates the patient by reminding them to take up the regular checkups and keep track on their condition. AI-driven patient care monitoring helps in finding early complications of health and also provides the patient with the best level care.

ROBOTICS

Here, Robotics refers to the implementation of robotic technology with artificial intelligence to improve the healthcare system. Now a day's robots are used in minor surgery's which are guided and monitored by the doctors themselves. The robots can perform the surgery more minutely and the success rates are much larger. These robots are used in patient rehabilitation process where the patient details are feed to the robot and helps in examining the patient's condition and facilitates the communication between the doctor and the patient. The virtual reality robot nurses are used in the hospitals for queries. The robotic dispensary system helps in dispensing the medication for the patient. The development of AI in robotics which are rapidly increasing especially in the field of healthcare.

PERSONALISED MEDICINE

Medicines play a significant role in a patient's health and well being. AI algorithm analysis the data to identify the various causes that is associated with the disease. The AI models analyse the combinations of data's that are used to predict the risk of developing disease. The development of personalized health apps which can be controlled through mobile phones allows the patient to monitor their medical data. The introduction of AI in personalized medicine holds the potential to improve the patients treatment efficiently and reduces the after effects the AI algorithm make sure that all the patient details are safe.

DRUG DISCOVERY

The AI has become so competent in the field of drug discovery and replacing the traditional method of drug discovery. The AI algorithm is capable of predicting the 3D structure of protein, the identification of molecular particles and studying of genetic mutation are being recorded by the AI. This helps in the identification of the drug in an efficient way. This can also study the after effects of that particular drug and the AI can identify the existing drugs that are found on different molecules. The component screening and designing are done using the AI driven virtual screening to analyse the vast database and identify the components binding. These data's are shared among researchers and pharmaceutical companies to increase the production of drug.

LIMITATIONS

While the AI in health care system of first numerous advantages there are few disadvantages that are to be noted and should be improved



- The privacy of the patients' data is crucial the use of AI involves a huge amount of privacy and security.
- Some AI models are highly specialised in specific task this makes them lack the ability to generalize well across different patients.
- The implementation of AI cost high and the resources are intensive.
- As the domination of AI increases, the over reliance of technology increases which leads to less human interaction with the patient.
- As the jobs are taken over by AI robots and software this situation potentially leads to job displacement.

FINDINGS

As the domination of AI in the field of healthcare is increasing rapidly, it is important that all the researches are still continued,

- The AI in healthcare improves the diagnostic accuracy. The AI has the ability to analyse the images like x-ray and scans. It accurately finds the place which is affected.
- AI has come up with personalized treatment planning that is patient centric.
- The implementation of AI in the administrative process which made the billing and appointment booking much more easier and the queries that are asked by the patient are answered immediately by the AI robots.
- The predictive molecules helps in finding the after effects and the risks of the complications that are suffered by the patient.
- The remote patient monitoring system has enabled the professionals to monitor the patient in real -time and make sure that the patient's condition is manageable.
- The drug discovery has accelerated the identification of drug. The use of AI algorithm helps in identifying the molecules and database which reduces the time and cost of the drug and helps in manufacturing new drug to the market.
- The decision support system helps the professionals in providing recommendation and assists with various treatments and diagnosis.
- AI algorithm collects all the patients' record and helps the patient by reminding them to take their medicine or to visit the hospital.
- The AI in healthcare has been patient centric and the invention of AI robots has efficiently improved the accuracy of the treatment.

CONCLUSION

In conclusion the implementation of artificial intelligent AI holds a great transformation in the health care industry. It also increases the outcomes and enhances the operational efficiency the AI in healthcare has successfully lead its path on diagnostic, personalized medicine, drug discovery, and patient care monitoring. The AI algorithm has the ability to analyse vast amount of data and provides, predictive insights. However, there are many challenges that are faced by the changes the privacy and security concerns. The careful consideration of the recommendations and the clinical test before the usage of drugs etc., as this field is developing day by day the balance between the doctors and the continuous evolution of the AI, ongoing researches, and collaborations are essential. Finally, the AI in health care will depend on the technology advancement by facing all the challenges and outcomes. The AI in healthcare is implemented for patient centric care.

REFERENCES

1. Artificial intelligence in healthcare: past, present and future, Fei Jiang, Yong Jiang, Hui Zhi, Yi Dong, Hao Li, Sufeng Ma, Yilong Wang, Qiang Dong, Haipeng Shen, Yongjun Wang
2. The Quality and Utility of Artificial Intelligence in Patient Care, Kai Wehkamp, Michael Krawczak, Stefan Schreiber
3. An AI-based Decision Support System for Predicting Mental Health Disorders, Salih Tutun, Marina E. Johnson, Abdulaziz Ahmed, Abdullah Albizri, Sedat Irgil, Ilker Yesilkaya, Esma Nur U, Tanalp Sengun, Antoine Harfouche
4. Artificial intelligence in disease diagnostics: A critical review and classification on the current state of research guiding future direction, Milad Mirbabaie, Stefan Stieglitz, Nicholas R. J. Frick
5. Applications of Artificial Intelligence (AI) in healthcare- Mohammed Yousef Shaheen



A Study on Artificial Intelligence in Logistics

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ABSTRACT: This research explores the transformative impact of artificial intelligence (AI) on logistics, delving into its applications, benefits, and challenges. Emphasizing the paradigm shift brought about by Industry 4.0, we investigate how AI, alongside automation and IoT, redefines manufacturing and supply chain dynamics. Objectives encompass checking inventory levels, implementing route optimization, and tailoring customer recommendations. AI's role in reducing working pressure is examined, showcasing its automation of tasks, decision-making support, and stress reduction in logistics operations. The study underscores AI's role in streamlining logistics functions, from order processing to last-mile delivery, emphasizing its increasing importance in the fast-paced business environment. The paper details benefits, including improved efficiency, cost-effectiveness, and real-time tracking, while acknowledging challenges in strategic alignment and data management. Looking forward, the future of AI in logistics envisions advancements in chatbots, risk management, dynamic pricing, and environmental impact analysis. This comprehensive exploration aims to contribute valuable insights to the evolving landscape of AI in logistics.

KEYWORDS: Artificial intelligence, Logistics, Customer satisfaction

INTRODUCTION

The digitization of everything is becoming a tangible reality with the integration of automation, artificial intelligence, IoT, and machine learning, providing unprecedented volumes and types of data for analysis. Brian Householder, President and COO of Hitachi Vantara, emphasizes the challenge of transitioning to the next phase, transforming our thinking, training, and work processes to extract value from advanced technologies. Industry 4.0 revolves around connectivity, where devices in a capable factory are interconnected, providing real-time data from numerous sensors to human interfaces. This interconnectedness allows people to access data at any time, marking a significant shift in manufacturing paradigms. Most automotive manufacturers and suppliers have willingly embraced Industry 4.0, anticipating higher profitability. According to Automotive World, sensors play a crucial role in the supply chain, with Bosch achieving a 25% production increase for automatic brake stabilization and electronic stability programs through the implementation of smart, interconnected wires.

OBJECTIVES

- To check the stock levels in Inventories and helps to maintain a record correctly.
- Implementing route optimization for delivery fleets and tailoring personalized customer recommendations based on their previous purchase histories are essential components of enhancing operational efficiency and fostering individualized shopping experiences.

THE UTILIZATION OF AI IN LOGISTICS

- To track the stocks in warehouse.
- Maintaining employers information.
- Helps to reduce the working hours of workers and working pressure.
- To maintain the accurate measures of stocks.

REDUCING WORKERS PRESSURE USING AI IN LOGISTICS

Artificial intelligence (AI) plays a pivotal role in alleviating the working pressure of professionals in the logistics industry. By automating repetitive tasks, such as data entry and paperwork, AI enables employees to redirect their focus toward more complex and strategic aspects of their roles.

The use of AI algorithms for decision-making processes aids logistics professionals by analyzing extensive datasets, reducing cognitive load, and improving the overall quality of decisions. Additionally, AI contributes to stress reduction through the optimization of delivery routes, minimizing the challenges associated with time-sensitive deliveries and unexpected disruptions.



AI's impact extends to inventory management, where predictive analytics helps forecast demand patterns, optimize stock levels, and automate reorder processes. This proactive approach ensures a smoother workflow and diminishes the stress related to stockouts or overstock situations. Predictive maintenance, another AI application, aids in preventing equipment breakdowns by anticipating maintenance needs, thus reducing unplanned downtime and the associated stress of sudden operational disruptions.

Moreover, AI enhances customer service by employing chatbots and automated systems to handle routine inquiries, allowing logistics professionals to address more complex customer issues. Real-time monitoring facilitated by AI ensures quick responses to operational issues or changes in the supply chain, offering a proactive solution that diminishes the stress linked to reacting to unforeseen events. In essence, AI in logistics not only streamlines operations but also contributes significantly to stress reduction by automating tasks, improving decision-making processes, and enhancing overall efficiency.

ROLE OF AI IN LOGISTICS

AI in logistics streamlines operations across order processing, inventory management, and distribution, aiming to enhance customer experience. Automation of routine tasks reduces costs, improves efficiency, and elevates customer service. Real-time tracking in ecommerce logistics enhances overall customer satisfaction. AI expedites data analysis, aiding businesses in making informed decisions and enhancing operations. Its ability to process large datasets allows for creating forecasts in intralogistics. Optimizing warehouse operations, such as item placement and picking routes, is achievable through AI. The use of AI is increasingly essential in today's fast-paced business environment. However, not everyone in the logistics sector is ready to adopt AI strategies, as indicated by research findings. It optimizes warehouse functions, like item placement and picking routes, contributing to overall operational improvement. Despite its increasing importance, research indicates varying readiness within the logistics sector to adopt AI strategies.

BENEFITS OF AI IN LOGISTICS

AI technology has revolutionized the logistics sector, offering companies improved performance and cost-effectiveness. By leveraging AI-driven solutions, automated processes reduce manual labor and optimize operations, leading to heightened efficiency and potential cost savings. The application of AI extends to real-time shipment tracking, instant customer support through chatbots, and enhanced decision-making in supply chain management.

However, despite the substantial benefits, businesses need to carefully navigate challenges associated with AI implementation. Considerations such as data privacy, infrastructure compatibility, and seamless integration with existing systems are crucial for fully harnessing the advantages that AI brings to logistics.

- Route Optimization
- Demand Forecasting
- Inventory Management
- Enhanced Visibility
- Warehouse Automation
- Last-Mile Delivery Optimization
- Predictive Maintenance
- Customer Service
- Dynamic Pricing
- Risk Management

CHALLENGES IN AI LOGISTICS ADOPTION

Despite the evident benefits of incorporating AI into various stages of the logistics process, such as demand forecasting, supply chain management, fulfillment, and last-mile delivery, numerous businesses confront challenges that serve as barriers to the widespread adoption of AI technology.

- **Strategic and Operational Hurdles:** Companies often face difficulties in aligning AI implementation with overall strategic goals and incorporating it seamlessly into existing operational processes.
- **Process Clarity and Governance Structures:** Ambiguity in defining clear processes and establishing robust governance structures poses a significant challenge. This includes determining how AI fits into existing workflows and decision-making frameworks.
- **Decision-Making on AI Focus Areas:** Businesses must grapple with decisions regarding where to prioritize AI applications for maximum impact. Identifying specific areas within logistics that can benefit the most from AI requires careful consideration.



- **Data Types and Interfaces (APIs):** Ensuring the availability and compatibility of necessary data types is crucial for effective AI implementation. Additionally, establishing interfaces such as APIs is essential for seamless integration with existing systems.

FUTURE OF AI IN LOGISTICS

- **Chatbots for Customer Service:** AI-powered chatbots are used for instant and efficient customer support, handling inquiries, tracking shipments, and providing information on demand.
- **Risk Management:** AI analyzes data to identify potential risks in the supply chain, such as disruptions due to weather events, geopolitical issues, or supplier-related challenges. This allows companies to develop proactive risk management strategies.
- **Dynamic Pricing:** AI helps in dynamically adjusting pricing based on various factors such as demand, competitor pricing, and market conditions. This enables companies to optimize revenue and profitability.
- **Order Fulfillment:** AI is used to optimize order fulfillment processes, including order picking and packing. This ensures faster and more accurate order processing.
- **Cognitive Document Processing:** AI technologies, including natural language processing (NLP) and machine learning, are employed for processing and extracting information from documents, invoices, and other paperwork, reducing manual data entry tasks.
- **Environmental Impact Analysis:** AI is utilized to analyze and optimize logistics operations with a focus on reducing environmental impact. This includes optimizing routes for fuel efficiency and exploring sustainable transportation options.

CONCLUSION

the integration of artificial intelligence (AI) in logistics marks a transformative era, enhancing efficiency and customer experiences. The paper highlights AI's role in route optimization, demand forecasting, and inventory management, addressing objectives such as accurate record-keeping and personalized recommendations. AI's utilization in tracking warehouse stocks, reducing working hours, and maintaining precision underscores its multifaceted impact. By automating repetitive tasks and improving decision-making, AI not only streamlines operations but significantly reduces workers' pressure. While AI benefits in real-time tracking, dynamic pricing, and predictive maintenance are evident, challenges in strategic alignment, process clarity, and data management persist. The future of AI in logistics holds promises in chatbots, advanced risk management, dynamic pricing, and environmental impact analysis. The paper concludes that successful AI implementation requires a holistic approach, addressing technical, organizational, and ethical considerations. The evolving logistics landscape will witness ongoing innovations, positioning the industry for resilience and competitiveness amid dynamic market demands. The journey towards a fully digitized and AI-driven logistics ecosystem signifies a paradigm shift with transformative potential for the industry's future.

REFERENCES

1. Data Analytics and Artificial Intelligence for Inventory and Supply Chain Management (2022) by Dinesh K. Sharma, Madhu Jain
2. <https://www.ilsccompany.com/ai-in-logistics/#bestpracticesforimplementingaiinlogistics>
3. <https://en.codept.de/blog/5-ways-to-use-artificial-intelligence-in-logistics>



A Study on Artificial Intelligence in Banking

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ABSTRACT: This research primarily focuses on AI in the banking sector where Artificial Intelligence has significantly impacted leveraging digital technology. It stands as one of the latest trends adopted by banks. AI's applications in banking encompass enhancing customer experience, bolstering cybersecurity, detecting fraud, deploying chat-bots, tracking market trends, managing risks, and conducting productive analyses. Moreover, AI aids in improving the efficiency of banking operations, reducing the workload for bank employees, and providing accurate data. It also helps in reducing customer wait times. Overall, this research aims to provide insights into the profound implications of AI adoption in reshaping digital technology within the banking domain and shaping the future of financial services.

KEYWORDS: Artificial intelligence, cybersecurity, customer experience

INTRODUCTION

The explosive growth of artificial intelligence has led to computer systems capable of performing complex tasks historically only done by humans, such as reasoning, decision-making, and problem-solving. Artificial intelligence is a trans-formative technology that can significantly impact various industries, including banking. It plays a vital role in the finance sector. Artificial intelligence has the potential to detect fraud, mitigate uncertain risks, and help manage regulatory compliance.

In India, there are many banks that use artificial intelligence, such as State Bank of India, Bank of Baroda, HDFC Bank, and ICICI Bank.etc. Banks is projected to reach \$64.03 billion by 2030, growing at CAGR of 32.6% from 2021 to 2030

OBJECTIVE

- ✓ To gain a deeper knowledge of AI application in the banking sector.
- ✓ To understand the positive and negative in artificial intelligence in banking industries.

THE UTILIZATION OF AI IN BANKING SECTOR

- The ample challenges in the banking sector.
- Its increase the efficiency of the personnel.
- Lessen the workload.
- To enhance banking returns.
- To organize precautionary measures.
- With the use of modern techniques, visualization can be used to expand human

WHAT IS ARTIFICIAL INTELLIGENCE IN BANKING SECTOR

Cutting-edge technologies have seen ground-breaking advances in the banking industry in recent years. Expansion of the industrial landscape to encompass retail, Information Technologies, and telecommunications has been undertaken by banks to facilitate the provision of mobile banking, e-banking, and real-time money transfer services.

The utilization of cognitive technology alongside AI allows banks to benefit from digitization and compete with agile Fin tech companies. The National business research institute and narrative conducted research showing how banks benefit from digitization and compete with agile fin-tech companies by utilizing cognitive technology alongside AI, services such as Voice Recognition and Predictive Analytics are already being used by almost 32% of financial service providers. Banking apps are sought after for various reasons such as heightened competition in the banking sector a drive for process - driven services and increased consumer demands for more customized experience. Solutions, enhancing employee productivity, and envisioning the expansion of Human work capabilities the use of software robotics, the creation of operational efficiencies, the facilitation of effective decisions and actions, and much more.



WHY IS ARTIFICIAL INTELLIGENCE BEING USED IN BANKING

Technology is the face of this generation, with an increasing demand for solutions to all the problems encountered by this generation. Answers are sought at the tip of their fingertips. Queries are addressed by a machine or a human relations manager on the other side of the screen.

Big data is considered the optimal choice now, and efforts are being made by every company to extract as much information as possible from unstructured data banks. The Fin-tech domain has already been transformed by big data applications in Artificial Intelligence.

Artificial Intelligence is now a reality. Exploitation of this data to improve client relations in the finance and banking industries is being embraced, not only by using the benefits of AI in extracting and organizing the available data.

BENEFITS OF AI IN BANKING SECTOR

Customer satisfaction, an important requirement not only for the banking industry but for all industries, is expected by every customer. Personalized and timely services are anticipated from the bank, Artificial Intelligence aids the bank not only in increasing revenue but also in making faster decisions and maintaining healthy client connections.

Chat bots: Have you ever engaged in a chat with the bank by utilizing chat bots This AI utilizes Natural Language Processing to provide relevant answers to different Customer inquiries. Chat bots are essentially automated conversation programs that operate automatically or follow a pre -determined course. In the banking industry, chat bots are now being utilized to offer consumers a 24/7 service experience.

Fraud Detection: Banking fraud, one of the most feared topics among the public due to the difficulty in recovering monetary losses, can be significantly reduced by the banking industry through extensive use of Artificial Intelligence.

FUTURE OF AI IN THE BANKING INDUSTRY

Digital technology has an impact on nearly every industry, altering not only industries but also the operational methods of businesses. Options are being analyzed, and strategies are being implemented by every industry to thrive in this tech-driven world.

In today's scenario, digitization in every country has led to continuous growth in the number of customers in the banking sector. The pressing question arises: how can the banking sector assist more customers without escalating workforce expenses

Matching the unique demands of customers poses a challenge for industries. Customers of today have exceedingly high expectations. They are digitally sophisticated and anticipate a pleasant and comfortable customer experience from industries, a similar expectation held for the banking sector.

To meet customer expectations, the banking sector has extended its reach into retail, IT, and telecom fields to offer services such as mobile banking, e-banking, and real- time money transactions. These advanced features enable customers to access banking at their fingertips, albeit at a cost to the banking industry.

The involvement of IT, telecom, and retail has raised the likelihood of confidential information being transferred over virtual networks. Sometimes, this leads to cyber- attacks and fraud within the banking sector. Such fraud not only impacts the bank in terms of funds but also affects people's trust.

In the banking industry, the primary objective of artificial intelligence is to assist consumers by prioritizing their choices. Consumers' satisfaction with the bank's services is ensured by Artificial Intelligence. AI or machine intelligence supports the banks in its operation

ARTIFICIAL INTELLIGENCE CHALLENGES IN THE BANKING

Confusion exists among many banks regarding the decision to upgrade or adapt to new methods. Traditional methods have standardized the banks with fixed processes, posing a challenge for certain



locations in tier two and three cities across the country.

Banks employing artificial intelligence on a larger scale are obligated to adhere to government regulations. Privacy regulations govern increased services like net banking and online transactions, mandating compliance by the bank.

Moreover, there is a significant deficiency in training among the current workforce concerning advanced technologies and the utilization of artificial intelligence in banking. As artificial intelligence gains popularity, a strong number of qualified workers are required. Experts specializing in domains like data science and machine learning are essential to lend credibility to the available data.

ARTIFICIAL INTELLIGENCE ROLE IN BANKING

Personalized Finance Guidance: Clients can make quick and accurate financial decisions with the assistance of artificial intelligence in finance, as it presents them with the most up-to-date market information. It can be assumed that customers can be assisted with personalized financial guidance by AI.

Digital Wallets: The digital money movement has undoubtedly been propelled to new heights by digital wallets. Anything can be purchased online by customers by simply submitting their cellphone number or a unique one-time password (OTP) which is a unique feature of digital wallets.

The company contacts customers using an interactive voice response system (IVRS). The primary objective of this application is to offer customers an excellent banking experience by accurately addressing their inquiries.

CONCLUSION

The satisfaction of clients or consumers in the Banking and Financial Services sector has been found to be met by Artificial Intelligence applications. There is good awareness among Banking and Financial Services consumers about the applications of Artificial Intelligence. The highest adoption in applications was seen in Banking and Financial Services AI, followed by KYC/AML, Chat bots, and Security Compliance, aiding in fulfilling customer demand more swiftly and easily. Representatives in banking and financial services are expected to show more commitment by receiving innovative training to enhance the AI procedures in the workplace. Additionally, it is utilized to meet regulatory compliance, detect fraud, and assess individual creditworthiness.

REFERENCES

- 1) Bonnie G. Buchanan, P.F (2019 APRIL) Artificial intelligence in finance retrieved 5 22 ,2023 from The Alan Turing Institute .
2. <https://hashstudioz.com/blog/future-of-artificial-intelligence-in-banking-financial-industries/>
3. <https://www.mdpi.com/2071-1050/15/4/3682>



A Study on How AI Enhances the OTT Movie Streaming Experience for the Audience

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ABSTRACT: The movie viewing pattern of the audience has transformed from traditional multiplexes to over-the-top (OTT) Platforms. The audience finds OTT platforms more convenient as the viewer has the freedom to choose his own content and has the comfort to watch the content in his own free time. The usage of viewing content on mobile phones has increased so tremendously that people have started paying subscriptions for OTT on a regular basis. Newly released movies on multiplexes are reaching the OTT platforms in such a short time that there is a separate fan base waiting exclusively for the OTT release. Since content has become the king, many new companies are making huge investments in starting new OTT platforms. Artificial Intelligence (AI) is changing the way audiences consume movie content on OTT platforms like Amazon Prime, Netflix, and Hotstar, benefiting both users and platform owners. The user experience in the OTT space is dramatically improving, which makes them visit the OTT platforms repeatedly. The advantage of using AI is that it creates personalized content for the audience based on their previous watch and search history. Making personalized content retains the existing audience as well as bringing in new ones based on their recommendations. This research paper tries to identify the impact of AI in streaming movies on the audience. This paper has reviewed many studies that discuss how AI enhances the OTT movie streaming experience for the audience. This review paper will improve the existing knowledge and give an in-depth perspective in the area of how AI is used for streaming movies on OTT platforms.

KEYWORDS: Artificial Intelligence (AI), Over-the-Top (OTT), movie streaming, personalized content

INTRODUCTION

The aim of the proposed study is to understand how AI enhances the OTT movie streaming experience for the audience. OTT services in India have become popular during and after the lockdown period. The movie-watching experience has transformed from television to mobile, especially after the increased bandwidth of mobile services. People prefer to watch on mobile devices rather than in television and cinema theatres. Predicting this, Netflix has allotted a global annual content budget of \$17 billion (Vidya, 2023).

Resnick. et al. (1994) state that the recommender system assists and augments the natural social process in order to provide a good movie streaming experience for subscribers with the best options and recommendations. Bennett & Lanning (2007) emphasize that since there is a lot of information on the web, it becomes difficult for consumers to search for and select the right content. It's important that streams of data are collected through algorithms that allow us to understand the recommender system better (Amatriain, 2013). Bennett & Lanning (2007) also claim that Netflix has understood the constant evolution of the recommender system and generated new AI algorithms to face market competition with other OTT players. Privacy issues are also a major concern in recommender system algorithms (Resnick. et al., 1997). However, Li et al. (2010) state that users are willing to disclose personal information for the tailored service. So recommender system has played a major role in increasing the time spent watching movies on OTT platforms as it fits the tastes of the audience (Tryon, 2015).

People's behaviour can be steered using modern science (Wilkinson, 2012); further, Schneider et. al. (2018) define digital nudging as persuasive technology that changes attitudes and behaviours that include aspects of human-computer interaction beyond interface design. The audience tends to be influenced by looking at how the design interface of the websites or apps is presented. Options like getting to watch from where they left and allowing them to skip the intro and go directly into the movie play a major role in spending more time to watch movies in OTT.

Awad & Krishnan (2006) state that OTT platforms have to constantly get information about their customers in order to improve their services and their designs. Aguirre, Roggeveen, Grewal & Wetzels (2016), personalization can have two different effects on customers. First of all, it could enhance their engagement with the firms, but the effect could also be the opposite and diminish the engagement.



HOW AI ENHANCES THE OTT MOVIE STREAMING EXPERIENCE: A REVIEW

This paper has reviewed many studies that discuss how AI enhances the OTT movie streaming experience for the audience. This review paper will improve the existing knowledge and give an in-depth perspective in the area of how AI is used for streaming movies on OTT platforms.

2.1 Personalized customer experience

The biggest advantage of using OTT is that customers have the ability to choose their own content to watch at their preferred times (Maddodi & K., 2019). Netflix has found that if subscribers are not able to find something within 90 seconds, they tend to move on to something that interests them. This is where the OTT platforms have started to design their own AI algorithms to deliver content based on the user's tastes. OTT platforms are profiling the users based on the people's psychological characteristics and behaviours in order to assess or predict their capabilities in spheres and assist in identifying the categories of people". Netflix's recommender system has increased audience watching time and allowed it to retain its users.

2.2 Uninterrupted viewing

Streaming services deliver massive amounts of data each second. Service interruptions are bound to occur. Providers can facilitate data traffic flow by using AI techniques to parse data on what users are streaming and where to expect service spikes. For example, algorithms can determine when to cache websites on regional services for faster load times. Predictive analytics rely on AI methods to identify potential network problems before they occur (Logicwind, 2023).

2.3 Smarter, faster video indexing

Search engines on OTT platforms have started using AI and ML techniques to retrieve appropriate content for users. Results generated based on key search terms enable the audience to spend more time on the OTT platforms. AI indexing makes video content more discoverable and improves user engagement. AI indexing uses audio transcription and speaker recognition; auto-captioning gives a deeper understanding of emotions through a variety of cognitive services. (Galinna, 2019).

2.4 Intelligent encoding

OTTs use Dynamic Resolution Encoding (DRE) for streaming movies on their platforms. DRE encodes only frame rates that are necessary based on the scene. For example, talking heads can be encoded at thirty frames per second or lower without losing details, while live sports will be encoded at the appropriate frames per second at which they are captured. This enables us to reduce the computer load by thirty percent based on the content, and at the same time, file size is reduced without losing quality (Pennington, 2021).

2.5 OTT captioning

OTT platforms have evolved significantly, with AI now being used for video captioning. AI allows the OTT platforms to offer closed captions in different formats and different languages. AI tools can now review and revise the transcribed content done by the machines, which allows it to be more accurate and saves time for captioning in different languages (Peravalli, 2022).

2.6 AI speech recognition

The content on OTT platforms can now be accessed through voice commands, which will enhance the consumer experience. Like Siri and Alexa, the concept of using Natural Language Processing (NLP) in OTT allows the content to be accessed through voice commands. In the future, AI speech recognition will also be used in the viewing, production, and analytics of OTT platforms (Dandotia, 2023).

2.7 AI-recommended thumbnails

OTT platforms are also using AI-generated algorithms to produce compelling visual images used as thumbnails to increase viewership. Based on the past content choices of the audience, the thumbnails are created. This creates an opportunity for the OTT platforms to retain their audience by allowing them to choose the content based on their likes (Peravalli, 2022).

CONCLUSION

The viewership on OTT platforms is increasing day by day due to the constant evolution of the AI algorithms used. The interaction between the user and the OTT has become smarter, enhancing the viewer experience. The AI apps in OTT are growing in such a state that the concept of personalization is getting closer to the audience rapidly. The future of AI will create a huge impact in the OTT industry, surpassing theatre income, and play a huge role in improving the economy. OTT will be a major competitor, and AI will be the game changer in terms of how audiences consume content.



REFERENCES

1. Amatriain, X. (2013). Big & personal. Proceedings of the 2nd International Workshop on Big Data, Streams and Heterogeneous Source Mining Algorithms, Systems, Programming Models and Applications - BigMine '13. Published. <https://doi.org/10.1145/2501221.2501222>
2. Awad, N., & Krishnan, M. (2006). The Personalization Privacy Paradox: An Empirical Evaluation of Information Transparency and the Willingness to Be Profiled Online for Personalization. MIS Quarterly, 30(1), 13-28. doi:10.2307/25148715
3. Bennett, J & Lanning, S (2007), The Netflix Prize, Computer Science, Available at Proceedings of KDD Cup and Workshop 2007, San Jose, California
4. Dandotia, S (2023), How Artificial Intelligence Is Changing Content Creation And OTT Streaming, Indiatimes.com, Available at : <https://www.indiatimes.com/technology/news/artificial-intelligence-changing-content-creation-streaming-600354.html>
5. Gallina GR (2019), 4 ways AI can improve user engagement in OTT video services, Deltatre, Available at : <https://www.deltatre.com/insights/4-ways-ai-can-improve-user-engagement-ott-video-services>
6. Li, H, Xu, Heng, Sarathy, Rathindra (2010), Understanding Situational Online Information Disclosure as a Privacy Calculus, Journal of Computer Information Systems, Volume 51, Issue, 1.
7. Logicwind, (2023), AI for OTT Recommendation Engine, Logicwind, Available at : <https://blog.logicwind.com/ai-for-ott-recommendation-engine/>
8. Maddodi, S., & K, K. P. (2019). Netflix Bigdata Analytics- The Emergence of Data Driven Recommendation. SSRN Electronic Journal. Published. <https://doi.org/10.2139/ssrn.3473148> Pennington A (2021), AI Encoding Is Evolving (Everywhere), NabAmplify, Available at : <https://amplify.nabshow.com/articles/ai-encoding-is-evolving-everywhere/>
9. Peravalli, R (2022), How AI Is Transforming the OTT Experience, Streaming India, Available: <https://www.streamingmedia.com/Articles/ReadArticle.aspx?ArticleID=154060>
10. Resnick, P., Iacovou, N., Suchak, M., Bergstrom, P. & Riedl, J. 1994. Grouplens: An Open Architecture for Collaborative Filtering of Netnews. Proceedings of the 1994 ACM conference on Computer supported cooperative work, hlm. 175-186.
11. Schneider, Christoph & Weinmann, Markus & Brocke, Jan vom. (2018). Digital Nudging: Guiding Online User Choices through Interface Design. Communications of the ACM. 61. 67-73. 10.1145/3213765.
12. Tyron, C (2015), TV Got Better: Netflix's Original Programming Strategies and Binge Viewing, Media Industries, Volume 2, Issue 2.pp.104-116.
13. Vidya, S (2023), No reason why Netflix cannot acquire 100 mn subscribers in India over time: Ted Sarandos, Business today, Available at: <https://www.businesstoday.in/technology/news/story/no-reason-why-netflix-cannot-acquire-100-mn-subscribers-in-india-over-time-ted-sarandos-408737-2023-12-08>
14. Wilkinson, T. M. (2012). Nudging and Manipulation. Political Studies, 61(2), 341–355.



A Study on Cyber Security Influence of AI

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ABSTRACT: Imagine a world where cyber security defenses are not just reactive, but proactive. Where systems can analyse massive amounts of data, identify patterns, and predict cyber threats before they even happen. This is the power of Artificial Intelligence (AI) in cybersecurity. Artificial Intelligence (AI) has revolutionized the field of cybersecurity, empowering organisations to bolster their defenses against ever-evolving cyber threats. With the increasing complexity and volume of attacks, traditional security measures alone are no longer sufficient. AI brings a new level of intelligence and automation to the table. Moreover, AI can assist in predicting and preventing future attacks by analyzing historical data and identifying vulnerabilities in systems. It should be used in conjunction with other security measures and human expertise to achieve the best results. The collaboration between AI and human analysts can lead to more effective threat hunting, incident investigation, and decision-making. It is a game-changer in the field of cybersecurity. Its ability to analyze large datasets, automate processes, and continuously learn makes it a valuable asset in the ongoing battle against cyber threats. The power of AI, organizations can enhance their security posture and better protect their valuable assets.

KEYWORDS: Cyber threats, incident investigation, threat hunting, decision making, game changer.

INTRODUCTION

AI in cybersecurity it's all about using Artificial Intelligence to enhance security measures and protect against cyber threats. It's an exciting and rapidly evolving field that combines the power of AI algorithms with cybersecurity practices. AI can help in detecting and preventing cyber attacks, this can be sensitive data, governmental and industrial information, personal information, personally identifiable information (PII), intellectual property and protected health information (PHI). Cyber threats have become increasingly sophisticated, necessitating innovative approaches to cybersecurity. In response to the issues, artificial intelligence tools are commonly implemented to deal with cyber threats.

OBJECTIVES

- ▶ Enhancing threat detection: AI can help identify and analyse patterns, anomalies, and indicators of cyber threats in real-time, allowing for quicker and more accurate detection.
- ▶ Improving incident response: AI can automate and streamline incident response processes, helping security teams to respond promptly and effectively to cyber attacks.
- ▶ Vulnerability management: AI assists in identifying and prioritizing vulnerabilities, enabling proactive patching and mitigation.
- ▶ Authentication and access control: AI strengthens secure access mechanism, such as biometrics or behavioural analysis.
- ▶ Data protection: AI develops robust encryption algorithms and data protection measures to safeguard sensitive information.

TYPES OF WEB BASED CYBER SECURITY THREATS

These are the attacks which occur on a websites or web applications. While the types of cyber threats continue to grow, there are some of the most common and prevalent cyber threats are as follows:

Phishing: 80% Cybercriminals send malicious emails that seem to come from legitimate resources. The user is then tricked into clicking the malicious link in the email, leading to malware installation or disclosure of sensitive information like credit card details and login credentials.

Malware: It is malicious software, including spyware, ransomware, viruses and worms, which gets installed into the system when the user clicks a dangerous link or email. Once inside the system, malware can block access to critical components of the network, damage the system, and gather confidential information.

Ransomware: Ransomware is a type of malware attack in which the attacker locks or encrypts the victims data and threatens to publish or block access to data unless ransom is paid. Learning more about ransomware threats can help companies prevent and cope with them better.



Advanced Persistent Threats (APT): An advanced persistent threat occurs when a malicious actor gains unauthorized access to his system or network and remains undetected for an extended time.

Benefits of AI in Cybersecurity

- ◆ Continuous learning
- ◆ Improved efficiency
- Scalability
- Real-time monitoring Automated response

Drawbacks of AI in Cybersecurity

- x Adversarial attacks: Hackers can try to manipulate AI systems by feeding them malicious data or exploiting vulnerabilities, potentially by passing the AI defenses.
- x Privacy concerns: The use of AI in cybersecurity often involves analyzing large amounts of data, which raises privacy concerns and may require careful handling to protect sensitive information.
- x Lack of human intuition: AI systems may struggle to interpret context or understand the intent behind certain actions, which can limit their ability to make accurate decisions in complex situations.
- x Dependency on data quality: AI algorithms heavily rely on the quality and relevance of the data they are trained on. If the data is biased or incomplete, it may affect the accuracy and effectiveness of the AI system.
- x Cost and resource requirements: Implementing and maintaining AI-powered cybersecurity systems can be expensive and resource-intensive, requiring specialized expertise and infrastructure.

AI IN DIGITAL FORENSICS

1. Digital forensics is the process of collecting, analyzing, and preserving electronic evidence in order to investigate and prevent cybercrimes. It involves techniques like data recovery, network analysis, and forensic imaging to uncover digital evidence that can be used in legal proceedings.
2. Digital forensics helps in identifying and catching cybercriminals, as well as protecting individuals and organisations from cyber threats.

AI IN NETWORK SECURITY

1. AI has revolutionized network security by providing advanced capabilities to protect against cyber threats. One of the key areas where AI shines is in intrusion detection. Another significant advantage of AI in network security is its ability to perform behavioural analysis.
2. With AI-powered network security solutions, organisations can enhance their defenses capabilities, predict and prevent potential threats, and confidentiality of their networks.

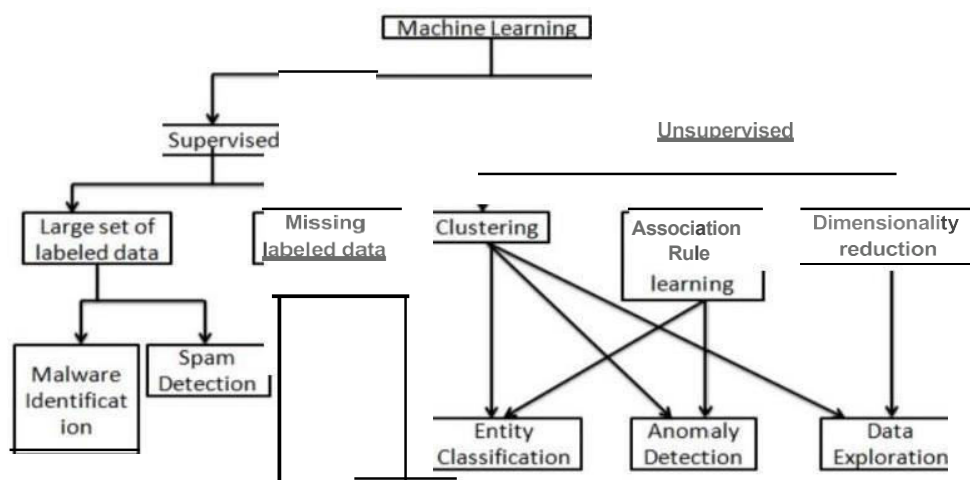
Machine Learning Applications in Cybersecurity

As cyber security threats are changing and developing constantly, immediate response is required and an automatic. Therefore, machine learning techniques, specifically deep learning that does not generally require prior experience or dependence on previous expert classifications may be particularly important as an implementation of cyber security AI approaches.

Machine learning applications offer several benefits in cybersecurity to their ability to analyze vast amounts of data and identify patterns that humans might miss. Another benefit is the ability of machine learning models to continuously learn and adapt. As new threats emerge, machine learning algorithms can update their knowledge and improve their accuracy in identifying and mitigating risks.

This automation helps reduce the burden on human analysts, allowing them to focus on more complex and strategic security tasks. It also provides faster threat detection, improved accuracy, and increased efficiency, making them valuable tools in protecting digital assets and networks.

To illustrate the practical impact of AI in cybersecurity, it's valuable to examine some real-world case studies.



Case Study 1: Threat Detection

In a large financial institution, AI-driven anomaly detection systems played a crucial role in identifying a sophisticated cyberattack. Traditional security measures failed to detect the attack's subtle patterns. However, AI algorithms, trained on historical data, recognized unusual behaviors in network traffic, enabling the rapid containment of the threat.

Case Study 2: Security Analytics

A multinational corporation with a sprawling IT infrastructure used AI-powered security analytics to streamline its incident response. By automating the initial analysis of security alerts, the company's security team could focus on more complex investigations. This not only reduced response times but also improved overall cybersecurity posture.

Case Study 3: Predictive Analysis

A government agency employed predictive analysis using AI to anticipate cyber threats. By analyzing historical attack patterns and vulnerabilities, the agency could proactively patch systems and bolster defenses. This pre-emptive approach prevented several potentially catastrophic cyber attacks.

These case studies highlight the tangible benefits of AI in cybersecurity across different sectors. From rapid threat detection to proactive defense strategies, AI is proving its worth in safeguarding critical systems and data.

Challenges in Implementing AI For Cybersecurity

- ◆ Skill Gap
- ◆ Data Quality and Quantity
- ◆ Cost
- ◆ Regulatory Compliance

Remedial measures for AI in Cybersecurity

Firstly, it's important to regularly update and maintain AI models to ensure they stay effective against evolving threats. This includes training the models with up-to-date data and refining their algorithms to improve accuracy.

Secondly, implementing a layered approaches to security is crucial. AI should be used as a part of a comprehensive security strategy that includes other technologies and practices such as firewalls, encryption, access controls and employee training.

At last, collaboration and information sharing within the cybersecurity community is key. By sharing knowledge, best practices, and threat intelligence, we can collectively strengthen our defenses against cyber threats and stay one step ahead.

AI techniques

- ϕ Machine Learning (ML)



- ϕ Natural Language Processing (NLP)
- ϕ Deep Learning
- ϕ Behavioral Analytics
- ϕ Predictive Analytics

CONCLUSION

Artificial Intelligence and Cybersecurity have become inseparable allies in the relentless battle against evolving cyber threats. AI stands as our vanguard in this endeavor, holding the potential to protect and empower us, but only if wielded responsibly and ethically. It is a testament to human ingenuity and an ever-expanding frontier of innovation. The symbiosis of AI and cybersecurity is a beacon of hope in the digital age, illuminating a path toward a safer, more resilient digital world for generations to come.

REFERENCES

1. AI in Cybersecurity - Prateek Dutta, Swagat M. Karve, Arpit Yadav. www.researchgate.net
2. AI and Cybersecurity: An Ever- Evolving Landscape - Kauser Jatoi.
3. The Importance of cybersecurity frameworks to regulate emergent AI technologies for space applications - Nebile Pelin Manti, Paola Breda, Nicola Boschetti, Tobias Rahloff. www.researchgate.net
4. Artificial Intelligence in Cybersecurity - Hadas Klein. www.cloudfront.net
5. AI in Cybersecurity: Pros and Cons. www.terrano vasecurity.com
6. www.linkedin.com
7. AI-Based Cybersecurity Threat Detection and Prevention -Tina Sharma
8. www.exterro.com
9. www.balbix.com
10. www.ibm.com
11. www.engati.com
12. www.orangemantra.com
13. www.scribd.com
14. AI in Cybersecurity- Mr. Antonio Carlo, Ms. Francesca Casamassima, Mr. Nicolo Boschetti. www.researchgate.com
15. Artificial Intelligence in Cyber Security - Rammanohar Das and Raghav Sandhane. <https://iopscience.iop.org.com>



AI AND MACHINE LEARNING IN CYBER SECURITY

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ABSTRACT: An independent person can't handle the complication of operations and the scale of information without substantial automation, which is to be utilized to secure cyberspace. Technology as well as software with traditional fixed implementations are challenging to build decision-making-logic in order to strongly safeguard against security threats. This form can be dealt with using machine simplicity and learning methods in AI. At present due to huge application of IOT, cyber attack is massively affecting all over the world. AI has shown models hopeful results in cyber security scrutinize the data through its decision making. AI-based techniques can provide efficient and powerful cyber defence tools to recognize malware attacks, networks fake message, where if the received person click the open the message at the time the cyber criminals will own the data of that person and spam emails, and data breaches, to name a few and to alert security incidents when they occur. When we come to know that there are many other used to solve the problem of Cyber security and from that, the machine learning is also used as an application in cyber security.

Artificial intelligence and machine learning in Cyber security

An independent person is not capable of handling the complications of several operations and the sheer size of information without the help of automation, which is to be utilized to secure cyberspace technology as well as software with traditional fixed implementation are challenging to build decision making logic in order to strongly safeguard against security threats. But before we dive into the applications of Artificial Intelligence and Machine Learning in Cyber security, Let us take a detailed look at what is cyber security.

Cyber refers to anything related to computers, information technology, and mainly the internet. Security refers to protection of data from individual systems or server containing multiple systems. Now a question might arise, "What/who is cyber security protecting the data from". The answer to that question is people called as "Black Hat Hackers" or "Cyber criminals" who use many different types of attacks and these attacks are often called as "Threat".

A Cyber Threat is an attack which will be focused on an individual system or a group of systems and the intent of this attack is to either disable the target system, take the service offline or get access to all of the files and take all the data which could be extremely valuable to the victim.

The Kill Switch was found many hours after the initial attack was started and it lead to a loss of 4 billion US dollars. The traditional Cyber Security will based on the response to an attack and rely on the static control of the security device and a manual input from an individual or a team of people, which is far more time consuming and very difficult thing to do.

Artificial intelligence and Machine Learning plays a really crucial role in Threat Detection, Behavioural Analysis, Predictive analysis, Phishing Detection Adaptive Security. Vulnerability Management, User Authentication

Threat Detection:

Artificial Intelligence and Machine Learning uses several techniques known as algorithms



which is used to analyze patterns and find any abnormalities and it does so in a vast datasets, which in turn helps to identify potential threats in a much quicker and efficient manner.

Behavioural Analysis:

Artificial Intelligence and Machine learning can learn and understand the difference between a normal user and their system's behaviour which makes it easier to identify any deviations from the usual activities of the user and analysis the suspicious activities that may correlate to a security threat.

Predictive analysis:

Artificial intelligence and Machine Learning is also capable of predicting vulnerabilities in a system and evolves attack methods by analysing data from the past and also analyses the trends of attacks and which in turn enables it to set up additional security measures.

Phishing Detection:

Phishing is a type of attack which involves the attackers using a e-mail, messages, or websites to trick people into revealing their personal information or sensitive information such as their credit card information etc,. Artificial Intelligence and Machine Learning can identify and block these types of malicious e-mails and messages by analysing the content of them and the user's behaviour.

Adaptive Security:

Machine learning deals with the ability of a machine to learn new things which inturn allows the machine to adapt and evolve based on the ever changing nature of cyber attacks, which ensures a robust defence mechanism.

Vulnerability Management:

Artificial intelligence helps in scanning and identifying every vulnerability of a system even a network of systems and the applications used by the specified systems to mitigate potential weaknesses.

User Authentication:

One of the best ways to overcome cyber attacks is having an authentication factor. Authentication ranges from a simple password to biometrics and behavioural analysis. The more secure the password or the mode of authentication the harder it is to break into the system. These are the basic roles of Artificial intelligence and Machine learning in Cyber Security

The Main task of the Cyber Security is different from the above mentioned as it involves, Maintaining Network Traffic, Checking the System logs, Constantly checking for any vulnerabilities and ensuring that the operating systems and software and all the applications used by the user are up-to-date with the latest of the security patches applied, Monitoring the Access and permissions given to a user to prevent unauthorised access and ensure the privilege lies to only the administrator.

Most of the attacks take place due to the user not being aware of the types of attacks. So, Threat awareness and Basic Security measures should be taught to the users for now, when we have full fledged Artificial intelligence and Machine learning in Helping the Cyber Security Sector, It might not be even necessary, but the awareness of the Capabilities of Artificial Intelligence would be mandatory. As the field of Artificial Intelligence develops, the ways of it being misused also



develops alongside it. Weaponized Artificial Intelligence is a threat that we still don't have any way of knowing when it comes to existence but usage of Artificial Intelligence in Cyber attacks by cyber criminals which could happen has already been predicted.

Chat GPT a very well know Large Language Model which is know for its conversational approach to user's request is also capable of writing code for any given situation but the accuracy of the code might not always be 100 percent and Chat GPT is known for giving false information sometimes and it is termed as LLP's Hallucination in which is gives false information and thinks that is the accurate information. This hallucination can lead to a theorized attack known as an "AI package hallucination" in which the user asks Chat GPT to create a package to solve a coding problem, Machine learning is used mainly due to its ability to adapt to any given situation and it does that by 2 methods which is specified by the ML implementor.

1. Supervised Learning
2. Unsupervised Learning

Supervised Learning and Unsupervised Learning:

Supervised Learning is defined by the use of labelled datasets to train algorithms that classify data is fed into the model, Supervised Learning helps organizations solve a variety of real-world problems at a large scale but Machine cannot learn without the intervention of a human by input of any kind as well as in Unsupervised Learning, it uses Machine Learning algorithms to analyse and cluster unlabeled datasets. These algorithms discover hidden patters or data groupings without the need for human intervention. Clustering is a data mining technique used to group unlabeled data based on their similarities and differences. Clustering algorithms are used to process raw unclassified data into groups represented by structures or patterns.

False Positive and Negatives:

Machine learning algorithms may produce false positives which is incorrectly identifying non malicious activities as malignant and missing the real malicious activities is called as False positives and False Negatives.

Limited Understanding of Context:

Machine learning might be able to learn how to prevent the security threats but it might not be able to understand why is has to protect against these threats and not able to understand the broader context of these events might make it harder to differentiate between benign and malignant behaviour

Dependency on Training Data:

Artificial intelligence and Machine Learning must have a knowledge base and it must be vast or else it is not worth to set up a automated security system, and failing to do so would result in lowered quality and usage of their trained data. Biased or incomplete or incorrect data may be made by the automated system due to low quality and low quantity of data available for training.

Interpreting Decisions:

Understanding why a decision was made by Artificial Intelligence or Machine Learning model can be really difficult, Lack of this transparency can be a struggle to build rapport with and explaining the security measures to the higher officials in a organization setting.

Complexity:

Setting up an Artificial Intelligence and Machine Learning Cyber Security System must be done with an individual who has specialized knowledge and expertise in this field. Any small organizations or large organizations that does not have access to such an expert might find it difficult or near impossible to set up on their own. [2]



CONCLUSION

In Conclusion, Cyber Security plays a vital role in safeguarding our digital assets from a multitude of threats and implementation and integration of advanced technologies such as Artificial Intelligence and Machine Learning has significantly improved the capabilities of organizations and individuals. From real-time threat detection to defence mechanisms set up against attacks, Artificial Intelligence and Machine Learning have become invaluable tools to humanity against cybercriminals. Even though machines are capable of doing everything us humans can do in case of systems, a human expertise remains paramount as interventions of humans are needed in case of improper results or incorrect decisions made by the machine.

The decision of whether Artificial Intelligence and Machine Learning is good or bad is made with err on side of caution as anything is possible in this day and age and once a good approach to Artificial Intelligence far more advanced than current ones that we use in a daily basis is found it would spread like a wildfire across the world and all types of exploits would be found and to counteract against these cyber criminals, Cyber Security Experts would be equipped with better countermeasures.

REFERENCES

- [1] Kantnosh Morovat and Brajendra Panda – 2020 “A Survey of Artificial Intelligence in CyberSecurity”- 2020 International Conference on Computational Science and Computational Intelligence(CSCI)
- [2] IBM Data and AI Team – 2023 “AI vs Machine Learning vs Deep Learning vs Neural Networks:What’s the difference?”
- [3] H. Manoharan, Y. Teekaraman, P. R. Kshirsagar, S. Sundaramurthy, and A. Manoharam, “Examining the effect of aquaculture using sensor-based technology with machine learning algorithm,” *Aquaculture Research*, vol. 51,no.11, pp. 4748-4758, 2020.
- [4] Kshirsagar, P., and Akojwar, S.(2016). Optimization of BPNN parameters, using PSO for EEG signals. In *Proceedings of the international conference on communication and signal processing,2016 (ICCASP 2016)*.
- [5] Pravin Kshirsagar and Sudhir Akojwar (2017), “Classification of ECG-signals using Artificial Neural Networks”, Researchgate.net
- [6] P. Kshirsagar, “Brain Tumor Classification and Detection Using Neural Network”, in *proceedings of the 2013 Fourth International Conference on Computing, Communications and Networking Technologies (ICCCNT)*, pp.83-88, IEEE, Tiruchengode, India, January, 2020.
- [7] P. Vijayakumar et. Al., “Machine Learning Algorithm for Improving the Efficient of Forgery Detection” *AIP Conference Proceedings*, Volume 2393, Issue 1, 10.1063/5.0074086.



A Conceptual study on “Printing currency alone will not make the nation wealthier”

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ABSTRACT: In the field of economics, the idea that creating money is a quick route to wealth has long attracted the interest of both decision-makers and the general public. This article examines the myth that underlies the notion that a nation may become wealthy for all time by merely printing more money. Although the printing press offers a rapid solution to economic problems, a thorough analysis reveals the complex dynamics at work. The idea of inflation, a stealthy force that devalues a country's currency, is crucial to the conversation. A nation's supply-demand equilibrium is upset when it inundates its economy with newly created money, which drives up prices. As a result, the purchasing power of the populace declines, making the initial funding infusion useless for promoting true prosperity. The essay also explores the worldwide ramifications of unrestrained money production. This article debunks the fallacy that money printing leads to long-term prosperity using historical evidence and economic theory. It highlights that the real cornerstones of a rich country are sound fiscal policies, investments in profitable industries, and the establishment of a stable economic environment.

KEYWORDS: Money, Economy, Monetary, Financial, Wealth, Inflation, Investment

INTRODUCTION

Inside the huge realm of economics, there exists a reputedly attractive belief that a country should print extra money to alleviate its economic woes and catapult itself right into a realm of boundless prosperity. At first look, the concept seems practicable—despite everything, with a countless supply of money at its disposal, why wouldn't a rustic print its manner to unfathomable wealth? However, delving into the tricky workings of economic systems exhibits a reality that defies this simplistic notion. In this comprehensive article, we embark on an in-intensity exploration to resolve the complexities that underpin the essential precept: printing more money no longer equates to developing authentic wealth for a state.

THE FALLACY OF ENDLESS WEALTH

The concept of an endless delivery of money looks like a sure fire way to alleviate financial problems and create an abundance of wealth. In any case, with the printing press as a reputedly infinite aid, why wouldn't a country print its manner to prosperity? however, the allure of this belief is constructed on a faulty premise that fails to account for the complex dynamics of financial structures.

The number one aspect that thwarts the idea of printing cash as a panacea for economic prosperity is inflation. While a country embarks on a spree of printing extra cash, it unleashes a series of events that gradually erodes the cost of its foreign money. Inflation takes place whilst the deliver of cash exceeds the demand for goods and offerings within an economic system. because the money supply increases, each unit of forex turns into much less scarce, leading to a decrease in its fee.

The effect of inflation is a decline in buying strength. because the cost of cash diminishes, residents discover that their difficult- earned wages buy them much less than before. prices start to upward thrust throughout the board, and the value of products and offerings escalates.

The seemingly ample cash supply turns into a mere illusion, because the real wealth of a kingdom steadily dissipates under the burden of growing fees and dwindled shopping strength. Printing extra cash creates an



illusion of abundance in the brief term. With improved liquidity, humans can also have extra cash handy, which can quickly stimulate spending and increase monetary hobby. However, this transient surge in call for isn't sustainable.

The underlying trouble lies in the truth that the expanded money supply isn't always accompanied by a corresponding growth inside the production of products and services. The result is an imbalance between the deliver of cash and the provision of actual wealth, growing a mirage of prosperity that in the long run proves to be unsustainable. The fallacy of printing cash and expecting a country to end up rich rests on a fallacious information of the complexities of economics.

The instant appeal of ample money deliver mask the underlying effects that come inside the form of inflation, eroding buying energy, and a distorted perception of wealth. Inside the following chapters, we can delve deeper into those troubles and explore the problematic internet of things that underscore the lack of ability of printing cash to create actual prosperity for a state.

THE VICIOUS CYCLE OF INFLATION

Once inflation takes maintain, it units off a vicious cycle that perpetuates financial instability. As expenses rise due to an excess money deliver, the value of products and services escalates. This growth in charges influences people, families, and businesses alike. normal essentials emerge as more luxurious, placing a stress on household budgets and lowering clients' buying energy. Furthermore, corporations face better production charges, along with extended wages and uncooked fabric fees, squeezing their income margins.

With rising expenses, corporations find themselves caught in a hard dilemma. To maintain profitability, they are forced to increase the charges of their goods and services. but, this locations a further burden on clients who are already grappling with the erosion in their shopping energy. As a end result, businesses may additionally experience a decline in call for, affecting their sales and revenue.

This, in flip, can lead to price-reducing measures including layoffs, lowering employment opportunities and in addition straining the financial system. As fees maintain to rise, customers face mounting challenges in meeting their basic wishes. The diminishing purchasing power erodes their potential to find the money for vital items and offerings, forcing them to make difficult alternatives and sacrifices. people and households have to allocate their restricted assets cautiously, prioritizing requirements over discretionary spending. this will lead to a decline in overall intake, which has a long way-reaching implications for businesses and the wider economic system.

The cycle of growing costs and eroding shopping energy undermines the stableness of an financial system. As individuals and companies battle with the burden of inflation, the general economic climate will become an increasing number of unsure. This volatility makes it hard for corporations to plot and invest for the future, as they grapple with unpredictable fees and call for fluctuations. Investors may additionally end up hesitant, wary of placing their capital into an surroundings fraught with monetary instability. Therefore, this hinders monetary growth and deters lengthy-time period investments which can be crucial for sustained prosperity.

The vicious cycle of inflation underscores the constraints of printing more money as a pathway to economic riches. At the same time as the preliminary surge in cash deliver may create a brief raise in spending, the lengthy-time period outcomes of growing costs, declining shopping energy, and economic instability monitor the fundamental flaw in this technique. Inside the next chapters, we are able to discover the consequences of useful resource misallocation and the worldwide repercussions that further compound the drawbacks of printing money as a means to acquire lasting wealth.

DISTORTED USEFUL RESOURCE ALLOCATION

When a country prints more money, the newfound wealth generated tends to concentrate in unique sectors or among sure privileged agencies. This choppy distribution exacerbates earnings inequality, creating a divide



among the rich few and most of the people of the populace. As wealth will become an increasing number of focused, the economic benefits fail to reach the broader society, hindering universal prosperity.

The widening gap between the rich and the negative intensifies social tensions inside a country. Those at the lower end of the earnings spectrum endure the brunt of inflation's impact as their wages fail to keep tempo with rising charges. This ends in a decline in their well known of dwelling, reduced get entry to important goods and services, and confined possibilities for economic mobility.

The resulting disparities in wealth and opportunity can result in social unrest, political instability, and a breakdown in societal brotherly love. Printing extra cash distorts aid allocation inside an financial system. because the money deliver will increase, the point of interest shifts faraway from effective investments and proper financial development. rather, assets tend to float toward sectors or sports that provide brief returns, speculative investments, or non-efficient belongings inclusive of real property.

This misallocation stifles innovation, productiveness, and lengthy-time period monetary boom, perpetuating a cycle of restrained possibilities and dwindled capability. The misallocation of resources and the attention of wealth hinder the long-time period prospects of a kingdom. Sustainable financial development relies on strategic investments in training, infrastructure, healthcare, studies and development, and different regions that foster productivity and innovation. But, whilst money is printed indiscriminately, these critical investments take a back seat, hindering the overall development of the united states and preventing it from understanding its authentic monetary capability.

The results of printing extra money make bigger some distance past the immediate implications of inflation. The unequal distribution of wealth, income inequality, and the misallocation of assets all make contributions to a stifled economy that fails to achieve sustainable growth. Inside the following chapter, we are able to explore the international repercussions of printing money and the capacity disruptions it can cause in the sensitive equilibrium of global commerce.

THE INTERCONNECTED WORLDWIDE ECONOMIC SYSTEM

In contemporary interconnected world, the movements of one country can have good sized repercussions on the worldwide economic landscape. The decisions made regarding financial policy and the printing of cash are no exception. The economies of countries are intricately linked through alternate, investment, and economic flows, making them vulnerable to the ripple outcomes of any economic imbalances.

Whilst a country prints more money, it commonly ends in a devaluation of its forex relative to others. A weaker foreign money can make a rustic's exports greater less costly for overseas consumers, probably boosting its exchange stability inside the quicktime period. but, it also raises the cost of imported items, as the purchasing energy of the forex diminishes. this will result in exchange imbalances and stress relationships among nations, main to trade disputes and capacity retaliatory measures.

The devaluation of a rustic's forex can create tensions and conflicts with its trading companions. because the cost of the foreign money declines, it makes imported items more high-priced, affecting businesses and clients in other international locations.

This could result in accusations of currency manipulation and unfair alternate practices, further straining worldwide relationships and doubtlessly triggering monetary conflicts. Printing extra cash also can deter overseas traders. forex devaluation erodes the fee of investments denominated in that currency, making them less appealing to worldwide investors. additionally, the monetary instability on account of inflation and misallocation of resources can undermine self belief in a rustic's financial system, deterring overseas direct investment (FDI) and hindering long-time period monetary increase.

The worldwide repercussions of printing more money spotlight the sensitive balance of the global monetary gadget. moves taken by way of one u . s . a . to deal with its personal economic challenges will have far-reaching implications for others. The ensuing trade imbalances, strained relationships, and deterrents to foreign investment can disrupt the equilibrium of global commerce and prevent average economic balance. Inside the



subsequent and final bankruptcy, we will discover the path to sustainable monetary increase and description the crucial elements that go beyond printing money in fostering actual prosperity for a state.

THE PATH TO SUSTAINABLE MONETARY BOOM

Achieving sustainable monetary increase requires the implementation of prudent fiscal regulations. Governments must awareness on accountable spending, ensuring that fees are aligned with the long-term desires of the country. This entails prioritizing investments in infrastructure, training, healthcare, and studies and improvement to decorate productivity, foster innovation, and create a good business environment. additionally, retaining a balanced price range and coping with public debt responsibly are critical to avoid economic instability and immoderate reliance on printing cash.

Sound financial management is crucial for financial stability and increase. Vital banks play a critical role in maintaining fee stability and controlling inflation through economic coverage. This includes the usage of gear including interest quotes, reserve requirements, and open market operations to control the money supply successfully.

By way of adopting a cautious approach and balancing the want for monetary stimulation with the threat of inflation, principal banks can contribute to sustainable monetary boom and the preservation of the fee of the forex. Actual financial prosperity lies in fostering innovation and productiveness.

Countries must spend money on studies and improvement, generation, and human capital to drive innovation and enhance productiveness degrees. via growing an surroundings that encourages entrepreneurship, supports small and medium-sized businesses, and promotes a way of life of creativity and expertise-sharing, nations can cultivate industries which might be globally competitive and resilient inside the face of monetary demanding situations. Strategic investments are important for lengthy-term financial improvement. Governments should prioritize infrastructure projects that decorate connectivity, facilitate change, and attract investments.

This includes investing in transportation networks, energy systems, digital infrastructure, and sustainable development tasks. via making focused investments that align with the us of an economic strengths and boom capacity, countries can lay the groundwork for sustainable economic development and appeal to home and overseas investments. He path to sustainable economic increase calls for a holistic approach that is going past the simplistic perception of printing extra cash.

Prudent economic guidelines, responsible economic control, fostering innovation and productivity, and strategic investments are the important thing pillars that underpin lengthy-time period prosperity. By using embracing those ideas, nations can create an surroundings conducive to sustainable financial increase, job advent, and the development of residing standards for his or her residents. In end, the notion that a rustic can print more money and become wealthy is a fallacy rooted in a lack of knowledge of the problematic dynamics of economics. Printing more money ends in inflation, erodes shopping strength, distorts aid allocation, and triggers global repercussions. true economic prosperity lies in prudent monetary regulations, responsible monetary control, fostering innovation and productivity, and strategic investments.

By way of embracing those concepts and adopting comprehensive monetary techniques, international locations can chart a path towards sustainable monetary boom and long-term prosperity. It's far vital for policymakers, economists, and most people to recognize that the road to wealth and prosperity can not be paved by using actually printing extra money. alternatively, it calls for a concerted attempt to cultivate an surroundings that promotes innovation, productiveness, and accountable financial practices. By means of doing so, countries can liberate their true financial potential and thrive inside the complicated worldwide landscape, growing a brighter and extra wealthy destiny for all.

CONCLUSION

To sum up, the notion that a nation's economic problems can be instantly solved by printing money is a myth that has long-term effects. There are many obstacles, including global consequences, resource misallocation, and



inflation. Prudent fiscal policies, accountable financial management, and value creation through innovation are necessary for true success. Wealth cannot be achieved just by printing more money; instead, comprehensive economic plans and ethical behaviour are needed for real growth. It becomes clear from navigating economic complexity that the idea that money production will create prosperity is false. Real prosperity necessitates a comprehensive strategy that addresses a variety of issues. With a better understanding, let's move on and strive for a more prosperous future for everybody.

REFERENCES

- [1] Cagan, P. (1956). "The Monetary Dynamics of Hyperinflation." In Studies in the Quantity Theory of Money (pp. 25-117). University of Chicago Press.
- [2] Friedman, M. (1968). "The Role of Monetary Policy." The American Economic Review, 58(1), 1-17.
- [3] Barro, R. J. (1979). "On the Determination of the Public Debt." Journal of Political Economy, 87(5, Part 1), 940-971.
- [4] Sargent, T. J. (1982). "The Ends of Four Big Inflations." Inflation: Causes and Effects (pp. 41-97). University of Chicago Press.
- [5] Bernanke, B. S. (2002). "Deflation: Making Sure 'It' Doesn't Happen Here." Speech at the National Economists Club, Washington, D.C.
- [6] International Monetary Fund (IMF). (2016). "Hyperinflation: Causes, Cures."
- [7] World Bank. (2018). "Understanding Inflation: A Lesson for the World."



Artificial Intelligence in Communication

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ABSTRACT: Technology has been changed our livesfor decades, and artificial intelligence is no exception. Artificial intelligence has made it way into various industries, including communication. It's no surprise that AI has revolutionized the way we connect with each other.

Artificial intelligence is making communication faster ,more effective, and more accessible than ever before. In this article we will explore the way in which AI is transforming communication, how it's being used of artificial intelligence duringthese days.

INTRODUCTION TO THE RISE OF AI IN COMMUNICATION

In today's fast-paced digital age, the way we communicate has undergone a remarkable transformation. With the rise of Artificial Intelligence (AI), our interactions have become more seamless, efficient, and personalized than everbefore. AI has revolutionized various industries, and communication is no exception.

The integration of AI in communication has opened up a whole new realm of possibilities. From virtual assistants like Siri and Alexa to chatbots on websites and messaging platforms, AI-powered technologies have become indispensable tools in our daily lives. These intelligent systems are designed to understand and interpret human language, enabling us to interact with them naturally and effortlessly.

One of the key advantages of AI in communication is its ability to process vast amounts of data in real-time. This allows businesses to gather valuable insights and make informed decisions. For instance, AI-powered chatbots can analyze customer queries and provide instant responses, enhancing customer service and satisfaction. Additionally, AI algorithms can analyze user preferences, behavior patterns, and feedback to personalize communication and offer tailoredrecommendations.

Moreover, AI has transformed the way we connect with others. Natural languageprocessing capabilities enable AI-powered virtual assistants to not only understand our requests but also engage in meaningful conversations. Whether it's scheduling appointments, sending messages, or making phone calls, these virtual assistants can handle various tasks, saving us time and effort.

The rise of AI in communication has also paved the way for advancements inmachine translation. Language barriers are no longer an obstacle, as AI algorithms can swiftly translate spoken or written words across different languages. This has facilitated global communication and fostered collaborations on a global scale.

However, as AI plays an increasingly prominent role in communication, ethical considerations come into play. Issues surrounding data privacy, security, and theresponsible use of AI must be addressed to ensure that the benefits are maximized while minimizing potential risks.

In conclusion, the rise of AI in communication has transformed the way we connect, offering unprecedented convenience, personalization, and efficiency. From virtual assistants to chatbots and machine translation, AI-powered technologies have become an integral part of our communication landscape. AsAI continues to advance, it holds immense potential to further revolutionize communication and shape the future of human interaction.



UNDERSTANDING THE IMPACT OF AI ON COMMUNICATION

Understanding the impact of AI on communication is crucial in today's rapidly evolving digital landscape. Artificial Intelligence has revolutionized the way we connect with each other, transforming traditional modes of communication into more efficient and personalized experiences.

AI-powered communication tools and platforms have become increasingly prevalent, simplifying and enhancing interactions across various channels.

Chatbots, for instance, have gained popularity in customer service, providing instant and automated responses to queries. This not only improves customer satisfaction but also frees up human agents to handle more complex tasks.

Moreover, AI has empowered businesses to analyze and interpret large volumes of data, enabling them to gain valuable insights into customer behavior and preferences. This data-driven approach allows companies to tailor their communication strategies, offering personalized recommendations and targeted marketing campaigns based on individual preferences and past interactions.

Beyond customer service, AI has also revolutionized language translation, breaking down language barriers and facilitating global communication.

Language processing algorithms can now accurately translate text and even speech in real-time, making international collaborations and cross-cultural communication seamless and efficient.

Additionally, AI-powered voice assistants like Siri, Alexa, and Google Assistant have become integral parts of our daily lives, providing us with instant information, managing our schedules, and even controlling smart devices in our homes. These virtual assistants utilize natural language processing and machine learning algorithms to understand and respond to our commands, making communication more intuitive and convenient.

However, it is important to acknowledge the potential challenges and ethical considerations that come with the rise of AI in communication. Issues such as data privacy, algorithmic bias, and the potential displacement of certain job roles need to be addressed to ensure responsible and inclusive use of AI technology.

In conclusion, AI has transformed communication in remarkable ways, offering enhanced efficiency, personalization, and accessibility. As this technology continues to advance, it is essential to embrace its potential while also being mindful of its implications, ensuring that AI remains a powerful tool for positive and meaningful connections in our increasingly interconnected world.

AI-POWERED CHATBOTS: ENHANCING CUSTOMER SERVICE AND SUPPORT

In today's fast-paced digital world, customer service and support have become increasingly important for businesses striving to provide exceptional experiences to their customers. Enter AI-powered chatbots, the game-changers in the realm of communication and customer service.

Gone are the days of long wait times, frustrating automated phone menus, and human errors in customer interactions. With AI-powered chatbots, businesses can now offer instant and personalized support around the clock. These intelligent virtual assistants are revolutionizing the way we connect with brands, making customer service more efficient, convenient, and seamless.

AI-powered chatbots leverage natural language processing (NLP) algorithms to understand and respond to customer inquiries in real-time. They can provide instant answers to frequently asked questions, offer product recommendations, assist with troubleshooting, and even handle transactions. With their ability to learn from every interaction, chatbots continuously improve their responses, ensuring a higher level of accuracy and customer satisfaction over time.

The benefits of AI-powered chatbots extend beyond just enhancing customer service. They can handle multiple conversations simultaneously, eliminating the need for customers to wait in queues or be put on hold. This not only



saves time but also creates a positive impression of efficient service delivery. Moreover, chatbots can collect valuable customer data and insights, enabling businesses to gain a deeper understanding of their audience's needs, preferences, and pain points.

From a business perspective, implementing AI-powered chatbots can lead to substantial cost savings. By automating repetitive and mundane tasks, companies can free up their human resources to focus on more complex and value-added activities. This not only improves productivity but also allows businesses to scale their customer service operations without significant additional costs.

However, it's important to strike the right balance between automation and human touch. While chatbots excel in handling routine queries, there are instances where human intervention may be necessary, especially for complex or emotionally-charged issues. Therefore, businesses should ensure a seamless transition from chatbots to human agents when the situation demands it, providing a personalized and empathetic touch.

As AI continues to advance, the potential of chatbots in transforming the way we connect and communicate is limitless. They are becoming an integral part of the customer service landscape, providing businesses with a competitive edge by delivering exceptional customer experiences. By embracing AI-powered chatbots, businesses can elevate their customer service and support to new heights, paving the way for a future where communication is smarter, faster, and more personalized than ever before.

VIRTUAL ASSISTANTS: REVOLUTIONIZING PERSONAL AND PROFESSIONAL PRODUCTIVITY

Virtual assistants have become an integral part of our daily lives, both personally and professionally. These AI-powered helpers are revolutionizing the way we manage tasks, organize schedules, and enhance productivity.

Gone are the days of manually setting reminders or flipping through calendars to keep track of important dates and deadlines. Virtual assistants, such as Siri, Alexa, and Google Assistant, have taken over these responsibilities, providing us with a seamless and efficient way to stay organized. With just a simple voice command, we can schedule appointments, set reminders, and even dictate emails or messages. This hands-free approach saves time and allows us to focus on more important tasks.

In the professional world, virtual assistants have become invaluable tools for businesses of all sizes. They can handle a wide range of tasks, from managing customer inquiries and providing instant support to automating repetitive administrative tasks. This not only streamlines operations but also frees up valuable time for employees to focus on high-value projects and strategic decision-making.

Moreover, virtual assistants have the ability to learn and adapt to individual preferences and behaviors, making them highly personalized. They can anticipate our needs, offer recommendations, and provide tailored information based on our habits and preferences. This level of customization further enhances productivity and efficiency, as virtual assistants become trusted companions that understand our unique requirements.

The rise of virtual assistants has undoubtedly transformed the way we connect and interact with technology. As their capabilities continue to evolve, we can expect even more advanced features and integration into various devices and platforms. From smartphones to smart homes and even smart cars, virtual assistants are becoming ubiquitous, making our lives easier and more connected than ever before.

NATURAL LANGUAGE PROCESSING

Breaking down language barriers In the ever-evolving landscape of communication, one of the most groundbreaking advancements is the integration of natural language processing (NLP) powered by AI. This technology has emerged as a game-changer in breaking down language barriers and revolutionizing the way we connect with one another.

Natural language processing involves the ability of machines to understand and interpret human language. It goes beyond simple translation by comprehending the nuances of language, including context, grammar, and even emotions. This allows for seamless communication between individuals who speak different languages, eliminating the need for human translators or language learning.



With NLP, language is no longer a barrier to effective communication. Whether it's in business negotiations, international conferences, or even everyday conversations, AI-powered tools can instantly translate spoken or written words in real-time. This opens up a world of opportunities for global collaboration, cultural exchange, and mutual understanding.

Moreover, NLP has transformed customer service and support. AI chatbots equipped with NLP capabilities can understand customer queries and respond with accurate and contextually relevant information, providing a personalized and efficient customer experience. This not only saves time and resources but also enhances customer satisfaction and loyalty.

The applications of NLP are not limited to spoken or written language alone. It can also analyze and interpret non-verbal cues such as facial expressions, gestures, and tone of voice. This adds another layer of depth to communication, enabling machines to understand the emotional context behind human interactions.

As AI continues to advance, natural language processing will only become more sophisticated and refined. The potential for NLP to bridge communication gaps on a global scale is truly awe-inspiring. It holds the promise of a future where language is no longer a barrier but a catalyst for connection, collaboration, and understanding. The rise of AI in communication is transforming the way we connect, bringing people closer together in an increasingly interconnected world.

AI-POWERED TRANSLATION TOOLS: BRIDGING THE COMMUNICATION GAP

In today's globalized world, effective communication is essential for businesses to thrive. However, language barriers can often hinder the seamless exchange of ideas and information. This is where AI-powered translation tools come into play, revolutionizing the way we connect and bridging the communication gap like never before.

AI-powered translation tools leverage the power of artificial intelligence and machine learning algorithms to provide real-time translation services. Gone are the days of relying on human translators or struggling with inaccurate translation apps. These advanced tools can instantly translate text, voice, or even images across multiple languages, enabling smooth and efficient communication between individuals from diverse linguistic backgrounds.

The benefits of AI-powered translation tools are manifold. Firstly, they offer unparalleled accuracy and speed, ensuring that the intended message is accurately conveyed without any misunderstandings or misinterpretations. This is particularly crucial in business settings where precision and clarity are of utmost importance.

Moreover, these tools are constantly learning and improving, adapting to different contexts and nuances of language. By analyzing vast amounts of data and patterns, AI algorithms can refine their translations over time, providing more accurate and contextually appropriate results.

Furthermore, AI-powered translation tools are incredibly versatile, catering to various communication channels. Whether it's translating emails, website content, or even live conversations, these tools seamlessly integrate into existing platforms, making cross-border communication effortless and efficient.

The rise of AI in communication has not only transformed the way we connect but has also opened up new opportunities for businesses to expand their reach globally. With AI-powered translation tools, companies can effortlessly communicate with international clients, tap into new markets, and foster meaningful cross-cultural collaborations.

In conclusion, AI-powered translation tools have emerged as a game-changer in the realm of communication. By breaking down language barriers, these tools are revolutionizing the way we connect, enabling businesses and individuals to communicate effectively and effortlessly across borders. Embracing this technology can unlock a world of opportunities and propel us towards a more interconnected and inclusive future.



SPEECH RECOGNITION TECHNOLOGY: ENABLING SEAMLESS VOICE INTERACTIONS

Speech recognition technology has revolutionized the way we communicate, enabling seamless voice interactions that have become an integral part of our daily lives. With the rise of artificial intelligence (AI), speech recognition has taken a giant leap forward, transforming the way we connect with technology and each other.

Gone are the days of typing out messages or commands on a keyboard. Now, we can simply speak to our devices and have them understand and respond to our words. Whether it's asking our virtual assistant for the weather forecast, dictating a text message, or even controlling smart devices in our homes, speech recognition has made our interactions faster, more convenient, and more natural.

One of the key advancements in speech recognition technology is its ability to accurately understand and interpret human speech. Through machine learning algorithms and deep neural networks, AI-powered speech recognition systems can now recognize and transcribe spoken words with remarkable accuracy. This has opened up a wide range of possibilities for businesses and individuals alike.

In the business world, speech recognition technology has transformed customer service and call centers. Instead of navigating through complex phone menus or waiting on hold, customers can now simply speak their needs and be directed to the right department or receive immediate assistance from a virtual agent. This not only improves customer satisfaction but also enhances operational efficiency for businesses.

Furthermore, speech recognition technology has made significant strides in multilingual communication. With the ability to recognize and process speech in different languages, barriers to global communication are being broken down.

This has opened up opportunities for businesses to expand their reach and cater to a wider audience, regardless of language differences.

In our personal lives, speech recognition has become an integral part of our smartphones, smart speakers, and other connected devices. We can now control our devices, search the internet, play music, and perform various tasks with just our voice. This hands-free convenience has made our lives more efficient and has transformed the way we interact with technology on a daily basis.

As speech recognition technology continues to advance, we can expect even more seamless voice interactions in the future. From voice-activated cars to AI-powered language translators, the possibilities are endless. The rise of AI in communication has truly transformed the way we connect, making our interactions more natural, efficient, and personalized.

AI IN SOCIAL MEDIA: TRANSFORMING THE WAY WE ENGAGE AND CONNECT

AI has been revolutionizing various industries, and social media is no exception. With the rise of AI in social media, the way we engage and connect with others has undergone a remarkable transformation.

One of the key ways AI has impacted social media is through personalized content recommendations. Social media platforms like Facebook and Instagram have implemented AI algorithms that analyze user preferences, behavior patterns, and interests to curate and display content that is most relevant to each individual user. This not only enhances the user experience but also enables businesses to reach their target audience more effectively.

Additionally, AI-powered chatbots have become increasingly prevalent in social media communication. These intelligent bots are capable of understanding and responding to user queries, providing instant customer support, and even engaging in personalized conversations. This has not only improved response times but also relieved businesses of the burden of managing large volumes of customer inquiries.

Furthermore, AI has enabled social media platforms to detect and filter out spam, fake accounts, and malicious activities. By analyzing user behavior and content patterns, AI algorithms can identify and flag suspicious accounts or content, enhancing the overall safety and security of social media platforms.

The integration of AI in social media analytics has also revolutionized the way businesses gather and analyze data. AI algorithms can quickly process and analyze vast amounts of social media data, providing valuable insights into consumer behavior, sentiment analysis, and trends. This enables businesses to make data-driven



decisions and tailor their social media strategies to better engage their target audience.

In conclusion, AI has transformed the way we engage and connect on social media. From personalized content recommendations to AI-powered chatbots and advanced analytics, AI has enhanced the user experience, improved customer service, and empowered businesses to make smarter decisions in their social media strategies. As AI continues to evolve, we can expect even more innovativeways it will shape the future of social media communication.

Ethical considerations and challenges in AI communication

As AI continues to advance and transform various industries, including communication, it is crucial to address the ethical considerations and challenges associated with this technology. While AI-powered communication systems offer immense potential for efficiency and convenience, they also raise concerns regarding privacy, bias, and accountability.

One ethical consideration revolves around data privacy and security. AI communication systems often rely on collecting and analyzing vast amounts of personal data from users. This raises questions about how this data is stored, protected, and used. It is essential for organizations to prioritize data privacy and implement robust security measures to safeguard sensitive information.

Another challenge is ensuring that AI communication systems are free from biases. AI algorithms are developed based on existing data, which can sometimes contain biases, leading to discriminatory outcomes. Organizations must be diligent in addressing these biases and continuously monitor and refine their AI models to ensure fairness and equality in communication.

Accountability is also a significant ethical concern when it comes to AI communication. As AI systems become more autonomous, it becomes crucial to determine who is responsible for the outcomes and actions of these systems.

Clear frameworks and guidelines need to be established to ensure accountability and prevent potential harm caused by AI communication systems.

Additionally, there is a need for transparency and explainability in AI communication. Users should have a clear understanding of when they are interacting with AI systems and the limitations and capabilities of such systems. Organizations should strive to be transparent about their use of AI technologies and provide explanations when automated decisions are made.

Addressing these ethical considerations and challenges requires a collaborative effort between technology developers, policymakers, and society as a whole. It is essential to establish ethical frameworks, regulations, and standards that promote responsible and ethical use of AI communication systems. By doing so, we can harness the transformative power of AI while ensuring the protection of individual rights, fairness, and accountability in our communication landscape.

The future of AI in communication: Opportunities and potential advancements

The future of AI in communication holds countless opportunities and potential advancements that have the power to revolutionize the way we connect with one another. As technology continues to advance at an unprecedented pace, the integration of AI into communication platforms is becoming more prevalent and transformative.

One of the key areas where AI is expected to make a significant impact is in customer service. AI-powered chatbots and virtual assistants are increasingly being utilized by businesses to enhance customer interactions. These intelligent systems are capable of understanding and responding to customer queries, providing personalized recommendations, and even handling complex transactions. By automating routine tasks, AI-powered customer service can free up human agents to focus on more complex and meaningful interactions, ultimately improving overall customer satisfaction.

Additionally, AI has the potential to revolutionize language translation and interpretation. With AI algorithms constantly improving, real-time language translation is becoming more accurate and seamless. This



breakthrough can eliminate the language barriers that have long hindered effective communication between individuals and businesses across different countries and cultures. It opens up a world of opportunities for global collaboration, trade, and understanding.

Furthermore, AI-driven voice assistants like Siri, Alexa, and Google Assistant have already become integral parts of many households. These assistants even perform a wide range of tasks such as answering questions, setting reminders, controlling smart devices, and even providing entertainment. As AI technology advances, these voice assistants will become even more intuitive, personalized, and capable of understanding and responding to human emotions, further enhancing our communication experiences.

In the realm of business communication, AI is poised to transform how organizations collaborate and communicate internally. Intelligent algorithms can analyze vast amounts of data, identify patterns, and provide valuable insights that can inform decision-making processes. AI-powered communication tools can also automate administrative tasks, streamline workflows, and facilitate seamless communication across teams and departments, leading to increased productivity and efficiency.

While the future of AI in communication is bright, it is important to address the ethical implications and potential challenges associated with its widespread adoption. Privacy concerns, job displacement, and algorithmic biases are among the issues that need to be carefully navigated to ensure that AI-powered communication remains beneficial and inclusive.

CONCLUSION

In conclusion, the future of AI in communication is promising, offering a myriad of opportunities and potential advancements that can transform the way we connect with one another. From customer service to language translation, voice assistants to business collaboration, AI has the power to enhance our communication experiences and drive positive change. As we embrace this technological evolution, it is crucial to strike a balance between innovation and ethical considerations to harness the full potential of AI in communication.

In conclusion, the rise of AI in communication is truly transforming the way we connect with one another. From chatbots to virtual assistants, AI technology is revolutionizing the efficiency and effectiveness of our interactions. As we move forward, it is important to embrace these advancements and leverage them to enhance our personal and professional relationships. While there may be some concerns and challenges to address, the benefits of AI in communication cannot be denied. It is an exciting time to be part of this technological shift, and we look forward to witnessing the continued evolution of AI in our daily lives.

REFERENCES

1. Aaltola, K. M., & Taitto, P. (2019). Utilising experiential and organizational learning theories to improve human performance in cyber training. *Information & Security*, 43(2), 123–133. <https://doi.org/10.11610/isij.4311>
2. Almaiah, M. A., Alfaisal, R., Salloum, S. A., Hajjej, F., Shishakly, R., Lutfi, A., Alrawad, M., Mulhem, A. A., Alkhdour, T., & Al-Marouf, R. S. (2022). Measuring institutions' adoption of artificial intelligence applications in online learning environments: integrating the innovation diffusion theory with technology adoption rate. *Electronics*, 11(20), 3291. <https://doi.org/10.3390/electronics11203291>
3. Alsheibani, S., Cheung, Y., & Messom, C. (2018). Artificial Intelligence Adoption: AI-readiness at Firm-Level. *PACIS*, 4, 231-245. <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1036&context=pacis2018>
4. Argyris, C., & Schön, D. A. (1997). Organizational learning: A theory of action perspective. *Revista Espanola De Investigaciones Sociologicas*, 77/78, 345. <https://doi.org/10.2307/40183951>
5. Arsenijevic, U., & Jovic, M. (2019). Artificial intelligence marketing: chatbots. in 2019 international conference on artificial intelligence: Applications and innovations (IC-AIAI) (pp. 19-193). IEEE.



AI IN THE PANDEMIC COVID-19 TIMES

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ABSTRACT:

The emergence of the novel coronavirus 2019 (COVID-19) pandemic posed unprecedented challenges to healthcare systems worldwide, particularly increasing the diagnostic burden on radiologists. In response to the epidemic crisis, this paper presents our experience in developing and deploying an artificial intelligence (AI) system aimed at reducing physician workload and enhancing diagnosis accuracy for COVID-19 pneumonia. Collaborating with an interdisciplinary team of over 30 professionals with medical and or AI backgrounds, distributed across Beijing and Wuhan, enabled us to overcome various challenges, including data discrepancy and security concerns, within a four-week timeframe Utilizing 1,136 training cases, including 723 COVID-19 positives from five hospitals, we achieved a sensitivity of 0.974 and specificity of 0.922 on the test dataset, encompassing diverse pulmonary diseases. Keywords:COVID-19, pneumonia, artificial intelligence, CT imaging, diagnosis, interdisciplinary collaboration, sensitivity, specificity, case study.

INTRODUCTION:

The rapid spread of novel coronavirus 2019 (COVID-19) since January 2020 has led to a global health crisis, infecting over 100,000 individuals worldwide by early March 2020. While many carriers remain asymptomatic, the virus can cause severe pneumonia in 2%–8% of cases, often leading to acute respiratory distress syndrome. Despite the use of virus-specific RT-PCR for laboratory confirmation, challenges such as high false negative rates and processing delays persist, with reported sensitivities as low as 60%–70%.Chest CT imaging has emerged as a valuable tool for detecting and assessing COVID-19 pneumonia, showcasing characteristic features such as bilateral ground-glass lung opacities, particularly in subpleural areas. Numerous recent studies have underscored the efficacy of chest CT as a cost-effective and accurate diagnostic method, further supported by official guidelines from China's National Health Commission. The paper is organized as follows: Section 2 provides related work on data acquisition, lung segmentation, and AI-assisted diagnosis. Section 3 details the proposed method, while Section 4 presents experimental results and ablation studies. Section 5 discusses the method's advantages and disadvantages, and Section 6 concludes the paper.

DATA ACQUISITION :

The initial step in constructing an AI-assisted diagnosis system for COVID-19 involves image acquisition, with Chest X-ray and CT images being the most commonly utilized modalities. CT images are preferred in many applications due to their precise and efficient analysis and segmentation compared to X-ray images .Medical image segmentation, particularly using deep neural networks, plays a crucial role in AI-assisted COVID-19 analysis. It identifies regions of interest (ROIs) in CT or X-ray images for further examination, with tasks divided into lung region segmentation and lung lesion segmentation CT and X-ray images, aim to expedite diagnosis and alleviate the burden on radiologists. These systems can be categorized into X-ray-based screening and CT-based screening systems. In X-ray-based systems, Bayesian Convolutional Neural Networks [41], ResNet-50, Inception-V3, and Inception-ResNet-V2 models [42] have been employed to detect COVID-19 lesions in X-ray images.

These models help optimize classification between COVID-19 and non-COVID-19 cases, although X-ray images may be less sensitive than 3D CT images. For CT-based diagnosis, various approaches utilize single models or segmentation and classification mechanisms. Models like Deep Pneumonia [11], COV Net [12], and VB-Net [13] employ ResNet-50, U-Net, and VB-Net to differentiate COVID-19 from other diseases based on CT images. Others, like DeCoVNet [49], combine U-Net and 3D CNN models for lung segmentation and COVID-19 prediction based on CT scans.

METHODS:

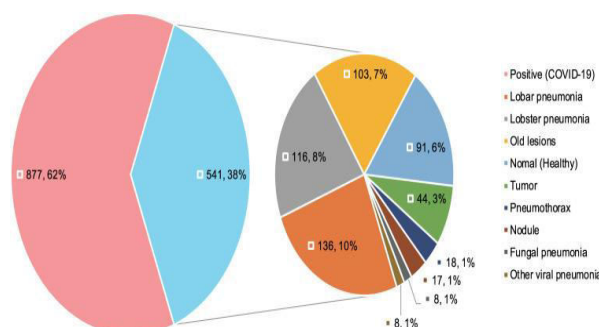
Overview:



1. Data collection: Gathering relevant data, including Chest X-ray and CT images, to form the dataset for training and evaluation.
 2. Data annotation: Annotating the collected data by labeling and marking key features in the images to assist in model training and validation.
 3. Model training and evaluation: Training the AI model using the annotated data and evaluating its performance to ensure accuracy and effectiveness in COVID-19 diagnosis.
 4. Model deployment: Deploying the trained model into real-world settings, such as hospitals or healthcare facilities, to assist healthcare professionals in diagnosing COVID-19 cases.
- Throughout the process, continuous iterations were made across these stages to enhance model performance and refine the AI-assisted diagnosis system.

DATA COLLECTION:

In addition to COVID-19 cases, we collected CT images of other types of pneumonia patients, including those with common pneumonia, viral pneumonia, fungal pneumonia, tumors, emphysema, and lung lesions. To select appropriate negative cases, senior physicians manually reviewed and confirmed each case based on their experience, choosing cases with characteristics similar to COVID-19. Furthermore, we included 450 cases with other known lung diseases exhibiting CT imaging features somewhat similar to COVID-19 to enhance the diversity of our dataset.



DATA ANNOTATION:

To train the models, a team of six data annotators meticulously annotated the lesion regions (if present), lung boundaries, and transverse section layers of the lungs in all CT samples. Given the urgency of saving time for radiologists during the epidemic outbreak, our data annotators took on the bulk of the annotation tasks. We implemented a three-step quality inspection process to ensure reasonable accuracy in annotation. All annotators possessed a background in radiology, and they underwent a comprehensive four-day hands-on training session led by a senior radiologist with clinical experience in COVID-19 before commencing annotations.

MODEL TRAINING:

For neural network training, we initiated training for all models from scratch with random initial parameters. Table 4 provides an overview of the training and test data distribution for both segmentation and classification tasks. The models were trained on a server equipped with eight NVIDIA TITAN RTX GPUs using the PyTorch framework [58]. We employed the Adam optimizer with an initial learning rate of $1e-4$ and a learning rate decay of $5e-4$ to facilitate model convergence and optimization.

DEPLOYMENT:

The trained models were deployed on workstations that were stationed on-premise at the hospitals. A standard workstation configuration included an Intel Xeon E5-2680 CPU, an Intel I210 NIC, two TITAN X GPUs, and 64GB of RAM (refer to Fig. 6). These workstations interfaced with the hospital's Picture Archiving and Communication Systems (PACS), importing images for analysis and displaying the results iteratively. Additionally, the server autonomously checked for model and software updates, allowing for remote updates to be installed as necessary.

For the segmentation tasks, we employed the Dice coefficient, calculated as twice the area of overlap divided by the total number of pixels in both images. The Dice coefficient is a commonly used metric in medical image segmentation to assess the performance of segmentation algorithms.



EVALUATION METRICS:

For the classification tasks, we utilized the area under the curve (AUC), specifically the area under the receiver operating characteristic (ROC) curve. The ROC curve is generated by plotting the true positive rate against the false positive rate under different classification thresholds. Additionally, we evaluated the selected best classification model using sensitivity and specificity measures. Sensitivity represents the true positive rate, while specificity represents the true negative rate, providing insights into the model's performance in correctly identifying positive and negative cases, respectively.

ANALYZING THE SYMPTOMS OF COVID-19 :

As mentioned earlier, the deployed system effectively reduces the rate of missed diagnoses and can distinguish between COVID-19 pneumonia and common pneumonia. Additionally, the system produces classification and segmentation results simultaneously, aiding doctors in making definite diagnoses. Moreover, with deployment in 16 hospitals and an average processing time of 0.8 seconds, the system has made crucial contributions to managing COVID-19 in practice. Despite the significant effects achieved by the proposed system, it still has some limitations. Firstly, it struggles when encountering multiple types of lesions or significant metal or motion artifacts. Enhancing the system's generalization ability is a focus of our future research. Secondly, training the network in the proposed system requires a large annotated dataset of CT images containing lung contours, lesions, and classifications. Thus, a flaw of our system is its dependency on fully annotated CT images.

CONCLUSION:

The developed system holds promise in assisting heavily affected areas where sufficient radiologists are unavailable, by providing preliminary CT results to expedite the screening process of COVID-19 suspected patients. Additionally, in less affected regions, it aids less-experienced radiologists in distinguishing COVID-19 from normal pneumonia, thereby improving the detection of highly indicative features of COVID-19 presence. While a general AI capable of automatically diagnosing every new disease remains elusive, we have established a generally applicable methodology for swiftly constructing models targeting specific diseases like COVID-19. This methodology encompasses a library of models, training tools, data collection, annotation processes, testing procedures, user interaction designs, and clinical deployment strategies. Leveraging this methodology, we developed the first usable model within 7 days of receiving the initial data batch and iterated on it four more times over the next 13 days while deploying it across 16 hospitals. At the time of writing, the model was conducting over 1300 screenings daily.

Continuous data intake remains pivotal for enhancing epidemic response, as updating the model with ongoing data leads to swift performance improvements. To further elevate detection accuracy, focus is directed towards incorporating training samples featuring complex cases, including those with multiple lesion types. Moreover, as CT imaging represents just one facet of diagnosis, efforts are underway to construct a multi-modal model capable of integrating various clinical data inputs such as patient profiles, symptoms, and laboratory test results to yield more accurate screening outcomes.

REFERENCES

- [1] World Health Organization (WHO) 2020. Coronavirus disease 2019 (COVID-19)
- [2] Huang C., Wang Y., Li X., Ren L., Zhao J., Hu Y., Zhang L., Fan G., Xu J., Gu X. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497–506. [PMC free article] [PubMed] [Google Scholar]
- [3] Graham R.L., Donaldson E.F., Baric R.S. A decade after SARS: strategies for controlling emerging coronaviruses. *Nat. Rev. Microbiol.* 2013;11(12):836–848. [PMC free article] [PubMed] [Google Scholar]
- [4] Chen H., Guo J., Wang C., Luo F., Yu X., Zhang W., Li J., Zhao D., Xu D., Gong Q. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020 [PMC free article] [PubMed] [Google Scholar]
- [5] Chung M., Bernheim A., Mei X., Zhang N., Huang M., Zeng X., Cui J., Xu W., Yang Y., Fayad Z. CT imaging features of 2019 novel coronavirus (2019-nCoV) *Radiology*. 2020 [PMC free article]



[PubMed] [Google Scholar]

[6] Pan F., Ye T., Sun P., Gui S., Liang B., Li L., Zheng D., Wang J., Hesketh R.L., Yang L. Time course of lung changes on chest CT during recovery from 2019 novel coronavirus (COVID-19) pneumonia. Radiology. 2020 [PMC free article] [PubMed] [Google Scholar]



Artificial Intelligence and Its Impact on Workforce

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ABSTRACT: This article titled Artificial Intelligence and its impact on work force starts with brief introduction to Artificial Intelligence. The term Artificial Intelligence is defined and its uses in various disciplines are stated. Next section of the article analyses in detail both positive and negative impact it has on employment. Finally it is concluded that it cannot replace human but it can be used by him. Human being in the modern era are largely dependent on Computers. Can a human being lead life without computer? It has become a million dollar question. Computer should be made intelligent so that human life is made easier. Artificial Intelligence is stimulation of human intelligence in machine.

KEYWORDS : Simulation, Instillation , automation, sentiment analysis.

A Research paper titled computer machinery and intelligence was first published by Alan Turing in 1950. The term Artificial Intelligence was coined in 1956 by John Mc. Carthy, who is considered to be the father of Artificial Intelligence.

According to him, “It is the science and Engineering of making intelligent machines especially, the intelligent computer programme”. Artificial Intelligence imitate human intelligence and senses, such as visual perception, speech recognition, decision making and translation between languages. In short A.I. has brought revolution in the field of technology.

Artificial Intelligence is used in various disciplines such as engineering, technology, military, mining and sentiment analysis. It is also used in languages processing, problems solving and planning and also in application of aerospace.

Many analyst opined that Artificial Intelligence will bring positive changes like enhancing products, improving efficiency, reducing cost, increase access to education on onehand. On the other hand many researchers believe that Artificial Intelligence will pose threat to employment opportunities.

Artificial Intelligence has significant impact on automation. Use of Artificial Intelligence in manufacturing and transportation has led to the development of automation of system which can perform task without the intervention of laborers.

Customer service is one of the domain which is affected by Artificial Intelligence. Now a day's customer service is not done by, over phone. Artificial Intelligence has been programmed with frequently asked questions and answer choices are also programmed. In companies receptionist are being replaced by robots. Phone calls are managed by a Artificial Intelligence System.

Artificial Intelligence for instance can see, listen and respond to customer. Accountants are also being affected by Artificial Intelligence. Many companies are using Artificial Intelligence for book keeping practices. This provides efficient account system, flexibility, security and cost reduction as cloud based services. Moreover Artificial Intelligence ensures data is stored safe, and analyzed efficiently.

Sales representatives are also affected by Artificial Intelligence. Instead of marketing in person for the product they can do the marketing through customer content App. Retail sellers are also affected by Artificial Intelligence. In short in every shop customers can scan their own items and pay the amount through debit cards.

People working in godowns are also affected by Artificial Intelligence. In recent days people have started to opt for online purchase, because of which online business has become trending. Artificial Intelligence can track the stock ordered by customer and get it delivered, with limited labour.

Though Artificial Intelligence affects mundane jobs it will not in any way affect some profession like teachers, lawyers, surgeon, writers, architects, actors/directors, CEOs etc.

Online class can be adapted in inevitable situations like Covid 19. Face to face interaction of teachers with the students contribute not only for students' academic development but shaping students' morale



(Discipline). Environment also plays the pivotal role in this. Lawyers should be well experienced knowledgeable to place his argument. More over his argument relies on the argument of the countering advocate. So lawyers will not become the victim of Artificial Intelligence. Doctors have to treat the patient depending upon his/her condition and his way of diagnosis will be different for different patients. Similarly surgeons have to carry out their operations depending on the circumstances.

People invest in company by looking at the leadership qualities of the management team. A good and efficient management team fulfil the vision and mission of the company. This cannot be performed by Artificial intelligence machine of Robot.

Writers write depending on his imagination and audience for whom he chooses to write. There is no need for Artificial Intelligence intervention. Actors and directors act and direct in their own style. So they may not be affected by Artificial Intelligence. Last but not the least if Artificial Intelligence has to function is has to be programmed by the analysts. So his profession as an analyst will not be affected.

The Massachusetts Institute of Technology conducted a study on Artificial Intelligence and its impact on work force. Though technological potential is evident through app like Chat GPT, Alphabet Ink. (USA), Baidu Ink, and Alibaba group of China Artificial Intelligence cannot replace majority of jobs. Study states that only 23% of the human jobs can be replaced by Artificial Intelligence. The study further states that installation of Artificial Intelligence, is very expensive and many organisation may not opt for it.

The study quotes an example of a bakery where they wish to install computer vision

system with a camera attached to it, to assess the quality of ingredients. If the labourers perform the same task only 6% of the effort is required. Moreover in a small bakery where there are limited employees with minimum salary, installation of computer vision system is not feasible, because it costs 14,000 US\$ per annum.

The impact of Artificial Intelligence on employment has been a topic of discussion. Some industrialists view installation of Artificial Intelligence in all organisations at the earliest is a hasty decision. Developing countries like India wants to be a forerunner in Artificial Intelligence installation. It is practically impossible, because vast human resources can not be replaced by the installation of Artificial Intelligence, which is a costly affair.

One can arrive at the conclusion that Artificial Intelligence is a tool created by human. It can be used to make one's tasks easier. In short Artificial Intelligence can not replace human totally, but only be substituted to the extent possible.

REFERENCES

1. Bhati, Divya. "Artificial Intelligence will replace million of jobs by 2030" "India today 4th Aug.2023. <http://www.indiatoday.in/technology/News>.
2. Davies, Pascale "AI is too expensive to replace human jobs right now, MIT study finds. 23rd January 2024. <https://www.euronew.com>.
3. Stahi, Ashley . "How AI will impact the future of work force and life" "Forbes, 2021/03/10. <https://www.forbes.com>. Ashley stahi.
4. "Artificial Intelligence". <http://www.dcehvp.org>



From Passive Spectators to Active Participants: AI's Role in Democratizing Live Event Production Experiences

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ABSTRACT: From strenuous energy to roaring cheers, live event production has seen it all. This research paper navigates into the evolving landscape of live events with integration of Artificial Intelligence (AI). The media industry has been rapidly evolving and making progress with the technological advancements that contribute towards the increased potential of the media industry to provide the audience with more engaging and interesting content. This paper delves into the substantial potential of the AI to enhance and improve audience adventure and engagements at live events like concerts and sporting events such as leagues and tournaments. We will be looking into how AI can personalize by bringing in food and beverages just by a click on the smartphones and amplify the experience by the adjustments of lights and sound according to the audience sentiment, aid in logistic optimization through predictive analysis and real-time crowd monitoring, deal with safety concerns via anomaly and object detection while creating a smooth experience for the audience and organizers. However, the use of AI also comes with its own set of challenges which will be later addressed in this paper. The challenges that would be discussed are the ethical considerations such as data privacy, algorithmic bias and striking the human-machine balance. By examining the existing AI applications in the Media and Entertainment Industry, analysing few cases of the successful implementations, this paper aims to draw a comprehensive picture of the future of the live event productions with AI.

KEYWORDS: Live Event production, Artificial Intelligence (AI), Personalization, Media and Entertainment Industry, Audience Engagement, Ethics.

I. INTRODUCTION

Live events have always been attracting a diverse pack of audience under one roof who have matching or similar passion. They have been a source of communal joy and bring people together for a shared moment of happiness. They are a contributing factor for the audience to have a smile on their face when they reminisce in nostalgia. Artificial Intelligence and Digital Technologies on the other hand, have the power to transform human relations, interactions and experiences in the business landscape (Lee, 2020). Over the decade, technology has changed our working methods, simplifying it.

The times when audience were passive spectators are gone. Now, AI encourages people to be active participants, that enhances audience experience in the event forging to create amazing memories (Feld, et al. 2020). AI can help you gain backstage experiences, facilitate meet and greet with your favourite celebrity, personalise post event content to extend those magical moments (Chung, et al. 2020).

However, this symphony of technology and human experience necessitates a critical examination of ethical considerations (De Freitas, 2020). Concerns surrounding data privacy, algorithmic bias, and the potential for technology to supplant human interaction must be addressed with careful consideration and responsible implementation. Striking the right balance ensures that AI enhances, rather than supplants, the irreplaceable magic of live events.

This paper delves into the existing AI applications, case studies and the possible challenges of using AI in Live Events. In the long run, it envisions a future where technology acts as a bridge, harmonizing individual experiences and collective emotions to create a symphony of shared joy, wonder, and unforgettable moments.

III. NEW TECHNOLOGIES

Encouraging the use of AI has opened numerous opportunities to create new experiences, especially in the field of media. The Media and Entertainment Industry has been an advocate for the use of AI and special effects. When coming to the Live Event production, the opportunity that the use of AI creates is humongous. Here are few new technologies that prove to be useful to enhance the experience and engagement of the audience:



3.1 Personalization:

3.1.1 Mood Adaptive Environment:

Imagine attending a concert, where the sensors can analyse your facial expressions to adjust the sound and lights of the surrounding. “Smart cameras analyse crowd reactions, dynamically adjusting lighting, visuals, and even setlists. This level of customization ensures each concert is a unique spectacle, catering to the preferences of a diverse audience” (Park. et al. 2020). The concert could turn into a calming environment from a vibrant party when a slow song starts to play thereby enhancing the emotional and psychological experience of the audience.

3.1.2 Curated Food and Beverage:

As mentioned before, AI assistants can assess your dietary preferences and suggest you with the most compatible food and beverages that might be available in the venue.

3.1.3 Virtual Assistance and Fan Interactions:

AI-powered assistants could answer questions about the event, venue layout, and artist information. They could even facilitate virtual meet-and-greets with performers or athletes, creating personalized and memorable moments for fans.

3.2 Immersion:

3.2.1 Interactive Projections in concerts:

Using interactive projections in concerts would possibly blur the lines between the audience and the performer creating a dynamic and responsive environment. For an instance, the walls could pulsate according to the audience’s roars and cheers, providing an immersive experience.

3.2.2 VR experiences:

Who wouldn’t want to peek at the backstage or experience the magic of the front row! Providing the audience with a VR would do just that. People can transport virtually to the backstage or put the audience right on the field during the game (Gomez, 2019). This would create unique immersive experiences to the audience defying the physical restrictions put forth.

3.3 Logistics and Safety:

3.3.1 Crowd Flow Optimization:

By combing the analysis of historical data and the real time crowd movements, AI can predict and identify the congestion points (Kiese, 2020). This allows for dynamic adjustments to venue layouts, signage, and personnel deployment, minimizing wait times and ensuring a smoother flow throughout the event.

3.3.2 Threat Detection and Smart Parking:

Intelligent security systems can analyse video footage and sensor data to identify suspicious behaviour or potential threats. This allows for early intervention and preventative measures, enhancing overall safety and security for all attendees. Smart parking systems can guide attendees to available spaces in real-time, reducing frustration and streamlining the arrival process. Similarly, AI can optimize departure routes based on real-time traffic conditions, making the exit process smoother and faster.

IV. CASE STUDY – DREAMHACK BEYOND THE GAME

DreamHack, is one of the leading e-sport festival. According to the website, it is the ultimate fusion of digital delight and sleep deprived excitement. DreamHack, in one of their festivals, implemented an AI powered platform that personalized the attendee experience. Here’s how:

- a) **Data Analysis and Recommendations:**
By analysing the data input and browsing history, the AI was able to suggest the games, workshops, merchandise and tournaments that might interest the attendee.
- b) **Dynamic Content and Gamification:**
To create a sense of accomplishment, they unlocked a new merchandise or a new level of their favourite game, once the attendee completed a workshop.
- c) **AI powered Chatbots:**
These chatbots helped in providing real-time assistance and answered questions about scheduling, venues and activities facilitating the attendees each step.

The outcome of this were quite fruitful as it has seen an increased customer engagement and satisfaction. This boosted their customer loyalty and ensured a reduced churning rate.



V. ETHICAL CONSIDERATIONS

While it is immersive and interesting to use AI in Media and live events, it is also important to follow the ethical measures in order to prevent any undesirable outcomes. Here are a few ethical considerations to keep in mind:

5.1 Data Privacy and Security:

Data collection and storage: Attendees must be informed about what data is collected, how it's used, and who has access to it. Robust security measures are crucial to prevent data breaches and ensure attendee privacy. (Citron & Mayer-Schönberger, 2019)

Algorithmic bias: AI algorithms trained on potentially biased data can perpetuate inequalities and unfair treatment. It's crucial to audit algorithms for bias and actively work to mitigate its impact. (Gebru et al., 2019)

5.2 Human Interaction and Agency:

Over-reliance on technology: Excessive dependence on AI-driven interactions can diminish human connection and spontaneous experiences. Striking a balance between personalized recommendations and organic exploration is essential. (Minsky, 2006)

Job displacement and automation: AI-powered solutions may automate certain tasks currently performed by humans. Addressing job displacement through training and reskilling programs is crucial. (Ford, 2019)

5.3 Governance and Accountability:

Ethical guidelines and frameworks: Clear ethical guidelines and regulatory frameworks are needed to govern AI development and implementation in the live event industry. (European Commission High-Level Expert Group on AI, 2019)

Transparency and explainability: AI algorithms should be transparent and explainable, allowing users to understand how decisions are made and address potential biases. (Mittelstadt, 2019)

Stakeholder engagement and oversight: Open dialogue and collaboration between event organizers, attendees, policymakers, and researchers are crucial for responsible AI development and deployment. (Jobin & Ienca, 2019)

REFERENCES

1. Chung, M., Koo, J., & Park, J. H. (2020). The impact of artificial intelligence on the live music industry. *Sustainability*, 12(15), 5984. <https://www.forbes.com/sites/cindygordon/2023/01/29/impact-of-ai-on-the-music-industry-part-2-of-a-two-part-series/>
2. De Freitas, A. R., & Gomes, A. S. (2019). Artificial intelligence in the sports industry: A systematic review. *Sports Management Review*, 22(4), 427-439. https://www.researchgate.net/publication/365250845_Literature_review_on_the_relationship_between_Artificial_Intelligence_Technologies_with_Digital_Sports_Marketing_and_Sports_Management
3. Feld, J., & Kiese, J. (2020). Artificial intelligence in event management: A theoretical framework and research agenda. *Journal of Hospitality Marketing & Management*, 29(7), 873-894. <https://www.tandfonline.com/toc/teta20/current>
4. Kim, J. Y., & Fesenko, J. (2020). The future of live events: How artificial intelligence is changing the game. *Journal of Hospitality & Tourism Education*, 32(2), 105-114. <https://www.linkedin.com/pulse/future-now-ai-changing-game-your-business-ready-play-matt-wallis>
5. Lee, N., & Kim, J. (2020). The impact of artificial intelligence on the event industry. *International Journal of Information Management*, 51(1), 102037. <https://link.springer.com/article/10.1007/s12525-020-00433-4>
6. IBM (2023). Real-time artificial intelligence and event processing. <https://www.ibm.com/blog/real-time-artificial-intelligence-and-event-processing/>
7. McKinsey & Company (2020). Live events after COVID-19: A new era of hybrid experiences. <https://www.mckinsey.com/featured-insights/mckinsey-live>
8. PwC (2020). The future of live events: How technology is transforming the industry. <https://www.pwc.com/us/en/tech-effect/emerging-tech/convergent-technologies.html>
9. The Ticketing Business (2023). Top 10 AI trends in live events. <https://www.eventtitans.com/etblog/powerofai>
10. World Economic Forum (2020). The future of live events: How technology is reshaping the industry. <https://www.weforum.org/agenda/2023/01/davos-2023-eight-ways-technology-will-impact-our-lives-in-the-future/>
11. European Commission. (2016, April 27). Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0679>
12. European Commission High-Level Expert Group on AI. (2019, February 8). Ethics guidelines for trustworthy AI. <https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



Exploring the Synergy of Artificial Intelligence in Sound Production: A Comprehensive Review

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ABSTRACT: This research abstract explores the transformative impact of artificial intelligence (AI) on the field of sound production. AI in the present time has emerged as a powerful tool as the intersection of technology and creativity is rapidly evolving, thus helps in shaping the landscape of sound engineering, audio processing and music composition.

This research paper provides an overview of the fundamental principles on the basis of AI in the context of sound production. By exploring the application of machine learning algorithms, neural networks, and deep learning techniques to analyse, synthesize, and enhance audio content this paper also tries to understand the integration of AI in sound production, that not only automates traditional processes but also introduces innovative capabilities that redefine the creative boundaries of audio professionals.

Music composition and arrangement is one of the significant area to be explored in AI's role. To generate original pieces or to assist composers in the field of music and other creative process, advanced algorithms are employed to examine vast datasets of musical compositions, learning patterns and styles. Thus the study also tries to investigate the impact of AI-generated music on artistic expression and the evolving relationship between technology and human creativity.

Furthermore, the research scrutinizes AI's impact to audio processing and enhancement. AI algorithms are applied to remove noise, improve audio quality, and even simulate the characteristics of different acoustic environments. The paper tries to understand the practical implications of AI-driven audio processing, ranging from improving the clarity of recorded speech to enhancing the immersive experience in virtual reality and augmented reality applications.

The use of AI in sound design for various media, such as films, video games, and virtual simulations are investigated and explored in this paper, as the AI-powered tools at present are being employed to create realistic and dynamic soundscapes, augmenting the overall sensory experience for users.

The challenges and ethical considerations related with the amalgamation of AI in sound production are being analysed in this paper, apart from that, issues related to copyright, intellectual property, and the potential displacement of human creativity are also critically examined.

As AI continues to evolve, its impact and role in shaping the future of audio content creation is poised to be a dynamic and influential force. Thus this comprehensive examination sheds light on the multidimensional impact of AI on sound production, emphasizing the symbiotic relationship between technology and creativity.

INTRODUCTION

The introduction outlines the background of AI in the context of sound production, emphasizing the growing role of AI in music composition, audio processing, and the development of virtual instruments. It sets the stage for understanding the potential benefits and challenges associated with the integration of AI in the field of sound production.

AI in Music Composition:

This section delves into the use of AI algorithms in music composition. It explores the evolution of AI-generated music, from simple melody generation to complex compositions. Examples of prominent AI-powered



music composition tools are discussed, highlighting their impact on creativity and the music industry. The convergence of artificial intelligence (AI) and music composition has opened new frontiers in the realm of creative expression. This abstract delves into the evolving landscape where human creativity collaborates with machine intelligence to generate novel musical compositions. As AI technologies continue to advance, their integration into the music composition process poses intriguing possibilities and challenges.

This exploration begins by tracing the historical context of AI in music composition, highlighting key milestones and breakthroughs. From rule-based systems to contemporary deep learning approaches, the evolution of AI in this domain reflects a fascinating journey where algorithms evolve in tandem with the changing dynamics of musical genres.

The abstract then examines the various AI models and techniques employed in music composition, emphasizing the role of generative adversarial networks (GANs), recurrent neural networks (RNNs), and transformer models. These algorithms exhibit the capacity to analyze vast datasets of musical styles, enabling the creation of compositions that resonate with both innovation and familiarity.

Furthermore, the ethical implications surrounding the collaboration between AI and human composers are considered. Questions pertaining to authorship, intellectual property, and the preservation of artistic integrity are discussed within the context of this emerging paradigm. The abstract acknowledges the need for a thoughtful discourse on the ethical dimensions of AI-generated music to ensure a harmonious integration with traditional creative processes.

NEURAL NETWORKS AND AUDIO PROCESSING

Here, the focus shifts to the application of neural networks in audio processing. The review investigates how AI is employed in tasks such as audio denoising, equalization, and spatial audio processing. Case studies and examples showcase the effectiveness of neural networks in enhancing the quality of audio production. exploration of the synergies between neural networks and audio processing, showcasing the transformative impact of artificial intelligence (AI) on the field. With the rapid development of deep learning techniques, neural networks have emerged as powerful tools for extracting meaningful information from audio data, enabling unprecedented advancements in tasks such as speech recognition, music analysis, and sound synthesis.

The paper begins by providing a comprehensive overview of the fundamental principles of neural networks and their application in audio processing. It explores various types of neural network architectures, including convolutional neural networks (CNNs), recurrent neural networks (RNNs), and more recent developments such as transformer-based models. Special emphasis is placed on understanding how these architectures can be tailored to address the unique challenges posed by audio data.

Furthermore, the research delves into the applications of neural networks in speech processing, investigating their role in automatic speech recognition (ASR), speaker identification, and emotion detection. The paper also examines the strides made in music information retrieval (MIR) through neural networks, discussing their effectiveness in tasks like genre classification, instrument recognition, and music generation.

In addition to summarizing existing literature, this research highlights recent breakthroughs and emerging trends in the field. It explores the integration of neural networks with other advanced technologies, such as transfer learning and attention mechanisms, to enhance the performance and efficiency of audio processing systems.

Moreover, the paper addresses the challenges and limitations associated with the application of neural networks in audio processing, including computational complexity, dataset biases, and the need for large labeled datasets. Strategies and ongoing research efforts to mitigate these challenges are discussed, offering insights into the future directions of this rapidly evolving field.

VIRTUAL INSTRUMENTS AND AI

This section explores the development of virtual instruments through AI technologies. It discusses how machine learning is used to model and replicate the sounds of traditional instruments, creating realistic and dynamic virtual counterparts. The review also addresses the implications of AI-generated instruments on the future of music production.

This research explores the synergistic integration of Virtual Instruments (VIs) and Artificial Intelligence (AI) to enhance the efficiency, accuracy, and versatility of scientific research and industrial processes. Virtual Instruments, encompassing software-based representations of physical devices, have become integral tools in various fields, enabling real-time data acquisition, analysis, and control. Concurrently, Artificial Intelligence techniques, including machine learning and neural networks, have demonstrated remarkable capabilities in pattern recognition, decision-making, and optimization.



In this study, we investigate the convergence of Virtual Instruments and AI, aiming to create a sophisticated framework that leverages the strengths of both technologies. The integration allows for the development of intelligent virtual systems capable of autonomously adapting and optimizing their behavior based on dynamic environmental conditions and user-defined objectives.

THE RESEARCH FOCUSES ON SEVERAL KEY ASPECT

:

Smart Sensing and Data Acquisition: Implementing AI algorithms in Virtual Instruments for intelligent sensing and data acquisition, enabling the instruments to adaptively optimize measurement parameters, filter noise, and enhance signal quality.

Automated Analysis and Interpretation: Employing machine learning algorithms within Virtual Instruments to automate the analysis and interpretation of complex datasets, allowing for real-time decision-making and insights extraction without manual intervention.

Adaptive Control and Optimization: Integrating AI-driven control mechanisms into Virtual Instruments to facilitate adaptive and self-optimizing systems. This includes applications in industrial automation, where the instruments can dynamically adjust parameters for optimal performance.

Human-Machine Interaction: Enhancing the user interface of Virtual Instruments through natural language processing and human-like interaction capabilities, making the instruments more user-friendly and accessible to non-experts.

Real-world Applications: Demonstrating the practical applicability of the integrated Virtual Instruments and AI in various domains, such as healthcare, manufacturing, and environmental monitoring, showcasing the potential for improved efficiency and innovation.

The outcomes of this research are expected to contribute to the development of next-generation Virtual Instruments with embedded AI capabilities, fostering advancements in scientific research methodologies and enhancing the performance of industrial processes. The integration of Virtual Instruments and AI holds promise for addressing complex challenges in diverse fields and opening new avenues for technological innovation.

AI AND SOUND DESIGN

The integration of AI in sound design is examined in this section. It explores how AI algorithms assist in creating unique and innovative soundscapes for various media, including film, video games, and virtual reality. The review also considers the impact of AI on the efficiency and creativity of sound designers.

Generative Models for Music and Soundscapes:

Generative Adversarial Networks (GANs): GANs have been used to generate realistic and novel music and soundscapes. These models can learn the patterns and structures present in existing audio data and create new, unique compositions.

Variational Autoencoders (VAEs): VAEs are another type of generative model used for creating music and sound. They work by learning a probabilistic mapping between the input data (e.g., existing music) and a latent space, allowing for the generation of new, diverse outputs.

Interactive and Adaptive Soundscapes:

AI has been employed to create interactive and adaptive sound environments. For example, systems use machine learning algorithms to analyze user behavior or environmental conditions and adjust the sound design accordingly, providing a more personalized and immersive experience.

Audio Synthesis and Manipulation:

AI algorithms are used to synthesize and manipulate audio, creating new sounds or modifying existing ones. This includes techniques like neural audio synthesis, where deep learning models are trained to generate realistic audio waveforms.

Emotion and Sentiment Analysis in Music:

AI is applied to analyze the emotional and sentimental content of music, which can then inform the design of soundtracks for various applications, such as video games or movies. Sentiment analysis models can assist in creating soundscapes that align with the desired emotional impact.

Automated Foley and Sound Effects:

AI tools are being developed to automate the creation of foley and sound effects. Machine learning models can be trained on large datasets of sound effects to generate realistic and contextually appropriate sounds for different scenes in media production.



Noise Reduction and Audio Enhancement:

AI techniques, including deep learning, are used for noise reduction and audio enhancement. These applications are valuable in post-production to improve the overall quality of audio recordings.

Collaboration between AI and Human Sound Designers:

Some projects focus on collaboration between AI systems and human sound designers. The goal is to enhance the creative capabilities of human designers by providing them with AI-assisted tools and workflows.

Challenges and Ethical Considerations:

The challenges associated with the synergy of AI and sound production are critically evaluated in this section. Ethical considerations related to copyright, authorship, and the potential displacement of human creativity are discussed, providing a balanced perspective on the implications of AI in the field.

CONCLUSION

The conclusion summarizes the key findings of the comprehensive review, highlighting the transformative impact of AI on sound production. It also discusses future directions and potential areas for further research, emphasizing the need for a balanced approach that leverages AI while respecting ethical considerations in the creative process.

REFERENCES

1. Geoffrey Hinton, Li Deng, Dong Yu, George E Dahl, Abdel-rahman Mohamed, Navdeep Jaitly, Andrew Senior,
2. Vincent Vanhoucke, Patrick Nguyen, Tara N Sainath, et al. Deep neural networks for acoustic modeling in speech recognition: The shared views of four research groups. *IEEE Signal Processing Magazine*, 29(6):82–97, 2012
3. Tagg, P. (1982). Analysing popular music: theory, method and practice. *Popular music*, 2:37–67. DOI: <https://doi.org/10.1017/S0261143000001227>
4. Shilling, R. D., & Shinn-Cunningham, B. (2002). Virtual auditory displays. In K. Stanney (Ed.), *Handbook of virtual environment technology* (pp. 65–92). Mahwah, NJ: Lawrence Erlbaum.
5. Goodfellow, J. Pouget-Abadie, M. Mirza, B. Xu, D. WardeFarley, S. Ozair, A. Courville, and Y. Bengio, “Generative adversarial nets,” *Advances in neural information processing systems*, vol. 27, 2014



A Study on the AI Applications Available in Canva for User Creatives

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ABSTRACT: As we are moving towards digital transformation with the advancement of AI technologies, the scope of these AI features in graphic design is tremendous. Graphic design is the process of making creative content using various elements and principles of design. To make the designs, we have various software like Adobe Photoshop, Adobe Illustrator, Adobe InDesign, Corel Draw, and much more. While these softwares cater to the needs of professional designers, Canva is a web-based graphic design platform that enables a common man to create designs in a much easier way for their day-to-day essentials like social media posts, brand posters, presentations, etc. Being more inclined to cater to the needs of the commoner, Canva has recently included a well-curated set of AI applications in its platform, which indeed enhances the quality of the design and reduces the time involved in the design process. The greatest advantage of this platform is that anyone can create personalised contents with ease with professional packaging. One of the commendable features is that one can access the Canva Platform on all gadgets, like PCs, laptops, tablets, and mobile phones, which can have a stable internet connection. This study provides insights about the Magic Creator AI tools in Canva and how they are capable of enhancing user creative. This research will contribute to a better understanding of the fact that AI is enriching the process of graphic design and reducing the time for the creative process.

KEYWORDS: Artificial Intelligence (AI), Graphic Design, Canva, Brand posters, Social Media Posts, personalised content, Creatives.

I. INTRODUCTION

In recent years, Canva has grown into an irresistible web-based graphic design platform for creating visual content, right from designs for presentations to branding and social media posts. With the inclusion of the new AI features, Canva empowers its users with a new arena to make the design process simpler and more creative. This research article specifies the unique features of the Canva AI apps and their role in enhancing user creative. This study will shed light on the notable addition of the Magic Creator AI tools and how they make the user content generation process much easier and more creative (Rezk, 2023).

The integration of AI in design platforms has been a growing trend, with various tools aimed at simplifying complex tasks and inspiring creativity. Previous studies have highlighted the potential of AI in enhancing user experience and creativity in graphic design platforms. Canva's incorporation of AI tools aligns with this trend, and understanding the effectiveness of these tools is crucial for both designers and platform developers (Watkins, 2023).

Existing literature emphasises the transformative role of AI in graphic design platforms. Studies have highlighted the potential of AI to boost creativity and streamline design workflows. With the introduction of Magic Creator tools in Canva, this research builds upon the existing knowledge base to explore the unique capabilities and impact of these features (Yaron, 2022).

II. THE LATEST AI TOOLS IN CANVA

Canva introduced its first AI feature, 'Background Remover', in the year 2019, after which the experts are striving hard to create more AI tools to embrace the creative process of user content development. For user convenience, Canva has grouped and listed the AI tools in its 'Magic Studio' section. Canva's AI tools are made available exclusively for its Pro or Teams category users. There are a minimal set of AI tools that are available to users for free on the Canva platform (Haneef, 2023).

2.1 Magic Media

Canva has been brilliant in incorporating technology from leading AI firms to give life to the Magic Media tool rather than developing its own generative AI model for images and video. The Magic Media tool has two variations:



2.1.1 Text-to-Image

Like DALL·E and Midjourney, which generate images based on user text prompts, Canva is powered by Stable Diffusion for generating images from the prompt texts. A simple description of the image will help Canva attempt to create it close enough to the prompt. The quality of the results will vary based on the prompts that the user provides.

2.1.2 Text to Video

Canva's Text to Video tool integrates with Runway, one of the leading AI technologies to carry out text-to-video, which acknowledges the quality of the generative video (Haneef, 2023).

2.2 Magic Eraser

The removal of unwanted objects from an image consumes a lot of time. The use of the AI-powered Magic Eraser enables the user to select the objects they want to remove from the image, and with just a click of the tool, the object gets removed. The Magic Eraser works effectively when one removes the objects from a less complicated background (Haneef, 2023).

2.3 Magic Edit

The Magic Edit tool helps the user select a particular object or portion of the image and replace it with a different object or graphic by receiving a few text prompts from the user. This will help in creating more mock-ups for the user branding process (Haneef, 2023).

2.4 Magic Grab

The Magic Grab tool changes static images into editable images by dynamically matching the pixels in the image to fill the gaps created as a result of shifting a particular portion of the image using this tool. One also has the privilege to use the Grab Text tool, which will help in converting static text to editable text that is part of the flattened image. The only restriction in this case is that Canva's library fonts are limited, and if the font selected for grab text is not available, then this tool can't work effectively (Haneef, 2023).

2.5 Magic Expand

The Magic Expand AI tool is used to extend part of the image beyond its borders. It works effectively in the case of landscapes when compared to complex backgrounds. One restriction of this tool is that it sometimes makes the extended portions look blurry, and in the case of portions with faces, it may turn out to be stretched or blurred (Kane, 2023).

2.6 Magic Morph

The Magic Morph tool allows the user to provide text prompts to transform the elements of design, such as shapes, text, and graphics. This tool helps the user create unique and creative images for marketing strategies to be used in their social media content and other branding initiatives. Canva's suggestive prompts or slight modifications to the suggestions can help produce the best-looking results (Kane, 2023).

2.7 Magic Write

Magic Write is Canva's built-in text generator, which helps generate written content for posts, blogs, presentations, and articles. This tool is very effective for short content. This tool reduces the time taken to generate content for multiple platforms (Kane, 2023).

2.8 Magic Design

The initial creation of designs in Canva was to customise the templates available inside Canva by uploading user images, logos, design elements, etc. After the advancement of the Magic Design AI tool in Canva, users can upload photos and include text prompts that describe what they need to generate suitable templates, which in turn is an asset as users don't have to work from scratch. The templates range from YouTube thumbnails to infographic presentations. The highlight of the tool is that one can choose suitable templates for various platforms (Haneef, 2023).

2.9 Magic Animate

Magic Animate helps in setting automatic animations for different objects and texts in a design in such a way that the flow of the animation is smooth. This tool provides a great set of predefined animation styles, and the user will have the ability to edit the basic controls of the animation, such as speed, position, rotation, etc (Haneef, 2023).

2.10 Instant Presentations

Instant Presentations is a feature of Magic Design in Canva where one can create an entire presentation in a single or couple of text prompts. Though Canva can't generate a complete content-packed presentation, it can definitely help in generating a first draft with minimal content, from which the user can develop the content effectively and save time. The restriction of this tool is that it is limited to a smaller number of slides (Haneef, 2023).

2.11 Beat Sync

Syncing the audio to the visuals is a tedious process. It takes a lot of time to tune the audio and video to sync. The Beat Sync AI tool in Canva automatically syncs the video clips to the rhythm of the audio by shortening or lengthening the clips as needed (Kane, 2023).



2.12 Magic Design for Video

Canva's Magic Design for Video takes the raw content and makes the video content ready for publishing with animations, music synced with the content, and appropriate captions. The user just needs to upload the files that need to be included in the video, and then Magic Design for Video will do its job for the user (Kane, 2023).

2.13 Translate

Canva Translate enables the user to translate their content into multiple languages. Though there are multiple tools on the net to translate the content, this built-in feature of Canva saves a lot of time, as the user will have all the provisions under one roof. This tool will help users reach a global audience by creating content in different languages (Haneef, 2023).

2.14 Magic Switch

The Magic Switch tool provides the best solution to reduce the struggle of resizing the user's creative to match the dimensions of various social media platforms and formats, such as Instagram and Facebook posts and Instagram and Facebook stories. Magic Switch automatically resizes each element of the user design and makes it easy to change as per the channel of branding (Haneef, 2023).

III. BENEFITS AND CHALLENGES

3.1 Benefits

Users can enjoy the benefit of making reasonable designs, even if they are not designers. Since Canva has more AI tools, it saves a lot of time and effort for the user while making creative designs. It provides a design platform to explore and experiment with different styles and concepts of design for the user.

3.2 Challenges

As Canva has a lot of AI tools and features, users will have limited control over creative planning and decision-making. Much reliance on automated designs will reduce the development of user design skills. There are possibilities that the AI-generated content may be misused or biased.

IV. DISCUSSION AND ETHICAL CONSIDERATIONS

While Canva's AI tools provide a great platform for everyone to create their own creative, it is very crucial to validate that they are not the replacement for human creative processes and decision-making. Complete control over the suggestions posted by Canva and use them suitably by refining and modifying the designs and templates as per user requirements. Key considerations on the ethical factor are data privacy, bias in algorithms, and misuse of the content.

V. FUTURE DIRECTIONS

Discussing the challenges and limitations of the AI apps in Canva, this section lists the scope for future developments. Today, developments in AI will help in creating more advanced AI features that can understand the prompts more effectively and respond in a progressive manner. Constant reiteration on the ethical and responsible aspects of AI apps in Canva will help increase the credibility of the content.

VI. CONCLUSION

The AI applications in Canva provide the user with valuable tools for creating and enhancing their creatives. By understanding the benefits, challenges, and limitations, the user gets the opportunity to create more effective designs with complete control over the creative design decisions. Effective development with great responsibility and ethical consideration will ensure AI-enabled creative design in a much more positive and enriched manner.

REFERENCES

1. Rezk, Sara Mohammed Mamdouh (2023) "The Role of Artificial Intelligence in Graphic Design," Journal of Art, Design and Music: Vol. 2 : Iss. 1 , Article 1. Available at: <https://doi.org/10.55554/2785-9649.1005>
2. Watkins, Stuart. "AI In Graphic Design: Impact on the Industry." *DevStars*, 2023, www.devstars.com/blog/the-impact-of-artificial-intelligence-on-graphic-design-industry.
3. Yaron, Meron. "Graphic Design and Artificial Intelligence: Interdisciplinary Challenges for Designers in the Search for Research Collaboration." *DRS2022*, 2022, <https://doi.org/10.21606/drs.2022.157>.
4. Kane, Ryan. "14 Canva AI Tools to Improve Your Design Workflow." *Zapier*, 31 Oct. 2023, zapier.com/blog/canva-ai.
4. Anwar Haneef, 2023, "Elevate your designs with AI-powered apps in Canva", www.canva.com, Canva, 2023, Available at www.canva.com/newsroom/news/canva-ai-apps.



Usage of Artificial Intelligence in James Cameron's "Avatar: The Way of Water"

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ABSTRACT: Films are a fantasy world where the audience tends to immerse themselves in the characters and the storyscape created by the auteur. To create stunning visuals and impactful storytelling, the directors incorporate various advanced technologies into filmmaking. Hollywood is a pioneer in producing movies that experiment with technologies like Computer Generated Imagery (CGI), Visual Effects (VFX), Virtual Reality (VR) and Augmented Reality (AR) elevating the cinematic experience for the viewer. James Cameron, director of Titanic and Terminator has pushed moviemaking to the next level with his technological innovations in his films. He used sophisticated Artificial Intelligence (AI) and Machine Learning (ML) algorithms in his film "Avatar: The Way of Water" and in its storyline which has been lauded by the critics worldwide. This review paper will describe the use of AI technologies in James Cameron's "Avatar: The Way of Water".

KEYWORDS: Films, Artificial Intelligence (AI), Avatar, James Cameron, CGI, Generative AI, VR, AR, VFX, ML, Weta FX.

I. INTRODUCTION

Artificial Intelligence (AI) has emerged as a central theme in modern cinema, providing filmmakers with a canvas to explore the complex interplay between humanity and intelligent machines. James Cameron's groundbreaking "Avatar" franchise, initiated with the 2009 film, has seamlessly woven AI into its narrative tapestry, creating a visually stunning and intellectually stimulating cinematic experience (Das, 2022).

At the heart of the "Avatar" franchise is the concept of avatars—biologically engineered entities that serve as a bridge between humans and the indigenous Na'vi people on the fictional moon Pandora. These avatars, controlled by human operators, represent a sophisticated form of AI, blending the organic and the synthetic to enable unprecedented exploration and interaction (Das, 2022).

The franchise delves into the ethical implications of AI as human characters navigate their existence through the lens of these avatars. The dual identity of the avatars prompts profound reflections on the boundaries of consciousness and the consequences of manipulating intelligent beings for human purposes. As the narrative unfolds, the franchise raises poignant questions about the responsible use of AI and the moral quandaries associated with the intersection of technology and humanity (Blinx AI, 2022).

Moreover, the "Avatar" franchise provides a cautionary tale about the potential militarization of AI. Initially designed for scientific exploration, the avatars become entangled in the power struggles of corporate and military interests, highlighting the risks of weaponizing advanced technologies. This narrative arc resonates with contemporary concerns surrounding the ethical development and deployment of AI, underscoring the importance of responsible innovation (Blinx AI, 2022).

In essence, the "Avatar" franchise serves as a cinematic exploration of AI's impact on society, morality, and the intricate relationships between humans and intelligent machines. Through its visually mesmerizing storytelling and thematic depth, the franchise contributes significantly to the ongoing dialogue in both the realms of science fiction and real-world discussions about the profound implications of artificial intelligence (Blinx AI, 2022).

II. AI TECHNOLOGIES USED IN AVATAR: THE WAY OF WATER

2.1 Machine Learning for Creature Creation

Weta's proprietary "Golem" system leverages machine learning algorithms to generate realistic creature locomotion and behavior. This system analyzes real-world animal movements and applies them to the film's diverse aquatic fauna, imbuing them with lifelike fluidity and believability (Thompson, 2023).

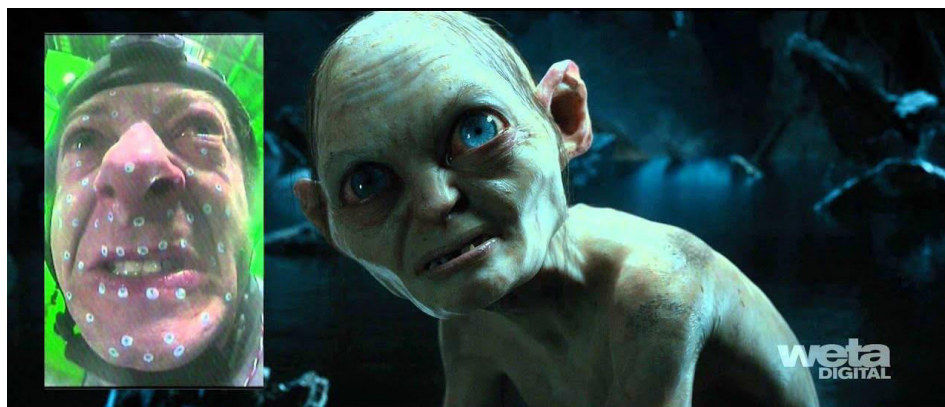


Fig. 2.1: Weta's proprietary Golem System

2.2 Procedural Animation for Environmental Detail

AI-powered procedural animation techniques breathe life into Pandora's oceans, generating dynamic and ever-evolving underwater landscapes, from swirling bioluminescent plankton to undulating coral reefs. This technology creates a sense of tangible immersion, where the environment is not static but actively reacts to the characters and narrative (Thompson, 2023).



Fig. 2.2: Procedural Animation for Environmental Detail

2.3 Fluid Simulations for Realistic Immersion

Weta's "Physically Based Simulation" (PBS) system utilizes fluid dynamics simulations to render realistic water behavior in real-time. This allows for stunning underwater sequences, from the gentle ripples of a passing creature to the crashing waves of a storm, further blurring the line between reality and CGI (Egbert, 2023).



Fig. 2.3.1: Fluid Simulations for Realistic Immersion

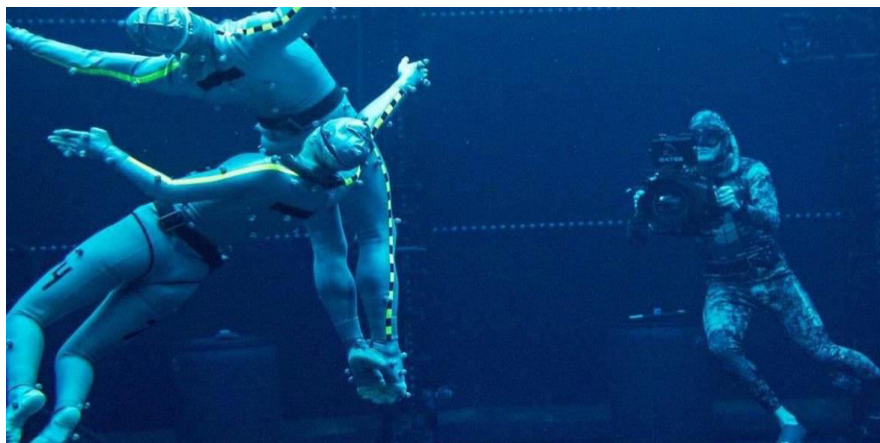


Fig. 2.3.2: Underwater filming

2.4 Deep Learning for Facial Animation

Advanced deep learning algorithms enhance the film's performance capture technology, translating the subtle facial expressions and emotions of the actors into the Na'vi characters with unprecedented accuracy. This emotional resonance fosters deeper connections between the audience and the characters, drawing them into the heart of the story (Egbert, 2023).



Fig. 2.4.1: Performance Capture Technology

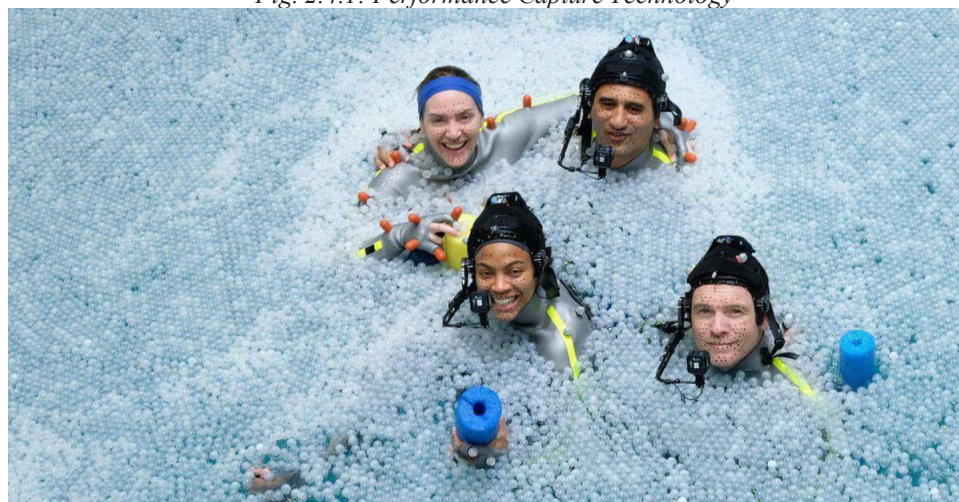


Fig. 2.4.2: Deep Learning for Facial Animation



III.WETA FX & AVATAR: THE WAY OF WATER

The New Zealand-based VFX company Weta FX teamed up with ace director James Cameron to create the fantasy world of Pandora, which differs from the actual environment witnessed in the movie Avatar 2009. Cameron went on with his team to a deepsea dive, which helped him set the environment of Pandora's underwater life, which does not exist (Greshko, 2022).

Quite aside from the sheer volume of work created for Avatar: The Way of Water, the project necessitated a range of never-before-seen innovations. From underwater performance capture to multi-coupled simulations, this system enabled believable underwater motion as well as complex interaction between thin film, sprays, splashes, and water volumes with skin, air, hair props, and costumes. To give the director an accurate blended view of live action and CG elements in real time while filming, a new 'depth compositing' workflow using machine learning was developed. It allowed James Cameron to see a pixel-perfect composition of plate and CG elements together in-camera in real time with accurate occlusions, including simulated elements such as water (Weta FX, 2023).

IV.ETHICAL CONSIDERATIONS AND THE FUTURE OF AI IN FILMMAKING

The dazzling spectacle of "Avatar: The Way of Water" showcases not just ground-breaking visuals but also the ethical tightrope filmmakers like James Cameron walk with AI's increasing role in cinema. While AI excels at animation, generating mesmerizing creatures and environments (as with Pandora's underwater wonders), its impact on storytelling raises concerns.

One ethical crux lies in the potential for AI to homogenize narratives. Relying solely on algorithms for plot generation or audience prediction could lead to formulaic blockbusters lacking artistic soul (Brundage et al., 2021). Additionally, AI-driven editing processes might prioritize emotional manipulation over authentic storytelling, risking viewer manipulation (Bode, 2022).

However, navigating these pitfalls is possible. By prioritizing human creative control over AI algorithms and leveraging AI as a tool to enhance, not replace, artistic vision, filmmakers can avoid these pitfalls. Cameron's use of AI in "Avatar 2" exemplifies this responsible approach: AI enriches the world and animation, but storytelling remains firmly in human hands.

Looking ahead, ethical considerations remain paramount. Transparency regarding AI usage, fostering diverse creative voices, and prioritizing human judgment over blind algorithm reliance are crucial. Only then can AI truly unlock its potential to revolutionize filmmaking without sacrificing the artistic spirit and ethical responsibility that define cinema.

V.CONCLUSION

"Avatar: The Way of Water" dives into a technological ocean, showcasing the transformative power of AI and its potential to revolutionize filmmaking. Weta FX, in collaboration with Cameron's visionary mind, wielded AI like a brush, painting a world teeming with intelligent, autonomous creatures and hyper-realistic underwater landscapes. Algorithms became actors, generating unscripted interactions and breathing life into digital characters. Real-time rendering empowered filmmakers with unparalleled flexibility, while AI algorithms analyzed film data, whispering suggestions for cuts and emotional beats. Cameron himself aptly noted, "AI is not replacing artists; it's freeing them." Indeed, this film is a testament to that freedom, pushing the boundaries of storytelling and cinematic experience. While ethical considerations linger, "Avatar: The Way of Water" stands as a beacon, illuminating the path for a future where AI and human ingenuity swim hand-in-hand, weaving tales that are both wondrous and thought-provoking. The ripples of this technological wave will undoubtedly reshape the cinematic landscape, leaving audiences gasping for air and eager for the next plunge into the depths of immersive storytelling.

REFERENCES

1. Das, Siddhartha. "Exploring the Technology Behind the Mind-Blowing Visuals of 'Avatar: The Way of Water.'" *fugitives.com*, 25 Dec. 2022, fugitives.com/avatar-2-technologies-behind-visuals-explained-2022-film-james-cameron.
2. Blinx AI, "Artificial Intelligence Behind Avatar: The Way of Water." *medium.com*, 16 Dec. 2022, medium.com/@blinx/artificial-intelligence-behind-avatar-the-way-of-water-9c0ad13875a6.
3. Fx, Weta. *Our Work on Avatar: The Way of Water | Wētā FX*. 30 Mar. 2023, www.wetafx.co.nz/articles/our-work-on-avatar-the-way-of-water.
4. Greshko, Michael. "The Seas of Avatar: James Cameron on the Real Science Behind His Fictional World." *Science*, 13 Mar. 2023, www.nationalgeographic.com/science/article/avatar-the-way-of-water-james-cameron-science-oceans.



5. Letteri, Joe. "Technology and Innovation in Avatar: The Way of Water." DigiPro '23: Proceedings of the Digital Production Symposium, 3, pp. 1–3. <https://doi.org/10.1145/3603521.3604300>.
6. Egbert, C. (2023, December 14). Avatar: The Way of Water's 'Flesh' tech pushes facial animation to new depths. <https://www.wetafx.co.nz/films/filmography/avatar-sequels/>
7. Thompson, A. (2023, December 15). Avatar: The Way of Water review: a visually stunning return to Pandora. <https://www.hollywoodreporter.com/movies/movie-reviews/avatar-the-way-of-water-james-cameron-sequel-1235279758/>
8. Brundage, Miles, et al. (2018), "The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation." arXiv preprint arXiv:1802.07228.
9. Bode, Peter F. 2022, "Artificial intelligence and media manipulation: Towards ethical and regulatory frameworks." In Artificial Intelligence and Communication, pp. 351-363. Springer
10. Weta Digital. (2023, January 19). Avatar: The Way of Water: Weta Digital's VFX breakdown. <https://www.youtube.com/watch?v=pk-NBKpJ65g>



How Does AI Affect the Creative Process and the Experiential Connection to Making Art

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ABSTRACT: As an artist, art is something that is akin to our soul, more than just a beautiful, perfect work to be admired. A single painting or any form of art can evoke a million emotions in the viewer, from happiness to sadness and more. The feel artists get while holding a cat in their hand, the bushy fur rubbing their skin, is not the same as seeing the same visual in a video. In the same way, the feel artists get while applying paint to the canvas with a rough brush, the smell of the paint, the strokes, all these human experiences and connections have become limited when it comes to auto-generated artwork. The emotional connection to art and the experience of doing it is what make human art powerful. Artificial Intelligence (AI) has almost captured all the creative fields and is progressively reshaping human interactions and how they perceive various forms of media. AI may produce extraordinary, perfect, and more appealing works, but it lacks the experiential and personal connection that human artists bring to their work. In this article, interviews with artists will be conducted to understand how AI is affecting the creative process and the experiential connection while making art.

KEYWORDS: Artificial Intelligence (AI), Art, Emotion, Experiential Connection, Auto-Generated Art Work

I. INTRODUCTION

Art is an image of human creativity, expression, and innovation. Starting from the earliest cave paintings to the renowned masterpieces of the Renaissance, from cubism to abstract paintings, art has evolved alongside human development. The human urge to create art is as old as civilization itself. From cave paintings to contemporary masterpieces, art has served as a mirror for our souls, reflecting our emotions, experiences, and understanding of the world. But in recent years, a new player has entered the creative arena: artificial intelligence (AI). However, with the advent of artificial intelligence, painting has taken an unprecedented leap forward. AI has not only challenged traditional practices of artistry but has also opened new possibilities for artistic creation.

II. THE EVOLUTION OF ART

Throughout history, painting has undergone various transformations from time to time. Humans' beings have been painting for more than 40,000 years, expressing their thoughts right away and paving the way for artistic expression (Özcan, 2023). In the beginning, man recorded the events he observed in his environment (e.g., cave paintings). After the invention of mirrors in the 4th century BC, artists were able to observe and capture their own reflections, further adding a new dimension to their work. Later, when technology developed and paper was invented, artists gained the ability to draw and depict various subjects, further enhancing their creative thoughts.

III. THE EMERGENCE OF ARTIFICIAL INTELLIGENCE

In recent years, through the development of computer sciences, artificial intelligence has emerged as a powerful tool that enables problem solving in various fields through a robust database (IBM, 2023). The art world has undergone a revolutionary change with the introduction of AI models that can produce unbelievable visuals with multiple options. In today's era, art has become something any lay person can create with just the correct prompt. Artists no longer need to rely solely on their painting skills; they can now equip themselves with the creative potential of AI to produce stunning visuals. This intersection of technology and art has sparked both excitement and debate. (Özcan, 2023),

IV. UNDERSTANDING ARTIFICIAL INTELLIGENCE AND HUMAN CREATIVITY

At first glance, artificial intelligence and human creativity appear to be identical and persuasive. But upon closer inspection, one is centered around algorithms and data analysis, while the other incorporates inspiration and feelings



from the individual. Artificial Intelligence is often regarded as the product of technology and computer science, primarily intended to produce results in a matter of seconds. Artificial intelligence makes conclusions based on preexisting patterns and generates outputs by learning from massive amounts of data flow (Panda, 2023). However, human creativity is sometimes perceived as this enchanted force that enables us to generate original ideas. We get ideas inspired by the environment we are placed in, for example, the cool breeze sweeping our faces and the warm sunlight kissing us in the morning while we stand on the shore with bare feet. All these sensory feelings contribute to the work we do. The personal emotional connection continues while reproducing it on the canvas, this is what gives the art a personal touch.

V. THE UNIQUE QUALITIES OF HUMAN CREATIVITY

There is no denying the fact that humans are superpowers on this planet. They are like those exotic creatures of the artistic world. The unique quality that differentiates them from the AI is the ability to think outside the box and come up with original ideas. Though AI can give countless variety of outputs, the one thing that it lacks is the special touch of human ingenuity. Humans are highly capable of drawing inspiration from their experiences, emotions, and imaginations. They can dive into their deadliest thoughts, their inner feelings, and use their experiences to create something truly meaningful. Although AI may be able to analyze data and duplicate patterns, is it capable of expressing the intricacy of human feeling through dance, or can it just not capture the essence of love in a painting? Technically, it cannot, and that's where our uniqueness shines brightest. (Panda, 2023).

5.1. The Value and Limitations of Human Creativity

Humans have the incredible ability to imagine, innovate, and create extraordinary things from nothing. Their creative potential knows no bounds, especially when it comes to painting, writing, composing, and creating something new. Though we love to praise the value of human creativity, there are also some limitations to be aware of. Humans can be a bit volatile when it comes to inspiration. One day they feel loaded with bursting ideas and ready to conquer the world; the next day they stare at a blank canvas or a blinking cursor, wondering where all those brilliant thoughts went. Another limitation is that sometimes their creative endeavors don't quite achieve their satisfaction. And then the issue of time constrains, even a decade will never be enough for an artist to satisfactorily complete a work. "Art is never finished, only abandoned," by Leonardo da Vinci, clearly defines it. These limitations shouldn't dampen the enthusiasm for human creativity. After all, it's what distinguishes humans from AI-powered devices and robots. Rather than stressing the imperfections, one should embrace them.

5.2 Limitations and Challenges Faced by Human Artists

Being a human artist comes with its fair share of limitations and challenges. There's the never-ending challenge of overcoming the dreaded "creative block." It is similar to attempting to extract juice from a parched lemon. Waiting for inspiration to hit as you stare at a blank canvas or an empty page attempting to clear the creative block. And not to forget about the never-ending quest for originality. In an era where everything seems to have been done before, how to create something that's unique. The pressure is on to create something that will leave people awestruck. Hence, there are joys and frustrations in being a human artist.

VI. THE IMPACT OF AI ON THE ART WORLD

6.1 The Changing Artist's Role

The role of artist has been redefined and transformed with the rise of AI-generated artwork. While traditional methods of painting and sculpting required dexterity and skill with a brush, the focus has now shifted to storytelling and prompt crafting. Nowadays, humans can communicate their artistic vision through words rather than brushstrokes by using AI as a tool to make visuals in response to verbal stimuli. (Özcan, 2023),

6.2 The Role and Rise of Prompt Engineering

In the field of AI-generated art, prompt engineering has become essential. It takes a profound understanding of ideas, light, colour, and artistic movements for artists to create prompts that effectively elicit the intended visual results. Prompt engineering creates a mutually beneficial interaction between human creativity and AI capabilities by allowing artists to direct AI models to generate visuals that correspond with their artistic aims. (Özcan, 2023).



6.3. The Future of Art Professions

With the advancement of AI, the future of certain art professions hangs in the balance. Illustrators, for example, may witness a decline in demand as AI tools become more accessible and skilled at creating visuals. On the other hand, brand-new fields like prompt crafting and prompt engineering might develop and call for people with a strong background in both technology and the arts. In the future, the role of the artist may include prompt writing or feeding in your ideas through words.

VII.CONCLUSION

AI algorithms, with the power and ability to ideate, examine data, and discern patterns, can streamline the creative process, particularly enhancing exploratory and transformational creativity. AI cannot accurately duplicate the distinct human essence and contextual intricacies that lie at the heart of imaginative creativity, which is deeply interwoven with human emotion, intention, and meaning. As a result, artists prefer to acknowledge AI as an aid that magnifies and complements their creative prowess rather than supplants it. In the battle between AI created artworks and human creativity, there are no winners or losers. They each bring something valuable to the table. But as humans, our emotions tend to trigger when we analyze an artwork done with human touch. Embracing both sides of this creative coin, can create wonders beyond our wildest dreams.

REFERENCES

1. Panda, T, (2023), Will Artificial Intelligence Destroy Human Intelligence and Human Emotion in Creative Arts?, LinkedIn, Available at : <https://www.linkedin.com/pulse/artificial-intelligence-destroy-human-emotion-creative-tapas-panda>
2. Özcan, B, (2023), The Impact of AI on the Art World, Toolify.ai, Available at : The Impact of AI on the Art World(toolify.ai)
3. Hutson, J, (2023), AI and the Creative Process: Part One, How does generative artificial intelligence upend conventional understandings of who is and what makes for a true artist? JSTOR Daily, Available at : <https://daily.jstor.org/ai-and-the-creative-process-part-one/>
4. Hutson, J, (2023), AI and the Creative Process: Part Two, How does generative artificial intelligence upend conventional understandings of who is and what makes for a true artist? JSTOR Daily, Available at : <https://daily.jstor.org/ai-and-the-creative-process-part-2/>
5. Logan, S, (2023), The impact of AI in creative industry, Twine, Available at : <https://www.twine.net/blog/impact-of-ai-in-creative-industry/>
6. Lytho, (2023) Available at : <https://www.lytho.com/blog/ai-artificial-intelligence-creative-impact/>
7. IBM, What is artificial intelligence? (2023) Available at : <https://www.ibm.com/topics/artificial-intelligence>



Artificial Intelligence Using E-Commerce Industry

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ABSTRACT: In today's tech-driven era, Artificial Intelligence (AI) stands as a pivotal force reshaping daily life, including the landscape of commerce. This paper explores the burgeoning influence of AI within the E-commerce sector, illustrating its integration into various facets of online shopping experiences. From personalized customer interactions to advanced data processing, AI is revolutionizing E-commerce portals, enhancing efficiency, and fostering customer-centric approaches. Through an analysis of AI applications in E-commerce, this paper aims to illuminate the transformative impact and future prospects of this symbiotic relationship.

I.INTRODUCTION

Artificial Intelligence (AI) is a field of computer science dedicated to mimicking human thought and behavior, encompassing learning, planning, and problem-solving. Today, AI is indispensable in the tech industry, permeating nearly every sector. Whether recognized or not, AI permeates our daily lives through mobile devices, TVs, gadgets, electric vehicles, and more. Its applications span diverse fields including education, healthcare, entertainment, gaming, and notably, E-commerce. E-commerce platforms leverage AI for personalized customer interactions, from tailored responses to inquiries to reminders about wish lists and alerts on deals. Through AI, E-commerce optimizes customer engagement, expands its clientele, and enhances product recommendations, marking it as a prime example of AI's transformative impact.

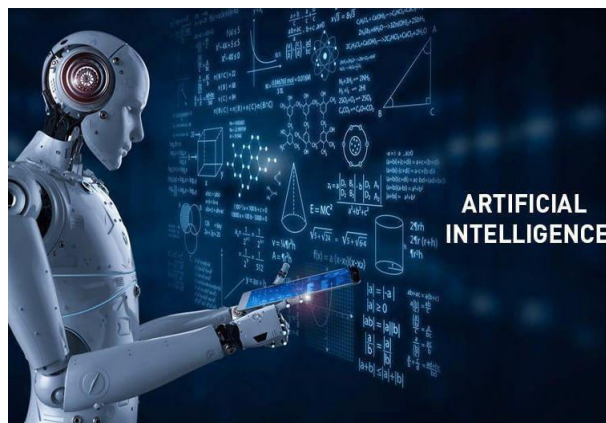
E-commerce businesses are revolutionizing customer communication through innovative tools like chatbots and self-generated feedback forms. AI plays a crucial role in helping these businesses identify the right customers, leading to improved targeting and enhanced experiences. Customers, in turn, benefit from AI-driven E-commerce portals offering intelligent visual and advanced voice search capabilities, along with superior after-sales services, resulting in heightened satisfaction.



II.AI KEY TECHNOLOGIES

Machine learning :

Frequently used interchangeably with AI nowadays, there is a significant difference. While AI encompasses the concept of "thinking" machines from science fiction to self-learning computer code developed by industry and academia, Machine Learning (ML) is the practical implementation making the greatest strides in reality. At its core, it's technology designed around the principle that instead of explicitly programming machines for every task, we should feed them data and allow them to deduce the rules themselves. This is achieved through simulated experimentation, where machines analyze datasets using algorithms capable of learning from the data to better process subsequent information.

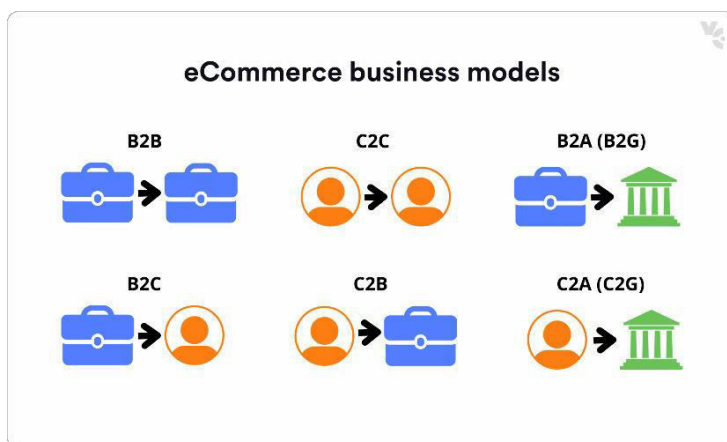


Neural Network:

Algorithmic models are structured as progressive networks of hubs, exchanging data to derive increasingly precise importance and value from it as it traverses the chain. Their intricate, interconnected design allows for more thorough handling of information compared to traditional, linear algorithms, enabling more intelligent output from vast, complex, and unstructured datasets. The term "artificial neural networks" (ANNs), often abbreviated as "neural networks," refers to the system of biological neurons in the animal brain that machine learning seeks to replicate.

III.E-COMMERCE MODELS

An e-business model is the approach a company adopts to achieve profitability on the Internet. Various buzzwords describe different aspects of electronic business, with subgroups like content providers, auction sites, and pure-play Internet retailers in the business-to-consumer space. E-commerce or Electronics Commerce business models can be broadly categorized into the following types:



IV.APPLICATION OF AI IN E-COMMERCE

(I) Chatbots:

E-commerce websites are leveraging chatbots to enhance their customer support services. Chatbots, a prime application of artificial intelligence, interact with customers via SMS or chatbot messages to understand their preferences and provide assistance.

(II) Intelligent Visual Search:

Picture recognition platforms empower visitors to e-commerce websites to search by image rather than text, facilitating the matching of relevant items to specific images. An example of visual search is Pinterest's Visual Search feature, allowing users to select an item in any online photo and prompt Pinterest to display similar items using image recognition software.

(III) Advance Voice Powered Search:



Voice is progressively replacing text-based queries in online shopping. The accuracy of voice recognition has significantly improved, with nearly 70% of requests being natural or conversational language interactions with Google Assistant. Smart devices featuring voice-controlled personal assistants include Apple's HomePod powered by Siri and Amazon's Echo fueled by Alexa. Alexa's voice-based search functionality can even be utilized to place orders for delivery from Amazon. According to a study by ComScore, it's projected that half of all searches will be conducted via voice by 2020.

(IV) Real-Time Product Targeting:

E-commerce companies aim to replicate the best offline shopping experiences in the online space by providing customers with a hassle-free way to discover the products they seek. Artificial intelligence (AI) plays a pivotal role in delivering personalized product recommendations, discounts, and offers to online customers, thereby enhancing their shopping experience.

(v) AI Virtual Assistant:

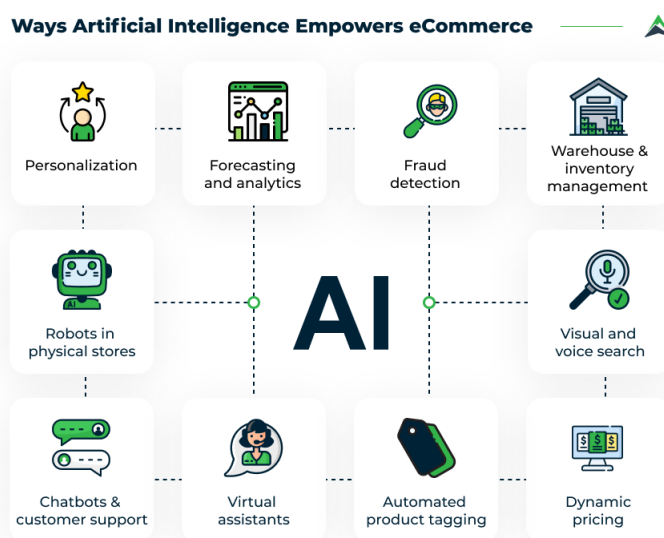
An e-commerce virtual assistant is a software expert proficient in providing business support services and technical assistance. It is capable of executing tasks or services for individuals. The term "ChatBot" is also often used interchangeably with the virtual assistant. Recently, Lenovo has announced its virtual assistant to compete with Google Now and Cortana. Lenovo's assistant, known as CAVA, relies on AI-powered deep learning. It boasts features such as face and voice recognition, aiding in data management and various tasks.

(VI) Security Reinvented: AI's Role in Fraud Detection:

AI isn't just about enhancing convenience; it's about fortifying security. Advanced fraud detection algorithms analyze transaction patterns, preemptively identifying and preventing fraudulent activities. This ensures trust and confidence in online transactions, safeguarding both businesses and consumers.

(VII) The Future Unveiled: Beyond Transactions to Experiences:

The fusion of AI and e-commerce transcends mere transactions. It's a paradigm shift towards creating immersive shopping experiences. As AI continues to evolve, every click, recommendation, and interaction propels us into the future of retail, where the lines between physical and digital commerce blur. Brace yourself for the AI revolution – it's not just changing how we shop; it's transforming the very essence of retail.



V.CONCLUSION

AI is gaining momentum in the online business industry, yet it remains imperfect. It enables businesses to offer a more personalized experience to customers, analyzing vast interactions to target offers down to individual customers. E-commerce firms are continually enhancing their AI tools to better understand market demand and partnering with other organizations to create more sophisticated solutions. AI technology is expected to have a significant impact on the e-commerce industry, transforming how we shop and search online, and creating opportunities for data science, machine learning, and IT jobs. However, this evolution may also render some skills obsolete, potentially leading to unemployment in certain sectors in the future.



REFERENCES

- [1] Dhavare, U. and Kulkarni, U. (2015). Natural Language Processing using Artificial Technology in Computer Science, 4(2)
- [2] Gupta, S., Borkar, D., De Mello, C., Patil, S. (2015). An ECommerce website based Chatbot, International Journal of Computer Science and Information Technology, 6(2)
- [3] Kapoor, D. and Gupta, R.K. (2016). Software cost estimation using artificial intelligence technique, International Journal of Research and Development in Applied Science and Engineering, 5(4)
- [4] Kar, R., & Haldar, R. (2016). Applying Chatbots to the Internet of Things: Opportunities and Architectural Elements. Inter. Journal of Advanced Computer Science and Applications 7(11), 147-154.
- [5] Pannu, A. (2015). Artificial Intelligence and its Application in Different Areas, Internal Journal of Engineering and Innovation Technology, 4(10)
- [6] Pan, Y.H., 2016. Heading toward artificial intelligence 2.0. Engineering, 2(4):409-413.
- [7] Sahu, M. (2016). Plagiarism Detection using Artificial Intelligence, International Journal of Scientific and Technology Research, 3(1).
- [8] Soni, D.V. (2020). Emerging roles of Artificial Intelligence in e-commerce, International Journal of Trend in Scientific Research and Development, 4(5): 223-225.
- [9] The Application & Impact Of Artificial Intelligence (Ai) On E-Commerce, Mr. Ambar Srivastava, Assistant Professor, Eternal University, Baru Sahib, Himachal Pradesh



AI in Fintech

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ABSTRACT: Fintech and artificial intelligence (AI) are the topics of this article. You can see how AI fits into Financial Technology from this explanation. In financial technology, AI reduces costs and saves time. It thus provides a thorough understanding of AI's application in Fintech. Fintech has revolutionized the provision of financial services by using technology to more effectively perform many traditional banking tasks. In terms of technological use, the Fintech Space has talked the most about the adoption of disruptive technologies like artificial intelligence (AI). An AI: What is it?

Fintech: what is it? AI in Fintech: who introduced it? Fintech's nature, components, growth, types, and uses are all covered. The study's findings offer light on and provide an understanding of AI in Fintech.

INTRODUCTION

"A new financial industry that applies technology to improve financial activities" is the definition of Financial Technology, or Fintech (Schueffel 2016, p. 45). "Building intelligent machines" is the goal of artificial intelligence (AI) (McCarthy 2004, p. 2). Artificial Intelligence (AI) is a powerful tool that financial sector companies can employ to manage and analyze data from various sources. By addressing the difficulties they have on a daily basis in providing basic services like payment processing, these inventive solutions assist banks. Globally, this industry has been expanding quickly. A subfield of computer science known as artificial intelligence, or AI, was developed to carry out activities that normally require human intelligence.

AI seeks to create machines that can simulate thought processes. These devices are usually introduced to lessen the workload or stress of the human beings.

Financial Technology can be shortened to Fintech. It's a general word that covers the application of technology to provide better financial services. Fintech seeks to improve the effectiveness and accessibility of financial services to meet the demands of both individuals and enterprises. It's easy to understand as financial services integrating technology.

AI IN FINTECH

Artificial intelligence and its technologies applied to the financial sector are referred to as Fintech. AI is mostly employed for time-saving, accurate information provision, quick information manipulation, and other reasons that lessen the need for human labor in the financial sector. Because of its efficiency, creativity, and enhanced customer experiences, it is a key factor in the transformation of traditional financial services.

1. Collaborative AI introduction in Fintech:

It is impossible to pinpoint one organization or person as the originator of AI in Fintech. Throughout time, a range of innovators, researchers, and organizations have worked together in a collaborative endeavor. Incorporating AI into many Fintech components has been made possible by financial institutions, startups, and technology corporations. The banking sector became aware of AI's potential advantages for process automation as technology developed.

2. Operation or nature of Fintech

- ☐ Fintech companies leverage technology to enhance and mechanize financial services.
- ☐ This can include developing new software and technologies to make financial transactions faster, cheaper, and secured.
- ☐ They also often have a strong digital presence with many Fintech Companies communicating and interacting with customers through mobile apps and websites.
- ☐ Fintech companies may operate as standalone entities or they may partner with traditional financial institutions such as banks, to offer e services to customers.



3. Elements of Fintech:

The elements of Fintech encompass a variety of technologies and strategies that contribute to the integration of technology into financial services. Some of the elements are:

Mobile banking apps

- ☐ Block chain technology:
A decentralized and secure way of recording transactions, often associated with cryptocurrencies like Bitcoin, but also used in various financial applications.
- ☐ Digital payment:
Technologies facilitating electronic and contactless payments, including mobile wallets, digital currencies, and peer-to-peer payment platforms.
- ☐ Cloud computing:
Use of cloud-based infrastructure to store and process financial data, providing scalability and accessibility.
- ☐ Insurtech:
Technological innovations in the insurance industry, such as digital platforms for policy management, claims processing, and personalized insurance solutions.
- ☐ Artificial intelligence and Machine learning(AI/ML):
Utilized for data analysis, risk assessment, fraud detection, and providing personalized financial recommendations.
- ☐ Crowdfunding platforms:
Online platforms that connect individuals or businesses seeking funding with potential investors.

4. Types of Fintech Company:

- ☐ Payment and transactions:
Fintech companies in this category focus on developing new way for individuals and business to make and receive payments such as digital wallets, mobile payments, and peer to peer money transfer.
- ☐ Lending and credit:
Fintech companies in this category focus on specialize in providing loans and credit to individuals and businesses, often using online platforms and data analysis to make lending decisions.
- ☐ Insurance:
Insurtech is the sub-category of the Fintech which is founded on using technology to improve the way insurance products are designed, sold, and serviced. It also includes providing new ways for individuals and businesses to purchase and manage the insurance policies.
- ☐ Personal finance and wealth management:
Fintech companies in this category focus on helping individuals to manage their personal finances, such as budgeting, saving, and investing. Some Fintech companies may also offer automated financial advice using algorithms and machine learning.
- ☐ Block chains and digital currencies:
Fintech companies in this category focus on developing and implementing block chain technology and digital currencies such as Bitcoin and Ethereum, to provide to provide secure and transparent transactions.
- ☐ Regtech:
It is a sub-category of Fintech which is focused on using technology to comply with financial regulations. It helps financial institutions and Fintech companies to manage their compliance list and to comply with regulations more efficiently.

5. Growth of AI in Fintech:

The growth of AI in Fintech provides a short development in transformation, revolution, and landscape of financial services. Fintech companies are increasingly integrating AI technologies to enhance efficiency, improve decision making and deliver more personalized services. Automation powered by AI helps in routine tasks, fraud detection, and allowing financial institutions to operate more efficiently. Advanced data analytics facilitated by AI is providing deeper insights into consumer behavior, enabling personalized



financial recommendations, and more accurate risk assessments. AI's role in credit scoring has expanded, considering broad range of data points for a more nuanced evaluation of creditworthiness. AI also helps in reshaping the investment landscape, offering algorithm-driven advice and portfolio management.

6. Transformation of finance after the usage of AI:

- ☐ Customer service of AI is conversational interferences and chatbots. It becomes common in future.
- ☐ New standard of security passwords, usernames, and security questions will become major superior in few years. AI will become major solution for security.
- ☐ Face recognitions, finger prints, and many biometric data are used for security recognition of customer data.

7. Uses of AI in Fintech:

- ☐ 32% of banks are already using AI.
- ☐ It helps up to 70% of operational cost reduction.
- ☐ Analyze massive amount of data quickly.

8. Application of AI in Fintech:

- ☐ Automation:
AI automates routine tasks, improving operational efficiency in processes such as data entry, customer service, and transaction processing.
- ☐ Credit decision:
AI algorithms analyze diverse data points to assess creditworthiness, enabling more accurate and dynamic credit decisions for individuals and businesses.
- ☐ Trading:
AI-driven algorithms execute trades at high speeds, leveraging realtime market data and historical patterns to optimize trading strategies.
- ☐ Risk management:
AI models analyze large datasets to identify patterns and potential risks, enhancing the accuracy of risk assessments.
- ☐ Fraud prevention:
AI technologies continuously monitor transactions, using pattern recognition and anomaly detection to swiftly identify and prevent fraudulent activities.
- ☐ Personalized bank:
AI enables the customization of banking experiences, tailoring services based on individual preferences, transaction histories, and behavioral patterns.
- ☐ More accurate prediction:
Advanced data analytics powered by AI allows for more accurate predictions regarding market trends, customer behaviors, and other factors influencing the financial landscape.

CONCLUSION

The result of the article is to provide the clear and crispy gist about the AI in Fintech. AI in Fintech is mostly used in financial digital transformation. In 2023, Top 5 Startups of AI in Fintech such as Axyon AI, Forwardlane , Token Metrics , AiDA , Active.ai . Top 5 Cases of AI in Fintech are Wealthfront , Kasisto, Adyen,Perfios and Suplari are create great impact about AI in Fintech. Nowadays and Future, AI becomes easier and convenient way to use in our rush life. It provides and clarifies the importance of AI in Fintech.

REFERENCES

1. Muryjas, P. (2014). Business intelligence for small and medium sized businesses. *Actual Problems of Economics*, 151(1), 469–476.
2. Neagu, B. (2016, May). *How disruptive is fintech really?* Available from <http://banknxt.com/56717/disruptivefintech/>
3. Neil Dunay, Artificial Intelligence Software Market Forecasts, 29th June 2020,
4. O'Brien, J. A., Marakas, G., Management Information Systems, McGraw-Hill Education, 2011, 704 pp.



5. Teece, D. (1986). Profiting from technological innovation: Implications for integration, collaborations, licensing and public policy. *Research Policy*, 15(6), 285–306. doi:10.1016/0048-7333(86)90027-2
6. Yeoh, W., & Popovič, A. (2016). Extending the understanding of critical success factors for implementing business intelligence systems. *Journal of the Association for Information Science and Technology*, 67(1), 134–147. doi:10.1002/asi.23366



AI in Media

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ABSTRACT: Modern innovation has significantly impacted the PR industry, leading to the rapid adoption of unused PR innovations and the integration of AI in PR. Indonesian open relations professionals are now using AI for Media Checking to gather faster and more valuable data. This has led to a shift in PR roles, with AI tools such as media monitoring increasing effectiveness and adequacy. However, AI cannot replace the essential role of human communication, particularly in PR work. A study of 245 participants found that when users connected with Microsoft's Small Ice Chabot, they displayed unique identity characteristics and communication qualities from their interactions with people. Clients were found to be more open, pleasing, extroverted, honest, and self-disclosing when working with people than with AI. These findings align with Michel's cognitive-affective framework and the Computers Are Social Performing Artists Worldview, and suggest potential hypotheses for future PR practices.

INTRODUCTION

The growing frequency of artificial intelligence (AI) in diurnal life has led to multitudinous ethical debates, including how AI can make moral opinions, how these decision-making processes can be transparent to humans, and who should be held responsible for these opinions. The development of ethical AI aims to cultivate public trust and acceptance of AI technologies. Enterprises have been raised about the business motorists for monetizing AI, as successful strategies for AI development frequently produce a lack of translucency. The media plays a significant part in shaping public opinion and acceptance of AI, as it influences what kind of AI is developed and how AI is regulated by the government. It's important to dissect how issues of AI and ethics are portrayed in the media, as there's no original reason to suspect a mismatch between media representation and public prospects. Former work on the media representation of other new technologies has emphasized the disruptive eventuality of exorbitantly enthusiastic media content to distort intimately available information. Lack of engagement in the public discussion by experts and informed decision makers may lead to a polarization effect in the public, where "hype and stopgap" and "dusk and doom" perspectives distort the debate. In recent times, news stories detailing the palpable developments of AI've urged discussion on the effect that narratives, both real and fictional, have on the public perception of AI. The benefits and challenge of AI in digital Art

THE BENEFITS AND CHALLENGES OF AI IN DIGITAL ART BENEFITS OF AI IN DIGITAL ART

1. AI-generated art faces several challenges, including the potential loss of human touch and authenticity, ethical issues surrounding copyright ownership, and democratization of art creation. While AI can produce visually beautiful art, it may lack emotional nuance and intimate narratives.
2. Additionally, AI can promote creativity by allowing artists with financial or physical limitations to express themselves creatively.
3. AI systems can also support creative collaboration, allowing artists to explore novel concepts and aesthetics.
4. Furthermore, AI can produce personalized and customized art, making it more interesting and tailored to individual tastes. Addressing these issues is crucial to ensure legal compliance and protect author rights.
5. Art Restoration and Preservation: AI is essential to the preservation and restoration of art.
6. AI systems are capable of analyzing historical artworks, spotting deterioration or damage, and suggesting repair plans. For the benefit of future generations, this technology helps preserve our culture.

CHALLENGES OF AI IN DIGITAL ART

1. AI-generated art faces several challenges, including the loss of human touch and authenticity, ethical issues regarding copyright ownership, overreliance on technology, potential discrimination and bias, technical



complexity, and sustainability concerns. While AI can produce visually beautiful art, it may lack emotional nuance and intimate narratives.

2. Additionally, AI algorithms can reinforce preexisting biases, such as gender, racial, or cultural prejudices, if not properly vetted.
3. Artists unfamiliar with programming or machine learning may find it difficult to understand how to use AI technologies in their work.
4. Technical complexity can also discourage artists from fully utilizing AI in their creations.
5. Sustainability concerns arise due to the high processing power required to train AI models, which can increase energy use and carbon emissions.
6. Therefore, AI developers and artists must consider the environmental impact of their work.

THE RISE OF AI IN DESIGN CHALLENGES AND OPPURTINIES

1. **Loss of Creativity:** The use of AI in design has raised concerns that it may lead to a loss of creativity. With the use of automated design creation, designers may rely too heavily on AI to create designs, reducing their creativity and individuality.
2. **Dependence on Technology:** The integration of AI in design may also lead to a dependence on technology. With the reliance on AI for design tasks, designers may become less skilled in manual design tasks and may struggle to create designs without the aid of AI.
3. **Bias in Design:** The use of AI in design may also lead to biased designs. AI algorithms may have inherent biases that reflect the biases of their creators. This can result in designs that are discriminatory or exclude certain groups of people.
4. **Privacy Concerns:** The use of AI in design also raises concerns about privacy. With the collection and analysis of user data, there is a risk that personal information may be used in ways that are not intended.

AI RESHAPING THE FILM INDUSTRY

In Paris, UNESCO hosted a conference inviting filmmakers to confront the fast-approaching age of artificial intelligence in their industry. Addressing a conference on AI in Paris, organized by the UN's cultural and scientific agency UNESCO, Joseph McIntyre Nichol, who directed Charlie's Angels and Terminator Salvation, set out an apocalyptic vision. Mg is not so sure, however. "I think given the degree to which it is improving itself, it's going to be very difficult to tell Almodóvar apart from AI, which breaks my heart, but I think that's how powerful AI is becoming". He says AI is a groundbreaking new tool that will democratize filmmaking by making it quicker, easier and cheaper, creating opportunities for talented individuals armed with nothing more than their smartphones and AI tech. "I think this can open up filmmaking to more people," - Valenzuela said.

AI FOR RESPONSIBLE SOCIAL MEDIA MANAGEMENT

It allows marketers in overall social media management like creating and publishing content that is not only high-quality but also highly relevant to their audience.





Some of AI tools in music production:-



MAGENTA

Magenta Studio is a collection of music plugins built on Magenta's open source tools and models. Using cutting-edge machine learning techniques for music generation, Magenta is available to use as a standalone application or as a plugin for Ableton Live.



ORB PRODUCER SUITE

Helping producers generate melodies, bass lines, and wavetable synthesizer sounds, Orb Producer utilizes state-of-the-art technology to create infinite musical patterns and loops for musicians to base ideas off.



Ampere

Ampere is designed to require a minimum amount of input to create a unique piece of music. The music generated is generated from scratch before being composed, performed, produced and recorded for content creators of all kinds. There's no pre-created material, licensed music, or premade loops.

AI in Podcasting

The easiest way to podcast is to use AI tools and podcasting platforms that simplify and automate the process. AI can help with scripting, transcription, audio enhancement and podcast editing, while platforms like Anchor make it easy to share podcasts.



To create an AI podcast, start by choosing a topic and creating an outline. Use AI tools to create a script, convert it to an audio file, enhance and edit audio, and share your podcasts with an AI- powered podcast host.

AI can produce podcasts

It can automate various stages of the podcast production process, from scripting to audio enhancement, editing and distribution. Artificial intelligence tools can handle many of these tasks, saving time and effort and ensuring a high-quality end product. With so many different AI tools on the market, it's important to know which ones work best for your podcast production.

Here are the 8 best AI podcast software or apps along with their main features and price:

1. OpenAI ChatGPT: Known for its advanced language models, ChatGPT can help with scripting and content creation. It uses machine learning algorithms to generate natural language output.
2. Description: This tool provides audio editing, transcription and podcasting features. It also has an Overdub feature that can create a synthetic sound from your audio file.
3. Podcast: Provides an easy way to convert blog posts and other written content into podcast episodes using text-to-speech technology.
4. Spotify Anchor: This podcast host offers an AI-powered transcription service and makes it easy to share podcasts on Spotify and other platforms.
5. AI Voiceover Platforms: Services like Replica Studios can produce high-quality AI voiceovers , perfect for solo podcasters who need a co-host.
6. Lyrebird AI: This is a text-to-speech tool that lets you create an AI voice clone for your podcast.
7. Title: This creates an attractive video of your podcast for social media platforms like Tik Tok,
8. increasing the visibility of your podcast.
9. Riverside .FM: This podcast platform offers high-quality recording and also transcribes podcasts in real time, which can be useful for show notes.

Finally, promoting an AI podcast is as important as creating it. Sharing your podcast on social media platforms, embedding it on your website and optimizing it for search engine visibility with RSS feed automation will help you reach a wider audience.

Combining AI with podcasts opens up new possibilities. AI tools have made podcast production an easier and more streamlined process, allowing anyone to become a podcast host.

The future of podcasting is here, and it's powered by artificial intelligence.

CONCLUSION

Artificial intelligence is an umbrella term that covers many different technologies such as like machine learning, expert systems, robotics, computer vision, natural language processing, and more. Many companies already realize that is the way forward for progressing business. AI will continue to influence social media networks as the technology develops and evolves. When it comes to AI in social media, the sky is the limit. The combination of AI and social media are proving to be greatly beneficial for businesses. The future is bright and exciting for any business that is harnessing AI tools. There is no question that AI will have profound impacts on media markets.

REFERENCES

- [1] M. N. O. Sadiku, "Artificial intelligence", IEEE Potentials, May 1989, pp. 35-39.
- [2] Jannat Jalil, "AI is reshaping filmmaking", Euronews , 24/10/2023 - 07:25
- [3] Debug solution,"The Rise of AI in Design: Benefits and Challenges , linkedin ,May 25, 2023
- [4] Cliff Weitzman , "Dyslexia & Accessibility Advocate, CEO/Founder of Speechify Dyslexia & Accessibility Advocate, CEO/Founder of Speechify ", May 04, 2023



AI in Resume Building and Report Writing

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ABSTRACT: Artificial intelligence (AI) refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems. Today, the term AI describes a wide range of technologies that power many of the services and goods we use every day. AI has its powerful track in almost all the areas around the globe. It plays a predominant role in students' career by guiding them to prepare resume and report. The corporates in the competitive world expect outstanding resume and report from the freshers which is satisfied with the help of AI. It serves as a strong platform in designing resumes and reports by customization and personalization, accessibility and affordability and improved keyword optimization. This paper provides intelligence on AI in resume building and report writing. As main insights, the paper highlights the role of AI in this field and the student's change over in course of pre-evolution and post-evolution of AI in resume building and report writing. The paper also adds information on the significance, pros and cons and the data statistics of AI used in resume and report building. As a whole paper emphasis on the rise in AI's role in the recruitment process as well in the field of education. This paper is prepared to study the position of AI in developing a resume and report.

KEYWORDS: Complex tasks, resume, report, strong platform, significance.

“ Our Intelligence is what makes us human, and AI is an extension of that Quality”

INTRODUCTION

Humans are living beings with specialised abilities known as Intelligence. Artificial Intelligence is a tool that works beyond human intelligence. AI has its influential effectiveness in the nook and corner of every area of activity including resume building and report writing. A resume is a formal instrument of an employee which is prepared to demonstrate his qualification and skill sets. It is the base for hiring process. The employee has to prepare the resume with great responsibility to market himself in the corporate world. In this scenario the interviewees seek the help of AI. There are numerous AI to build a resume in an expertise manner with various layouts in it. It serves as a convenient platform to build their resume. On the other hand report writing refers to a framing an article on a specified topic, researching about it and converting the collected data into a report. Students and scholars undergo report writing quiet often as a part of their curriculum. AI also prepares report on the topic specified within seconds which is further used by students. It also guides them to prepare resume and report.

OBJECTIVES

- └ The main goal of AI in resume writing and report building is to satisfy the expectations of the researchers, scholars or the students who are in need of it.
- └ It aims at investigating and analysing a problem and coming up with a solution in the form of resume or report.
- └ It's objective include generating outlines for preparing a report, providing various layouts and slides to make the users feel comfortable.
- └ It aims at rendering the resume customisable and user friendly in the creation process and presenting the data in clear and organised way.
- └ The AI in report writing aims to provide a consistent level of output by completing complex data summarization.

ROLE OF AI IN RESUME BUILDING AND REPORT WRITING

- └ **Impressive assistant:** The AI acts as an assistant for building a resume and a report. It is designed to support and enhance the human involvement. It provides guidance and assistance to humans for their improved and better progress in their work.
- └ **Acts as a game-changer:** The advanced software programs of AI utilize machine learning techniques to



assess the users and suggest them with better word choices, improve sentence structure and offer comprehensive writing tips.

- └ **Creates pre-draft content:** AI in report writing helps in saving time to research before starting to draft the content. It comprises all the information and provide as a data for preparing the report easily.
- └ **Tailor the resume to fit:** AI can respond well to industry, position, and even experience-level of prompts and can exactly draw up a resume that the employee requires.
- └ **Notice errors and rectifies:** AI could improve resume writing by pointing out potential errors and facts that may be incorrect and rectify it. It also suggests keywords to be included in the resume which is an added advantage.

AI TOOLS

SL.NO	RESUME BUILDING	REPORT WRITING
1.	Rezi	Writesonic
2.	Kickresume	INK editor
3.	ChatGPT	Anyword
4.	Skillroads	Jasper
5.	Jobscan	Wordtune
6.	Resume.co	Grammarly

PRE-EVOLUTION AND POST EVOLUTION OF AI

Before the introduction of AI people had sufficient knowledge in building resume, had self confidence to do their own job and to crack their interview. People had their own skills to perform the task assigned to them. Each student is trained to prepare their own resume from their schooling itself. It an art which is inculcated for every student and when they upgrade themselves for their higher studies in Universities, they had the ability to prepare their own resume and report manually. They had no other way rather than learning to build a report or a resume. They considered resume or report building as a significant process of updating themselves and to market themselves in the growing corporate world.

Invention of AI is a great platform to perform tasks and it is an advanced technology which performs beyond human power. It saves time, energy and serves as a great guide to prepare a resume or a report. But it also has some demerits in it. The bitter truth is that after introduction of AI, few people became too inactive to perform their task. They solely depend on AI for every work. It created to feel lethargic and paved way for procrastination. It also made the people to accept that they are not capable of doing their own job such as preparing their report or resume. But the rest of them use AI accordingly. This serves as a great pathway towards success. AI is always beneficial but it depends upon how people use it.

Pros of AI in resume building and report writing:

- └ AI has the potential to generate content according to the job seeker's qualification, skills and his experience and upgrades the resume.
- └ AI assists in piling up the related information to prepare the report and even guides to prepare an error



free report.

- └ It saves time and energy for preparing the resume and report.

Cons of AI in resume building and report writing:

- └ AI downgrades human potential to act creatively.
- └ There are possibilities to reject the resumes and reports prepared with the help AI by the hiring companies or institutions.
- └ There are possibilities for providing wrong information as content.

CONCLUSION

In this rapid evolving world, where technology continues to reshape industries, job seekers and researches must strike a balance between embracing AI's capabilities and infusing their own distinctive identities to succeed in their field. It is important to understand that AI tools are not designed to eliminate human involvement but rather to support and enhance it. Moreover, the use of AI in resume building and report writing can actually create new opportunities. Writers could have more time to deepen their expertise, engage in research, or innovate in their writing styles and techniques. Usage of AI requires careful handling as well. Whether to decide using AI as a tool or sticking with the cognitive skills of human, it is mandatory to remember have a friend, not a robot. To conclude the use of AI in resume building and report writing would be a great platform to get an idea on making a resume or report professionally but inculcating our own creativeness and skills will bring perfection to it. Thus human skills should be in collaboration with AI.

REFERENCES

1. Singh, A., Pal, S., & Singh, S. P. (2022). BASED ON THE APPLICATION OF AI TECHNOLOGY IN RESUME ANALYSIS AND JOB RECOMMENDATION. 07, 816–823.
2. Woodside, J. (2022). Use of an artificial intelligence-based résumé critique product and co-operative education students' job search outcomes. September.
3. Drewery, D., Woodside, J., Eppel, K., Flatt, A., Hayden, J., Skuza, E., & Michaud, J. (2021). Artificial Intelligence and Résumé Critique Experiences.
4. Khaire, P. S. A., Birari, M. R. B., Jagale, M. R. S., Patil, M. S. A., & Paul, M. S. T. (2021), Review on Resume Analysis and Job Recommendation using AI. May.
5. Chou, Y. (2020). Based on the application of AI technology in resume analysis and job recommendation. 291–296.
6. <https://openquire.com/marketwatch-artificial-intelligence-report-writing/>
7. <https://careerimprovement.club/blog/ai-job-search-statistics>



AI Routine Gears for Logistics –A Study with Special Reference to Ports and Terminals

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ABSTRACT: Smart port advances are digital-based, multi stakeholder frameworks. Harbour partners can utilize these innovations to reconfigure fundamental capacities and make strides existing operations to reengineer how work gets done without major speculations in unused foundation and gear. Appropriately, our audit of smart port advances does not incorporate conventional IT administrations, such as information standardization and frameworks integration, or frameworks such as terminal mechanization frameworks that serve as it were a single entry. Smart advances incorporate frameworks that bolster fundamental foundation, as well as, for case, devices for dealing with cargo, overseeing activity, managing with traditions, guaranteeing security, and observing vitality utilize. A few advantage the extent of harbour accomplices whereas others bolster particular organizations between, for illustration, a harbour specialist and terminal administrators.

KEYWORDS: AI, cargo, logistics

INTRODUCTION

The coordination's industry is scandalous for its complexity and challenges, which incorporate overseeing complex systems, optimizing transportation courses, and estimating request. Within the early days, coordination's included the method of transportation, warehousing, and dispersion of merchandise. Be that as it may, as the supply chain has gotten to be more complex over the a long time, businesses have turned to innovation to assist them oversee the method more efficiently.

Artificial Insights AI is one of the mechanical progressions that have the potential to revolutionize the coordination's industry. With the capacity to prepare endless sums of information in real time, AI is quick getting to be the go-to arrangement for coordination's companies looking to streamline their operations. In this web journal post, we'll see at a few of the AI utilize cases within the coordination industry.

Artificial insights AI can streamline operations in shipping, with critical applications counting robotized preparing and real-time analytics. Machine learning employments an organization's verifiable and real-time information to assist relieve mitigate dangers and serves as a supportive apparatus that helps in decision-making forms. As the utilize of manufactured insights in logistics grows, it gets to be more basic than ever some time recently that organizations embrace these devices to optimize their operations to keep a competitive edge.

AI could be a important apparatus in most businesses and its potential to gotten to be more is difficult to disregard. Remaining up to date on the current state of undertakings as the innovation develops and creates permits organizations to embrace more AI devices into their operations, particularly in shipping and delivery.

OBJECTIVES

- To recognize the unmistakable quality of AI in harbour management
- To distinguish the impact of AI Applications in Delivery
- To investigate the consolidation of AI in Logistics

CURRENT STATE OF THE SHIPPING INDUSTRY

The shipping industry is recuperating from disturbances and delays experienced amid the widespread, but it's still encountering precariousness. Companies can anticipate accumulations and delays, holder deficiencies, and fluctuating costs. Coordination AI innovation can increment productivity and perceivability to assist shipping businesses overcome industry challenges.



AI complements human capabilities whereas dispensing with the require for them to lock in in schedule work. This advantage makes AI a imperative apparatus at every arrange of the conveyance handle. All inclusive, over 77 of companies are either as of now utilizing or within the handle of arranging their AI integration. Mechanical patterns guarantee to grandstand the positive affect of AI within the shipping industry within the long run, indeed in case the majority of prompt integrative show up to be small scale.

AI Applications in Delivery: There are a few critical benefits of utilizing fake insights in coordination's, from upgrading how stock is stuffed into conveyance vehicles to mapping devices for conveyance drivers. These capacities work together to upgrade the supply chain's effectiveness, security, and client experience.

Delivery Apps

Well-known within the e-commerce industry, these apps straightforwardly advantage both the organization and the client base. They optimize conveyances by advertising the speediest and most cost-effective courses for conveyance vehicles. With steady climate estimates and activity overhauls, course alterations are made in genuine time to guarantee opportune conveyances. At long last, applications like these permit clients to track their orders and get exact conveyance gauges, making strides communication and straightforwardness over all channels.

Drone Deliveries

Drones are changing last-mile conveyances as they can explore through congested ranges and complex territories to provide bundles expeditiously. With the assistance of AI calculations, rambles can avoid collisions, identify deterrents, and adjust to changing climate conditions. Organizations like Amazon and Walmart are as of now utilizing independent conveyance rambles, joining this eco-friendly, cost-effective, quick delivery service into their offering.

Chatbot Integration

Chatbots coordinates integrate into client benefit channels give clients moment delight by reacting to inquiries, advertising following capabilities, and giving advance real-time help, decreasing human intercession. These frameworks can too plan or reschedule conveyances taking after client demands, which gives extra comfort for the client and coordination's team.

Optical Character Recognition

Optical character acknowledgment OCR increments proficiency in information passage by extricating information from images for assist handling. It can moreover identify measurements, permitting organizations to offer more exact costing gauges . OCR helpfully diminishes the hazard of mistakes, computerizes the data entry prepare, frees up representatives to center on more value added assignments and moves forward generally conveyance effectiveness for organizations.

Assistance of AI in Shipping

AI as of now conveys a few benefits in coordination's , from fetched decrease to quicker turnaround times and way better chance moderation . By consolidating Web of Things IoT innovations , organizations optimize their AI utilize . IoT gadgets communicate with each other, trading and collecting data that can better vehicle utilization , warehousing and following conveyances . Here are a few of the benefits of coordination AI

- Predictive upkeep AI calculations analyze vehicle sensor information to recognize potential issues and designs to assist maintain a strategic distance from armada downtime.
- Intelligent distribution center frameworks Distribution centers optimize operations by inclining on machine learning calculations that can computerize picking frameworks to streamline stock management.
- Efficient scaling: AI is developing quick sufficient to adjust to the requests of the shipping industry, whether it is obliging expanding arrange numbers or extending conveyance systems without a hitch.
- Intelligent activity administration Anticipating blockage can make strides activity stream and speed up transportation. This advantage is especially appropriate to the less than truckload LTL carriers.
- Reducing overheads: Course optimization, prescient upkeep and asset assignment , AI can offer assistance diminish operational costs. It can moreover maximize the utilize of transportation resources whereas bringing down costs by advertising effective cargo stacking and unloading strategies.
- Better analytics: Much appreciated to straightforwardness in analytics and valuable bits of knowledge from AI, partners are enabled to create data driven choices for stock management.



- Performance estimating Chronicled information can offer assistance experts superior get it their vessels corruption rate, making the opportunity to plan upkeep or overhaul conveyance frameworks or vehicles promptly.
- Safety and compliance: AI frameworks can screen conveyance vehicles or shipping holders and, within the case of vehicles, uphold security conventions . Checking driver behavior and guaranteeing they follow to directions can decrease mischances and lawful liabilities.

Challenges of AI in Shipping

AI brings critical points of interest to coordination's and shipping organizations. To coordinated innovation into operations effectively , partners must address the challenges that come with AI. Overcoming these deterrents can permit them to utilize AI in their commerce to its full potential.

- Job substitution Commonly seen over all businesses may be a fear that AI will supplant employments . Organizations are mindful for teaching representatives on using AI and how it complements them rather than evacuating their center functions.
- Adaptation costs: The beginning speculation can be high, which is especially challenging for littler companies. Be that as it may , you'll be able break up these costs over time by receiving unused innovations sparingly or on a set plan . The return on venture will be well worth it.
- Cyber security: This challenge particularly applies to AI conveyances . Numerous individuals have concerns almost ramble conveyances past the visual line of locate . Joining IoT gadgets to screen ranges and real time data processing to relieve potential cyber assaults and burglary can boost cyber security.

Embracing the Control of AI within the Shipping Industry

As AI develops , it may bypass the require for a persistent bolster of instructions to help its forecasts and usefulness , permitting innovation to incline into computerization more. This development will increment numerous stakeholders believe within the innovation , contributing to a strong and productive arrange build while liberating up profitable assets for organizations to reinvest into stock , operations and workers .

Purolator International offers supply chain and coordination's arrangements that make the foremost of what AI offers the shipping and conveyance industry. A leader in cross border shipping, we offer on time conveyances , trustworthy client benefit and adaptable arrangements that meet your organizational needs.

Route Optimization

Planning and overseeing transportation courses is one of the elemental errands within the coordination's industry. With the assistance of AI, coordination's companies can optimize their courses based on different variables such as activity , climate , and conveyance plans . AI powered course optimization program is able of distinguishing the foremost effective course for each conveyance , essentially lessening transportation costs and moving forward conveyance times.

Optimise Operation and Labor Hours

Providing exact Assess Time of Entry Estimated time of arrival figures by keeping track of different vessel course and creating real time execution figures to enhance berthing time and remain length of vessels. Harbour administration will be able to address top operation prerequisites and enhance labor hours.

Container Analytics & Viable Observing of Goods and Vehicles

With accessible holder data , successfully screen sorts of merchandise , remain length within the ports, and other data that can offer assistance administration superior dissect and track developments of holders . This will give opportunity to better plan and oversee operation.

Real-time Programmed Distinguishing proof of Merchandise utilizing OCR

OCR innovation is basic within the harbour environment. It is able of recognizing and perceiving alphanumeric or symbol based characters and connecting them to advanced data holder codes, wagon codes, barcodes, vehicle number plates, serial numbers and, in common , any code with a institutionalized structure within the coordination's and harbour industry.

Identify Best Routes

Predictive transport displaying empowers brilliantly investigation of conveyance courses , both sea and overland. This advance courses and plans , kill potential wasteful aspects and make strides in general harbour action . Nowadays , manufactured insights calculations have the capacity to dissect all sorts of factors , from the climate to the request for products . Knowing this data is fundamental to create vital choices quickly.



Improve Working environment and Workforce Safety

Cut mishaps and make more secure working environments by setting alarms and recognizing unsafe or unordinary exercises . AI can too make strides security and cyber security, which is progressively critical in ports. All these employments lead to advancement , supportability and fetched investment funds in day to day errands in ports and their operations

Cut Carbon Emission

AI and advanced analytics can give a way better picture of sea vitality effectiveness from a harbour point of view and appear how harbour administration , harbour framework advancement and harbour calculated frameworks contribute to by and large oceanic vitality effectiveness and discuss quality.

DOLES OF AI

- Increase Port Efficiency: Use data analytics to form the proper commerce choices and run operations successfully . The concept is to utilize shrewd innovation to extend a port s productivity , make strides execution and financial competitiveness.
- Improve Holder Harbour Execution Record CPPI Identify holes and openings for enhancement in holder harbour operations, and to invigorate a exchange among key partners for essential improvements.
- Improve safety: With machine vision, progressed analytics, and robotized alarms , diminish work environment episodes , make strides security compliance, and increment in general security score of harbour operation.
- Monitor and Degree ESG Endeavors and Results With made strides effectiveness ports can offer assistance diminish carbon outflow from both ocean and arrive transportation accomplices . Natural maintainability endeavors as well as security change both contribute to ESG scores of harbour operation and can be checked and impacts measured.
- There are various AI Utilize Cases for Harbour and Terminal operations that can be beneficial to harbour administration whether it s to progress security , increment productivity , and help measure ESG comes about .
- AI Counseling Bunch has experienced and master Administration specialists and AI Designers that can assist you build up your AI Utilize Case to address your harbour operation prerequisites

Investigating the long run of AI within the supply chain and coordination's industry

The future of AI in coordination's and supply chain is exceedingly promising and is expected to bring noteworthy changes to the industry. Here are a few of the patterns and forecasts for long-standing time of AI in supply chain and logistics

Increased selection The appropriation of AI in supply chain is expected to extend essentially within the coming a long time as more companies realize the benefits of AI in making strides effectiveness , lessening costs, and improving client experience.

Autonomous vehicles: Independent vehicles in coordination's are expected to extend , driving to the more productive and secure transportation of merchandise . Self driving trucks and rambles can decrease the require for human drivers and progress the speed and exactness of deliveries.

Predictive analytics: Prescient analytics will play a noteworthy part within the supply chain and coordination's future. AI powered apparatuses can analyze huge sums of information to foresee request designs , optimize courses , and avoid disturbances some time recently they occur.

Seamless integration: Coordination AI innovations with existing frameworks will ended up more consistent and streamlined, making it less demanding for companies to execute and advantage from AI solutions.

Enhanced safety and security: AI advances such as facial acknowledgment , biometric recognizable proof , and machine learning calculations will upgrade security and security measures in supply chains and coordination's . This will offer assistance to decrease dangers such as robbery , extortion , and terrorism.

Sustainability: AI will too play a part in advancing maintainability within the supply chain and



coordination's industry. Optimized courses , diminished emanations , and effective vitality utilization can offer assistance diminish the industry's natural impact.

CONCLUSION

AI is set to revolutionize the coordination's industry. With the capacity to process vast sums of information in real time, AI has the potential to streamline coordination's operations, decrease costs, and move forward proficiency . From course optimization to request estimating to prescient support , the utilize cases for AI in coordination's are perpetual . Coordination's companies grasping AI and other innovative headways will unquestionably pick up a competitive advantage within the ever evolving coordination's landscape.

AI within the supply chain and coordination's industry presents a critical opportunity for businesses to move forward effectiveness and client encounters . AI driven arrangements can offer assistance computerize and optimize course arranging , request determining , stock administration , and real time following forms . This, in turn, can lead to taken a toll reserve funds , speedier conveyances , moved forward asset utilization, and way better client satisfaction.

Moreover, AI in supply chains can be utilized to personalize client encounters and avoid false exercises , which are basic viewpoints of the industry. The potential for AI to alter the supply chain and coordination's industry is monstrous , and its affect will proceed to develop within the coming a long time . As innovation propels , businesses must grasp the control of AI and contribute in its usage to stay competitive. Creating AI driven arrangements requires skill , and businesses can look for organizations with AI advancement companies to assist coordinated AI into their operations viably . AI's potential to optimize forms and give superior client encounters is without a doubt a game changer for the supply chain and coordination's industry.

REFERENCES

1. Addo-Tenkorang, R. and Helo, P. T., 2016. Big data applications in operations/supply-chain management. A literature review. *Computers & Industrial Engineering*, 101, pp. 528–543.
2. Arunachalam, D., Kumar, N. and Kawalek, J. P., 2018. Understanding big data analytics capabilities in supply chain management. Unravelling the issues, challenges and implications for practice. *Transportation Research Part E: Logistics and Transportation Review*, 114, pp. 416–436.
3. Backhaus, K., Erichson, B., Plinke, W. and Weiber, R., 2016. *Multivariate Analysemethoden*: Springer Gabler.
4. Cavicchi, B., 2018. You can't afford to be static: Rolling with the punches in forecasting. *ABERDEEN*, 2018.
5. <<https://www.ibm.com/blogs/business-analytics/aberdeen-reasons-adopt-rolling-forecasts/>; <https://www.ibm.com/downloads/cas/BRE7ALNK>> [Accessed 13 May 2019]
6. Christopher, M. and Peck, H., 2004. Building the resilient supply chain. *The International Journal of Logistics Management*, 15(2), pp. 1–14.
7. Czaja, L., 2009. *Qualitätsfrühwarnsysteme für die Automobilindustrie*: Gabler.
8. Fan, H., Li, G., Sun, H. and Cheng, T., 2017. An information processing perspective
9. on supply chain risk management. Antecedents, mechanism, and consequences. *International Journal of Production Economics*, 185, pp. 63–75.
10. Gehr, F. and Hellinrath, B., 2006. *Logistik in der Automobilindustrie*. Berlin: Springer Verlag.
11. Moder, M., 2008. *Supply Frühwarnsysteme*.
12. Nassif, A. B., Azzeh, M., Banitaan, S. and Neagu, D., 2016. Guest editorial: special issue on predictive analytics using machine learning. *Neural Computing and Applications*, 27(8), pp. 2153–2155. <<https://doi.org/10.1007/s00521-016-2327-3>>.
13. Oliveira, J. B., Jin, M., Lima, R. S., Kobza, J. E. and Montevechi, J., 2019. The role of
14. simulation and optimization methods in supply chain risk management. *Simulation Modelling Practice and Theory*, 92, pp. 17–44.
15. Schlüter, F., Diedrich, K. and Güller, M., 2017. Analyzing the Impact of Digitalization
16. on Supply Chain Risk Management. *IPSERA Conference*, Hungary.
17. Tang, O. and Musa, S. N., 2011. Identifying risk issues and research advancements in supply chain risk management. *International Journal of Production Economics*, 19. 2011(133), pp. 25–34.
20. Thomé, A., Scavarda, L. F., Pires, S., Ceryno, P. S. and Klingebiel, K., 2014. A multitier study on supply chain flexibility in the automotive industry. *International*
21. *Journal of Production Economics*, 2014(158), pp. 91–105.



Artificial Intelligence in Marketing

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ABSTRACT: The use of AI in the marketing industry is the subject of the entire article. The modern trend of artificial intelligence has significantly changed the way traditional marketing is done. Artificial Intelligence potential has been explored in digital marketing and its impacts are noteworthy. The market can now focus more on the customers and meet their needs in real life using Artificial Intelligence as this applies to technology highly depending on the nature of the website and the types of business. By using Artificial Intelligence they can quickly determine what contact to target the customers and which channels to employ them. The uses, merits, and demerits of Artificial Intelligence are explained in detail in the article along with real-life case study situations to enhance the understanding in a better and clearer way that could be more beneficial for those who are interested in the incorporation of Artificial Intelligence in their business. Artificial Intelligence is a primary consideration in user retention and lead conversion in digital marketing. Digital Marketing gives a visible pleasant experience for clients with Artificial Intelligence for advertising across social media and digital platforms such as Facebook and Instagram. These platforms thoroughly assess users' information directing them to offers appropriate to their wants. Artificial Intelligence also assesses the market in identifying and forecasting trends. Artificial Intelligence tools can also be used to analyze the performance of competitor's campaigns and reveal their customer expectations.

INTRODUCTION

Artificial Intelligence (AI) is one of the fastest-growing fields of technological advancement. Artificial intelligence (AI) is the study of how machines can simulate or come close to human intelligence. Artificial intelligence uses computers to improve perception, reasoning, and learning. Finance and healthcare are just two of the numerous areas that use artificial intelligence these days. Some of the biggest advancements in computing over the last few decades have been made possible by artificial intelligence (AI).

Marketing is used to describe any activity a business does to draw attention to its goods or services by using effective messaging. With the long-term objectives of showcasing product value, fostering brand loyalty, and eventually boosting sales, marketing seeks to provide prospects and customers with stand-alone value through content.

The process of using artificial intelligence (AI) techniques and technologies, including data models, algorithms, and machine learning, to provide consumer insights that inform budgetary decisions, content customization, and customer journey personalization, is known as artificial intelligence (AI) marketing. AI marketing solutions encompass a variety of tools and services, including image recognition, recommendation engines, Chabot, personalized assistants (like Google Assistant, Amazon Alexa, Microsoft Crotona, and Apple Siri), targeted advertising based on search queries, and dynamic pricing on e-commerce platforms.

USES OF AI IN MARKETING

Build stronger customer relationships:

Artificial intelligence (AI) systems, such as Google Cloud, are constantly there to assist clients and offer 24/7 support. Customer support teams can use this to save time while answering routine inquiries and concentrate on other crucial work and challenging inquiries.

Faster data-driven decision-making:

Sorting through massive amounts of data much more quickly is now possible thanks to marketing technologies. On top of these technologies, AI-powered systems produce insightful data and connect with the right clients at the right moment.

Boost campaign ROI (Return on investment):

With AI decision-making, creating content that connects with your audience and generates leads is more likely. Utilize past data to inform campaigns that enhance your audience's journey by providing material that they are interested in and find engaging. This improves the ROI of your campaign and impacts your bottom line.

Personalize the content with customer data:

It might be challenging to determine and produce something that appeals to your customers if you are unaware of their preferences—what they want and don't want. You can find potential customers who are interested in your goods or services by using customer information such as area, purchasing patterns, and demographics. Artificial Intelligence is the most effective method for obtaining and decoding this information.

Automate repetitive tasks:

It takes time and energy to complete routine tasks. Do you frequently feel worn out and occasionally unmotivated when performing the same task repeatedly? Then, let Levity handle routine duties such as responding to frequently asked questions, reporting, survey analysis, and email correspondence. AI can save you time and money while helping



you develop and deal with challenging issues.

BENEFITS OF AI MARKETING

AI marketing is already being used today to boost the performance and ROI of digital marketing campaigns. It can also yield these business benefits:

Make advertising smarter:

Big data is used by AI to provide insightful research and produce more intelligent online advertisements, elevating account-based marketing solutions. Additionally, AI may analyse your data and results to provide more focused advertising.

Make searches better:

AI and big data solutions can analyze consumers' digital search patterns and help pinpoint key areas on which to focus marketing strategies. It helps to determine the areas of weakness in traditional marketing and create brand-new methods that attract a wide variety of people towards the products.

Personalize content:

Big data, machine learning, and AI together allow marketers to fine-tune statistics to understand each customer individually and tailor content accordingly. The newest trend is hyper-personalization, which combines digital and non-digital channels to focus on the preferences of the customer.

Improve customer service:

Artificial intelligence bots are rapidly being used in chat and other customer engagement platforms. It helps maximize customer satisfaction through proper services in many unique ways with minimal defaults. It does not exhibit human emotions like anger, rudeness, tensed, etc in dealing with customer grievances.

DISADVANTAGES OF AI IN MARKETING

We often need rich sets of data:

Practically speaking, the only thing limiting artificial intelligence is data availability. Since an artificial intelligence application's capacity directly correlates with its data richness, data becomes the system's most important component.

Reliable prediction and analysis can be uncertain:

Attempting to simultaneously optimize for several dependent outcomes presents another challenge for AI. Suppose you wish to optimize two conversion rates at the same time. That can quickly get quite complicated and challenging. Assume you are doing A/B testing for a landing page and that the ad creative that first entices users to the page is being varied by a different algorithm. The current method for achieving that is to complete each one separately because completing them simultaneously quickly becomes computationally unfeasible.

It's really hard to replace humans:

Fortunately, many uses for AI will empower people rather than replace them. AI nonetheless adds significant value when it crunches data to generate suggestions, for example, even if they are only "right" 80% or 90% of the time. This is because humans are fast enough to distinguish between the right and wrong courses of action. **The**

marketing stack is complicated and disconnected:

This meant that, in our specific industry, marketers were unable to obtain direct results since they lacked access to consumption, channel, and content data. In an attempt to address this, we have developed an integrated platform that connects a variety of data sources to a single user.

REAL-LIFE CASE STUDIES

NUTELLA USES AI TO CREATE PACKAGING:

Industry: Food & Beverage

Use case: Design

The idea: Nutella aimed to differentiate its packaging, enhance the appeal of its products, and increase brand awareness. The branding firm Ogilvy Italia was tasked with this revolutionary task. They generated 7 million distinct labels, each as expressive and one-of-a-kind as Italians, using artificial intelligence and twelve different patterns. And thus Nutella Unica came to be.

The result: As soon as the 7 million jars produced for this promotion went on sale, they were all gone.



VOLKSWAGEN USES AI TO FORECAST BUYING DECISIONS:

Industry type: Automobile

Use Case: Predictive Analysis

The idea: Volkswagen is a fantastic example of AI in marketing. Volkswagen may be automating its cars, but did you know it was also automating its ad-buying decisions? Volkswagen's marketers chose to depend only on data and trusted an AI because the advertising firm they were working with was providing subjective interpretations regarding the judgments made regarding ad purchases. This allowed them to spend less on campaigns while increasing sales.

The results: Volkswagen reduced hidden expenses previously incurred by the media agency by improving its forecasting of purchase decisions. Additionally, sales from Volkswagen dealerships increased by 20%.

CONCLUSION

In summary, artificial intelligence (AI) has had a huge impact on digital marketing and given companies new chances to enhance their competitiveness and marketing mix. One of the main uses of AI in digital marketing is personalization. Other uses include advertising optimization and task automation. To make sure that AI is applied ethically in digital marketing, ethical issues must be resolved. In order to fully understand the long-term effects of AI on digital marketing and how companies may best utilize this technology to meet their marketing objectives, further research is required as AI technology continues to advance.

REFERENCES

1. www.wikipedia.com
2. www.linkedin.com
3. www.hbr.com
4. www.marketgaininstitute.com



Data Analytics in Cybersecurity

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ABSTRACT: In the current cybersecurity environment, businesses have to contend with an increasing number of sophisticated cyberattacks that take advantage of weaknesses in complex networks and systems. Because these threats are dynamic and ever-evolving, traditional security solutions are frequently proven to be insufficient. To strengthen defences, identify abnormalities, and anticipate future vulnerabilities, this article offers a thorough overview of the revolutionary use of data analytics in cybersecurity.

This study focuses on the critical role that data analytics plays in enhancing cybersecurity efforts. Predictive modelling, anomaly detection, and real-time analysis are emphasized as crucial features that enable enterprises to go beyond reactive strategies and enable a proactive and adaptable protection posture. To present a comprehensive picture of the cyber landscape, the article examines the wide range of data sources that are accessible for analysis, such as network logs, user activity patterns, and external threat information feeds.

The implementation of various data analytics approaches in cybersecurity is covered in detail in the next section. A thorough analysis is conducted to demonstrate the efficacy of machine learning algorithms, artificial intelligence models, and big data analytics in identifying insider threats, detecting sophisticated malware, and anticipating potential vulnerabilities before they can be exploited. The study provides concrete evidence of the usefulness of data analytics in bolstering cybersecurity postures through case studies and real-world scenarios. Data analytics integration in cybersecurity is not without its difficulties, though. We look at privacy issues, the requirement for trained staff, and the difficulty of putting these cutting-edge technologies into practice. To establish a synergistic approach to data-driven security, strategies to overcome these obstacles are presented, with a focus on the significance of collaboration between cybersecurity specialists, data scientists, and domain-specific professionals.

The paper's conclusion outlines data analytics' potential applications in cybersecurity going forward. The significance of ongoing innovation and adaptability is emphasized, and emerging technologies like blockchain and quantum computing are taken into consideration. The strategic path for future research and development in the sector is suggested to be the combination of automation, orchestration, and real-time analytics.

KEYWORDS: Cyber security, Data Analytics, Security information, Threat Intelligence.

I. INTRODUCTION

Organizations are facing an escalating number of cyber threats in the field of cybersecurity. These threats are becoming more sophisticated, rendering traditional security measures less effective. To combat this challenge, data analytics has emerged as a transformative solution. By integrating data analytics into their operations, businesses can proactively identify, defend against, and respond to cyber threats. This approach goes beyond reactive tactics and enables organizations to anticipate, prevent, and mitigate potential threats. Critical tools such as anomaly detection, predictive modeling, and real-time analysis empower cybersecurity experts to foresee vulnerabilities and address them in advance. Given the complexity of today's cyber landscape, which includes ransomware, malware attacks, and insider threats, data analytics offers a comprehensive strategy to enhance defense posture. In the following sections, we will delve into the uses, challenges, and potential applications of data analytics in cybersecurity, aiming to provide readers with a comprehensive understanding of leveraging data for cyber resilience.

II. USES OF DATA ANALYTICS IN CYBER SECURITY

Data analytics is essential to cybersecurity because it gives businesses the information and tools, they need to improve their defences, spot irregularities, and take proactive measures against new threats. The following are some important applications:

1. Threat Identification:

Anomaly Identification: Finding unusual patterns and behaviours in network traffic, user activity, or system records is made possible by data analytics. Disturbances from predetermined benchmarks may indicate possible security risks, such as malware infestations or unapproved entries.



Signature-based Detection: By examining past data, data analytics can identify trends or signatures connected to recognized cyber threats. This makes it easier to identify viruses, malware, and other harmful entities by using established features.

Behavioral Analytics: Data analytics, through the study of user behaviour, can spot odd or suspect activity that might point to compromised accounts or insider threats. The capacity to identify complex attacks that conventional security measures could miss is improved by this method.

2. Reaction to Incident:

Real-time Evaluation Through the use of data analytics, security events can be monitored and analyzed in real-time, enabling enterprises to quickly address any concerns. Minimizing the effect of a cybersecurity event requires quick discovery and action.

Using data analytics, forensic analysis can be performed following a security incident to determine the cause, extent, and consequences of the breach. To effectively remediate the situation and stop similar ones in the future, this information is essential.

3. Predictive Modeling in Vulnerability Management:

Data analytics assists in anticipating any openings and flaws in a system before they are taken advantage of. Organizations can increase their entire security posture and proactively address risks by examining historical data and finding patterns.

Patch management: Organizations can prioritize and put into action prompt patching strategies by analyzing data on software vulnerabilities and patch status. This lessens the possibility that known vulnerabilities will be exploited.

4. Entity Behavior Analytics (UEBA): Identification of Insider Threats: Insider threat identification can be aided by the use of data analytics, which can spot anomalous user behaviour or departures from typical trends. This includes malevolent actions carried out by persons within the company, such as data exfiltration or unauthorized access.

5. Security Information and Event Management (SIEM):

Log Analysis: To provide a centralized view of security events, SIEM systems use data analytics to analyze and correlate logs from several sources. This enhances general situational awareness and aids in spotting possible security incidents.

6. Integration of External Feeds for Threat Intelligence:

Organizations can incorporate external threat intelligence streams with the use of data analytics. The organization's comprehension of the present threat landscape is improved by analyzing this data in conjunction with internal data, allowing for better decision-making.

III. DIFFICULTIES OF USING DATA ANALYTICS IN CYBERSECURITY

Data analytics has a lot of potential to improve cybersecurity, but putting it into practice has its share of obstacles. Organizations looking to get the most out of data analytics in their cybersecurity plans must address three obstacles. Using data analytics in cybersecurity presents the following main challenges:

1. Quality and Integration of Data:

Volume and Variety of Data Logs, network traffic, and endpoint activity are just a few of the many sources of data that cybersecurity creates. Data quality, consistency, and completeness problems might arise from the management and integration of these disparate datasets.

Timeliness of Data: Current and pertinent data must be available for real-time analysis to take place. The ability of data analytics to react quickly to new threats may be hampered by delays in data collecting and processing.

2. The Threat Landscape's Complexity:

Complexity of Attacks: The sophistication of cyber threats is on the rise, as they utilize sophisticated evasion and obfuscation strategies. It can be difficult to modify data analytics models so they can identify and counteract these intricate attack routes.

Zero-Day Exploits: Using historical data to identify and respond to zero-day exploits (vulnerabilities that were not previously disclosed) can be challenging because typical data analytics may not have patterns or signatures for such unique threats.

3. Skill Deficit:

Insufficient Number of Data Scientists Sophisticated experts who comprehend the subtleties of data analytics as well as the complexities of cybersecurity are needed to implement effective data analytics in cybersecurity. One major difficulty is the lack of qualified professionals with experience in both fields.



Effective collaboration between cybersecurity professionals and data scientists is important for bridging the interdisciplinary divide. In certain organizations, establishing mutual understanding and effective communication between different disciplines can be challenging.

4. Data Security and Observance:

Concerns about Data Privacy: Privacy concerns arise when sensitive data is analyzed for cybersecurity reasons. To preserve personally identifiable information (PII) and adhere to data protection rules, organizations must manage legal frameworks and put safeguards in place.

The need for improved cybersecurity must be balanced with moral and legal issues, such as protecting users' right to privacy. This can be a challenging balance to strike. Planning and abiding by ethical standards are essential to striking the correct balance.

5. False Positive and Negative Outcomes:

Model Accuracy: It is difficult to strike a compromise between reducing false positives—erroneously classifying benign activities as dangers—and false negatives—missing real threats. It is a constant endeavor to fine-tune models to minimize these errors without compromising overall accuracy.

6. Resource Limitations:

Computational and Infrastructure Resources: Using data analytics in cybersecurity frequently calls for a large computer power. Scaling infrastructure to meet the growing volume and complexity of data may provide issues for organizations.

Budget Restrictions: For many firms, the expenses linked to the deployment and upkeep of comprehensive data analytics solutions may be too high. Advanced analytics technology adoption may be hampered by limited funding.

IV.CONCLUSION

To sum up, the dynamic landscape of cybersecurity necessitates creative solutions to combat the growing complexity of cyberattacks. The revolutionary power of data analytics is supplementing traditional security measures, which are inadequate in the face of dynamic threats. This essay has given readers a thorough understanding of the ground-breaking role that data analytics plays in improving cybersecurity initiatives.

The significance of predictive modelling, anomaly detection, and real-time analysis was highlighted as essential components that facilitate the shift of companies' protection postures from reactive to proactive and flexible. A thorough image of the cyber landscape was created by providing a thorough analysis of numerous data sources, such as network logs, user activity patterns, and external threat information feeds.

The application of data analytics techniques, including big data analytics, machine learning algorithms, and artificial intelligence models, was examined for how well it identified insider threats, found advanced malware, and foresaw holes before they were exploited. Empirical data from case studies and real-world situations demonstrated how crucial data analytics is to strengthening cybersecurity postures.

Data analytics integration in cybersecurity is not without its difficulties, though. Significant obstacles include privacy concerns, the requirement for skilled personnel, and the difficulty of integrating cutting-edge technologies. To create a synergistic approach to data-driven security, strategies for overcoming these challenges were outlined, with a focus on the significance of cooperation between cybersecurity experts, data scientists, and domain-specific professionals.

The conclusion highlighted future directions for data analytics in cybersecurity while highlighting the importance of continuous innovation and flexibility. Quantum computing and blockchain were taken into account while determining the strategic direction for further research and development. The proposed amalgamation of automation, orchestration, and real-time analytics presents a propitious path towards augmenting cybersecurity protocols in the always-changing digital terrain. Integration of data analytics is still essential for proactive protection and resilience as cyber threats to enterprises continue to escalate.

REFERENCES

- [1] Abdellahi S et al “Developing a User Interface Security Assessment Method” USENIX 2020 [2]
Abedin M et al “Analysis of Firewall Policy Rules using Traffic Mining Techniques” 2010 [3]
Vandana P. Janeja “Data Analysis for Cybersecurity” Cambridge University 2022



Development of AI in the Metrological Department

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ABSTRACT: This case study examines the developmental journey of AI'S (Artificial Intelligence) in the metrological department. AI in transport and travel revolutionizes efficiencies. The synergy of AI transforms the landscape, making both land and water transports smarter and more reliable by the public. In this case study we shall analyze and get an in-depth knowledge about how metros tend to work in different scenes in both land and water metros. We delve into how land metros and water metros have the same authority but the actions performed by them are in respective of their respective scenarios. In land metros we get to understand how the AI streamlines routes, enhances commuter experience, and reduces any disruptions caused by the predictive power of the AI. In water metros we understand how crucial AI is since it enhances navigation and overall efficiency. Smart sensors gather real time data on water conditions, traffic and weather. The involvement of AI with transport heralds a new era of transportation, where both land ways and waterways become more efficient and effective. This synergy not only improves daily commuting but also marks a leap forward in the evolution of modern transportation system.

KEYWORDS: Efficiency, Revolutionizes, Analyze, New Era, Daily commute, Precision in prediction, accuracy in observation; an AI in the metrological department ensures forecasts with unwavering dedication.

INTRODUCTION

Artificial intelligence (AI) is a variety of technological inventions and represents a paradigm shift in the way machines can mimic, learn and perform tasks that traditionally require mortal intelligence. Basically, artificial intelligence is the intersection between computational wisdom, mathematics and cognitive wisdom. Their goal is to create intelligent agents that can solve problems, make decisions, and adapt to different scripts.

The concept of artificial intelligence has evolved over the decades, from early dreams of creating machines with lethal capabilities to modern times when artificial intelligence is an integral part of everyday life. In a rapidly evolving measurement environment, the implementation of artificial intelligence has proven to be a transformative force. Integrating artificial intelligence into the measurement department has proven to be more effective and ushers in a new era of precision.

This composition explores the dynamic field of artificial intelligence in measurement technology and examines the various ways in which artificial intelligence accelerates traditional methods. From using machine operation algorithms to reuse large amounts of experimental data to improving the capabilities of digital models, the development of artificial intelligence in the metrology department is a journey full of inventions.

Metropolitan regions, centers of diversity and dynamism, face numerous challenges, ranging from road congestion and resource management to ensuring public safety and sustainable development. Implementing AI technology in metropolitan systems promises to not only address these challenges but also usher in a new era of efficiency, responsiveness and innovation.

In this article, we see how advances in AI technology and education have proven to be one of the easiest and most accurate ways to manage subway line systems, providing an alternative to everything and an effective audience.

The development of artificial intelligence (AI) in metropolitan areas is based on a set of strategic goals aimed at improving urban life, sustainability and efficiency. These goals aim to use artificial intelligence technologies to address the specific challenges of metropolitan regions and unlock new opportunities for smart and responsive urban development. Here are the main goals of AI support in subways:

- **TRAFFIC MANAGEMENT AND OPTIMIZATION**

Using advanced analytics and machine learning algorithms, the system can predict traffic patterns, identify congestion points and dynamically optimize signal times to alleviate traffic problems.

- **SAFETY AND PROTECTION**

Predictive policing models can also be developed to efficiently allocate resources based on historical crime data, contributing to a safer urban environment.

- **URBAN PLANNING AND DEVELOPMENT**

AI models can analyze demographic trends, traffic patterns and environmental factors to help city planners make



informed decisions that lead to sustainable and resilient urban development.

- **ECONOMIC GROWTH**

AI models can analyze demographic trends, traffic patterns and environmental factors to help city planners make informed decisions that lead to sustainable and resilient urban development.

- **MAINTENANCE OF INTELLIGENT INFRASTRUCTURES**

By continually monitoring the condition of bridges, roads, utilities and other essential facilities, AI algorithms can predict potential problems and make maintenance recommendations. This proactive approach minimizes downtime, reduces repair costs and ensures the reliability of the city's infrastructure.

- **RESOURCE MANAGEMENT**

AI-powered Smart Grids can optimize energy distribution, water management systems can be improved for greater efficiency, and waste collection routes can be dynamically adjusted based on real-time data.

Integrating artificial intelligence (AI) into the subway offers many advantages, but also presents some limitations and challenges. Recognizing these limitations is essential for responsible and effective implementation. Here are some key limitations of AI in the subway:

- **PRIVACY ISSUES**

As Metro's AI systems continually collect and analyze data, the risk of data breaches increases. Surveillance technologies such as facial recognition and tracking raise concerns about individual privacy. Finding a balance between using data to improve services and protecting citizens' privacy becomes a delicate challenge.

- **HIGH IMPLEMENTATION COSTS**

Although artificial intelligence promises to increase efficiency, the initial costs of implementation in urban systems can be significant. This includes investments in hardware, software, staff training and infrastructure maintenance.

- **SOCIAL IMPACT AND EMPLOYMENT**

The widespread adoption of artificial intelligence in metropolitan areas could lead to job relocation in some sectors, with potential impacts on workers' livelihoods. Addressing these social and employment impacts requires proactive strategies, including skills development programs, workforce transition support and measures to promote job creation in emerging sectors.

LIMITATIONS

- **COMPLEXITY AND LACK OF UNDERSTANDING**

The complexity of AI algorithms can make it difficult for non-experts, including the public, to understand how decisions are made. A loss of transparency can lead to a lack of trust. Efforts to improve explainability, transparency, and public education about AI are critical to promoting trust and acceptance.

- **VULNERABILITY TO CYBER SECURITY THREATS**

The interconnectedness of AI systems makes them vulnerable to cyber threats. Unauthorized access, data breaches or manipulation of algorithms can jeopardize the security of Metro operations. It's important to implement robust cybersecurity measures, conduct regular audits, and remain vigilant against new threats.

FINDINGS

Following the development and integration of AI in subways, several notable findings have emerged that shed light on the impact, effectiveness, and challenges of implementing AI in urban transportation systems. Here are the main conclusions that can be included in the article:

- **MORE RELIABILITY OF PUBLIC TRANSPORT**

Artificial intelligence applications in public transportation, such as predictive maintenance and route optimization, have significantly improved service reliability. Predictive maintenance has reduced unexpected outages and optimized route planning ensures fast and reliable public transport.

- **PUBLIC UNDERSTANDING AND ACCEPTANCE**

Strategies to improve public understanding of artificial intelligence have increased acceptance and trust. Initiatives such as public education campaigns, transparency in decision-making and opportunities for citizen participation have contributed to positive perceptions of AI in subways

- **OPTIMUM USE OF RESOURCES**

AI based resource management systems, including energy, water and waste, have led to the optimization of resource utilization. Predictive analytics help predict demand, reduce waste, and improve the overall efficiency of resource-intensive city operations.

- **PRIVACY AND CITIZEN AWARENESS**

Cities have actively implemented data protection measures when implementing AI technologies. Transparent policies, data anonymization practices, and public awareness campaigns have been instrumental in addressing privacy concerns. Citizen participation in the development of these policies has contributed to a more privacy-friendly approach.



CONCLUSION

In summary, the development of artificial intelligence in metropolitan systems represents a significant advance towards smarter, more efficient and more sustainable urban life. Solving various related problems has really become easier. Furthermore, the results highlight the resilience of AI-based metropolitan systems to potential cybersecurity threats. Although some believe that it is not a safe path, AI has proven to be one of the best sources for processing data and ensuring the security of data flow.

As technology continues to evolve, cities will face new challenges and take advantage of new opportunities. Collaboration between urban planners, policymakers, technologists and society remains crucial to guide the development of artificial intelligence in a direction consistent with the values and aspirations of the communities it serves.

The vision is not just about using technology to increase efficiency, but also about creating cities that are inclusive, sustainable and responsive to the changing needs of their residents. At the intersection of artificial intelligence and urban life, the journey continues, promising a future in which artificial intelligence will be a powerful ally in building better, more resilient and connected urban spaces.

REFERENCES

1. "Smart Cities: A Comprehensive Survey" by Yaser Khan, Salah Uddin, and Hussein Al- Bayatti (2019).
2. "Artificial Intelligence in Urban Development: A Review" by M. Madina, I. S. Mohamad, and N. Azman (2020).
3. "Smart Cities and Artificial Intelligence: Synergies and Challenges" by Konstantinos Gakis and Panos Fitsilis (2021).
4. "Big Data Analytics, Machine Learning, and Artificial Intelligence in Smart Cities" by Ahmad Lotfi and Madjid Merabti (2019).
5. "Urban Informatics: Past, Present, and Future" by Marcus Foth (2015).
6. "Artificial Intelligence in Transportation: A Comprehensive Review" by Saad Saleh et al. (2020).
7. "The Impact of Artificial Intelligence on Urban Living" by Anthony Townsend (2019).
8. "Challenges of Urban Mobility: A Comprehensive Review" by S. M. Rezaul Hasan (2019).
9. "Data-Driven Smart Cities: A Review" by B. G. Cetin (2018).
10. "Artificial Intelligence in Public Transportation Systems: A Review" by Shuo Feng et al. (2019).
11. Google Scholar (scholar.google.com)



Hiring Through LinkedIn - A Digital Transformation

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ABSTRACT: With the advent of globalization, all conventional methods of recruitment have come to a halt. As the internet opened doors to abundant talents and competent candidates, most companies prefer following electronic-medium and procedures to grow their human capital. When hiring is done mainstream through third party job portals, social media and company websites, there has been a silent yet tremendous growth in recruiting with LinkedIn. LinkedIn being one of its kind, established itself as a professional networking site in the year 2002. Over the years it has become not only a popular medium connecting the entire corporate world but also created several potential career opportunities.

This qualitative study aims at understanding the mechanism of LinkedIn and its impact on the process of recruitment. Also, the study focuses on how LinkedIn aids in building professional relationships. Semi-structured interviews with HRs and employees who were hired through LinkedIn were conducted and that data was used for the study.

KEYWORDS: e-hiring, LinkedIn, networking, changes in recruitment industry

I.INTRODUCTION

LinkedIn, a professional networking site being a monopoly in the market currently has 875 million users across 200 countries and more. According to LinkedIn's report, nearly 75% of its members are recruiters. In the highly accelerated phase of digitalization, HRs have replaced all conventional methods with e-hiring. LinkedIn being one such popular platform already, has gained more attention and extensive features after its acquisition by Microsoft in 2016. This integration has led to many developments in the site like LinkedIn talent solutions, LinkedIn marketing solutions, LinkedIn business solutions and automated tools under each of them.

II.REVIEW OF LITERATURE

- In many multinational corporations, LinkedIn profiles have replaced traditional resumes. Recruiters scrutinize candidates based on the efficiency of their profiles. A detailed study on how these profiles are evaluated was done by Julie Zide Ben Elman Comila Shahani-Denning, (2014), published on the topic "LinkedIn and recruitment: how profiles differ across occupations", in the journal of Employee Relations, Vol. 36 Issue 5 pp. 583 – 604. The study also examined how people create an official identity for themselves through the site.
- A research paper by Md Sajjad Hosain and Ping Liu - Recruitment through LinkedIn: Employer's perception regarding usability in the Asian Journal of Management states that the majority of employers prefer candidates with an active LinkedIn account over others. The results showed that apart from the resume, recruiters consider the information mentioned in LinkedIn profiles and match them with the job description. Also, the networking status of the candidate is the second factor considered vital during hiring.
- Another work by Md Sajjad Hosain and Ping Liu on LinkedIn for Searching Better Job Opportunity: Passive Job Seekers' Perceived Experience shows that the platform turns out to be a boon for such employees. This qualitative research tells that consistent surfing in the network can help in career upliftment.

III.RESEARCH METHODOLOGY

In order to understand the detailed insights of recruitment done using LinkedIn, qualitative research was conducted.

Thematic method of data analysis was adopted in the study. It allows data collected to be sorted into open codes. Then these codes are placed into categories, these categories are further consolidated into themes. These themes are elaborately discussed and validated.

The term "theme" is used for describing the fact that the data are grouped around a main issue (Brink, wood 1997)

Thematic Analysis lets to determine precisely the relationships between concepts and compare them with the replicated data (Alhojailan, Mohammed Ibrahim – West East Journal of Social sciences, dec 2012)

Data collection was done in two phases, in the first phase - employers were interviewed regarding the usage of the platform for hiring.

Q1.1 How does LinkedIn help as a recruitment tool?

Q1.2 Can you elaborate on your LinkedIn hiring process

Q1.3 As a recruiter, when looking at a candidate's profile on LinkedIn, what are the details that you notice?

Q1.4 Can you talk about the status of your organization's LinkedIn page

In the next phase, employees who secured a job through the platform were asked to share their experience.

Q2.1 Why do you prefer LinkedIn over other sources for job search?

Q2.2 How did you get placed using LinkedIn, can you elaborate on the process

Q2.3 What are ways in which you have enhanced your LinkedIn profile?

Q2.4 What are the companies that you follow on LinkedIn and why do you choose to do so?

Sample size

Participants	Number	Technique
Recruiters / HR Managers	25	Semi structured interviews
Employees	30	Open ended questionnaires and interview



IV.OBJECTIVES OF THE STUDY

- The study aims to examine LinkedIn as a recruitment tool and also how it has transformed the process of recruitment in this digital era.
- The study also finds how LinkedIn is different from other forms of online recruiting mediums.

V.RESULTS AND DISCUSSION OF THE STUDY



CATEGORIES	THEMES
T1.1 Automated and customized process T1.2 Team hiring T1.3 Easy apply T1.4 Turnaround time	T1 - HIRING MECHANISM
T2.1 Global opportunities T2.2 Reliability and authenticity T2.3 Skill endorsements T2.4 Connection patterns T2.5 Listing of educational institutes	T2 - LINKEDIN Vs JOB PORTALS
T3.1 Flexible hiring T3.2 Advanced resume tools T3.3 Spotlights T3.4 Pro finder	T3 - DISTINCTIVE ATTRIBUTES
T4.1 Niche audience T4.2 Stellar status	T4 - BRAND DEVELOPMENT
T5.1 Direct hiring T5.2 Private mode T5.3 Candidate individuality	T5 - PASSIVE POTENTIAL HIRING

T1 – HIRING MECHANISM

Post pandemic made the concept of virtual workplace a reality. This hastened the phase of work and reduced the cost of operations as well. Facilitating that, LinkedIn has provided relief from the complex process of recruitment. LinkedIn statistics revealed that six people were hired through the platform every minute in the year of 2022.

LinkedIn talent solution tools have customized services (**T1.1**) where recruiters can add relevant questions for the applicant along with the submission of their resume in the prescribed format. Once the recruiter receives all the applications, they can sort them using a variety of filters and store them in their pipelines. They even can schedule interviews and conduct meetings. This data can be easily shared along with other members making it possible to do team hiring (**T1.2**).

On the other hand, it allows job seekers to create resumes, save them and apply at one touch with the help of easy apply feature (**T1.3**). It also gives them prompt updates on their application. Thereby it reduces the turnaround time for both the parties involved (**T1.4**).

T2 - LINKEDIN Vs JOB PORTALS

LinkedIn has broadened the horizons and made the entire world its arcade. It allows people from anywhere to follow companies around the globe (**T2.1**). It alerts you with job notification from desired organization, specific industry or designation and even from particular country or city whereas most of other platforms are confined to mere resume services with geographical constraints.

Digitalized recruiting comes with the drawback of authenticity, all job portals act as a medium to access various applicants but does not give any kind of assurance. LinkedIn stands apart in this aspect, it provides social and professional proofing (**T2.2**). When a recruiter shortlists a candidate, the details mentioned in his or her application can be cross verified by certain factors. Skill endorsement (**T2.3**) given by the site itself, connections maintained by the candidate with former colleagues (**T2.4**), mapping the profile with the concerned educational institution's official page (**T2.5**) and having linkages with other alumni assures the validity of the candidate.

Similarly, the candidate can check the reliability (**T2.2**) of the hiring manager using their connections, timeline, activities and official association with the company.



T3 – DISTINCTIVE ATTRIBUTES

LinkedIn is a site that is constantly evolving, the company's report shows almost 60 percent of its users are aged between 25 and 34 years with the average engagement rate of 3.16 percentage per impressions. In order to meet its own standards, LinkedIn introduces distinct features enabling digital hiring to reach a whole another level.

Flexibility in hiring/ job search is one such attribute, it gives options such as remote settings which separates job postings that are only for remote candidates. It even launched descriptions for stay-at-home parents and those on sabbatical leave (T3.1). Pro finder feature allows recruiters to approach freelancers for a particular project or service (T3.4).

Video resumes and audio clips for name pronunciations are additional elements that boost a candidate's profile. It also shows vacancies to the candidate where they can be the top applicant (T3.2).

Special mention to the Spotlight feature (T3.3) that aids in through promoting "open to work frames" in head shots which help increase job seeker's profile visibility. It further helps in identifying past applicants, candidates who are likely to respond and who are associated with the company.

T4 – BRAND DEVELOPMENT

Besides professional connectivity, LinkedIn assists in enhancing the overall brand value of the company. It enables the company to create showcase pages for each community of followers according to their preferences (T4.1).

At the end of the year 2022, it is revealed that 30% of a company's engagement on LinkedIn comes from employees. Hence the connections of employees get to know about the perks of being a part of the organization. By following several companies, followers start rating them and create a stellar status (T4.2). This automatically benefits the hiring process of the company. Candidate understands the needs of the company and waits for an opportunity. Once there is a vacancy, they never cease to miss it.

T5 – PASSIVE POTENTIAL HIRING

The major breakthrough for the site is the passive potential hiring, no other sites/ handles can provide such contemporary means of career development.

Setting aside the regular ways of posting a vacancy and receiving applications, LinkedIn supports direct hiring. This is possible through open messaging and sharing stories through posts and articles (T5.1). Further private mode allows recruiters to anonymously view profiles (T5.2).

Recruiters say that information like description, headlines, background in the profile reveals more information than the resume submitted (T5.3). LinkedIn pulse articles not only facilitates viral discussions and professional take-ways, it shows the perception level and how articulate the candidate is.

Thereby it stands as a guide to the recruiter to get to know the candidate closely and decide whether he or she would be a perfect fit for the role.

VI.FINDINGS OF THE STUDY

- The hiring dynamics of LinkedIn proves to be effective and simple at the same time.
- LinkedIn has surpassed its competitors and shows a high level of growth potential.
- The platform is loaded with abundant features satisfying both recruiters and job seekers
- It promotes personal branding and overall brand development of the company as well which influences hiring decisions.
- Recruiters and job seekers find the platform equally useful in comparison with others

VII.LIMITATIONS OF THE STUDY

- The study is subject to a small sample of recruiters and employees across several industries who belong only to the city of Chennai, India.
- As the thematic method of analysis is flexible, it may give the idea of being inconsistent or non-coherent as stated by Holloway & Todres, 2003.

VIII.CONCLUSION

Since digitalization has become the only way forward, in conclusion LinkedIn turns out to be a vital recruitment tool. Enormous services provided by the network have brought about many changes in the process of hiring and still continue to challenge the same. There are presently 58 million companies on LinkedIn (2022) and with such a dynamic business environment it is only expected to grow more. With ever growing technology, LinkedIn is sure to establish a bigger mark in the recruitment industry.

REFERENCES

1. Julie Zide Ben Elman Comila Shahani-Denning, 2014, LinkedIn and recruitment: how profiles differ across occupations, journal of employee relations, Vol. 36 Issue 5 pp. 583 – 604
2. Md Sajjad Hosain and Ping Liu, January- March| 2020, Recruitment through LinkedIn: Employer's perception regarding usability, Asian Journal of Management
3. Sahin Cem Geyik, Qi Guo, Bo Hu, Cagri Ozcaglar, Ketan Thakkar, Xianren Wu, Krishnamurthy Kenthapadi, July 8-12, 2018, Talent Search and Recommendation Systems at LinkedIn: Practical Challenges and Lessons Learned, SIGIR'18, Ann Arbor, MI, USA
4. ShareLinkedInFacebookTwitter. (n.d.). *December workforce report 2022*. December Workforce Report 2022. Retrieved December 27, 2022, from <https://economicgraph.linkedin.com/resources/linkedin-workforce-report-december-2022>
5. Md Sajjad Hosain and Ping Liu, 2020, LinkedIn for Searching Better Job Opportunity: Passive Jobseekers' Perceived Experience, The Qualitative Report 2020 Volume 25, Number 10, Article 13, 3719-3732
6. Alhojailan, Mohammed Ibrahim, December 2012, Thematic analysis: a critical review of its process and evaluation, West East Journal of Social Sciences
7. Aronson J, 1994, A pragmatic view of thematic analysis, the qualitative report, 2(1).
8. Immy Holloway and Les Trodes, August 15, 2016, The Status of Method: Flexibility, Consistency and Coherence, sage journals
9. Cerro, S., Rodríguez, C. Vidal, M., Escabrós, M. and Oberst, U. (2017). Interpersonal perception of LinkedIn profiles and employability. *Aloma*, 35(2), 13-22.
10. *LinkedIn talent solutions | powerful recruiting tools*. (n.d.). Retrieved December 27, 2022, from <https://business.linkedin.com/talent-solutions>
11. Davison, H. K., Maraist, C. and Bing, M. N. (2011). Friend or foe? The promise and pitfalls of using social networking sites for HR decisions. *Journal of Business and Psychology*, 26(2), 153- 159.



Uses of AI in Supply Chain Management in Indian Paradigm

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ABSTRACT: Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and exhibits their capabilities. It has the equal one or more advances abilities than humans and can reproduce itself. Now-a-days AI plays an important role in Supply Chain Management (SCM) which results in contextual intelligence, boosting productivity, demand forecasting and also in enhancing customer experience. By implementing Artificial Intelligence (AI) in supply chain management, companies can mitigate risks, minimize downtime and reduce wastages. AI systems can optimize production schedules and analyze large volumes of data in supply chain management and has led to sustainability. Supply chain management took the opportunity to adopt these modern technologies to transform the way business is done. This paper evaluates the use of Artificial Intelligence (AI) in the supply chain management.

KEYWORDS: Intelligence, Abilities, Implementation, Demand, Sustainability.

INTRODUCTION

“The world will function normally until humans take control of technology”

Supply chains have gotten more complicated to manage in recent years. Using AI for supply chain management is one of the way in which many companies are starting to handle the difficulties of supply chains globally and locally. AI is gaining popularity in the supply chain industry.

It is becoming increasingly distinct to supply chain industries .AI is more than capable of handling the difficulties involved in running both local and global logistics networks.

Now-a-days we have seen a rapid increase of interest in Artificial Intelligence, especially with AI applications. The use of AI in supply chain management has a captivating history, marked by important development that is transformed path to the businesses grasp their supply chain operations.

AI can easily mimic like human and execute tasks very accurately. Using AI technologies in supply chain management makes work easier and detect the weaknesses, gaps, and risks. AI utilizing real- time data to enhances security and safety in the supply chain.

AI in the supply chain market was values at USD 5172.68 million in 2022 and is expected to expand at a Compound Annual Growth Rate (CAGR) of 19.43%. During the forecast period in the supply chain, it is said to be that the market value may reach USD 15010.88 million by 2028.

OBJECTIVES

- **Efficiency:** AI in supply chain management helps improve efficiency by automating repetitive tasks, optimizing processes, and reducing human error. It can analyze large amounts of data quickly and make real-time decisions, leading to more streamlined operations.
- **Inventory optimization:** AI can analyze historical data, market trends, and customer demand patterns to optimize inventory levels by accurately forecasting demand and adjusting inventory. Accordingly, businesses can minimize stockouts, reduce carrying costs, and improve overall supply chain performance.
- **Demand forecasting:** AI algorithms can analyze various factors like historical sales data, market trends, social media sentiment, and even weather patterns to predict future demand. This helps businesses plan their production, procurement, and distribution activities more effectively, leading to better inventory management and customer satisfaction.
- **Predictive maintenance:** AI can monitor equipment and machinery in real-time, collecting data on performance, maintenance history, and environmental conditions. By analyzing this data, AI can predict when maintenance is needed, preventing unplanned downtime and optimizing maintenance schedules.
- **Logistics optimization:** AI can optimize logistics operations by analyzing factors such as transportation routes, carrier performance, and real-time traffic data. It can identify the most efficient routes, suggest alternative options in case of disruptions, and optimize load planning to maximize resource utilization and minimize costs.

ORIGIN OF AI IN SUPPLY CHAIN MANAGEMENT:

AI has been making its way into supply chain management over the past few decades. The origins can be traced back to the integration of advanced technologies like machine learning, data analytics, and automation into supply chain processes.

Initially, AI was primarily used in areas like demand forecasting and inventory optimization. However, with advancements in technology, AI has expanded its role in supply chain management to include predictive maintenance, logistics optimization, and even autonomous vehicles for transportation.

It has enabled businesses to make more accurate predictions, optimize operations, and improve overall efficiency.

BENEFITS OF AI IN SUPPLY CHAIN MANAGEMENT:



One of the benefits of AI in supply chain management is improved efficiency, AI technologies can help to improve the efficiency by optimizing routing inventory levels and scheduling to their supply networks.

Improved customer service can lead to a favourable result to the supply chain industries with the help of AI technologies. It serves real time information about shipments and resolve the customer issues as more quickly.

Artificial Intelligence (AI) is transforming the businesses and industries around the world and logistics and supply chain is no deviation. AI can also enrich transport logistics source enhance descriptions can inspect real-time data, weather conditions and other factors to endorse the most organised paths saving both time in the warehouse.

AI energized robots can mechanize picking and packing procedure, minimizing errors and increasing the speed of order fulfilment.

CHALLENGES OF AI IN THE SUPPLY CHAIN MANAGEMENT:

AI is having important concussion on the supply chain business. AI is modifying the way that industries direct their supply chains, making them more organised, nimble, and tough. AI involved in supply chain management also have challenges as follows,

Artificial Intelligence (AI) has a great impact on the supply chain management but it also fails to gain trust among peoples and the first and the foremost challenge it face is building trust. The working of AI actually lies on the technology and a lot of people do not trust and understand the process of AI.

It also have a challenge that is, if AI can gain trust among people it have the difficulty of professionals who couldn't able to work with this AI technology that is the people who lack the knowledge about the advancement of AI and this is known as the human interface.

And the next challenge lies on the investment. Although there are many facilities in AI technology it must need more investment to implement the AI in the supply chain industries. The businesses and the professionals who is interested in AI technology lacks in investment.

Use of AI in the supply chain management also face the challenge of software malfunction in which the machines and algorithms controlling AI it is very difficult to identify the cause of malfunctions and machines in AI technology.

The limitations of tasks is one the challenges faced by supply chain industries using AI technologies. AI can replace only the certain tasks in supply chain industries, it cannot replace all the tasks among supply chain management.

And the last challenge is the people who have high expectations on AI technology, not everyone can understand the functioning of AI and might also have high expectations of functioning.



PEOPLE'S PERSPECTIVE OF AI IN SUPPLY CHAIN MANAGEMENT:

The people's perspective on AI in supply chain management can vary. They believe that AI can help optimize processes, improve demand forecasting, and streamline logistics, ultimately leading to better customer satisfaction.

On the other hand, there are those who may have concerns about the impact of AI on job security. They worry that automation and AI technologies might replace certain roles in the supply chain, potentially leading to job losses.

It's important to note that while AI can automate certain tasks, it also creates new opportunities for workers to focus on more strategic and complex aspects of supply chain management. So, overall, the perspective can be a mix of excitement for the benefits AI brings, along with some concerns about the potential changes it may bring to the workforce.

USES OF AI IN FUTURE:

AI system don't need large infrastructure to work anyone with the internet connection can use AI tools right away. The capabilities of most advances system especially GPT4 is at a level were we can assist a professional human being in a larger way of complex knowledge intensive or creative tasks.

We are now experiencing the beginning stages of true forth industrial revolution, but this revolution isn't without its challenges over reliance on AI systems undue faith in AI judgements or unethical usage of AI systems can lead to problems in other words the possibility for distribution in supply chains is multi dimensional.

Individual interpretation shaped by unique believes and experience significantly influence the trajectory of AI adoptions and its ultimate utility in supply chain.



CONCLUSION

AI in supply chain management is a powerful tool that complements human intelligence rather than replacing it. The key lies in harnessing the potential of AI to automate repetitive tasks, enhance decision-making processes, and improve overall supply chain performance. With this collaborative approach, we can strive for perfection and unlock new levels of effectiveness in supply chain management. AI in supply chain management works alongside humans, not in place of them. By combining human intelligence with AI, we can achieve perfection and optimize supply chain processes. It's all about teamwork!

REFERENCES

https://www.linkedin.com/pulse/role-ai-supply-chain-management-iyvappan-s-cii-scmpro?utm_source=share&utm_medium=member_android&utm_campaign=share_via
<https://appinventiv.com/blog/ai-in-supply-chain-analytics/> <https://throughput.world/blog/ai-in-supply-chain-and-logistics/>



Company Announcements and Stock Price Reactions

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ABSTRACT: The relationship between stock prices and Announcement is a critical aspect studied across various academic papers. Numerous studies have delved into this relationship, exploring different dimensions and perspectives to understand the intricacies of how earnings affect stock prices. One common perspective in these papers is the fundamental analysis of stocks, where earnings play a pivotal role. Positive earnings often signal strong performance. Conversely, negative or lower-than-expected earnings might result in a decline in stock prices as investors reassess their valuation of the company. Earnings surprises occur when reported earnings significantly differ from analysts' expectations. Additionally, the role of market sentiment and behavioural finance in influencing the relationship between earnings and stock prices is also important. Behavioural biases, also have been studied extensively. These papers often highlight how psychological factors can distort the immediate impact of earnings on stock prices, leading to short-term mispricing that might eventually correct over time. Another aspect that numerous studies address is the influence of different market conditions on the earnings-stock price relationship. Factors like market volatility, economic conditions, industry trends, and global events can significantly modulate how earnings affect stock prices. In conclusion, the relationship between earnings and stock prices is intricate and multifaceted, encompassing fundamental analysis, market sentiment, behavioural biases, and broader market conditions. Index Terms- Quarterly Results; announcement dates; Impact; share prices;

INTRODUCTION

When a company makes announcements, it reflects on the performance of the company in the market. Announcements can be many, Quarterly reports, stock buyback, personnel change, product release, dividends, approvals and like. Each one of these affects the company's stock price in the market. In this study, it is found that Announcements impact on share prices for that different company from automobile and banking sectors are selected by looking into announcement of various messages. There are some company specific factors that can affect the share price like Introduction of a new product or a product recall, News releases on earnings and profits, future estimated earnings, Announcement. There are some economic factors also which affects the share price like Economic, political shocks, Changes in economic policy, Interest rates etc .A quarterly report is a set of financial statements issued by a company every three months and this report are important financial updates that provide a market notice on how stocks will likely be valued in the future. In this study, it is found that quarterly results impact on share prices. This study has attempted to determine the market friction in the stock market during the quarterly earnings announcement news related to selected samples. The SECONDARY DATA has been taken for this research is from various sources like internet, journals and other publications. The stocks prices and market index were collected from the National Stock Exchange (NSE). This study is trying to understand from various previous papers on the behaviour of stock prices on announcements.

NEED FOR PRESENT STUDY

The study is helpful for the companies to check there is any relationship between the share price and Announcement. It's delved upon on the various events occurring in a company's annual lifecycle and their relationship with the share price. Here, the various research papers have been taken into consideration and descriptive and validating attempt is made, like a different set of events in a new set of companies. This will also help investor in decision making to invest in which company earn profit.

RESEARCH PROBLEM

Is there any impact on share price of companies after various events in the companies?

PRIMARY OBJECTIVES

- To investigate the pros and cons of announcement of the selected company and changes in share prices.
- To find out the relationship between growth or retardation in the performance of the company and changes in the share price.

SECONDARY OBJECTIVES

- To identify the price fluctuation of shares of selected companies during the pre and post announcements.
- To determine the market friction in the stock market during the quarterly earnings announcement news related to selected sample.

NEED FOR THE STUDY

Events help investors to take the pulse of public companies. By comparing the effect of events on Price on different times, investors can get rich insight into business's performance and growth. Furthermore, events like new product launch, management change, mergers and new projects help investors to predict future earning potential, which is highly correlated to a company's share price

TIME PERIOD OF STUDY

The duration of the study is 2022 March to Jan 24

TOOLS USED FOR STUDY

Average, correlation, covariance, standard deviation, co-efficient variation, Graphs have been used in this study.



DATA COLLECTION

The study has based on secondary data. Secondary data has been collected for the share price of the companies from the NSE websites. The companies and banks improvised financial report collected from companies' and banks websites. Share price of the company has been collected 15 days before and 15 days after the announcements of the every quarter's result. Also, various analysis papers in this connection have been referred and analysed.

SAMPLING DESIGN

Secondary data will be collected from companies' websites, NSE website. Analytical sites etc. as these constitute as the reliable source of data for the research. 5 companies from the most valuable companies from the Nifty 100 have been taken for sample (Bajaj Auto Ltd., HDFC Bank Ltd., Reliance Ltd., Tech Mahindra Ltd., Coal India Ltd.) have been selected as sample size.

LIMITATION OF THE STUDY

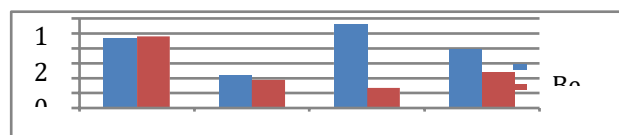
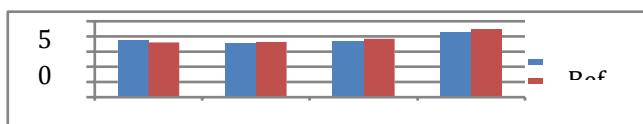
The study analysis the impact of result on share price only not on the number of share traded, turn over, number of trades, etc. As, the study is conducted only with the samples of 5 companies because of the generalization of conclusion cannot not be made to whole Indian corporate world.

DATA ANALYSIS AND INTERPRETATION

This paper has observed various papers published in this subject and understand there is a fluctuation after the announcements. One of the papers discussed Maruti Suzuki Ltd, Tata Motor Ltd, Mahindra & Mahindra Ltd, State Bank of India and Bank of Baroda. To prove this further, we have taken a different sample of 5 companies from the most valuable pack of Nifty 100 in NSE.

QUARTERLY RESULTS

Bajaj Auto Ltd.,



First Quarter

It has been observed that share price has increased in trend, before the announcement of quarterly result. Average share price for 15 days before announcement of quarterly result were ₹ 3735 And S.D. was 93.99 but after announcement share price has been decreased and average share price were ₹ 3606 and S.D. was 95.89. It means fluctuation were less after the announcement as compared to the pre-announcement.

Second Quarter

The results shows that Average share price for 15 days before announcement of quarterly result were ₹ 3566 And S.D. was 43.48 but after announcement share price has been decreased and average share price were ₹ 3647 And S.D. was 37.77. It means fluctuation were more after the announcement as compare to the pre-announcement. Share price has increased by 2.28% after the announcement.

Third Quarter

In the third quarter, it has been observed that share price was increased in trend, before the announcement of quarterly result. Average share price for 15 days before announcement of quarterly result were ₹ 3659 and S.D. was 112 but after announcement share price has been decreased and average share price were ₹ 3848 and S.D was 27. It means fluctuation were more after the announcement as compare to the pre-announcement. Share price has increased by 5% after the announcement.

Fourth Quarter

In the fourth quarter, it has been observed that share price fluctuation was more after the announcement as compare to the pre-announcement. Share price has been increase by 5.7% after the announcement.

Merger - HDFC Bank Ltd.,

There was a merger announcement by HDFC BANK and HDFC on April 7 2022. We will analyse this announcement using share price data



This announcement had a considerable price change before and after the event, in the range of 20% up and down. That is a huge change. Again, the record date of merge was July 1 2023. The second oval describes the price change around that date. That is again in the range of 9% price variation. This confirms the relationship between announcement and price.

Profits Down - Reliance Ltd.,

Reliance Ltd had a quarterly results announcement in Jul 21 2023, where the YoY sales was down by 20%, this resulted in huge price movement as indicated below.



New Business - Tech Mahindra Ltd.,

In TechM , we will analyse the announcement on new business for the company. There was a news of Amazon signing partnership with TechM around Nov 7 2023. This resulted in a huge ramp of share price after that around 20%



Capex Plans - Coal India Ltd

Around Sep 2023, Coal India announces Capex plans of Rs.24000 cr. That had an effect on the share price. The red oval indicates the period after which the price jerks up and moves by almost 50%.



CONCLUSION

Share price of the companies effected by the micro and macro factors. Like FII investment, Government policies, Economic policies, Company profile, their history etc. In case of Maruti Suzuki Ltd; share price has been affected by the announcement of the quarterly result. Two quarter announcement have positive effect and two quarters have negative effect on share price. It has been analysed that share price are increased after the announcement as compare to decreased in share prices. In case of Tata Motors Ltd; there is positive impact of announcement of 4 quarters result on share price. It has been analysed that share price are increased after the announcement of quarterly results. In case of Mahindra and Mahindra ltd; there is positive impact of announcement on 3 quarters share price. And one quarter has impacts negative impact. It has been analysed that share price are increased after the announcement of quarterly results. In case of State Bank of India; three quarters announcement have positive



effect and one quarter have negative effect on share price. It has been analysed that share price are increased after the announcement as compare to decreased in share prices. In the case of Bank of Baroda; share prices has been affected by the announcement of 3 quarters result on share price. And in it only one quarter's impact was negative. It has been analysed that share price are increased after the announcement of quarterly results. Bajaj Auto Ltd results had no big time impact on share price, but statistically was significant. Other events in RIL, HDFC Bank, Coal India, Tech Mahindra has significant impact on the share prices. This study indicates that quarterly results and other events of the companies do have statistically significant impact on share prices of the selected companies.

REFERENCES

1. Shock Events: The Impact of News Media and Communication Strategies on Listed Companies' Share Price - *Fandella, Paola ; Ceccarossi, Guido Luigi - 2022*
2. Share price reactions to advertising announcements and broadcast of media events – *G Filbeck, X Zhao, D Tompkins...Managerial and Decision Economics - November 2008*
3. The Analysis of World Events and Stock Prices - *Victor Niederhoffer , The Journal of Business - , 1971 - The University of Chicago Press*
4. A study on impact of quarterly financial result on stock price - *Payal Nareshbhai Joshi, Nisarg Shah& others , 2019 JETIR March 2019, Volume 6, Issue 3*
5. www.moneycontrol.com
6. www.nseindia.com



Android Malware Detection Using Machine Learning

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ABSTRACT: The user interface allows users to search for apps in the Play Store and quickly recovers the licensing listing and privacy covering. The individual then has the option to select a specific authorization, which is detailed in detail in a list of recommended diversifications. This interface provides useful information about reasonable permissions and highlights the relevant sections of the privacy policy, allowing the user to quickly assess the privacy risks associated with an Android application. We provide them a fresh method for analyzing privacy covering within the framework of Android apps by taking cues from the privateness coverage. A technology designed to understand the privacy consequences of include 1/3-celebration applications has already demonstrated its capacity to concentrate on app disruption incidents. Because of the device's expandable architecture, it is simple to incorporate more tendencies into the strategy to increase efficiency and balance.

KEYWORDS: Android, malware, benign, permissions-based, signatures-based.

I INTRODUCTION

The quantity and variety of applications running on mobile devices have increased over the past ten years due to the remarkable rise in mobile devices running different operating systems. Lately, people have been using cellphones in instead of or in addition to laptop computers. a closer examination of the reasons for mobile phone use, particularly the well-known fact that it's for social networking, internet, and online dependence. They are also utilized for special mobile tasks including SMS messaging, random area analysis, and ubiquitous access. Primary changes in the way we carry out tasks in several aspects of our daily lives, including business and social communications, have been brought about by the advent of cellphones and cell applications.

Emerging cellular application marketplaces like Google Play Market, Apple App Store, or Microsoft Windows Store offer a wide selection of packages for clients with specific needs, ranging from games to multimedia programs, navigation systems, and fitness-related apps. The swift ascent in popularity of cellphones has expedited their susceptibility to malevolent acts. This is mostly because users of cell applications have access to a variety of private statistics. Because of this, several applications in the market are thought to engage in harmful sports. Additionally, market policy providers influence the malware's proliferation. To guarantee appropriate protection scores for apps featured on its app platform, Apple's App Store, for instance, recently established a stringent registration and digital certification criteria to the organization prior to releasing any apps.

Developers have wider latitude to submit their apps to other marketplaces in addition to Google Play. When reports of fraudulent pastime are received, drugs are removed from the market. Specifically, the modern model of the Android operating system allows you to remove the dangerous application from the tool. The Apple App Store likewise has a similar removal process. Early identification of harmful programs is necessary for a put up-detection malware cleanup strategy.

II LITERATURE SURVEY

Literature evaluation is the most crucial step within the software program development manner.

A Bayesian Classification Analysis-Based Approach to Android Malware Detection Mobile malware is becoming larger and more complicated due to the steady proliferation of smartphones around the sector. Android is unexpectedly turning into the most famous cell platform, main to a dramatic boom in malware objectives

On the forehead In addition, Android malware is evolving too speedy to be detected by traditional signature-based improvement. Despite ongoing detection efforts, well timed detection of new malware remains a essential trouble. This calls for new procedures to mitigate the developing chance of Android malware. The authors therefore expand and resolve a proactive gadget getting to know technique in Bayesian classification geared toward detecting unknown Android malware the use of static analysis. The have a look at, on a large range of malware samples, from maximum of the present malware families, demonstrates the excessive precision of the detection abilities. Empirical outcomes and comparative evaluation are provided, imparting useful data for growing effective solutions based totally on static Bayesian analytical classification for the detection of unknown malware for Android.

Android permissions: a perspective combining risks and benefits

The Android working machine has become exceedingly popular over the past few years. This platform has verified itself to be dominant no longer best inside the cell global, however also in IoT technology. However, this popular protection currency has turn out to be a tempting target for malicious use. There is therefore an increasing want for classy, computerized and portable malware detection solutions [1]

Android structures have emerged as a goal for criminals due to the multiplied variety of Android users in 2017. More than eight,000 Android malware are detected each day, making it hard for malware analytics to stumble on. Traditional malware detection methods are now not dependable for detecting newly created malware in a brief time period. In this text, we use some other method to hit upon the Android checkout loop. The detection is completed and in comparison the use of 3 different classifiers, specifically okay-nearest (KNN), random bounce (RF), and choice tree (DT). Representation [2].

Various research have highlighted the importance of Android permission pattern evaluation for effective Android malware detection. Optimizing Android malware detection with multidimensional license facts is a bottleneck this is an acute hassle. Various device gaining knowledge of classification algorithms together with Linear Regression (LR), Support Vector Machine (SVM), K-Nearest Neighbor (KNN), Decision Tree (DT);Random Forest (RF), Gradient Boosting (GB) and Extreme Learning Machine (ELM) are evaluated. Shell-based feature choice the usage of the Firefly Algorithm (WFSFA) outperformed different algorithms in terms of feature reduction and marked a higher category accuracy of 95.28% when examined with the CIC InvesAndMal2019 multivariate function set with 4115 functions [3].

Android malware in particular targets the Android OS by using leaking touchy facts and disrupting the system. Several tries have been made to discover MAS malware thru secret information leaks and machine crashes. Several tries were made to detect Android malware. But these equipment can not discover malware right away, and most of them rely on signatures that can't come across new ones. However, those groups can not mechanically detect malware, and most rely upon subscriptions that can not stumble on new malware variations. [4].



The growing popularity of Android-primarily based smartphones has caused the proliferation of malicious programs developed with the aid of malicious actors, necessitating the usage of sophisticated malware detection techniques. Several methods had been proposed that use of static and/or dynamic information extracted from an Android utility to discover malware. The use of system learning is tailored to diverse malware detection strategies to triumph over the manual overhead. Machine getting to know classifiers had been broadly used to discover Android malware styles based on static capabilities and dynamic behavior.

In order to resolve the problem of malware detection, in this newsletter we proposed a gadget mastering detection machine for malware on the Android platform. We advise a device based totally on randomly accrued examples of proper and horrific programs to teach classifiers. To test the performance of the proposed "Ran Droid" system, various experiments had been carried out, which showed that Ran Droid ought to obtain a high type accuracy of ninety seven.7%.

The Android working device has turn out to be the most popular working device on smartphones and capsules considering 2012. This popularity has caused the fast boom of Android malware in latest years. The complexity of Android's obfuscation and malware detection methods has significantly advanced, making many conventional malware detection strategies obsolete. In this newsletter, we advocate DL Droid, a deep studying device for the detection of Android malware via dynamic evaluation the usage of complete kingdom era. In addition, the outcomes boom the importance of better enter technology for dynamic evaluation, as the DL Droid based totally on state input generation suggests that it's far advanced to the modern approach [6].

In trendy digital global, maximum anti-malware equipment are signature-based totally, that is ineffective for detecting unknown state-of-the-art malware, viz. Metamorphic malware. In this article, we take a look at the frequency of opcode occurrence for unknown malware detection using device studying strategies. For this, we used the Microsoft malware category dataset. The pinnacle 20 features derived from Fisher's scale, facts acquisition, advantage, selected chi-squared capabilities, and symmetric uncertainty are in comparison. We additionally tested numerous classifiers in the WEKA GUI-primarily based system learning device and found that five of them (Random Forest, LMT, NBT, J48 Graft, and Arbor) can discover malware with an accuracy of almost one hundred%.

Compared to standard sparse neural networks, DBNs can use unstructured statistics to teach a generative model layer which can higher represent the traits of information patterns. We examine the overall performance of DBN with 3 basic malware detection fashions that use vector machines, selection bushes, and okay nearest associates as classifiers. Experiments display that the DBN model offers extra correct detection than the base fashions. When additional raw information is used to teach DBN. Experiments display that the wide encoder can efficaciously reproduce the basic shape of the input statistics and extensively reduce the quantity of the function vector [8].

One of Android's main safety mechanisms for restricting get admission to to features at its core is permission manage. However, there is a big risk in regards to granting permissions as 97% of malware attacks target Android mobile devices. As malware becomes greater state-of-the-art, a greater sophisticated method has been proposed in a latest take a look at that tests the conduct of the evolved utility towards the behavior of the marketed software due to inconsistencies. In this newsletter, we discover such inconsistencies by means of matching the software's requested license with the application's natural language descriptions, which gives intuitive insight into the software's expectations from the user.

We consequently suggest which you use the prolonged app description for higher malware detection based on app descriptions and permissions. To compare overall performance, we ran numerous checks with the 56K. The proposed improvement reduces the fake positives of the cutting-edge processes, Why by way of, Auto Cog, CHABADA by at least 87% and TAP by means of at least fifty seven%. We proposed a brand new technique to evaluate the reliability of text descriptions for permission-based totally malware detection. Our experimental outcomes display a excessive detection fee of 98.72% for 71 malware households and an accuracy of 90% for benign and obfuscated malware samples. Our effects also show that touchy permissions and textual UI descriptions are required to offer promising talents for strong Android malware detection [9].

Anti-malware software program has traditionally used signature-primarily based detection techniques and heuristics. These detection structures should be manually up to date to locate new, unknown, or adapted malware. The goal is to create a new malware detection solution in an effort to serve three purposes: mechanically discover and record unknown documents based at the severity of the malware spectrum; enforcing a hybrid machine studying technique to stumble on malware change traces; and enhance the accuracy of the detection outcomes.

Our answer is powered through metallic mining and machine getting to know standards and algorithms. We carry out styles of information mining on samples, n-gram and PE function extraction, which are used for system studying. We also present a new hybrid learning method that uses each unsupervised and unsupervised system gaining knowledge of in a duplicate protocol. A controlled set of rules is applied to suggest whether a document is taken into consideration malicious or secure. The malware files will then be classified after which assigned in step with the severity spectrum the usage of the SOFM algorithm [10].

Android malware has persevered to develop at an alarming rate in latest years. Many modern-day malware programs that use distinctly state-of-the-art detection prevention strategies are tons much less powerful than traditional gadget studying-primarily based malware detection techniques. In unique, Android can tolerate unique sorts of malware and come across boundaries because of the use of a unmarried category algorithm. To address this obstacle, in this article, we advocate a new technique that makes use of parallel mastering and information aggregation strategies called Android malware detection. To put in force this technique, we first extract eight feature lines from the Android app static evaluation and create types of function movies after feature selection. Then an apparent learning pattern detection is evolved to speed up the classification process.

Finally, we discover an approach to information fusion based totally on probabilistic evaluation and theory that efficiently achieves detection results. To check our technique, different modern day invention work turned into decided on for assessment with real Android apps. Experimental effects show that it is able to offer a better detection accuracy and superior time to present malware detection answers [11].

In order to solve the trouble of malware detection, researchers have these days started to discover the possibilities of gadget studying techniques to recommend powerful processes. Several promising consequences were said in the literature, and lots of approaches had been evaluated using a not unusual "10-factor cross-validation" layout. This paper critiques the reason of malware detection to run the adequacy of the "10x" scheme of trying out strategies that don't surely perform well. To this quit, we developed a number of machine mastering classifiers, which were based on a new set of features superimposed on CFG packages. We use big facts set of over 50,000 Android apps, gathered from sources that we have selected the use of a country of the artwork method. We show that our approach is superior to current system gaining knowledge of methods. However, such excessive performance in datasets does no longer suggest average high overall performance inside the real international.

Many present malware detection strategies are designed to locate malware primarily based on resource necessities including permissions, device calls, and suspicious API calls. The Android app tag is now used to tell customers about the dangers of putting in apps. Users from all around the global have started out to increase an increasing number of cellular applications in reaction to Android technology and wireless networks. The growth in side the number of programs leads to an growth inside the likelihood of putting in malicious packages and malware. When the person installs the app, they've the option to test the permission required for the Android app and cancel the set up if the permissions are unnecessary or excessive.



As a result, present strategies are less effective at detecting many regular malware that require little or no suspect sources, but use the intercomponent verbal exchange (ICC) mechanism at the start of the assault. In an existing gadget, ICC Detector gives a reputation version with observe packages and a fixed of educated malware, and makes use of the educated version to stumble on malware. The approach we endorse proposes a framework which could hit upon malicious Android packages to assist the Android market. The proposed framework is designed as an engine-based malware detection system on Android to detect malicious programs and objectives to enhance the safety and privateness of telephone customers. This device monitors numerous traits and authority-primarily based and obtained results from Android applications and analyzes these characteristics the usage of system gaining knowledge of classifiers to decide whether the utility is right or malware[12]

With over 50 billion downloads and over 1.3 million apps at the respectable Google marketplace, Android continues to gain reputation among telephone users round the world. At the same time, there has been an growth in platform-machine malware, with newer techniques the use of greater sophisticated detection-avoidance techniques. As conventional malware-primarily based methods become less effective at detecting unknown malware, a choice is wanted for strategic 0-day detection. Therefore, this examine proposes a getting to know synthesis method for Android malware detection. It combines the blessings of static analysis with the efficiency and performance of ensemble device learning to improve Android malware detection accuracy. Machine gaining knowledge of fashions are built using big repositories of malware styles and applications covered by means of main antivirus providers. The provided experimental consequences and analysis display that the proposed technique uses a large area to utilize the studying talents of clustering [13].

Malicious software program abounds in the global of infinite pc customers who're constantly confronted with these threats from various assets, consisting of the Internet, local networks and portable drives. Malware is a low or high threat ability and can reason structures to malfunction, steal facts, or even crash. Malicious software program can be an executable file or a gadget library file inside the shape of viruses, worms, Trojans designed to violate machine security and violate consumer privateness. Typically, antivirus software program is primarily based on a signature detection system this is constantly up to date from the Internet and consequently keeps music of virus signatures. While this can be sufficient for home users, the safety threat from a brand new virus ought to threaten the entire company community. This article proposes a new and progressed anti-virus engine that not best scans files, but also accumulates expertise and detects files as capacity viruses. This is carried out with the aid of extracting machine API calls made through various ordinary and malicious executables and the use of machine gaining knowledge of algorithms to become aware of and therefore area files on the safety risk scale. Although the sort of system is CPU intensive, it is very effective whilst used within the middle to defend the corporate network, which may be extra vulnerable to such recognized virus threats. While this could be sufficient for domestic customers, the security danger from a new virus should threaten the complete corporate community. This article proposes a new and progressed anti-virus engine that not simplest scans files, but additionally accumulates information and detects documents as capability viruses. This is achieved by extracting system API calls made with the aid of numerous normal and malicious executables and the use of system studying algorithms to perceive and therefore vicinity documents on the security chance scale. Although the sort of system is CPU extensive, it's miles very effective while centrally the usage of a company network to shield in opposition to such threats [14].

III. PROPOSED SYSTEM

Determine the list of installed third-celebration packages. They elicit a full listing of permissions for every application. Define Android safety stage: security degree of each permission, i.E. Regular or dangerous for each utility. Get Android app permissions set. Classification algorithms are used to come across malicious packages. Pay interest to the accuracy of the junk mail classification it gives and the time it takes to complete it. Accurate outcomes among distinctive malware and not unusual packages. Classifiers are advanced.

IV. SYSTEM ARCHITECTURE

The apps on smartphones might have numbers on them. One possible method is to use a two-step process whereby programs are compiled into Java code and applications are extracted using XML code. After the statistics are parsed in XML, a number of permissions may be generated, and function calls to the API may be made in Java following data processing. Using a decision tree of rules, Android apps might be scanned. Both safe and dangerous apps can be placed after the scanning process. By applying the tree technique, one may determine whether a utility is harmful or not. If it is, then it isn't. We form the framework for our endeavor using this arrangement.

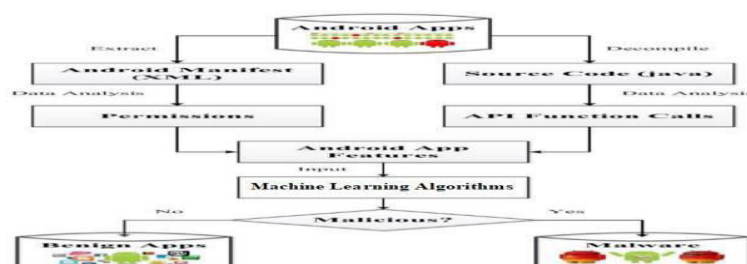


Fig 1. System Architecture

V. MODULES

LOGIN MODULE

When a user opens the website, this is the first movement to appear. The individual must provide the password and ideal contact number that the user supplies while registering to access the website. The consumer is successfully signed onto the website if their records match the data in the database; if not, a failure alert appears and they are prompted to provide the exact information again. For new registrations, a link for registration is also supplied.

REGISTRATION MODULE

Before logging in, a new user wishing to access the program must sign in. To check in the information, click the sign-in button when the login action opens. When registering, a new user must enter their entire call, password, and call variety.

The user must enter the password again in the text field labeled "Confirm Password." The user is prompted to log in again after entering data in each of the text fields and clicking the login button, which transfers the information to the database. After that, in order to access the software, the user needs log in. All text fields have validations applied to ensure the utility operates properly. Each text field in the registration will have information that needs to be filled in, including the name, contact information, password, and confirmation password. These fields will not be left empty.



The tool will provide a notice using the content that should be in each textual content if this type of textual content space is empty. Additionally, the data must fit effectively in the password and password affirmation areas. An additional confirmation is that the touch number must be legitimate and consist of ten digits. The user's registration will be rejected and they will need to re-register if any of these tests are broken. When one of the fields is left unfilled, the application will display a notice. Should all of these facts prove to be true, the user may be instructed to launch the program.

Application Download

In this module, many packages have already been downloaded to the cellular smartphone thru the play store. Once installed, genuinely look for malware present in various packages.

Android Application Scan

In this module, many packages have already been downloaded to the cell phone through the play store. Once mounted, without a doubt search for malware found in diverse programs. This kind of malware can not be detected by using victimization the usage of a qualitative signature technique or through making use of traditional static or dynamic analysis.

The discovery is purely based on the application's network site visitors styles. For every application, a specific lively model representing the nearby model (i.E. The device) is discovered.

Semi-supervisory gadget mastering strategies are used to study normal conduct patterns and detect errors expected from the conduct of the application. These packages are applied and evaluated on Android gadgets.

Malware Detection

One method is suggested in this machine for enhancing the safety of mobile software, which measures the security of cellular packages using information mining and cloud computing. The assessment, classification, detection, and final containment of the malware will comprise the malware detection challenge. Various malware-type methodologies are employed to identify their occurrences, which enables the identification of malware types, behaviors, and novel variants. Some sort of security measure needs to be used to counter such attacks to mobile devices.

Malware evaluation is capable of identifying individual malware instances by employing particular malware characteristics and highly unusual category schemes. A prototype device known as a Malware Detection System has also been developed here to assess the virulence or innocence of a mobile application. The goal of malware detection is to quickly identify and stop any infection from harming the computer in the same way.

The final portion of the work involves malware containment, which entails taking steps to stop it from spreading and prevent damage to the computer. Specifically, commercial antivirus employs a statistics-based methodology, in which new virus detecting devices are found by regularly updating the records. Zero-day exploit malware, on the other hand, is not detectable by antivirus software; instead, it identifies abnormal file segments by evaluating a binary file's contents mathematically.

Android Permission Check

Anyone who wants to use the installation and application of any third party does not understand the meaning and meaning of the utility's desired licenses, so they explicitly present all of the licenses, which also presents for the installation of malicious packages and their malicious actions. Behind the scenes A software should ask for the necessary authorization if it wants to use resources or statistics outside of its own sandbox. You indicate that your application needs a license by displaying a list of permissions and asking the user to confirm each one during runtime.

Every time you execute an action that requires a license, you must check to see if you have it if the utility requests a dangerous license. The sensitive permission determines how the device behaves once it has been granted permission. Certain capabilities are deemed "regular," therefore immediately following setup, the device provides them. Giving the user full access to the program is one of the "unstable" permissions that are deemed appropriate. See Security levels for further details on the various authorization styles. If a user plans to utilize features that call for a license but declines to obtain one, it's likely because they no longer understand the necessity of a license for that feature.

VI. REAL TIME IMPLEMENTAION

Application Download

In this module, many applications are already download in mobile phone through play store. After installation just find the malware present in various applications.

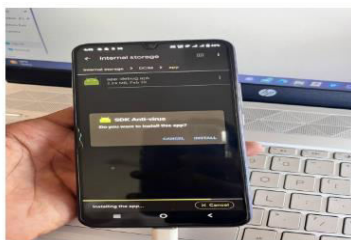


Fig. 2 Application downloaded in mobile

ANDROID APPLICATION SCAN

In this module, many application's are already download in mobile phone through play store. After installation just find the malware present in various application's. Malware of this kind can't be detected by victimization the quality signatures approach or by applying



regular static or dynamic analysis strategies. The detection is performed on the basis of application's network traffic patterns solely. For each application, a model representing its specific approach pattern is learned regionally (i.e., on the device).



Fig. 3 Android Application Scan in mobile

MALWARE DETECTION

In this proposed system in order to improve the security of the mobile apps one methodology is proposed which will evaluate the mobile applications security based on the cloud computing platform and data mining. The task of identifying malware will be categorised into analysis, classification, detection and ultimate containment of malware. Several classification techniques are utilized in order to classify malware in keeping with their instances and this has created it potential to acknowledge the sort and activities of a malware and new variant. For such kinds of threats to mobile devices there should be some security mechanism to be implemented. Analysis of malware has got to with distinctive the instances of malware by completely different classification schemes by exploitation the attributes of well-known malware characteristics.

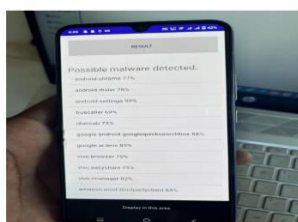


Fig. 4 Malware Detection in mobile

VII CONCLUSION

In this machine, if the utility handles private or touchy person information, the requirements in the "Personal and Confidential Information" segment below also are necessary. These Google Play requirements are further to any requirements below relevant privacy or records protection laws. We advocate: The user who desires to install or use any 1/3-party software does now not recognize the importance and meaning of the permissions asked by means of the application, and thus surely offers all of the assets, inflicting bad programs to install and run. His malicious activities behind the scenes.

REFERENCES

- [1] Rishab Agrawal , Vishal Shah , Sonam Chavan . Android Malware Detection Using Machine Learning. International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE).IEEE,(2020)
- [2] Darus,Fauzi Mohd,Salleh Noor Azurati Ahmad,and Aswami Fadillah Mohd Ariffin."Android Malware Detection Using Machine Learning on Image Patterns"2018 Cyber Resilience Conference(CRC).IEEE,2018.
- [3] Vrama,P.Ravi Kiran,Kotari Prudvi raj,and KV Subba Raju."Android mobile security by detecting and classification of malware based on permissions using machine learning algorithms."2017 InternationalConference on I-SMAC (IoT in Social,Mobile,Analytics and Cloud)(I-SMAC).IEEE2017.
- [4] Chang,Wei-Ling, Hung-Min Sun,and Wei Wu."An Android Behaviour Based Malware Detection Method using Machine Learning." 2016 IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC).IEEE, 2016.
- [5] Koli, J. D. "RanDroid: Android malware detection using random machine learning classifiers." 2018 Technologies for Smart-City Energy Security and Power (ICSESP).IEEE,2018.
- [5] Yerima, S. Y., Sezer, S., & McWilliams, G. (2014). Analysis of Bayesian classification-based approaches for Android malware detection. IET Information Security, 8(1), 25-36.
- [6] Sarma, B. P., Li, N., Gates, C., Potharaju, R., Nita-Rotaru, C., & Molloy, I. (2012, June). Android permissions: a perspective combining risks and benefits. In Proceedings of the 17th ACM symposium on Access Control Models and Technologies (pp. 13-22).ACM.
- [7] Zhou, W., Zhou, Y., Jiang, X., & Ning, P. (2012, February). Detecting repackaged smartphone applications in third-party android marketplaces. In Proceedings of the second ACM conference on Data and Application Security and Privacy (pp. 317-326).ACM.
- [8] Chia, P. H., Yamamoto, Y., & Asokan, N. (2012, April). Is this app safe?: a large scale study on application permissions and risk signals. In Proceedings of the 21st international conference on World Wide Web (pp. 311-320). ACM.
- [9] Yang, Z., Yang, M., Zhang, Y., Gu, G., Ning, P., & Wang, X. S. (2013, November)Appintend: Analyzing sensitive data transmission in android for privacy leakage detection. In Proceedings of the 2013 ACM SIGSAC conference on Computer & communications security (pp. 1043-1054). ACM.
- [10] Zhang, W., Li, X., Xiong, N., & Vasilakos, A. V. (2016). Android platform-based individual privacy information protection system. Personal and Ubiquitous Computing,20(6), 875-884.
- [11] Felt, A. P., Chin, E., Hanna, S., Song, D., & Wagner, D. (2011, October). Android permissions demystified. In Proceedings of the 18th ACM conference on Computer and communications security (pp. 627-638). ACM.
- [12] Lin, J., Amini, S., Hong, J. I., Sadeh, N., Lindqvist, J., & Zhang, J. (2012,September). Expectation and purpose: understanding users' mental models of mobileapp privacy through crowdsourcing. In Proceedings of the 2012 ACM Conference on Ubiquitous Computing (pp. 501-510). ACM.
- [13] Mann, C., & Starostin, A. (2012, March). A framework for static detection of privacy leaks in android applications. In Proceedings of the 27th annual ACM symposium on applied computing (pp. 14571462). ACM.
- [14] Stevens, R., Gibler, C., Crussell, J., Erickson, J., & Chen, H. (2012, May). Investigating user privacy in android ad libraries. In Workshop on Mobile Security Technologies (MoST) (p. 10).



कृत्रिम बुद्धिमत्ता और वैश्विक भविष्यवाणियाँ: एक व्यापक विश्लेषण

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सार : कृत्रिम बुद्धिमत्ता के त्वरित विकास का हमारे (एआई) ग्रह के भविष्य पर महत्वपूर्ण प्रभाव पड़ता है। यह अध्ययन प्रौद्योगिकी, अर्थव्यवस्था, समाज संरचनाओं, भूराजनीतिक गतिशीलता, नैतिक मुद्दों और एआई को नियंत्रित करने वाले मजबूत कानूनों की बढ़ती आवश्यकता पर कृत्रिम बुद्धिमत्ता के जटिल प्रभावों की गहन जांच प (एआई) करता है। यह पेपर प्रौद्योगिकी और हमारे वैश्विक परिदृश्य पर इसके प्रभावों के बीच महत्वपूर्ण संबंध को संबोधित करता है, एआई द्वारा प्रदान की जाने वाली संभावनाओं और समस्याओं पर जोर देता है। यह शोध उस भूमिका पर विचार करता है जो कृत्रिम बुद्धिमत्ता समाज और आधुनिक दुनिया के भविष्य को निर्धारित करने में निभाएगी, साथ ही इसके मूल्य पर भी विचार करेगी।

परिचय

कृत्रिम बुद्धिमत्ता हाल के वर्षों में एक विघटनकारी शक्ति रही है, जिसने हमारे रोजगार, रिश्तों और जीवन शैली को प्रभावित किया है। यह निबंध समस्याओं का समाधान करने और कई वैश्विक मुद्दों पर इसके प्रभाव की जांच करते हुए कृत्रिम बुद्धिमत्ता के वादे को स्वीकार करने का प्रयास (एआई) करता है। एआई के प्रभाव जटिल और व्यापक हैं, जिनमें नैतिक मुद्दों से लेकर वैज्ञानिक प्रगति तक शामिल हैं। 1956, एक कंप्यूटिंग सम्मेलन में कृत्रिम बुद्धिमत्ता का मुद्दा उठाया गया। कृत्रिम बुद्धिमत्ता पर एक लंबे विचारमंथन सत्र के लिए डार्टमाउथ विश्वविद्यालय के जॉन मैककार्थी द्वारा रमुख वैज्ञानिकों - [1,2] और गणितज्ञों को इकट्ठा किया गया था [1,2]। एक विद्वतापूर्ण अनुशासन से हटकर, कृत्रिम बुद्धिमत्ता मुख्यधारा की सामाजिक और आर्थिक प्रौद्योगिकी जैसे आवाज पहचान, चिकित्सा निदान और, हाल ही में, चालक रहित कारों और आवाज सक्रिय सहायता- [3,4] [में एक प्रमुख शक्ति के रूप में उभरी है।

कृत्रिम बुद्धिमत्ता की वर्तमान स्थिति में अन्य तकनीकों के अलावा मशीन ल (एआई)निर्ग, प्राकृतिक भाषा प्रसंस्करण और रोबोटिक्स शामिल हैं। स्पष्ट प्रोग्रामिंग के बिना, मशीनें अनुभव से सीख सकती हैं और मशीन लर्निंग, कृत्रिम बुद्धिमत्ता का एक उपसमूह, के माध्यम से बेहतर हो सकती हैं। गहन शिक्षण एल्गोरिदम के विकास की बदौलत एआई सिस्टम अब जटिल कार्यों को संभालने और अधिक सटीकता के साथ निर्णय लेने में कहीं अधिक सक्षम हैं [5,6]। एआई को कई तरीकों से वर्गीकृत किया गया है, हालांकि विचार करने के लिए दो मुख्य समूह हैं।

वर्गों के साथवर्गीकरणों का संक्षेप में नीचे वर्णन किया गया है। पहला वर्-साथ उनके उप-गीकरण एआई और एआईसक्षम उपकरणों और मानव - की उनकी क्षमता पर आधारित है। "महसूस करने" और यहां तक कि "सोचने" साथ मनुष्यों की तरह-मस्तिष्क के बीच समानता के साथएआई आधारित प्रणालियों को आगे चार श्रेणियों में वर्गीकृत किया जा सकता हैमन का सिद्धांत : प्रतिक्रियाशील मशीनें, सीमित जागरूक एआई।-मेमोरी मशीनें और आत्म-दूसरा वर्गीकरण प्रौद्योगिकी पर आधारित है और इसे तीन उपश्रेणियों में विभाजित किया गया है(एएसआई) आर्टिफिशियल सुपरइंटेलिजेंस : आर्टिफिशियल जनरल इंटेलिजेंस (एजीआई), और आर्टिफिशियल नैरो इंटेलिजेंस। (एएनआई)

तकनीकी विकास: कृत्रिम बुद्धिमत्ता की नींव इसका तकनीकी विकास है। मशीन लर्निंग और डीप लर्निंग की बदौलत आर्टिफिशियल इंटेलिजेंस (एआई) नई ऊंचाइयों पर पहुंच गया है, जो स्पष्ट प्रोग्रामिंग की आवश्यकता के बिना सिस्टम को सीखने और अनुकूलित करने में सक्षम बनाता है। प्राकृतिक भाषा प्रसंस्करण मशीन संपर्क में क्रांति ला दी है।-के क्षेत्र ने उन्नत आभासी सहायकों और भाषा अनुवाद प्रणालियों को जन्म देकर मानव (एनएलपी)

आर्थिक निहितार्थ: एआई आर्थिक माहौल में भारी उथलजबकि एआई के व्यापक उ :पुथल मचा रहा है। नौकरी सृजन और विस्थापन-पयोग से कुछ उद्योगों में नौकरी छूट सकती है, यह एआई के निर्माण, रखरखाव और पर्यवेक्षण में रोजगार के नए अवसर भी खोल सकता है। उत्पादकता में लाभ : स्वचालन, अनुकूलन और बेहतर निर्णय लेने के माध्यम से, कृत्रिम बुद्धिमत्ता में कई उद्योगों में उत्पादकता बढ़ाने (एआई)की क्षमता है।

सामाजिक बदलाव: चूंकि एआई हमारे रोजमर्रा के जीवन के हर पहलू में व्याप्त है, इसलिए सामाजिक बदलाव अपरिहार्य हैं। शिक्षा और कौशल अंतर : उभरते नौकरी परिदृश्य के लिए कार्यबल को तैयार करने के लिए, कई उद्योगों में एआई के एकीकरण के परिणामस्वरूप शिक्षा और कौशल विकास पर जोर देने की आवश्यकता है। स्वास्थ्य देखभाल में एआईदवा विकास : निदान और व्यक्तिगत उपचार सहित एआईआधारित चिकित्सा अनुप्रयोगों में रोगी - के परिणामों को बढ़ाने की क्षमता है।

नैतिक मुद्दों: कृत्रिम बुद्धिमत्ता से जुड़े नैतिक मुद्दे अत्यंत महत्वपूर्ण हैं। पक्षपाती एल्गोरिदम को पहले से मौजूद सामाजिक :पूर्वाग्रह और निष्पक्षता • असंतुलन को बनाए रखने से रोकने के लिए, यह जरूरी है कि एआई सिस्टम में निष्पक्षता और पूर्वाग्रह शमन सुनिश्चित किया जाए। गोपनीयता के बारे में • विशेष रूप से :चिंताएँ, डेटा एनालिटिक्स, चेहरे की पहचान और निगरानी में एआई के व्यापक उपयोग से गोपनीयता संबंधी चिंताएँ सामने आती हैं।

भूराजनीतिक गतिशीलता: अध्ययन एआई दौड़ पर गौर करता है और यह दुनिया में शक्ति संतुलन को कैसे प्रभावित करता है। राष्ट्र और :एआई प्रभुत्व के लिए वैश्विक दौड़ •व्यवसाय इस क्षेत्र में वर्चस्व के लिए प्रतिस्पर्धा कर रहे हैं, जिसका रणनीतिक और वित्तीय लाभ पर प्रभाव पड़ता है।

नैतिक :कानूनी कठिनाइयाँ •, कानूनी और वित्तीय मुद्दों को हल करने के लिए वैश्विक AI कानून और नियम बनाना कठिन है फिर भी आवश्यक है।



पर्यावरणीय प्रभाव: एआई का पर्यावरणीय प्रभाव, विशेष रूप से ऊर्जा खपत के संदर्भ में, एक गंभीर चिंता का विषय है। बड़े एआई मॉडल के प्रशिक्षण में उच्च ऊर्जा खपत का पर्यावरण पर काफी प्रभाव पड़ सकता है। कम ऊर्जा का उपयोग करने वाले एआई मॉडल और प्रक्रियाओं पर शोध करना महत्वपूर्ण है।

व्यापक एआई नीतियों की मांग: जैसेजैसे एआई विकसित हो रहा है-, ऐसी नीतियों की आवश्यकता भी बढ़ रही है जो पूरे क्षेत्र को घेर लेती है। नैतिक, कानूनी और सुरक्षा मुद्दों को हल करने के लिए अंतर्राष्ट्रीय सहयोग और सरकारी नियम महत्वपूर्ण हैं। एआई के उचित विकास और अनुप्रयोग की निगरानी के लिए सरकारों द्वारा स्पष्ट मानदंडों और विनियमों की स्थापना तेजी से आवश्यक होती जा रही है। नैतिक, कानूनी और सुरक्षा मुद्दों को संबोधित करने के लिए अंतर्राष्ट्रीय सहयोग आवश्यक है क्योंकि एआई चुनौतियों का दायरा वैश्विक है।

संभावित एआई लाभ: एआई को विभिन्न क्षेत्रों में एकीकृत करने के बहुत सारे फायदे हैं। तत्काल लाभों में बेहतर निर्णय लेने की क्षमता, लागत बचत और बढ़ी हुई दक्षता शामिल हैं। रचनात्मक उत्तर और नए दृष्टिकोण प्रदान करके, कृत्रिम बुद्धिमत्ता स्वास्थ्य देखभाल असमानताओं और (एआई)जलवायु परिवर्तन जैसे कठिन वैश्विक मुद्दों को संबोधित करने का वादा भी करती है।

निष्कर्ष : संक्षेप में, कृत्रिम बुद्धिमत्ता के साथ दुनिया का भविष्य रोमांचक और कठिन दोनों है। इस अध्ययन पत्र में प्रौद्योगिकी, अर्थव्यवस्था, समाज, नैतिकता, भूराजनीति और पर्यावरण- पर एआई के प्रभावों की गहन जांच की गई है। कृत्रिम बुद्धिमत्ता के जटिल क्षेत्र में नेविगेट करते समय वैज्ञानिक प्रगति और नैतिक विचारों के बीच संतुलन हासिल करना महत्वपूर्ण है। एआई के जिम्मेदार विकास और अनुप्रयोग को आगे बढ़ाने के लिए मजबूत नीतियों और अंतर्राष्ट्रीय सहयोग को प्रोत्साहित किया जाता है। अब हम जो निर्णय लेंगे उसका ग्रह पर स्थायी प्रभाव पड़ेगा, इसलिए यह जरूरी है कि हम एआई को जिम्मेदारी से और दूरदर्शिता के साथ एकीकृत करें।

सन्दर्भ

- [1] एंगेलब्रेक्ट, पी.ए. कम्प्यूटेशनल इंटेलिजेंस: एन इंटीडक्शन, (द्वितीय संस्करण), विली प्रकाशन: लंदन, यूके, 2007।
- [2] आर्टिफिशियल इंटेलिजेंस को एक नए शोध अनुशासन के रूप में परिभाषित किया गया: तकनीकी इतिहास में यह सप्ताह। फोर्ब्स, 28 अगस्त 2016।
- [3] पैन, वाई. कृत्रिम बुद्धिमत्ता 2.0 की ओर बढ़ रहे हैं। इंजीनियरिंग 2016, 2, 409-413।
- [4] फ्रैंक, एम.आर. एआई रिसर्च का विकास और इसके सामाजिक प्रभावों का अध्ययन 2019।
- [5] जलाल, टी.डी. नैरो एआई, जनरल एआई और सुपर एआई 2018 के बीच अंतर बता रहे हैं।
- [6] चा, जे. आर्टिफिशियल इंटेलिजेंस और संवर्धित इंटेलिजेंस 2019 के बीच अंतर।



சங்க மங்கையரின் நுண்ணறிவு

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ஆவிச்சி கலை மற்றும் அறிவியல் கல்லூரி, சென்னை, தமிழ் நாடு, இந்தியா

ஆய்வுச்சுருக்கம்

‘பெண்புத்தி பின் புத்தி’ பெண் என்பவள் பின்வரும் விளைவுகள் எதையும் யோசித்து பார்க்காமல் செய்துவிட்டு பின்னர் வருந்துவால் என்று பொதுவெளியில் அபத்தமாக எண்ணப்படுவது உண்மையல்ல. மாறாக, பெண்கள் மதிநுட்பத்திலும், நுண்ணறிவிலும் திறமை படைத்தவர்கள். இதனை உணர்ந்ததால் தான் பாரதி, “ஞான நல்லறம் வீரசுதந்திரம் பேணு நற்குடிப் பெண்களின் குணங்களாம்” என்று பெருமிதத்தோடு கூறினார். மேன்மை, அறிவு, பணிவு முதலிய குணங்கள் இயற்கையிலேயே அமையப்பெற்றவர்கள் பெண்கள். சங்க காலத்தில் மகளிருக்கு முழு உரிமை தரப்படவில்லை என்றாலும், அதையெல்லாம் கடந்து அவர்கள் அந்தக் காலத்திலேயே பல்துறைகளில் சிறந்தோங்கி சாதனை நிகழ்த்தியிருக்கிறார்கள். பல்வேறு துறைகளில் சிறந்து விளங்கியது போலவே தமிழிலும் புலமை மிக்கவர்களாகத் திகழ்ந்தார்கள். ஆனாலும், புலவன், கவிஞன் என்ற ஆண்பாற் சொற்களுக்கு இணையான பெண்பாற் சொல் தமிழில் இல்லாமல் போனது நமக்கு வியப்பை அளிக்கிறது.

சங்ககாலப் பெண்பாற்புலவர்களின் சிறப்பை நாம் நினைவுக்கூர்வதன் வாயிலாகவும், அவர்களின் மொழித் திறன், அறிவுத் திறன் ஆகியவற்றை ஆய்வதின் மூலமாகவும் பல விவரங்களைத் தெரிந்துகொள்ள முடிகிறது. சங்ககாலப் பெண்கள் அறம், மறம், காதல், இன்பம், இயற்கை இவற்றோடு இணைந்த வாழ்க்கையை வாழ்ந்தனர். அவர்கள் கல்வியறிவு பெற்றிருந்ததால் படைப்பாளிகளாகத் திகழ்ந்ததோடு பெண்களின் வாழ்க்கையையும் பதிவு செய்துள்ளனர். அகப்பாடல்களின் ஆணிவேர்களாகவும் புறப்பாடல்களின் புதுமைகளைகளாகவும் திகழ்ந்துள்ளனர். குறிப்பிட்டுச் சொல்லும்படியாக சங்ககாலத்தில் 41 பெண்பாற்புலவர்கள் பாடியிருக்கிறார்கள் என்பதை ஒளவை துரைசாமி அவர்களின் பதிவுகளின் வாயிலாக அறிய முடிகிறது. இந்தக்கட்டுரை சங்ககால ஒளவையின் நுண்ணறிவை ஆராயும் நோக்கில் அமைகிறது.

அறிமுகம்:

தமிழ் இலக்கிய வரலாற்றுப் பரப்பில் ஆணின் திறமைகள் வளர்க்கப்பட்டு போற்றப்பட்டு உயர உயர எடுத்துச் செல்லப்பட்டது போலப் பெண்ணின் திறமைகள் வளர்க்கப்பட்டதாகவோ போற்றப்பட்டதாகவோ வரலாறு கூறவில்லை. பெண்ணின் இருப்பு வலுவற்ற இருப்பாகவே இனங்காட்டப்படுகிறது. பெண் சமூகத்தின் வலுவற்ற நிலை மாற சமுதாய மாற்றங்கள் ஏற்பட வேண்டும் என தொடர் குரல்கள் அவ்வப்போது எதிரொலித்துக் கொண்டிருந்தாலும் எண்ணிய அளவு போதுமான மாற்றம் நிகழவில்லை என்றே கூறலாம்.

‘ஒன்று ஆள்வது இன்னொன்று ஆளப்படுவது இதுதான் இயற்கையின் நியதி. இதில் ஆண் ஆள்வது, பெண் ஆளப்படுவது என்பது இயற்கையின் நியதிக்கு உட்பட்டது’ என்ற ஆதிச் சிந்தனையாளன் அரிஸ்டாட்டலின் பார்வை இன்னும் நீண்டு கொண்டு தான் இருக்கிறது.

‘அடுப்பூதும் பெண்களுக்கு படிப்பெதற்கு’ என்ற பொதுப்பார்வைக்கு மூடு விழா நடத்தி, பட்டங்கள் ஆள்வதும் சட்டங்கள் செய்வதும் பாரினில் பெண்கள் நடத்த வந்தோம் என்று இன்று வீறு கொண்டு பெண் வெளிவந்த போதும் பல சூழலில், பல இடங்களில் பெண் இரண்டாம் பட்சமாக எண்ணப்படுவதில் மாற்றம் இல்லாமல் இருப்பதை மறுப்பதற்கில்லை.

இலக்கியங்களில் மகளிரைப் பிறர் அணுகிய முறைகள், அவர்கள் குறித்த எண்ணங்கள், கோட்பாடுகள் இன்னும் பெரிதும் மாற்றமில்லாமல் மடை மாற்றம் செய்வது தொடர்கிறது.



சங்க கால சமுதாயத்திலும், தந்தைவழி சமுதாயத்தின் நிலைப்பாட்டை காண முடிகிறது. பெண் ஆணைச் சார்ந்தே வாழ்ந்தாள். ஆணுக்கில்லாத கட்டுப்பாடுகள், விதிமுறைகள் பல பெண்ணிற்கு இருந்திருக்கின்றன. இல்லறத்தில் மனையாளை விட்டு பரத்தமை நாடிச் சென்ற ஆண், சமூகத்தால் தண்டிக்கப்பட்டதை குறிப்பில்லை. ஆனால் கணவனால் நிராகரிக்கப்பட்ட காரைக்கால் அம்மையார் கணவனுக்கு பயன்படாத என் இளமை நீங்கி தனக்கு பேயொரு வேண்டி பேயாய் அலைந்ததையும், அவரது கணவன் பரமத்தன்மறுமணம் செய்துகொண்டதையும் மறக்காமல் பதிவு செய்யப்பட்ட வரலாற்றைக் காண முடிகிறது.

இப்படி இலக்கியங்கள் படைக்கும் ஆண் படைப்பாளிகளுக்கு இடையே பெண் படைப்பாளிகளும் அவர்தம் படைப்புகளும் வெளிவருவதே அரிது. அப்படி அரிதினும் அரிதாய் படைப்புலகில் தெரியவரும் பெண்படைப்பாளர்களின் படைப்பை மீள் ஆய்வு செய்வது காலத்தின் தேவை.

சங்க இலக்கியப் பாடல்களை 140-க்கும் மேற்பட்ட புலவர்கள் படைத்திருக்கின்றனர். இதில் 41 பெண் புலவர்களும் அடங்குவர். அதில் சங்க மங்கை ஔவையின் பாடல்களில் இடம் பெற்றிருக்கும் சொல்வன்மையையும் நுண்ணறிவையும் கொண்டாடும் வகையில் இக்கட்டுரை அமைகிறது.

சங்க மங்கையர்கள்:

நச்செள்ளையார், நன்முல்லையார், ஆதிமந்தியார், நப்பசலையார், ஓக்கூர் மாசாத்தியார், காவற்பெண்டு, நக்கண்ணையார், நெட்டிமையார், பொத்தியார், பேய் மகள், இளவெயினி, வெள்ளிவீதியார், பாரி மகளிர்கள், முடத்தாமக்கண்ணியார், பொன்முடியார், காக்கைப் பாடினியார், ஔவையார் உட்பட 41 சங்க மங்கையர் வகுத்த பாடல்களாக 183 பாடல்கள் வரையறுக்கப்படுகிறது.

மலை முற்றத்தில் பூத்திருக்கும் முல்லையையும், கொல்லைப்புனத்தில் மேயும் கோழியையும் பாடியதைப்போலவே, காட்டில் திரியும் யானையின் இயல்புகளையும் புலியின் கொடுஞ்செயல்களையும் கூட சங்க மங்கையர்கள் பாடியுள்ளனர்.

அருஞ்சொல் நுண்தேர்ச்சிப் புலவர்:

உலகப் பொருட்களின் உண்மை நிலையினை நுணுகி அறிந்தும், அவ்வுண்மையை அழகிய சொற்களால் உணர் வைக்கும் ஆற்றல் பெற்றவர்களுமாய் புலவர்கள் திகழ்கின்றனர். அதில் 'அருஞ்சொல் நுண்தேர்ச்சிப் புலவர்' என ஔவை பாராட்டப்படுகிறார்.

பரிசில் வழங்க கால தாமதம் ஏற்பட்ட அதியமான் அவையிடத்தில், 'எத்திசைச் செல்லினும் அத்திசைச் சோறே' என வெகுண்டு பேசிய ஔவையின் பெருமித உணர்வையும், உள்ள உரத்தையும், உரிமைத் திறத்தையும் சங்கப்பாடல்கள் காட்டுகின்றன.

இவர் பாடியதாக உள்ள 59 பாடல்களில் 26 பாடல்கள் அகப்பொருள் பற்றியன. 36 பாடல்கள் புறப்பொருள் பற்றியன. அக உணர்வை வெளிப்படுத்தும் பாங்கிலும் சரி, புறப்பொருளை பாடும் பாடலிலும் சரி இவரது கருத்தாழம் கொண்ட மொழி நுட்பமும் துணிவும் குறிப்பிட்டு சொல்லும் வண்ணம் தனித்துவமிக்கது.

புறப்பாடலில் சொல்வன்மை:

அதியமானின் நெருங்கிய நட்புக்குரியவராய் விளங்கும் ஔவை, அதியமானின் பகை மன்னனை எதிர்த்து பேசுவதாய் அமைந்த பாடலில்,

இவ்வே, பீலிஅணிந்து, மாலை சூட்டி,
கண்திரள் நோன்காழ் திருத்தி, நெய் அணிந்து,
கடியுடை வியல்நக ரவ்வே; அவ்வே,
பகைவர்க் குத்தி, கோடுநுதி சிதைந்து,
கொல்துறைக் குற்றில மாதோ என்றும்



உண்டாயின் பதம் கொடுத்து
இல்லாயின் உடன் உண்ணும்
இல்லோர் ஒக்கல் தலைவன்

அண்ணல் எம் கோமான், வைந்நுதி வேலே. (புறம். 95)

உனது படைக்கலங்கள் மயில் தோகை அணிய பெற்று, மாலை சூட்டப்பட்டு அழகுப்படுத்தி, நெய் தடவப்பட்டுக் காவலுடன் உன் அரண்மனையில் உள்ளன.

இருக்கும்போது உணவிட்டும், இல்லாத போது பகிர்ந்து உண்டு மகிழும், வறியவர்கள் விரும்பும் என் தலைவனாகிய அதியமான் நெடுமான் அஞ்சியின் கூரிய வேல்களோ, பகைவர்களை தாக்குவதையே வழக்கமாய் கொண்டதால் முனை முரிந்தனவாகக் கொல்லனின் உலைக்களத்திலன்றோ இருக்கின்றன! என்று பகைமன்னனை இகழ்ந்து, அதியனை வீரத்தை புகழ் நினைத்த ஔவையின் பாடலில் அவரது நுண்ணிய சொல் வன்மையின் ஆற்றலை அறிய முடிகிறது.

நாடா கொன்றோ; காடா கொன்றோ;

அவளா கொன்றோ; மிசையா கொன்றோ;

எவ்வழி நல்லவர் ஆடவர்,

அவ்வழி நல்லை; வாழிய நிலனே! (புறம் 187)

நாடாக

இருந்தாலும், காடாக இருந்தாலும், பள்ளம், மேடு இடம் எப்படி இருந்தாலும் சரி, அந்த இடத்தில் உள்ள ஆடவர் நல்லவராக இருந்தால் தான், அந்த நிலம் நல்ல நிலமாக கொள்ளப்படும் எனக் கூறும் ஔவையின் துணியையும் கூர்நோக்கையும் வியக்காமல் இருக்க முடியவில்லை.

அகப்பாடலின் அக உணர்வு:

புறப்பாடல்களில் மட்டுமல்ல, அக உணர்வை வெளிப்படுத்தும் அகப்பாடல்களிலும் ஒரு பெண்ணின் நுண் உணர்வை, அழகாய், அப்பட்டமாய் வெளிப்படுத்தும் முறையினையும் ஔவையின் பாடல்களில் காணமுடிகிறது.

முட்டு வேன்கொல்? தாக்கு வேன் கொல்?

ஓரேன், யானும் ஓர்பெற்றி மேலிட்டு

'ஆ அஓல்' எனக்கூவு வேன் கொல்?

அலமரல் அசைவளி அலைப்ப என்

உயவுநோய் அறியாது, தஞ்சும் ஊர்க்கே. (குறுந் 28.)

பிரிந்து சென்ற தலைவனை எண்ணி, தலைவி பிரிவுத் தவிப்பில் உறங்காமல் வருந்துகிறாள். ஆனால் இந்த ஊரோ தவிப்பின்றி உறங்குகிறது. என் தவிப்பை இந்த ஊருக்கு எப்படி நான் தெரிவிப்பேன். முட்டுவேனா? ஆ வெனவும், ஓல்லெனவும் உறுதியுடன் குரலெடுத்துக் கூவுவேனோ? என்று கதறும் பெண்ணின் நுண்ணுர்வை கூட ஔவையால் பாடலாக்க முடிந்துள்ளது.

நிறைவாக,

பெண் என்பவள் பேதை குணம் கொண்டவள், அவளால் இயல்பாக எதையும் அறிய முடியாது, அடுத்தவர் அறிவுறுத்த பிறகு அறியும் மடவாள் என்றெல்லாம் பொதுவெளியில் பேசி நம்ப வைக்கப்பட்டிருந்தாலும் அது உண்மை அல்ல. பெண்கள் கூர்ந்த நுண்ணறிவும், ஆற்றலும் பெற்றவர்கள். வெளிப்படையாக சொல்ல முடியாத உணர்வை கூட அழகாக வெளிப்படுத்தும் ஆற்றலும், உள்ளதை உள்ளது போலவே உரக்க கூறும் நாவன்மையும் பெற்றவர்கள் என்பதற்கு ஔவை ஓர் சான்றாக இருந்துள்ளார் என்பதை மேலே உள்ள சங்கப் பாடல்கள் நமக்கு காட்டுகின்றன.

துணைநின்ற நூல்கள்:

- சங்க இலக்கியம், புறநானூறு, நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை, 2004.
- சங்க இலக்கியம், குறுந்தொகை, நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை, 2004.
- தமிழக மகளிர் தொடக்ககால முதல் ஆறாம் நூற்றாண்டு வரை, முனைவர் ர.விஜயலட்சுமி, சந்தியா பதிப்பகம், சென்னை, 2010.
- பெண்ணியம் அணுகுமுறைகளும் இலக்கியப் பயன்பாடும், முனைவர் இரா.ரெங்கநாயகி, நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை, 2005.
- புலமைச் செல்வியர், முனைவர் ஔவை நடராசன், தி பார்க்கர், சென்னை, 2003



குறுந்தொகையில் தமிழரின் வானிலை நுண்ணறிவு

முனைவர் நா.சத்தியா

உதவிப் பேராசிரியர், தமிழ்த்துறை,

ஆவிச்சி கலை மற்றும் அறிவியல் கல்லூரி, சென்னை, தமிழ் நாடு, இந்தியா

முன்னுரை

இயற்கையோடு இயைந்த வாழ்வியல் இன்பத்தை அக பாடல்களின் வழி எடுத்துரைக்கும் குறுந்தொகை புலவர்கள் அவற்றில் தம் அறிவியல் நுண்ணறிவையும் பதிவு செய்தனர். ஆகையால் பழந்தமிழரின் வானிலை அறிவு நுட்பத்தை எடுத்துரைக்கும் நூல்களில் ஒன்றாக குறுந்தொகையை கூறலாம். தாம் வாழும் உலகத்தின் சூழல்களையும் இயற்கை நிகழ்வுகளையும் எந்தவித தொழில்நுட்ப கருவிகளும் இன்றித் தம் கண்களாலும் அனுபவத்தாலும் உணர்ந்து அவற்றைத் தகுந்த தமிழ்ச்சொற்களால் வெளிப்படுத்தியிருக்கும் அவர்தம் அறிவு நுட்பம் வியந்து போற்றுதற்குரியது. இக்கட்டுரை பழந்தமிழரின் வானிலை அறிவியல் அறிவைக் குறித்து குறுந்தொகைப் பாடல்கள் வழி ஆராய முற்படுகிறது.

வானிலை அறிவியல்

இன்று வளர்ந்து வரும் அறிவியல் துறைகளில் ஒன்று Meteorology என்றழைக்கக்கூடிய வானிலை அறிவியல் ஆகும். வானிலையும் காலநிலையும் இன்று மனிதர்கள் அன்றாடம் அறிந்து கொள்ள வேண்டிய அவசியத் தேவையாக மாறியுள்ள சூழலில் வானிலை அறிவியல் முக்கியமான துறையாகக் கருதப்படுகிறது. இன்றைய வானிலை அறிவியல் குறித்த செய்திகளோடு குறுந்தொகைச் செய்திகளும் ஒப்பிட்டு நோக்கப்பட்டு இங்கே விவரிக்கப்படுகின்றன.

குறுந்தொகையில் மேகம், இடி, மின்னல், மழை போன்ற வானிலைத் தொடர்பான பல குறிப்புகள் பரவலாகக் காணப்படுகின்றன.

மேகங்கள்

தற்கால வானிலை அறிவியல் மேகங்களைப் பல வகைகளாகப் பிரிக்கிறது. அவை, 1.கீற்றுமுகில் (Cirrus), 2.கார்முகில் (Nimbo Stratus), 3.படர்முகில் (Alto Stratus), 4.திறல் முகில் (Cumulus) என்பனவாகும். குறுந்தொகைப் பாடல் வருணனைகளில் இத்தகைய மேகங்கள் பற்றிய குறிப்புகளைக் காணலாம்.

மிக உயரமான மலைப்பகுதிகளில் வெண்மையான தோற்றத்தைக் கொண்டு உருவாகிய 'உயர்மேகங்கள்' (High Clouds) என்று கூறப்படுபவையும் ஆகிய கீற்று முகில்கள் 'உறையரு மை' (339) என்று மழைத்துளிகளற்ற வெண்மையான மேகங்களாகக் குறுந்தொகையில் கூறப்படுகின்றன. அதிக அடர்த்தியோடும் கறுத்த சாம்பல் நிறத்தோடும் எப்போதும் மழை பெய்து கொண்டிருக்கும் கார்முகில்களைப் பற்றி,

'கறி வளர் அடுக்கத்து இரவில் முழங்கிய மங்குல்

மாமழை வீழ்ந்தென

(90)

என்று கூறுகிறது குறுந்தொகை. இலேசான மழைத்துளிகளைப் பெய்து கொண்டிருக்கும் நீர்த் திவலைகளால் ஆன படர்முகில்கள் 'தளிதரு தண்கார்' (65) என்றும், புயல், இடி, பெரும் மழையை உருவாக்கும் திறன் முகில்கள்,

'சேய் உயர் விசும்பின் நீர் உறு கமஞ்சூல்

தண்குரல் எழிலி ஒண்சுடர் இமைப்பப்

பெயல் தாழ்வு இருளிய புலம்பு கொள் மாலை'(314)

என்றும் குறுந்தொகை புலவர்களால் குறிக்கப்பட்டுள்ளமையைக் காணலாம் தமிழகம் வெப்பமண்டல நாடாகும் எனவே பிற பருவங்களில் காணப்படும் மேகங்களை விட மிகுந்த மழையை தரும் கார்காலத்தின் திறல் முகில் இனங்களே குறுந்தொகை புலவர்களால் பெரிதும் விரும்பி மிகுதியாக பாடப்பட்டுள்ளன.



'கழிந்த மாரிக்கு ஒழிந்த பழநீர்

புதுநீர் கொளீஇய உகுத்தரும்

நொதுமல் வானத்து முழங்கு குரல் கேட்டே' (251)

என்ற இடைக்காடனாரின் பாடலை நீர்மேலாண்மைக்கு மிகச்சிறந்த சான்றாக இங்கு கூறலாம். நீர் சுமந்த மேகங்கள் மழையாகப் பொழிந்தால் மட்டுமே மீண்டும் கடல்நீரை முகுந்து நீர் சுமந்து மழையாகப் பொழிய முடியும்' என்னும் செய்தி அறிவியல் நுட்பத்தோடும் வாழ்வியல் சிறப்போடும் கூறப்பட்டிருப்பது ஆராய்ந்து உணர முடிகிறது.

இடி

'வெடி ஒலி உரும் கோ விண்ணேறு அசனி

செல் இகுளி இடியேறு மடங்கலும் ஆகும்'

என்று இடியின் பல்வேறு பெயர்களைப் பிங்கல நிகண்டு பட்டியலிடுகிறது. குறுந்தொகைப் பாடல்களில் இடியின் தன்மை குறித்துப் பாடும் செய்திகள் நுட்பமானவை. இடியின் வேகத்தைக் கணக்கிட்டு வருணிக்கும் திறம் இன்றைய வானிலை ஆய்வுக்கு இடம் தருவதாகும்.

குறுந்தொகைப் பாடல்கள் வழி இடியின் தன்மைகளை 1.ஆரவாரத்தை உடைய இடி 2.முரசு போல் முழங்கும் இடி 3.பாம்பைத் துணிக்கும் இடி என மூன்று பிரிவுகளாகப் பிரிக்கலாம்.

ஆரவாரத்தை உடைய இடியைக் குறுந்தொகை 'இடியேறு' என்றும் 'ஆர்கலி ஏறு' என்றும் சுட்டுகிறது. மிகப்பெரிய மின்னலுக்குப் பிறகே, மேகங்களிலும் மலைத் தொடர்களிலும் பட்டு எதிரொளிப்பதாலோ தொடர்ந்து நெடுநேரம் 'டம டமா' எனக் கேட்கும் இடியோசையைக் குறுந்தொகை ஆரவாரிக்கும் இடியோசையாகக் குறிப்பிடுகிறது.

'கருவி மாமழைச் சிலை தரும் குரலே' (94)

'ஆர்கலி ஏற்றோடு கார் தலைமணந்த' (186)

என்று கூறும் குறுந்தொகை முரசு போல் முழங்கும் இடியை,

'வென்று எறி முரசின் நன் பல முழங்கி

பெயல் ஆனாதே வானம்' (380)

என குறிப்பிடுகிறது. இவ்விரண்டு இடிகளின் தன்மையுடன் மேலும் கடுமையாக முழங்கும் இடியைப் 'பாம்பை துணிக்கும் இடி' என்று குறுந்தொகை கூறுவது சிறப்பிற்குரியது. இதுபோன்ற இடி பற்றி நான்கு பாடல்கள் நூலில் உள்ளன.

'நெடு விசை மருங்கின் பாம்பு பட இடிக்கும் கடுவிசை உரும்' (158)

'வெஞ்சின் அரவின் பைந்தலை துமிய நரை உரும் உரரும்' (190)

.....பாம்பின் பையுடை இருந்தலை துமிக்கும் ஏறு' (268)

என்று கூறுவது நோக்கத்தக்கது. சங்ககாலப் புலவர்கள் வானிலையின் செயல்பாடுகளை உற்று நோக்கி அவற்றின் தன்மையைத் தம்மால் இயன்ற வரையில் பாடல்களில் பதிவு செய்துள்ளமை வியப்பிற்குரியதாக இருப்பதை நம்மால் அறிய முடிகிறது.

மின்னல்

இடியும் மின்னலுடனும் பெய்யும் மழையைக் குறுந்தொகை 'கருவி மாமழை' என்றும் சுட்டுகிறது.

..... மாமழை

இன்னும் பெய்யும் முழங்கி

மின்னும் தோழி'

(216)

என்னும் காஞ்சிக் கொற்றனின் குறுந்தொகைப் பாடல் தோழி கரிய பெரிய மேகங்கள் இன்னும் மழையைப் பெய்ய மேலும் முழங்கி மின்னுகின்றன என்ற வானிலை முன்னறிவிப்பை எடுத்துரைக்கின்றது என்பதை ஆய்ந்து அறிய முடிகிறது.

மழை

மழை பற்றிய அறிவியல் உணர்வு பழங்காலத்தில் தமிழர்களிடம் இருந்ததைப் போல பிற நாட்டாரிடம் இல்லை எனலாம். பிற நாட்டினர் மழையைக் கண்டு அஞ்சி



அதனைக் கடவுள் தந்த தண்டனையாகக் கருதிய காலகட்டத்திற்கு முன்னரே பழந்தமிழர் மழை எவ்வாறு பொழிகிறது என்பது பற்றிய அறிவியல் உண்மையை உணர்ந்திருந்தனர்.

குறுந்தொகைப் பாடல்களின் வழி பழந்தமிழர் மழையை 1.தூறல் மழை, 2.விடாமழை 3.புயல்மழை 4.பெருமழை என்று பகுத்துணர்ந்த அறிவு நுட்பத்தை அறியலாம் இதனுடன் 'வம்பமாரி' என்ற ஒன்றையும் பதிவு செய்துள்ளனர்.

வானம் மங்கலாக இருக்கும் போதும், மூடுபனியாக இருக்கும் போதும் பூமியில் மிகச் சிறு திவலைகளாக விழும் தூறல் மழையை,

'ஊதை தூற்றும் கூதிர் யாமத்து' (86)

'வந்த வாடைச் சில்பெயல் கடைநாள்' (332)

என்னும் குறுந்தொகை வரிகள் எடுத்துரைக்கின்றன.

பெரும்பெயல், மாமழை, படுமழை, கலிமழை என்னும் அடைமொழிகளால் பெருமழையைக் குறுந்தொகைப் புலவர்கள் குறிப்பிட்டு மகிழ்ந்தனர். பழந்தமிழர் நீர்வளம் நிரம்பப் பெற்று வாழ்க்கை நடத்தியவர்கள் ஆவர். அதனால் பெருமழை பொழியக்கூடிய கார்காலத்தைப் புனைந்து பாடுவதில் புலவர்கள் பெரும் விருப்பம் கொண்டிருந்தனர்.

'பெரும் பெயல் உழந்த இரும்பிணர்த் துறுகல்' (13)

'படுமழை பொழிந்த சாரல்' (249)

'கலிமழை கெழீஇய கான்யாற்று இடுகரை' (264)

இது போன்ற பாடல் வரிகள் குறுந்தொகையில் மிகுதியாக உள்ளதை அறிய முடிகிறது.

பெருங்காற்றோடு பெய்த பெருமழையைப் புயல் மழை என்று குறுந்தொகையில் பதிவு செய்துள்ளார் பெண்பாற் புலவரான ஓளவையார்.

'நெடுவரை மருங்கின் பாம்புபட இடிக்கும்

கடுவிசை உருமின் கழறுகூரல் அளைஇக்

காலொடு வந்த கமஞ்சூல் மாமழை!

ஆர் அளி இலையோ நீயே? பேரிசை

இமயமும் துளக்கும் பண்பினை!' (158)

எனும் இப்பாடல் இமயமலையையே ஆட்டி அசைக்கும் ஆற்றலுடைய காற்றோடு வரும் பெருமழை பற்றிய செய்தியை குறிப்பிடுகிறது. வானிலை ஆய்வாளர்களின் கருத்தோடு ஒப்பிட்டால் இதனைப் புயல் மழையாகக் கருதலாம்.

இடைவிடாது பெய்யும் அடை மழையைக் குறுந்தொகை,

'பொழுதும் எல்லின்று பெயலும் ஓவாது

கழுது கண்பனிப்ப வீசும்' (161)

'பெயல் ஆனாதே வானம்' (380)

என்று சுட்டிக் காட்டுகிறது. குறுந்தொகையுள் காணப்படும் பாடல் ஒன்று கோடைமழை பற்றிக் விவரிக்கிறது.

'உவரி ஒருத்தல் உழாஅது மடியப்

புகறி புழுங்கிய புயல் நீங்கு புறவில்

கடிது இடி உருமின் பாம்பு பை அவிய

இடியொடு மயங்கி இனிது வீழ்ந்தன்றே' (391)

பசுக்களும், மான்களும் வெம்மையால் புழுங்கி துன்புறும்படியாக, மேகம் மழை பெய்தலை நீங்கிய காட்டில் கடுமையாக இடிக்கும் இடியினால் பாம்புகள் படம் அடங்கி கிடந்தன. கரிய மேகங்கள், பெய்யும் பருவமறியாது இடியோடு கலந்து இனிதாகத் தாழ்ந்தன என்னும் செய்தி கோடை மழையைக் குறிப்பதாக புலவர்கள் இப்பாடலில் பதிவு செய்துள்ளதை அறியமுடிகிறது.

பழந்தமிழரின் வானிலை அறிவு நுட்பத்திற்கு, அவர்கள் காலமழைக்குச் சூட்டிய பெயர்களைச் சான்றாகக் கூறலாம். உரிய பருவத்தில் பெய்யும் மழையைக் 'காலமாரி' என்ற பெயராலும் காலமல்லாத காலத்தில் பெய்த மழையை 'வம்பமாரி' என்ற பெயராலும் அழைத்த அறிவு நுட்பம் வியந்து போற்றுவதற்குரியது.

'காலமாரி மாலை மாமழை' (200)

'காலமாரி பெய்தென' (251)

எனப் பெய்ய வேண்டிய நேரத்தில் பெய்யும் மழையைக் குறுந்தொகை குறிப்பிடுகிறது.

'வம்பமாரி' என்னும் சொல் பழந்தமிழருடைய அறிவுக்கூர்மைக்கும் அறிவியல் நுட்பத்துக்கும் சொல்லாட்சித் திறனுக்கும் தக்க சான்றாகக் கூறலாம்.



'வம்பு நிலையின்மை' (தொல்.உரி.31)

என்று வம்பு என்னும் சொல்லுக்கு பொருள் கூறுகிறது தொல்காப்பியம். பருவமல்லாத காலத்தில் பெய்து பின் மாறி விடுகின்ற நிலையில்லாத மழையே வம்பமாரியாகும்.

'பருவம் வாரா அளவை நெறிதரக்

கொம்பு சேர் கொடியிணர் ஊழ்த்த

வம்ப மாரியைக் காரென மதித்தே' (66)

வம்பு பெய்யுமால் மழையே வம்பன்று

காரிது பருவம் ஆயின்

வாராரே நம் காதலரே!

கார்காலம் வந்தும் தலைவன் வராததால் வருந்தியிருக்கும் தலைவியை ஆற்றுவிக்கும் பொருட்டுத் தோழி இது 'காலமாரி' அன்று 'வம்பமாரி' என்று கூறுவதாக அமைந்த சங்க இலக்கியப் பாடல்கள் மிகுதி, இச்செய்திகள் காலம் தவறிப் பெய்யும் மழைக் குறித்தும் அம்மழையைப் பொருள் மாறாது அழகிய சொல்லால் சுட்டிய தமிழர்களின் வானொலி நுட்பத்தையும் வெளிப்படுத்துவனவாக உள்ளன.

முடிவுரை

தற்கால வானிலை ஆய்வாளர்களால் பகுத்துரைக்கப்படும் பல செய்திகளைச் சங்க இலக்கியங்கள் அன்றே பதிவு செய்து வைத்துள்ளமைக்குக் குறுந்தொகை மிகச் சிறந்த சான்று நூலாகும். குறுந்தொகையுள் கூறப்படும் திரள்முகில் இனங்களும் பாம்பையும் துண்டிக்கும் இடிகளும் பெருமழையும் வம்பமாரியும் தமிழர் தம் கூர்த்த நுண்ணறிவைப் புலப்படுத்துவன. இதனால் தொழில்நுட்பக் கருவிகள் ஏதுமில்லாமலேயே பழந்தமிழர் வானிலை அறிவியலில் சிறந்து விளங்கியமையை அறிய முடிகிறது.

துணை நூல்கள்

- 1.டாக்டர். உ.வே.சாமிநாதையர்- குறுந்தொகை மூலமும் உரையும், டாக்டர் உ. வே .சா நூல்நிலையம்,2018.
- 2.அரிமாப்பாகன்.ஆ.சங்க இலக்கியத்தில் சூழலியல்,இராசகுணா பதிப்பகம், சென்னை, இரண்டாம் பதிப்பு -2017.



திருக்குறள் பயிற்றுவித்தலில் செயற்கை நுண்ணறிவின் பங்கு

முனைவர் ர. சக்தி பிரியா

உதவிப் பேராசிரியர், தமிழ்த்துறை

ஆவிச்சி கலை மற்றும் அறிவியல் கல்லூரி, சென்னை, தமிழ் நாடு, இந்தியா

ஆய்வுச்சுருக்கம்

நவீனமயமாகி வரும் தமிழ்க் கற்றலானது 'செயற்கை நுண்ணறிவு' (Artificial Intelligence) தொழில்நுட்பத்திலும் இன்று சுவடு பதித்து வருகிறது. செயற்கை நுண்ணறிவு என்பது நமது வருங்கால வளர்ச்சித் தொழில்நுட்பமாகும். இன்று உலகமே பல ஆராய்ச்சிகளின் மூலம் இத்தொழில்நுட்பத்தை நோக்கிப் பயணிக்கின்றது. இது தமிழின் வளர்ச்சிக்கும் அதன் இலக்கியங்களின் வளர்ச்சிக்கும் பல புதிய சாத்தியங்களை வெளிக்கொணரும் என்பதில் ஐயம் ஏதுமில்லை.

தமிழில், திருக்குறள் குறிப்பிடத்தக்க இலக்கியங்களில் ஒன்றாகும். எண்ணற்ற உலக மொழிகளில் மொழிபெயர்க்கப்பட்ட சமயச் சார்பற்ற நூல்களில் ஒன்றாகவும் இதுத் திகழ்கின்றது. இந்நூல் கி.மு. ஆறாம் நூற்றாண்டில் வாழ்ந்த திருவள்ளுவரால் எழுதப்பட்டது. மனித குலத்திற்குத் தற்காலத்தில் மட்டுமல்லாமல் எதிர்காலத்திலும் பின்பற்ற வேண்டிய அறக் கருத்துக்களை வழங்கும் இலக்கியமாகவும் இந்நூல் திகழ்கிறது. இதில் மொத்தம் 1330 குறள்கள் உள்ளன. ஒவ்வொரு குறளிலும் சரியாக ஏழு சீர்கள் இடம் பெற்றிருக்கும். அவற்றில் முதல் அடியில் நான்கு சீர்களும் அடுத்த அடியில் மூன்று சீர்களும் இடம்பெற்றுள்ளன. உதாரணமாக

“கற்க கசடற கற்பவை கற்றபின்
நிற்க அதற்குத் தக”

(குறள்: 391)

எனும் குறளைக் கூறலாம். இக்குறள் கல்வியின் சிறப்பினை எடுத்துக் கூறுகிறது. இதுபோன்று ஒவ்வொரு குறளும் ஒவ்வொரு சிறந்த கருத்தை எடுத்துக் கூறி மக்களுக்கு அற நெறிமுறைகளை போதிக்கும் வழிகாட்டியாகவும் இந்நூல் திகழ்கிறது. இத்தகு சிறப்பு வாய்ந்த திருக்குறளை, அதன் மகத்துவம் புரியாமல் நாமெல்லாம் பள்ளிப் பருவத்தில் வெறும் மதிப்பெண்கள் பெறுவதற்காக மட்டுமே மனப்பாடம் செய்துப் படித்திருப்போம். உண்மையில் திருக்குறளில் இல்லாத வாழ்வியல் கருத்துக்களே இல்லை.

ஈராயிரம் ஆண்டுகளுக்கு முன்பு திருவள்ளுவர் கற்றுத் தந்த வாழ்வியலின் உன்னதத்தை உலகெங்கிலும் உள்ள மக்களும், இன்றைய இளைஞர்களும் அறிந்துக்கொள்ளும் விதத்தில் பல்வேறான முயற்சிகள் மேற்கொள்ளப்பட்டு வருகின்றன. அதில் முதற்கட்டமாகக் 'குறள் பாட்' (KuralBot) என்கிற இணையதளப் பக்கம் ஒன்றை உருவாக்கி, அதன் மூலம் திருக்குறளை அனைவருக்கும் கொண்டு செல்லும் முயற்சியை மேற்கொண்டுள்ளார் ராஜசேகர் இளங்கோ. இந்தக் குறள்பாட் என்கிற இணையதளப் பக்கம் குறித்தும், அது செயல்படும் விதம் குறித்தும் ஆராய்வதே இந்தக் கட்டுரையின் நோக்கமாகும்.

குறள் பாட் [Kuralbot]

குறள் பாட் என்பது கருத்துகளைப் பரிமாறிக்கொள்ளும் ஒரு இயலி (chatbot). நம்மால் கேட்கப்படும் கேள்விகளுக்குத் திருக்குறளின் பொருண்மைகளில் இருந்து பெறப்பட்ட பதில்களையே இந்தக் குறள் பாட் விடையாக நமக்குக் கொடுக்கிறது. குறள் பாட் என்ற இந்த இயலி குறள்கள் (Kurals), பகிரப்பட்ட விடைகள் (Shared Answers), திருக்குறள் வகுப்புகள் (Thirukkural classes), திருக்குறள் காணொளிக் காட்சிகள் (Thirukkural videos) எனும் பல்வேறு பிரிவுகளைக் கொண்டு வடிவமைக்கப்பட்டு இயங்குகிறது. குறள்கள் (Kurals) என்னும்



பிரிவில் 133 அதிகாரங்களின் கீழ் 1330 குறட்பாக்கள் உள்ளீடு (Gpt) செய்யப்பட்டு இயக்கப்படுகின்றன.

உதாரணமாக, How to earn money? , How to be happy? முதலான வினாக்களை எழுப்பினால் , அவ்வினாவிற்கான பதிலாகத் திருக்குறளின் மூலம் பெறப்பட்ட விடைகளை ஒன்றன்பின் ஒன்றாக அடுக்கிக் கூறுகின்றன. அதோடு மட்டுமில்லாமல் அவ்வினாவுடன் தொடர்புடைய குறள்களையும் அவற்றிற்கான ஆங்கில விளக்கங்களையும் நிரலாக எடுத்து இயம்புகிறது. கேள்வி கேட்போர், அந்த விடைகளுடன் மேலும் பல தகவல்களை அறிய விரும்பினால் learn more என்ற பொத்தானை அழுத்தி மேலே நிரல் படுத்தப்பட்ட குறள் ஒவ்வொன்றையும் தனித்தனியாகத் தேர்ந்தெடுத்து அவற்றின் விளக்க உரை (Explain), சுருக்க உரை (Summarize) அக்குறளோடு தொடர்புடைய கதை (Story) , அக்குறளில் கூறப்பட்ட பொருளின்படி வாழ்க்கை நடைமுறைப் படிகள் (Live by kural) அக்குறளின் பொருள் (Meaning) போன்ற பல்வேறு நிலைகளில் அவற்றின் விரிவான தரவுகளைப் பெற்றுக்கொள்ளமுடிகிறது.

இதே போன்று 133 அதிகாரங்களிலும் உள்ள 1330 குறட்பாக்களையும் தனித்தனியாகத் தேர்ந்தெடுத்து, அதில் எந்த அதிகாரம் அல்லது எந்தக் குறளுக்குக் கருத்துகள் தேவையோ அக்குறளை அழுத்தினால் அக்குறளுக்கான விளக்கம் (Explain), குறள் மூலம் வாழ் செய்யக்கூடிய நடைமுறைப்படிகள் (Live by Kural), கதையைப் பயன்படுத்தி அர்த்தத்தை விளக்கும் முயற்சி (Story) என்னும் மூன்று நிலைகளில் எவை வேண்டுமோ அவற்றைத் தேர்ந்தெடுத்து அதற்கான விளக்கத்தையும் பெற்றுக் கொள்ள முடிகிறது .

உதாரணமாக, 45வது குறளைக் கொடுத்து இக்குறளினை ஏதேனும் ஒரு கதையினைக் கூறி விளக்கு என்ற வினாவினை எழுப்பினால் அவற்றிற்கு பின்வருமாறு இந்த இயலி விடையளிக்கிறது.

“Kural: 45, Explain using story

அன்பும் அறனும் உடைத்தாயின் இல்வாழ்க்கை

பண்பும் பயனும் அது.

Once upon a time, in a small village, there lived a couple named Ravi and Meera. They were deeply in love and had a strong bond of trust and respect. Their married life was filled with love and virtue, and they were admired by everyone in the village.

Ravi and Meera believed in the power of kindness and compassion. They would always lend a helping hand to those in need and treated everyone with respect. Their home was always open to guests, and they would go out of their way to make them feel welcome and comfortable.

One day, a poor traveler named Raju arrived in the village. He had lost his way and had nowhere to stay. Hearing about Ravi and Meera's kind nature, he decided to seek their help. When Raju reached their doorstep, he was greeted with warm smiles and open arms.

Ravi and Meera welcomed Raju into their home and offered him food and shelter. They treated him like a family member and listened to his stories with genuine interest. Raju was overwhelmed by their love and hospitality.

During his stay, Raju observed the love and virtue that filled Ravi and Meera's married life. He saw how they supported and encouraged each other in every aspect of life. Their love was not just limited to themselves but extended to everyone around them.

Inspired by their example, Raju decided to change his own life. He realized the importance of love and virtue in a married life and how it can bring happiness and fulfillment. He vowed to be more loving and virtuous in his own relationships.

As time passed, Ravi and Meera's love and virtue continued to shine brightly. Their actions inspired many others in the village to prioritize love and virtue in their own married lives. The village became a place where love and virtue were cherished and celebrated. And so, the story of Ravi and Meera's love and virtue spread far and wide, inspiring countless others to embrace these qualities in their own lives. Their married life became a shining example of how love and virtue can be both a duty and a reward.

Remember, just like Ravi and Meera, if we prioritize love and virtue in our married life, it will not only bring us happiness but also inspire others to do the same.”

(<http://www.kuralbot.org>)



இதுபோன்று அனைத்து விதமான வினாக்களுக்கும் விடையாக இந்த இயலி வெகுசிறப்பாக விடையளிக்கிறது. அதோடு மட்டுமின்றி இந்த குறள்பாட் மூலம் பெறப்படும் தகவல்களைப் பயன்படுத்துவோரின் இணையதளப் பக்கங்களில் பகிர்ந்துகொள்ளும் வாய்ப்பினையும் இந்த இயலி நமக்கு வழங்குகிறது. மேலும் கேட்கப்பட்ட வினாக்களும், விடைகளும் அவர்களின் இணையதளப் பக்கத்திலேயே உள்ள Shared Answers எனும் பகுதியில் சேமிக்கப்படுகின்றன. மேலும், இதில் உள்ள வினா விடைகளை நாம் எப்போது வேண்டுமானாலும் திரும்பச் சென்று பார்க்கமுடியும். வேறு யாரேனும் கேட்கப்பட்ட வினாக்களும் விடைகளும் நமக்குத் தேவைப்படுமாயின் அதையும் நாம் இந்தப் பக்கத்தில் இருந்து பயன்படுத்திக் கொள்ளலாம். அதோடு நின்றுவிடாமல் திருக்குறள் தொடர்பான முக்கிய வகுப்புகளும், திருக்குறள் தொடர்பான காணொலிகளும் இந்த இயலில் அதிகமாக பதிவிடப்பட்டுள்ளன.

ஆக, இந்த குறள்பாட் என்பது செயற்கை நுண்ணறிவை நோக்கிய முதல் படி. இதன் மூலமாகத் தமிழை அடுத்த கட்டத்துக்கு நகர்த்தும் ஒரு சிறு முயற்சி எனலாம். கற்களில் தமிழை எழுதத் தொடங்கி, ஓலைகள், தாள்கள், அச்சிடப்பட்ட புத்தகங்கள் என்ற நிலையில் பயணித்த தமிழ் இலக்கியங்கள் இப்போது கணினியில் பயணிக்கும் நிலைக்கு வந்துவிட்டன. இதன் அடுத்தக் கட்டம் செயற்கை நுண்ணறிவை உருவாக்குவதாகவே இருக்கும். தமிழை அடுத்தத் தலைமுறைக்குக் கடத்த கணினியில் தமிழை எழுதுவதோடு மட்டுமல்லாமல், கணினிக்கே தமிழைக் கற்குகொடுத்துவிட்டால், மொழியை அழியாமல் அடுத்த தலைமுறைக்குக் கடத்திவிடலாம்.

தமிழ் மொழி ஆதரவு:

GPT ஆனது தமிழ் மொழியைப் புரிந்துகொள்ள இன்னும் முழுமையாகப் பயிற்சி பெறவில்லை. எனவே குறள் பாட் (Kuralbot) தமிழ் மொழிக்குக் குறைந்தபட்ச ஆதரவையேக் கொண்டுள்ளது.

குறள் பெயர் அல்லது அதிகாரத்தைத் தட்டச்சு செய்ய தமிழ் மொழியைப் பயன்படுத்தலாம். ஆனால் கேள்வி கேட்கத் தமிழ் மொழியைப் பயன்படுத்த முடியாது. அதேபோன்று, பதில்களும் விளக்கங்களும் ஆங்கிலத்தில் மட்டுமே உள்ளன. இருப்பினும் குறள்கள், அதிகாரம் எனும் பக்கம் சென்று அனைத்துக் குறள்களின் தமிழ் பொருள்களையும் காணமுடிகிறது. இக்குறள்களின் தமிழ் அர்த்தத்திற்கு மு.வ., சாலமன் பாப்பையா, கலைஞர் ஆகியோரின் உரையைத் தேர்ந்தெடுத்தால் தேவையான பொருளுரையை நம்மால் பெறமுடிகிறது.

குறள்பாட் இயலியின் பயன்கள்

செயற்கை நுண்ணறிவின் சக்தியைப் பயன்படுத்தி, திருக்குறள் போதனைகளின் எளிய மற்றும் சுருக்கமான விளக்கங்களைக் குறள் பாட் வழங்குகிறது. மேலும், அவற்றைப் புரிந்துகொள்வதையும் அன்றாட வாழ்க்கையில் பயன்படுத்துவதையும் இது எளிதாக்குகிறது.

1330 திருக்குறள்கள் அனைத்தையும் நினைவில் வைத்துக் கொள்வதில் உள்ள சிரமத்தின் சிக்கலை இந்த இயலி தீர்க்கிறது.

வாழ்க்கையில் கற்றுக்கொள்ள அல்லது மேம்படுத்த விரும்பும் குறிப்பிட்ட தலைப்புகளைப் பற்றிய அறிவைக் கண்டறிகிறது. திருக்குறள் கொள்கைகளின்படி வாழ்வதற்கான உத்திகள் மற்றும் நடைமுறைப் படிகளை வழங்கும் ஊக்கமூட்டும் பயிற்சியாளராக இது செயல்படுகிறது.

குறள்பாட் மூலம், நீதி, நேர்மை, இரக்கம் மற்றும் மன்னிப்பு போன்ற தலைப்புகளில் திருக்குறளின் நெறிமுறைப் போதனைகளைப் பின்பற்றுவதன் மூலம் தனிநபர்கள் மிகவும் நிறைவான மற்றும் நோக்கமுள்ள வாழ்க்கையை வாழ முடியும். மேலும், அறிவு ரீதியாகவும் உணர்ச்சி ரீதியாகவும் தங்களை மேம்படுத்திக் கொள்ள இந்த இயலி துணை செய்கிறது.

நிறைவாக, அகராதி என்று எடுத்துக் கொண்டால் கூட அது கேட்கும் வினாவிற்கு ஏற்ப ஏதேனும் ஒரு பொருளை மட்டுமே நமக்கு விடையாகத் தரும். ஆனால் செயற்கை நுண்ணறிவு கொண்டு வடிவமைக்கப்பட்டுள்ள இந்தக் குறள் பாட் எனும் இயலி கேட்கும் வினாக்களுக்கெல்லாம் பல்வேறு விதமான விடைகளைக் கூறி நம்மை ஆச்சரியத்தில்



ஆழ்த்துகிறது. அந்த வகையில் இந்தக் 'குறள் பாட்' பக்கத்தினை ஆயிரத்துக்கும் மேற்பட்டோர் விரும்பி உள்ளார்கள் என்பதையும் இதற்கு நல்ல ஆதரவு கிடைத்து வருவதையும் நோக்கும்போது செயற்கை நுண்ணறிவின் பிற்காலப் பலனை இன்றே நம்மால் உணர முடிகிறது.

பயன்பாட்டு நூல்கள்

வரதராசன், மு. (உ. ஆசி.), 2014., "திருக்குறள் தெளிவுரை", சென்னை: பாரிநிலையம்.

இணையப் பக்கம்

<https://www.Kuralbot.org>



AI IN HEALTHCARE

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ABSTRACT: Artificial intelligence is revolutionizing and strengthening - ultramodern healthcare through technologies that can prognosticate, grasp, learn, and act, whether it's employed to identify new connections between inheritable canons or to control surgery- aiding robots. It can descry minor patterns that humans would fully overlook. This study explores and discusses the colorful ultramodern operations of AI in the health sector. Particularly, the study focuses on three most arising areas of AI- powered healthcare AI- led medicine discovery, clinical trials, and patient care. The findings suggest that pharmaceutical enterprises have served from AI in healthcare by speeding up their medicine discovery process and automating target identification. Artificial Intelligence (AI) can help also to exclude time-consuming data monitoring styles. The findings also indicate that AI- supported clinical trials are able of handling massive volumes of data and producing largely accurate results. Medical AI companies develop systems that help cases at every position. Cases' medical data is also anatomized by clinical intelligence, which provides perceptivity to help them ameliorate their quality of life.

Artificial intelligence (AI) aims to mimic mortal cognitive functions. It's bringing a paradigm shift to healthcare, powered by adding vacuity of healthcare data and rapid-fire progress of analytics ways. We survey the current status of AI operations in healthcare and bandy its future. AI can be applied to colorful types of healthcare data (structured and unshaped). Popular AI ways include machine literacy styles for structured data, similar as the classical support vector machine and neural network, and the ultramodern deep literacy, as well as natural language processing for unshaped data. Major complaint areas that use AI tools include cancer, neurology and cardiology. We also review in further details the AI operations in stroke, in the three major areas of early discovery and opinion, treatment, as well as outgrowth vatic nation and prognostic evaluation. We conclude with discussion about colonist AI systems, similar as IBM Watson, and hurdles for real- life deployment of AI.

KEYWORDS: Artificial intelligence, Clinical Intelligence, prognosticate, Ameliorate, paradigm, AI operations

INTRODUCTION

Artificial intelligence (AI) is revolutionizing healthcare by mimicking mortal cognitive functions. With the adding vacuity of healthcare data and advancements in analytics ways, AI can be applied to colorful types of data, including structured and unshaped. Major complaint areas using AI tools include cancer, neurology, and cardiology. AI operations in stroke include early discovery, opinion, treatment, outgrowth vatic nation, and prognostic evaluation. Pioneer AI systems like IBM Watson are being bandied, along with hurdles for real- life deployment. Exploration studies suggest that AI can perform as well or better than humans in crucial healthcare tasks, similar as diagnosing complaint. Algorithms are formerly outperforming radiologists in spotting nasty excrescences and guiding experimenters in constructing cohorts for clinical trials. Still, it's believed that it'll take numerous times before AI replaces humans for broad medical process disciplines. This composition discusses the eventuality of AI to automate care aspects and discusses the walls to rapid-fire perpetration of AI in healthcare.

DIAGNOSIS

Stanford's MYCIN, developed in the 1970s, was an introducing AI system for diagnosing blood- borne bacterial infections. Still, it wasn't extensively espoused due to its lack of superiority over mortal differentia and poor integration with clinician workflows and medical record systems. IBM's Watson, a combination of machine literacy and NLP capabilities, has gained attention for its perfection drug focus on cancer opinion and treatment. Still, early enthusiasm for Watson's operation has faded as guests realize the challenges of tutoring it to address specific types of cancer and integrating it into care processes and systems. Watson and other personal programs have also faced competition from free open- source programs like Google's TensorFlow. perpetration issues with AI are a significant challenge for healthcare associations. Rule- grounded systems within Electronic Health Records(EHR) systems warrant the perfection of algorithmic systems grounded on machine literacy, making them delicate to maintain as medical knowledge changes and handle the explosion of data and knowledge grounded on genomic, proteomic, metabolic, and other' osmic- grounded' approaches to watch. Exploration labs and tech enterprises are beginning to develop approaches using AI or big data to diagnose and treat conditions with equal or lesser delicacy than mortal clinicians.



These findings are grounded on statistically- grounded machine literacy models, steering in an period of substantiation- and probability- grounded drug, which brings challenges in medical ethics and case/ clinician connections. Tech enterprises and startups are also working on analogous issues, similar as Google uniting with health delivery networks to make vatic nation models from big data and developing AI- deduced image interpretation algorithms.

DECISION SUPPORT SYSTEM

Decision support is pivotal in a terrain characterized by accelerating change and an ever- widening range of choices. Still, the current computer- grounded information processing system frequently fails to meet the requirements of decision makers, leading to a distinction between the information and decision support handed by the system and the requirements of decision makers. This distinction negatively impacts decision timber processes, affecting the time and trouble expended by decision makers and the assessment of the benefits relative to the system's costs. Thus, a decision support system should directly support and be used by decision makers, performing in better decision timber and increased organizational efficacy.

PATIENT CARE MONITORING

Patient engagement is crucial in healthcare, as it significantly impacts the financial outcomes and member experience. Healthcare providers and hospitals often develop treatment plans based on clinical expertise, but noncompliance can lead to poor outcomes. A survey of over 300 clinical leaders and healthcare executives revealed that less than 50% of patients were highly engaged, and 42% reported less than 25%. AI-based capabilities can be effective in personalizing and contextualizing care, with machine learning and business rules engines driving nuanced interventions along the care continuum.

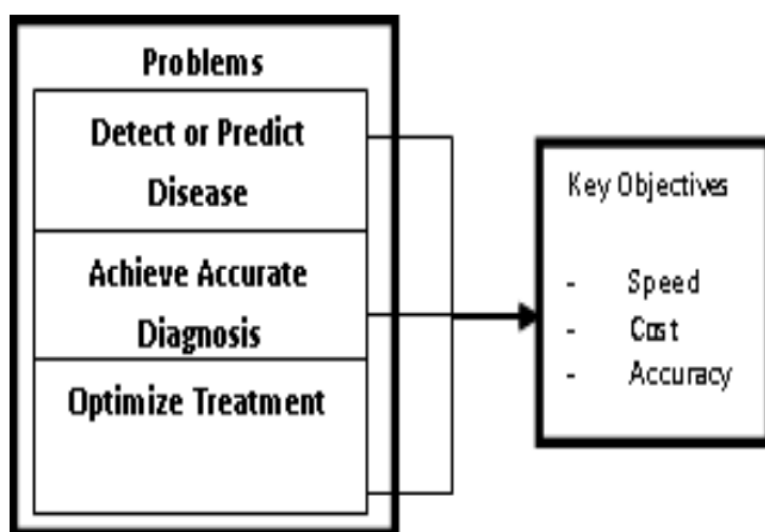
Another focus in healthcare is designing the 'choice architecture' to nudge patient behavior in a more anticipatory way based on real-world evidence. Software can tailor recommendations by comparing patient data to other effective treatment pathways for similar cohorts, providing recommendations to providers, patients, nurses, call-center agents, or care delivery coordinators. By leveraging big data and AI, healthcare providers can better address the 'last mile' problem of patient engagement and adherence, ultimately improving the overall health outcomes of patients.

ROBOTICS

Physical robots, which are extensively used in colorful diligence, have come decreasingly intelligent and cooperative with humans. In the USA, 200,000 artificial robots are installed annually, performing tasks similar as lifting, displacing, welding, and assembling objects. These robots are also getting more intelligent, with AI capabilities bedded in their operating systems. Surgical robots, originally approved in the USA in 2000, give surgeons with 'superpowers', perfecting their capability to see, produce precise lacerations, and sew injuries. Common surgical procedures using robotic surgery include gynecologic surgery, prostate surgery, and head and neck surgery. Robotic process robotization (RPA) is a technology that performs structured digital tasks for executive purposes, counting on a combination of workflow, business rules, and a donation sub caste integration with information systems. In healthcare, robots are used for repetitious tasks like previous authorization, streamlining case records, or billing. When combined with other technologies like image recognition, they can prize data from faxed images for input into transactional systems. As these technologies come more intermingled, compound results may come more likely or doable.

PERSONALIZED MEDECINE

The use of Artificial Intelligence ways in setting up or erecting individualized drug is important in terms of perfection and delicacy of complaint discovery, treatment, and medicine administration. The control of adverse medicine responses and enzymes metabolism which results in some people having issues barring medicines from their bodies, hence leading to overdose; while others exclude the medicine from the body before it gets the chance to work. The use of computers in hospitals and conventions to record medical conditioning or use of electronic health record(EHR) systems currently provides medical knowledge and data that can be used as a standard to enhance medical service delivery.



DRUG DISCOVERY

Medicine targets are moles, generally proteins that can alter a complaint state if their exertion is modulated. Machine literacy algorithms analysis colorful data, including gene expression biographies, protein- protein commerce networks, and genomic and proteomic data, to identify implicit targets involved in complaint pathways. Out of the roughly 20,000 proteins in the mortal proteome, only about 3,000 have been linked as implicit remedial targets. Unborn knowledge could expand our understanding of which proteins could come medicine targets. The first step in relating a target is to establish an unproductive relationship between the target and the complaint. A decision tree- grounded meta- classifier was proposed to prognosticate morbidity- associated genes that are also druggable. Machine literacy- grounded styles classified proteins as medicine targets or non-targets for specific conditions, similar as lung, pancreatic, and ovarian cancer, grounded on features similar as protein- protein commerce, gene expression, DNA dupe number, and mutation circumstance.

CLINICAL TRIALS

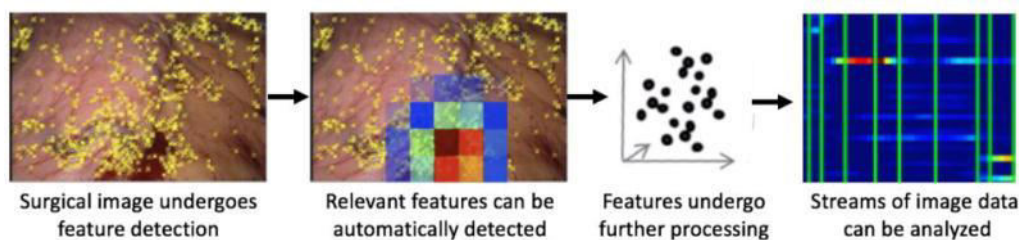
AI plays a critical step in medicine design, prognosticating medicine responses and efficacy in trials. Deep literacy- grounded styles like DeepConv- DTI and Deep Affinity help in bedding medicines and targets using complication and attention mechanisms. Similarity styles assume analogous medicines act on analogous targets, while point- grounded styles find individual medicine and target features. AI can help in opting implicit cases for pre-clinical trials by relating applicable bio-markers and anticipating implicit side goods. By filtering a high dimensional set of clinical variables, AI can elect a cohort of cases and prognosticate clinical trial issues ahead of the factual trial, minimizing dangerous goods on cases.

SURGERY

Artificial interfaces (AI) have significantly advanced the operation of surgery in the once two decades, with the Da Vinci Surgical System (DVSS) being decreasingly used across colorful surgical fortes. DVSS is forcefully established in urologic and gynoecia

Logic surgery, but its part in gastrointestinal surgery is evolving. Recent data indicates that DVSS is at least as ontologically effective as traditional laparoscopic approaches, furnishing multitudinous benefits like reduced conversion and complication rates. The adding relinquishment of AI/ DVSS worldwide places pressure on institutes and health sectors to develop similar programs. This composition provides an update on the current status of AI in surgery, particularly in colorectal surgery, and assesses the cost counteraccusations of AI/ DVSS- grounded vittles in the public health sector.

Computer vision, a field of machine understanding, has significantly advanced the field of surgery, enabling machine- suchlike capabilities in areas similar as object and scene recognition. It has operations in axial imaging, computer- backed opinion, image- guided surgery, and virtual colonoscopy. The field has shifted towards data- ferocious ML approaches, similar as neural networks, and is now fastening on advanced- position generalities like image- grounded analysis of patient cohorts, longitudinal studies, and conclusion of further subtle conditions like decision- making in surgery. Real- time analysis of laparoscopic videotape has yielded 92.8 delicacy in automated identification of surgical way, pressing the eventuality of AI in processing massive quantities of surgical data to identify or prognosticate adverse events in real- time for intraoperative clinical decision support.



PORTRAIT OF SURGERY ROBOTS



CONCLUSION

The study explores the use of AI in healthcare, analysis various healthcare data and identifying major categories of disease types. It delves into the two major categories of AI devices: ML and NLP, focusing on classical techniques like SVM and neural networks, as well as modern deep learning techniques. The study also surveys AI applications in stroke care.

AI technologies are gaining attention in medical research, but real-life implementation faces challenges. The first hurdle is the lack of standards for assessing the safety and efficacy of AI systems. The US FDA provided guidance for assessing AI systems, classifying them as 'general wellness products' with low risk to users. The second guidance justified using real-world evidence to assess AI system performance, and clarified rules for adaptive design in clinical trials to assess operating characteristics of AI systems.

REFERENCES

1. Dilsizian SE, Siegel EL, Artificial intelligence in medicine and cardiac imaging: harnessing big data and advanced computing to provide personalized medical diagnosis and treatment.
2. Jha S, Topol EJ, Adapting to Artificial Intelligence: radiologists and pathologists as information specialists.
3. Agrawal P. (2018). Artificial intelligence in drug discovery and development. J Pharmacovigil
4. Díaz, Ó. Dalton, J. A. R., & Giraldo, J. (2019). Artificial intelligence: a novel approach for drug discovery. Trends in Pharmacological Sciences



A Study on Heart Diseases Prediction using Machine Learning Techniques

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ABSTRACT: Heart disease, alternatively known as cardiovascular disease, encases various conditions that impact the heart and is the primary basis of death worldwide over the span of the past few decades. As per the recent study by WHO, heart related diseases are increasing. 17.9 million People die every-year due to this. With growing population, it gets further difficult to diagnose and start treatment at early stage. Data mining is a commonly used technique for processing enormous data in the healthcare domain. Researchers apply several data mining and machine learning techniques to analyze huge complex medical data, helping healthcare professionals to predict heart disease. We utilize different optimization techniques to classify current data and improve prediction accuracy. Machine learning is the branch of Artificial Intelligence (AI), it provides prestigious support in predicting any kind of event which take training from natural events. In this paper, we calculate accuracy of machine learning algorithms for predicting heart disease, for this algorithms are Naive Bayes K-Nearest Neighbor, decision tree by using UCI repository dataset for training and testing.

KEYWORDS: K-Nearest Neighbor, Decision tree, Naive Bayes, Heart disease

LINTRODUCTION

The work proposed in this paper focus mainly on various data mining practices that are employed in heart disease prediction. Human heart is the principal part of the human body. Basically, it regulates blood flow throughout our body. Any irregularity to heart can cause distress in other parts of body. Any sort of disturbance to normal functioning of the Heart can be classified as a Heart disease. In today's contemporary world, heart disease is one of the prim reasons for occurrence of most deaths. Heart disease may occur due to unhealthy lifestyle, smoking, alcohol and high intake of fat which may cause hypertension. According to the World Health Organization more than 10 million die due to Heart diseases every single year around the world. A healthy lifestyle and earliest detection are only ways to prevent the heart related diseases. The main challenge in today's healthcare is provision of best quality services and effective accurate diagnosis. Even if heart diseases are found as the prime source of death in the world in recent years, they are also the ones that can be controlled and managed effectively. The whole accuracy in management of a disease lies on the proper time of detection of that disease. The proposed work makes an attempt to detect these heart diseases at early stage to avoid disastrous consequences. Records of large set of medical data created by medical experts are available for analyzing and extracting valuable Knowledge from it. Data mining techniques are the means of extracting valuable and hidden information from the large amount of data available. Mostly the medical database consists of discrete information. Hence, decision making using discrete data becomes complex and tough task. Machine Learning (ML) which is subfield of data mining handles large scale well-formatted dataset efficiently. In the medical field, machine learning can be used for diagnosis, detection and prediction of various diseases. The main goal of this paper is to provide a tool for doctors to detect heart disease as early stage. This in turn will help to provide Effective treatment to patients and avoid severe consequences. ML plays a very important role to detect the hidden discrete patterns and thereby analyze the given data. After analysis of data ML techniques help in heart disease prediction and early diagnosis. This paper presents Performance analysis of various ML techniques such as Naive Bayes, Decision Tree, for predicting heart disease at an early stage



II.RELATED WORKS

Lot of work has been carried out to predict heart disease using UCI Machine Learning dataset. Different levels of accuracy have been attained using various data mining techniques which are explained as follows:

Avinash Golande and et al.; studies various different ML algorithms that can be used for classification of heart disease. Research was carried out to study Decision Tree, KNN and K-Means algorithms that can be used for classification and their accuracy were compared. This research concludes that accuracy obtained by Decision Tree was highest further it was inferred that it can be made efficient by combination of different techniques and parameter tuning.

Fahd Saleh Alotaibi has designed a ML model comparing five different algorithms. Rapid Miner tool was used which resulted in higher accuracy compared to Matlab and Weka tool. In this research the accuracy of Decision Tree, Naive Bayes. Decision tree algorithm had the highest accuracy.

Theresa Princy. R, et al, executed a survey including different classification algorithm used for predicting heart disease. The classification techniques used were Naive Bayes, KNN (K-Nearest Neighbour), Decision tree, Neural network and accuracy of the classifiers was analysed for different number of attributes.

The main idea behind the proposed system after reviewing the above papers was to create a heart disease prediction system. We analysed the classification algorithms namely Decision Tree, KNN (K- nearest neighbour) and Naive Bayes based on their Accuracy, Precision, Recall and f-measure scores and identified the best classification algorithm which can be used in the heart disease prediction.

III.DATA RESOURCE

The Cleveland heart data set from the UCI machine learning repository has been used for the experiments the data set consists of 14 attributes and 303 instances. There are 8 categorical attributes and 6 numeric attributes. The description of the dataset shown in the table.

Attributes	Description	Range
Age	Age of person in Years	29-79
Sex	Gender of person (1-M 0-F)	0,1
Cp	Chest pain type	1,2,3,4
Trestbps	Resting blood pressure in mm Hg	94-200
Chol	Serum cholesterol in mg/dl	126-564
Fbs	Fasting blood sugar in mg/dl	0,1
Restecg	Resting electrocardiographic results	0,1,2
Thalach	Maximum heart rate achieved	71-202
Exang	Exercise induced Angina	0,1
Oldpeak	ST Depression induced by exercise relative to rest	1-3
Slope	Slope of the Peak Exercise ST segment	1,2,3
Ca	Number of major vessels coloured by fluoroscopy	0-3
Thal	3-Normal,6-Fixed Defect,7-Reversible Defect	3,6,7
Result	Class Attribute	0,1

Table 1: Datasets of Heart Disease

Patients from age 29-79 have been selected in these dataset. Male patient are denoted by a gender value 1 and female patient are denoted by gender value 0. Four types of chest pain can be considered as indicative of Heart diseases. Type1 Angina is caused by reduced blood flow to the heart muscles because of narrowed coronary arteries. Type1 Angina is a Chest Pain that occurs during mental or emotional stress. Non-Angina Chest pain may be caused due to various reason and may not often be due actual heart disease. The fourth type, Asymptomatic, may not be a symptom of heart disease. The next attributes Trestbps is the reading of the resting blood pressure. Chol is the



cholesterol level. Fbs is the fasting blood sugar level; the value is assigned as 1 if the fasting blood sugar is below 120 mg/dl and 0 if it is above. Restecg is the resting electrocardiographic result, Thalach is the maximum heart rate, exang is the exercise induced angina which is recorded as 1 if there is pain and 0 if there is no pain, old peak is the ST depression induced by exercise, slope is the slope of the peak exercise test in minutes and number is the class attribute. The class attribute has a value of 0 for normal and 1 for patient diagnose with heart disease.

IV. CLASSIFICATION

The attributes mentioned in Table are provided as input to the different ML algorithms such as Decision Tree, and Naive Bayes classification techniques. The input dataset is split into 80% of the training dataset and the remaining 20% into the test dataset. Training dataset is the dataset which is used to train a model. Testing dataset is used to check the performance of the trained model. For each of the algorithms the performance is computed and analysed based on different metrics used such as accuracy, precision, recall and F-measure scores as described further. The different algorithms explored in this paper are listed as below. Firstly create a random forest then make a prediction using a random forest classifier created in the first stage.

1. Naive Bayes:

The Naive Bayes classifier is a supervised machine learning algorithm, which is used for classification tasks, like text classification. It is also part of a family of generative learning algorithms, meaning that it seeks to model the distribution of inputs of a given class or category. Naive Bayes is a simple but an effective classification technique which is based on the Bayes Theorem. It assumes independence among predictors that the attributes or features should be not correlated to one another or should not, in any way, be related to each other. Even if there is dependency, still all these features or attributes independently contribute to the probability and that is why it is called Naïve

$$P(H|E) = \frac{P(E|H) * P(H)}{P(E)}$$

Likelihood of the Evidence given that the Hypothesis is True

Prior Probability of the Hypothesis

Posterior Probability of the Hypothesis given that the Evidence is True

Prior Probability that the evidence is True

Fig 1: Naive Bayes

2. K-NN (K-Nearest Neighbour)

In 1951 Hodges et al. introduced a non-parametric technique for pattern classification which is popularly known the K-Nearest Neighbour rule. K-Nearest Neighbour is one of the simplest Machine Learning algorithms based on supervised learning technique. K-NN algorithms stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category K-NN algorithm. K-NN is a non-parametric algorithm, which means it does not make any assumption on underlying data. It is also called a Lazy learner algorithm because it does not learn from the training set immediately instead it stores the data set and at the time of classification, it performs an action on the data set.

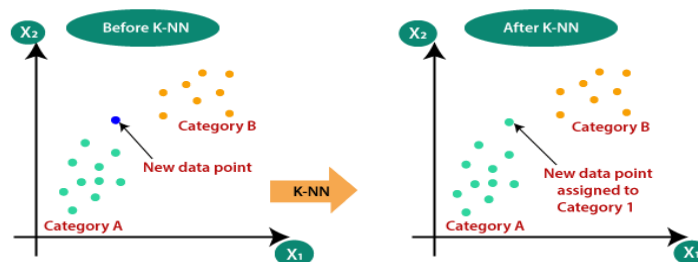


Fig 2: K-NN (K-Nearest Neighbour)



3. Decision Tree:

Decision tree is a supervised learning algorithm. This technique is mostly used in classification problems it performs effortlessly with continuous and categorical attribute. This algorithm divides the population into two or more similar sets based on the most significant predictors. Decision Tree algorithms, first calculates the Entropy of each and every attributes. Then the dataset is split with the help of the variables or predictors with maximum information gain or minimum Entropy.

$$\text{Entropy}(s) = - \sum_{i=1}^c p_i \log_2 p_i$$

$$\text{Gain}(S,A) = \text{Entropy}(S) - \sum_{v \in \text{values}(A)} \frac{|S_v|}{|S|} \text{Entropy}(S_v)$$

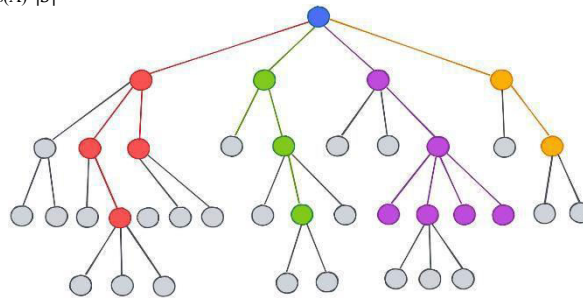


Fig 3: Decision Tree

GENERIC MODEL PREDICTING HEART DISEASE

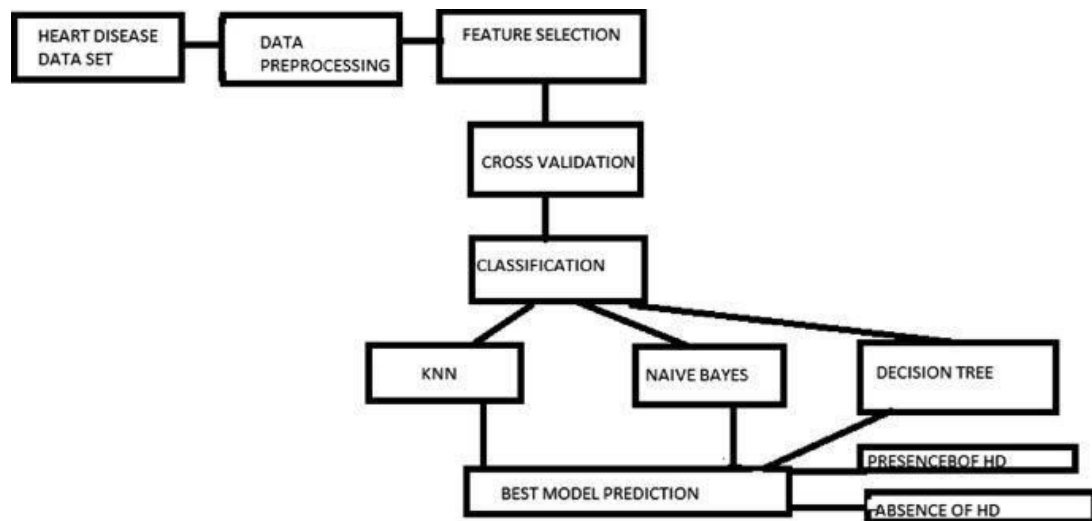


Fig 4: Model for predicting heart disease



VI.CONCLUSION

The survey on machine learning technology-based heart disease detection models is provided in this paper. Three approaches of ML models for heart disease detection are analyzed in this survey; these are the Naïve Bayes with weighted approach based prediction, KNN (K-Nearest Neighbor) and Decision Tree. According to the results analysis, the accuracy, precision, recall and threshold values are optimization in these weighted approach. Because the Generic model performs well on the Heart Failure Dataset with an accuracy of 86.0%. The present survey paper gives the best idea regarding different machine learning-based heart disease detection methods. This research can be updated in the future by adding more attributes to the heart disease dataset and making it more interactive for the users. It can also be carried out as a mobile application with reduced computing time and complexity. We will make changes to the system by linking it to the hospital's database.

REFERENCES

- [1] Avinash Golande, Pavan Kumar T, "Heart Disease Prediction Using Effective Machine Learning Techniques", *International Journal of Recent Technology and Engineering*, Vol 8, pp.944-950,2019.
- [2] T.Nagamani, S.Logeswari, B.Gomathy," Heart Disease Prediction using Data Mining with Map reduce Algorithm", *International Journal of Innovative Technology and Exploring Engineering (IJITEE)* ISSN: 2278-3075, Volume-8 Issue-3, January 2019.
- [3] Fahd Saleh Alotaibi, "Implementation of Machine Learning Model to Predict Heart Failure Disease", (IJACSA) *International Journal of Advanced Computer Science and Applications*, Vol. 10, No. 6, 2019.
- [4] Anjan Nikhil Repaka, Sai Deepak Ravikanti, Ramya G Franklin, "Design And Implementation Heart Disease Prediction Using Naives Bayesian", *International Conference on Trends in Electronics and Information(ICOEI 2019)*.
- [5] Aprub rajdhan, Avi Agarwal, Dundigalla Ravi, Poonam Ghuli, Milan Sai, "Heart Disease Prediction Using Machine Learning", *International Journal of Engineering Research & Technology (IJERT)*, ISSN: 2278-0181, Vol. 9 Issue 04, April-2020
- [6] Baban.U. Rindhe, Nikita Ahire, Rupali Patil, Shweta Gagare, Manisha Darade, "Heart Disease Prediction Using Machine Learning", *International Journal of Advanced Research in Science Communication and Technology* , May 2021
- [7] Pooja Anbuselvan, "Heart Disease Prediction Using Machine Learning Techniques", *International Journal of Engineering Research & Technology (IJERT)*, ISSN: 2278-0181, Vol. 9 Issue 11, November-2020
- [8] V.V. Ramalingam, Ayantan Dandapath, M Karthik Raja, "Heart Disease Prediction Using Machine Learning Techniques survey", *International Journal of Engineering & Technology*, March 2018



A Comprehensive Outline Of Chatgpt'S Competencies And Potential Touch

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ABSTRACT: ChatGPT is a language based on the GPT-3.5 architecture developed by OpenAI. ChatGPT is an AI-based natural language processing (NLP) system that excels in human-like communication with end users. ChatGPT specializes in creating interactive content and content, providing students with valuable resources to help with homework, language learning, writing development, and idea generation. It uses deep learning technology to generate human-like responses and engage in interactive interactions with users. Businesses leverage ChatGPT for customer support that can answer questions and provide quality information. Creators benefit from his creative input, helping with concept development and story development. ChatGPT is a technology that uses technology to generate instant answers or ideas. It has been used in many ways, from natural language processing to content creation for customers. ChatGPT is used as a coding aid to help programmers get code snippets and solve problems. Its application is also valid as psychological support and dating partner.

KEYWORDS: Open AI, Generating Coherent, Contextually relevant text, Idea generation, Story development, Deep learning techniques, Interactive conversations, Conversational companion.

INTRODUCTION

ChatGPT (Chat Generative Pre-Trained Transformer) is an intelligent chatbot developed by OpenAI and released on November 30, 2022. GPT 4 was released on March 14, 2023. GPT 5 could be released in 2023. Users can optimize and direct the conversation according to the desired length, type, style, level of detail and language used. A Bloomberg study said that "artificial intelligence could contribute \$15.7 trillion to the global economy by 2030." The impact of ChatGPT on business and business is a complex issue with both positive and negative potential, and its impact affects many things, from processing messages that are natural to customers to creating content.

OpenAI, the company behind ChatGPT, was founded in 2015 by a group of individuals including Twitter owner Elon Musk, Ilya Sutskever, Wojciech Zaremba, Greg Brockman and Sam Altman. Talk GPT founder OpenAI said Sam Altman will return as CEO with a reorganized leadership team. The change comes days after OpenAI's board fired Altman and he was hired by Microsoft. Microsoft, OpenAI's largest shareholder, welcomed the decision. The new AI model offers users advanced features and affordable prices. It is a smart design specifically designed to create human-like text and chat with users.

CHATGPT

ChatGPT stands for "Chat Generation Pre-Trained Transformer", indicating its nature as a language model based on the Transformer architecture. It uses the Transformer architecture and is trained on big data, enabling it to understand and produce human-like messages. ChatGPT is mainly used for chatting, answering questions and generating text based on input received from the user. It is designed to understand language and generation, allowing it to join the conversation and provide context. ChatGPT's main features include technical consulting, content creation, training support, professional services, customer support, coding services, translations and data recovery. ChatGPT is a powerful tool for creating interactive and interactive chatbots and virtual assistants. It helps create different content that supports activities such as writing articles, stories or coding. ChatGPT provides personalized instruction,



explanation and language practice to enhance learning. Assists in writing communications such as emails and reports, aids in business interactions.

Automate customer service scenario responses to increase efficiency and effectiveness. Help developers solve code questions by providing explanations and instructions. Support commenting to facilitate communication. Increase accessibility by providing instant information on a wide range of topics. Although ChatGPT has many uses, responsible use and ethical considerations are crucial to its effective and ethical use.

Impact of ChatGPT:

Career

Opportunities

ChatGPT can help you advance your career in many ways. You can use it for resumes, interview preparation, job training, job search strategies, skills development. The impact of ChatGPT's work depends on the nature of those times. If there is demand for AI-related intelligence, this will lead to further improvements and improvements in ChatGPT. On the other hand, if AI research or development changes, it may be slow. Working in the tech industry in general will impact the AI technology ecosystem. Get tips on how to improve your resume for specific jobs. Practice interview questions and get feedback on your answers. Get career advice, skills development and industry trends. Discuss great ideas for job hunting and improving your LinkedIn profile. Identify the key skills needed for the job you want and seek resources to develop those skills.

ChatGPT not only paves the way for artificial intelligence experts, but also supports the role in content creation, customer support and conversation. It demonstrates an attractive environment where people with skills and relevant activities have a positive impact on access to diversity and career change.

Advances in communication

There are many significant improvements in ChatGPT's impact on communication development: language skills, writing skills, instant feedback testing, cultural understanding and better accessibility. ChatGPT helps users improve their language skills through interactive communication and offers corrections and improvement suggestions. It helps improve communication by providing feedback on grammar, structure and overall clarity, making written communication better and clearer. Users receive rapid feedback, allowing them to learn quickly and correct mistakes made during communication. ChatGPT helps build bridges between different languages and cultures, promoting better understanding between people from different cultures. It supports people who have communication problems and enables them to express themselves better. As a result, these developments help enable better communication and participation in many areas.

Study Support

Helps support self-study, language teaching and practice to enhance learning. ChatGPT's impact on educational support is the importance of easy access to self-study, tutoring and homework help, language practice, training. ChatGPT can provide personalized assistance to students with explanations and guidance based on individual needs and progress. It acts as a virtual teacher to help students with their homework, studies, and clarify points that will improve learning. ChatGPT makes language learning easier by engaging users in conversation, correcting errors, and providing language practice. Can create learning materials, questions, and explanations that complement traditional learning resources and increase diversity of learning styles. ChatGPT helps students with different learning needs, provides additional support and makes learning content more accessible.

As ChatGPT develops technical training, it is important to integrate the role of human experts to ensure that it complements rather than replaces the main role of teaching. Ethical considerations and attention to potential biases are also important to resolve.

Human-Computer Interaction

The impact of human-computer interaction in ChatGPT is the understanding of good language, personal use, personal performance, good work and more. Improved interactivity means better understanding of user input, allowing ChatGPT to provide more accurate and informative responses. Improved interactions help provide a more engaging and rewarding user experience, making interactions with ChatGPT more convenient and enjoyable for users. By understanding the user's preferences and history, ChatGPT can customize responses to create a more personal and user-friendly experience. ChatGPT can help users complete tasks more efficiently by understanding complex questions and providing relevant information



or guidance. Improved human-computer interaction makes ChatGPT versatile and capable of serving users in many locations and situations with high flexibility. While progress in human-computer interaction is beneficial, ethical considerations, user privacy and fraud risks must be addressed to ensure responsible and inclusive use of technology.

Professional Assistance

Help the workplace by creating content, improving communication, and providing support in a variety of ways. ChatGPT's expertise in professional services includes content creation, marketing communications, technical support, optimization and project planning. ChatGPT saves content creation time by helping create professional-level content such as articles, flyers, or marketing materials. It helps create emails, proposals, and other business-related documents, ensuring clear and effective communication in a work environment. ChatGPT can help professionals solve problems and understand complex concepts by providing guidance and explanations in the workplace. It can offer suggestions to improve performance and help professionals better share their skills and experience. ChatGPT can assist with feedback, create and revise project plans, thus contributing to effective project management. While ChatGPT is an important tool for professional service, human attention to reliable and appropriate information is still important, especially in minor or sensitive situations.

Accessibility

Provide support to people with communication difficulties and provide instant messaging on different topics to help increase accessibility. ChatGPT's impact on accessibility is evident in many ways: communication support, conversational support, real-time information, technology support, and social networking. ChatGPT helps people with communication problems share their ideas and access information more easily. It facilitates language access and skill development by providing language learners with an interactive platform for practice and learning. ChatGPT provides instant information on a wide range of topics, making it more accessible to users with different levels of expertise. It can be used as part of assistive technology that promotes greater communication and accessibility for people with some disabilities. Improved human interaction in ChatGPT helps provide a more user-friendly experience for people with different needs. However, it is important to consider possible limitations and limitations on access to ensure fair and equitable use of the technology.

Automation and productivity in ChatGPT

Automation in ChatGPT can increase efficiency in many ways: quick responses, job automation, content creation, data analysis, etc. Automated replies simplify communication in customer or support scenarios by providing quick responses. ChatGPT can assist with daily tasks, facilitate tasks, and volunteer for complex or creative tasks. It can save content creators and writer's time by creating content such as articles, posters, or code. Automation can be used to analyze lots of data and provide better results and better models. The automated process in ChatGPT reduces the possibility of human error by ensuring consistent responses. But automation of measurement under human supervision is especially important in delicate or delicate situations. Ethical considerations, biases, and the need for human judgment must be taken into account to ensure responsible and efficient use of features in ChatGPT.

Automatic grading

Take a grade that uses ChatGPT to include language patterns used to grade and evaluate different types of assignments, tests, or assessments. This process has many meanings. The impact of using ChatGPT to improve scores such as efficiency, consistency, efficiency, feedback and objective evaluation. Automated grading streamlines the evaluation process, saves time in school, and provides quick feedback to students. It minimizes variability in evaluation that can occur between human raters by providing consistent scores. Automated grading is easily scalable and can evaluate multiple assignments or tests. ChatGPT can provide detailed feedback on student work, explain errors and offer suggestions for improvement. Automated scoring eliminates biases that may be present in the scorebook and facilitates objective evaluation. While there are many advantages to using ChatGPT for automatic rating, a balance must be struck by including human moderation, especially in complex tasks that may require evaluation and understanding.

Natural Language Processing (NLP)

ChatGPT is a natural language processing program provided by OpenAI that can produce human-like responses. This is a modification of the GPT language. NLP is already popular in applications such as spam filtering and machine translation. ChatGPT allows it to respond to content and create similar



responses by using lots of pre-existing data to learn patterns. An NLP chatbot is a conversational agent that uses language to understand and respond to human input. It uses machine learning algorithms to analyze text or speech and generate responses that get people to engage. Continuous improvement in NLP technology helps improve the model's ability to be effective and interactive over time. The continuous development of NLP technologies and models such as ChatGPT highlights the importance of language processing and intelligent technologies in shaping the future of interaction. As NLP continues to evolve, we expect the accuracy, content understanding, and overall effectiveness of ChatGPT and similar language models to continue to improve.

CONCLUSION

In short, the impact of ChatGPT is multifaceted. The main task of this article is to qualitatively examine the impact of smart chatbots such as ChatGPT on universities by analyzing current data. The development of AI-based tools such as ChatGPT raises the possibility of replacing human-based knowledge with low-cost Chatbot-based interactions. The development of AI-based tools such as ChatGPT raises the possibility of replacing human-based knowledge with low-cost chatbot-based interactions. This can lead to confusing teaching and learning that reduces human connection and support. On the one hand, it is revolutionizing natural language processing, enabling increasingly accessible communication capabilities. However, ethical issues, misuse, and the need for improvement continue to highlight the importance of development and implementation. The evolution of the AI communications field requires ongoing monitoring and ethical decision-making to maximize benefits while mitigating risk.

REFERENCES

- [1].Agrawal, A., Gans, J., & Goldfarb, A. (2022, December 12). ChatGPT and How AI Disrupts Industries. Harvard Business Review. <https://hbr.org/2022/12/chatgpt-andhow-ai-disrupts-industries>
- [2]. Altaf, Y. (2023, March 7). 5 Ways ChatGPT Will Impact Digital Marketing. Entrepreneur. <https://www.entrepreneur.com/growing-a-business/5-ways-chatgpt-will-impact-digital-marketing/446208>
- [3]. Biswas, S. S. (2023). Potential Use of Chat GPT in Global Warming. Annals of Biomedical Engineering. <https://doi.org/10.1007/s10439-023-03171-8>
- [4]. Diaz, M. (2023). How to use ChatGPT: Everything you need to know. ZDNET. <https://www.zdnet.com/article/how-to-use-chatgpt/>
- [5]. Else, H. (2023). Abstracts written by ChatGPT fool scientists. Nature. <https://doi.org/10.1038/d41586-023-00056-7>
- [6]. Lund, B. D., & Wang, T. (2023). Chatting about ChatGPT: how may AI and GPT impact academia and libraries? Library Hi Tech News. <https://doi.org/10.1108/lhtn-01-2023-0009>
- [7]. Mandelaro, J. (2023, February 27). How will AI chatbots like ChatGPT affect higher education? News Center. <https://www.rochester.edu/newscenter/chatgptartificial-intelligence-ai-chatbots-education-551522/>