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A Study on Machine Learning and its Applications

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ABSTRACT: Machine learning (ML) is an artificial intelligence (AI) branch that allows the machine to think like such a human being and can make a judgment on their own without human intervention. It is the process of automatically making machines to learn without being programmed directly. Through the use of statistical methods, algorithms are trained to make classifications or predictions, uncovering key insights within data mining projects. These insights subsequently drive decision making within applications and businesses, ideally impacting key growth metrics. It involves computers learning from data provided so that they carry out certain tasks. Machine learning are classified into three types. As machine learning technology advances, it has certainly made our lives easier. However, implementing machine learning within businesses has also raised a number of ethical concerns surrounding AI technologies. There are many applications like medical and healthcare, image and facial recognitions, google search, social media, banking domain, language translations, etc.

KEYWORDS: Machine learning, Machine learning classifications, Machine Learning Methods, Machine learning applications

I. INTRODUCTION

Machine learning (ML) is an artificial intelligence (AI) branch that allows the machine to think like such a human being and can make a judgment on their own without human intervention. It is the process of automatically making machines to learn without being programmed directly. The key aim of Machine Learning is to build a computer program that can access data and use it for learning processes. Machine learning is a branch of artificial intelligence and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. Technological developments around storage and processing power will enable some innovative products that we know and love today, such as robots, self-driving cars. Through the use of statistical methods, algorithms are trained to make classifications or predictions, uncovering key insights within data mining projects. These insights subsequently drive decision making within applications and businesses, ideally impacting key growth metrics. The newly emerged machine learning methods have become a strong driving force to revolutionize a wide range of industries, such as smart healthcare, financial technology, and surveillance systems, etc.

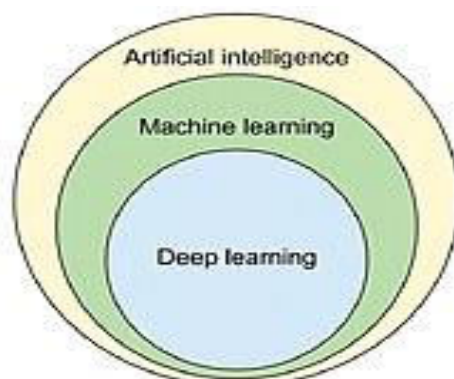


Fig. 1: Machine learning



II. MATERIALS AND METHODS

For this study of machine learning, we used desktops, laptops, smartphones to collect the data and information on machine learning. We used different websites of different organizations working in the area of machine learning, applications of machine learning. Studied many research papers on machine learning on websites of Google Scholar, Science Direct, etc. High speed internet facility like broadband internet, personal network, home network, wireless networks, fibre optic internet services, mobile internet were used for downloading data and information. Internet browser software viz. Google chrome, Mozilla Firefox, Edge were used for opening the different related websites on the Internet and to download it. Search engines like Google, Google Scholar and other search engines have been used for searching the latest information and literature on the topic. All related data and information are downloaded, collected, cleaned, tabulated, stored and summarised. Summarised data is analysed by using different statistical analysis software and data analysis tools. Results of analysis on the data have been presented and concluded in this paper.

III. MACHINE LEARNING WORKING

Machine learning programs can perform tasks without being explicitly programmed to do so. It involves computers learning from data provided so that they carry out certain tasks. For any job assigned to computer, it is possible to program algorithms telling the machine how to execute all steps required to solve the problem; on the computer's part, no learning is needed. For more advanced tasks, it can be challenging for a human to manually create the needed algorithms. In practice, it can turn out to be more effective to help the machine develop its own algorithm, rather than having human programmers specify every needed step.

Machine learning algorithm breaks into three main parts.

A Decision Process:

Machine learning algorithms are used to make a prediction or classification. Based on some input data, which can be labelled or unlabelled your algorithm will produce an estimate about a pattern in the data.

An Error Function:

An error function serves to evaluate the prediction of the model. If there are known examples, an error function can make a comparison to assess the accuracy of the model.

A Model Optimization Process:

If the model can fit better to the data points in the training set, then weights are adjusted to reduce the discrepancy between the known example and the model estimate. The algorithm will repeat this evaluate and optimize process, updating weights autonomously until a threshold of accuracy has been met.

IV. MACHINE LEARNING CLASSIFICATIONS

Machine learning are classified into three types as given below.

Supervised machine learning

Supervised learning, also known as supervised machine learning, is defined by its use of labeled datasets to train algorithms that to classify data or predict outcomes accurately. As input data is fed into the model, it adjusts its weights until the model has been fitted appropriately. This occurs as part of the cross validation process to ensure that the model avoids overfitting or underfitting. Supervised learning helps organizations solve for a variety of real-world problems at scale, such as classifying spam in a separate folder from your inbox. Some methods used in supervised learning include neural networks, naïve bayes, linear regression, logistic regression, random forest, support vector machine, and more.

Unsupervised machine learning

Unsupervised learning, also known as unsupervised machine learning, uses machine learning algorithms to analyze and cluster unlabeled datasets. These algorithms discover hidden patterns or data groupings without the need for human intervention. Its ability to discover similarities and differences in information make it the ideal solution for exploratory data analysis, cross-selling strategies, customer segmentation, image and pattern recognition. It's also used to reduce



the number of features in a model through the process of dimensionality reduction, principal component analysis and singular value decomposition are two common approaches for this. Other algorithms used in unsupervised learning include neural networks, k-means clustering, probabilistic clustering methods, and more.

Semi-supervised learning

Semi-supervised learning offers a happy medium between supervised and unsupervised learning. During training, it uses a smaller labeled data set to guide classification and feature extraction from a larger, unlabeled data set. Semi-supervised learning can solve the problem of having not enough labeled data to train a supervised learning algorithm.

V. MOST COMMON MACHINE LEARNING ALGORITHMS

Most commonly algorithms used in machine learning are

- 1) K-nearest neighbour
- 2) Linear regression
- 3) Decision tree
- 4) Naïve Bayes

VI. POPULAR APPLICATIONS OF MACHINE LEARNING

Here are just a few popular examples of machine learning we are encountered day to day:

Speech Recognition: It is known as automatic speech recognition, computer speech recognition, or speech-to-text, and it is a capability which uses natural language processing (NLP) to process human speech into a written format. Many mobile devices incorporate speech recognition into their systems to conduct voice search—e.g. Ok Google, Siri or provide more accessibility around texting.

Customer Service by chatbots: Online chatbots are replacing human agents along the customer journey. They answer frequently asked questions (FAQs) around topics, like shipping, or provide personalized advice, cross-selling products or suggesting sizes for users, changing the way we think about customer engagement across websites and social media platforms. Examples include messaging bots on e-commerce sites with virtual agents, messaging apps, irctc reservations systems, such as Slack and Facebook Messenger, and tasks usually done by virtual assistants and voice assistants.

Computer Vision: This AI technology enables computers and systems to derive meaningful information from digital images, videos and other visual inputs, and based on those inputs, it can take action. This ability to provide recommendations distinguishes it from image recognition tasks. Powered by convolutional neural networks, computer vision has applications within photo tagging in social media, radiology imaging in healthcare, and self-driving cars within the automotive industry.

Google Search

People generally turn to search engines, such as Google, for a wide range of information and answers. The search engine collects all of the information based on your search query and presents the results that are most relevant. Without Google, the task would be tedious, as you would have to go through tens or hundreds of websites, books and articles.

Voice and Facial Recognition

At one point, facial recognition was only a concept shown in movies. But machine learning has made it possible and now many are using this feature for your benefit. For instance, Facebook automatically recognizes the people in a photo and tags them for you, saving a lot of time. Without machine learning, Siri, Cortana, or Iris would not be able to answer your questions.

Online Shopping

Next up in the introduction to machine learning tutorial comes a very exciting point, that is, online shopping. People who shop on Amazon generally notice a lot of product suggestions. If you buy a formal shirt, Amazon suggests formal



shoes, ties, blazers, and apparel that go with what you buy. Machine learning is what powers that recommendation system. Similarly, according to your search on amazon, it will suggest and show similar type of products when you are opening amazon next times.

Social Media Features

Social media platforms use machine learning algorithms and approaches to create some attractive and excellent features. For instance, Facebook notices and records your activities, chats, likes, and comments, and the time you spend on specific kinds of posts. Machine learning learns from your own experience and makes friends and page suggestions for your profile.

Product Recommendations

Product recommendation is one of the most popular and known applications of machine learning. Product recommendation is one of the stark features of almost every e-commerce website today, which is an advanced application of machine learning techniques. Using machine learning and AI, websites track your behavior based on your previous purchases, searching patterns, and cart history, and then make product recommendations.

Image Recognition

Image recognition, which is an approach for cataloging and detecting a feature or an object in the digital image, is one of the most significant and notable machine learning and AI techniques. This technique is being adopted for further analysis, such as pattern recognition, face detection, and face recognition.

Regulating Healthcare Efficiency and Medical Services

Significant healthcare sectors are actively looking at using machine learning algorithms to manage better. They predict the waiting times of patients in the emergency waiting rooms across various departments of hospitals. The models use vital factors that help define the algorithm, details of staff at various times of day, records of patients, and complete logs of department chats and the layout of emergency rooms. Machine learning algorithms also come to play when detecting a disease, therapy planning, and prediction of the disease situation. This is one of the most necessary machine learning applications.

Predict Potential Heart Failure

An algorithm designed to scan a doctor's free-form e-notes and identify patterns in a patient's cardiovascular history is making waves in medicine. Instead of a physician digging through multiple health records to arrive at a sound diagnosis, redundancy is now reduced with computers making an analysis based on available information.

Banking Domain

Banks are now using the latest advanced technology machine learning has to offer to help prevent fraud and protect accounts from hackers. The algorithms determine what factors to consider to create a filter to keep harm at bay. Various sites that are unauthentic will be automatically filtered out and restricted from initiating transactions.

Language Translation

One of the most common machine learning applications is language translation. Machine learning plays a significant role in the translation of one language to another. We are amazed at how websites can translate from one language to another effortlessly and give contextual meaning as well. The technology behind the translation tool is called 'machine translation.' It has enabled people to interact with others from all around the world; without it, life would not be as easy as it is now. It has provided confidence to travelers and business associates to safely venture into foreign lands with the conviction that language will no longer be a barrier.

VII. CHALLENGES OF MACHINE LEARNING

As machine learning technology advances, it has certainly made our lives easier. However, implementing machine learning within businesses has also raised a number of ethical concerns surrounding AI technologies. Some of these include:

Technological Singularity

While this topic garners a lot of public attention, many researchers are not concerned with the idea of AI surpassing human intelligence in the near or immediate future. This is also referred to as superintelligence, which Nick Bostrom



defines as “any intellect that vastly outperforms the best human brains in practically every field, including scientific creativity, general wisdom, and social skills.” Despite the fact that Strong AI and superintelligence is not imminent in society, the idea of it raises some interesting questions as we consider the use of autonomous systems, like self-driving cars. It’s unrealistic to think that a driverless car would never get into a car accident.

AI Impact on Jobs:

While a lot of public perception around artificial intelligence centers around job loss, this concern should be probably reframed. With every disruptive, new technology, we see that the market demand for specific job roles shift. For example, when we look at the automotive industry, many manufacturers, like Tata, Kia, Toyota, GM, BMW and others are shifting to focus on electric vehicle production to align with green initiatives. The energy industry isn’t going away, but the source of energy is shifting from a fuel economy to an electric one. Artificial intelligence should be viewed in a similar manner, where artificial intelligence will shift the demand of jobs to other areas. There will need to be individuals to help manage these systems as data grows and changes every day. There will still need to be resources to address more complex problems within the industries that are most likely to be affected by job demand shifts, like customer service. The important aspect of artificial intelligence and its effect on the job market will be helping individuals transition to these new areas of market demand.

Privacy:

Privacy tends to be discussed in the context of data privacy, data protection and data security, and these concerns have allowed policymakers to make more strides here in recent years. For example, in 2016, GDPR legislation was created to protect the personal data of people in the European Union and European Economic Area, giving individuals more control of their data. In the United States, individual states are developing policies, such as the California Consumer Privacy Act (CCPA), which require businesses to inform consumers about the collection of their data. This recent legislation has forced companies to rethink how they store and use personally identifiable data. As a result, investments within security have become an increasing priority for businesses as they seek to eliminate any vulnerabilities and opportunities for surveillance, hacking, and cyberattacks.

Bias and Discrimination:

Instances of bias and discrimination across a number of intelligent systems have raised many ethical questions regarding the use of machine learning. We should be safeguard against bias and discrimination when the training data itself can lend itself to bias. While companies typically have well-meaning intentions around their automation efforts, Reuters highlights some of the unforeseen consequences of incorporating AI into hiring practices. In their effort to automate and simplify a process, Amazon unintentionally biased potential job candidates by gender for open technical roles, and they ultimately had to scrap the project. As events like these surface, Harvard Business Review has raised other pointed questions around the use of AI within hiring practices, such as what data should you be able to use when evaluating a candidate for a role.

VIII. LIMITATIONS

Some limitations of machine learnings are given below.

- 1) Although machine learning has been transformative in some fields, machine-learning programs often fail to deliver expected results. Reasons for this are numerous: lack of suitable data, lack of access to the data, data bias, privacy problems, badly chosen tasks and algorithms, wrong tools and people, lack of resources, and evaluation problems. In 2018, a self-driving car from Uber failed to detect a pedestrian, who was killed after collision. Attempts to use machine learning in healthcare with the IBM Watson system failed to deliver even after years of time and billions of dollars invested.
- 2) Machine learning has been used as a strategy to update the evidence related to systematic review and increased reviewer burden related to the growth of biomedical literature. While it has improved with training sets, it has not yet developed sufficiently to reduce the workload burden without limiting the necessary sensitivity for the findings research themselves.



IX. CONCLUSIONS

The key aim of Machine Learning is to build a computer program that can access data and use it for learning processes. Machine learning is a branch of artificial intelligence and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. The newly emerged machine learning methods have become a strong driving force to revolutionize a wide range of industries, such as smart healthcare, financial technology, and surveillance systems. Machine learning algorithm breaks into three main parts: A Decision process, An error function, A model optimization process. Most commonly algorithms used in machine learning are K-nearest neighbor, Linear regression, Decision tree, Naïve Bayes. Speech recognition, google search, voice and facial recognition, computer vision, banking domain, image recognition, health care and medical efficiency, heart failure, online shopping, social media domain, product recommendations, language translations are some applications of machine learning. Technological singularity, AI Impact on jobs, privacy and bias discriminations are challenges of machine learning. Machine-learning programs often fail to deliver expected results due to lack of suitable data, lack of access to the data, data bias, privacy problems, badly chosen tasks and algorithms, wrong tools and people, lack of resources, and evaluation problems.

REFERENCES

- [1] IBM. <https://www.ibm.com/in-en/cloud/learn/machine-learning>. Retrieved 19-6-2022.
- [2] Ibrahim Mahmood Ibrahim, et al, The Role of Machine Learning Algorithms for Diagnosing, Diseases. Journal of Applied Science and Technology Trends, Vol. 02, No. 01, 2021, pp. 10 – 19.
- [3] Simplilearn. [https://www.simplilearn.com/Machine%20Learning2022/An%20Introduction%20To%20Machine%20Learning%20\[2021%20Edition\].html](https://www.simplilearn.com/Machine%20Learning2022/An%20Introduction%20To%20Machine%20Learning%20[2021%20Edition].html) . Retrieved 18-6-2022.
- [4] Wikipedia. https://en.wikipedia.org/wiki/Machine_learning. Retrieved 19-6-2022.



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