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 [ijirset@gmail.com](mailto:ijirset@gmail.com)

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# Impact Assessment of COVID-19 using Artificial Intelligence

Shruti Patil<sup>1</sup>, Dhanashree Yelvikar<sup>2</sup>

Academic Researcher, Department of Information Technology, B. K. Birla College of Arts, Science and Commerce  
(Autonomous), Kalyan, Maharashtra, India

**ABSTRACT:** Artificial Intelligence (AI) a powerful tool has been proved very helpful in the fight against COVID-19 pandemic. There has been a scramble to use AI since this epidemic. In this review, we present an overview of recent studies using Machine Learning and, more broadly, Artificial Intelligence, to tackle many aspects of the COVID-19 crisis. [7] This article provides a review focusing on the contributions of (AI) against COVID-19. We had recognized applications that addresses difficulties presented at various scales, including: 1) alerts and warnings 2) tracking and prediction 3) data dashboards 4) diagnosis 5) treatments and cures, and 6) societal control. A balance between data privacy and health of public with interaction between humans and AI will help in overcoming the above mentioned constraints. We featured the requirement for worldwide collaboration to expand the capability of Artificial intelligence in this and future pandemics.

**KEYWORDS:** Coronavirus, COVID-19, Computed Tomography, diagnosis, Artificial Intelligence.

## I. INTRODUCTION

Coronavirus, the infection brought about by the SARS-CoV-2 has been announced a pandemic by the World Health Organization which has announced more than 3.22 Crore affirmed cases as of August 14, 2021. In this audit, we present an outline of ongoing studies utilizing Machine Learning and, more extensively Artificial intelligence, Natural Language Processing (NLP), to handle numerous parts of the Coronavirus emergency. The pattern recognition, prediction and explanation is done by teaching computers to read big data models. This functions help in diagnosis, prediction and treatment of the COVID-19 infection and also help in social as well as economic impacts. Since this pandemic has started, there has been a greater need for AI, also different tools that help in data analysis, for example see Broad(2020), Hollister (2020), and Taulli (2020) [9]. While discussing about the actual contribution of AI against covid -19 fight, this article provides an overview of current constraints on these contributions. This paper aims to shortlist few points from a long discussion and tedious work by working as an input for rapid responses in this research, policy and medical analysis. This pandemic will have a severe damage on people's lives and economic conditions. Pharmaceutical and non-pharmaceutical responses can be of great uncertainty surrounded by estimates. To help in reducing these uncertainties we used AI, a promising tool used for data analysis. Hence data scientists have taken this challenge.

## II. RELATED WORK

The progress of scientific community regarding the pandemic is unpredictable in its scale. We did an automated search for papers that were posted in COVID-19 Open Research Dataset (CORD-19). Among all the papers found, more than 1000 included the phrases "Deep Learning", "Machine Learning", "Artificial Intelligence" in their title or abstract. As we can see in the following Figure 1, after the mid-March 2020 there is a dramatic increase in the number of papers.



ARTIFICIAL INTELLIGENCE APPLICATIONS AGAINST COVID-19

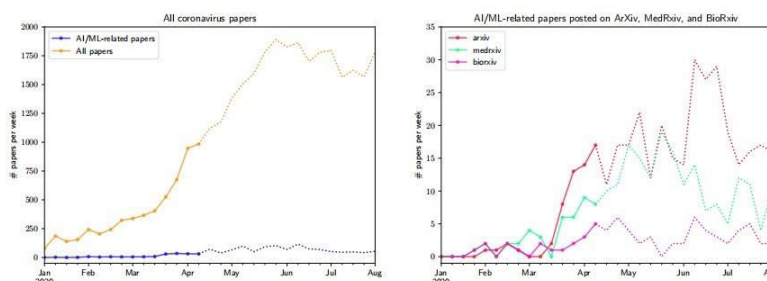


Figure 1: Increase over time of scientific articles and preprints related to COVID-19 between January 2 and August 1, 2020. Note that the y-axis scales differ between plots [3]

We also conducted manual searches for Google Scholars and pre-print servers; the manuscript released after January 01, 2020 and classified these articles on the basis of clarity, quality and originality.

### III. METHODOLOGY

#### 1] Potential contribution of AI against COVID-19:

We had recognized applications that addresses difficulties presented at various scales, including: 1) alerts and warnings

2) prediction and tracking 3) dashboards of data 4) diagnosis 5) cure and treatment , and 6) societal control.

##### 1.1] Alerts and warnings:

The instance of the Canadian-based AI model, BlueDot 4, has gotten unbelievable. It explains an AI model that is low cost (BlueDot was financed by a startup venture of around US\$ 9 million) can predict infection before people. As per accounts, BlueDot anticipated the spread of COVID -19 at the end of 2019, by giving a warning to the clients on 31st December 2019 before World Health Organization (WHO) did as such on 9 January 2020 [2]. A group of scientists working with BlueDot, recorded the main 20 objective urban communities where travellers from Wuhan would show up in the wake of the flare-up. They cautioned that these cities could be at the most danger from this infection. While BlueDot is without a doubt an integral asset, a large part of the exposure it has gotten contain some distortion and some undervaluation of the job of human researchers. When BlueDot was an alarm on 31st December 2019, a similar AI model named healthmap5 was introduced at Boston children's hospital (USA) which gave an alarm even earlier on 30 December 2019. Additionally, As per Associated Press, just a short time after this, a researcher at the Program for Checking Emerging Diseases (PMED) gave an alarm. While the AI-based model was quicker by just 30 minutes, it may be, appended an exceptionally low degree of importance to the flare-up. In pith, it required human translation and giving setting to perceive the danger. In reality, even on account of BlueDot, people stay focal in assessing and deciphering its yield, as Kamran Khan, Founder of BlueDot, clarified in a podcast. It is hence right to stretch that human contribution, across disciplines, is required for the ideal utilization of AI. (for example, see Hollister 2020)[5].

##### 1.2] Tracking and Prediction

Artificial intelligence can be utilized to follow and to anticipate how the COVID-19 illness will spread over the long run and over space. For example, following a past pandemic, that of the 2015 Zika-infection[1]. Models like these, in any case, should be re-prepared utilizing information from the COVID- 19 pandemic. This is by all accounts happening now. At Carnegie Mellon University, calculations prepared to anticipate the occasional infection, are presently being re-prepared. Also, as I examine underneath, different drives are in progress to gather preparing information from the current pandemic.

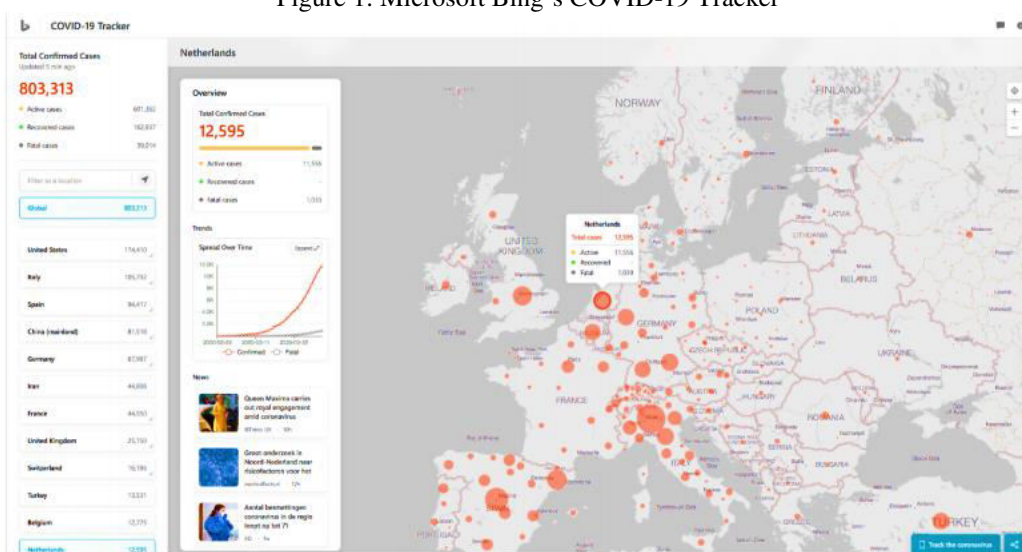
Different issues bother the exact estimating of the pandemic. These remember an absence of verifiable and fair information for which to prepare the AI; alarm conduct which prompts "noise" via web-based media; and the way that the qualities of COVID-19 diseases contrast from those of past pandemics. It isn't just the absence of verifiable information yet in addition the issues with utilizing "big data ", e.g., gathered from social media, that have demonstrated to be tricky. Here, the entanglements of enormous information and AI in the unique circumstance of irresistible sicknesses, as shown in the scandalous disappointment of Google Flu Trends, remain substantial. Generally

this terrible information for AI gauging models in different fields, counting financial aspects and money, since for any forecast calculation that depend on past conduct, a worldwide anomaly occasion with its mass of new and remarkable information, for example, COVID-19, can be depicted as by Rowan (2020)[7] does as "the kryptonite of current Artificial insight". As an outcome he infers that over the not so distant future "numerous ventures will be pulling the people once again into the determining seat that had been taken from them by the models".

1.3]Data Dashboards:

For the tracking and prediction of COVID-19 infection, data dashboards were created to differentiate between the actual and expected spread of this infection. MIT Technology Review ranked this tracking and prediction data dashboards.

Figure 1: Microsoft Bing’s COVID-19 Tracker



Note(s): Screenshot of Bing’s COVID-19 Tracker, 31 March 2020 [12].

To help in the production of visualized data in this epidemic, it illustrates how data can be extracted using Python script, from New York Time’s dataset [8]. Makulec (2020) has listed 10 points to consider while visualizing the data related to COVID-19 and explains the importance of responsible visualization of data [6].

1.4]Diagnosis and prognosis:

Quick and precise analysis of COVID-19 can save lives, limit the spread of the infection, and help us generate information for AI models. Simulated intelligence might give valuable contribution to this respect, in specific in making analyze dependent on chest radiography pictures.

Man-made intelligence can be as precise as possible people, can save radiologists' time, and play out a finding quicker what's more, less expensive than with standard tests for COVID-19. Both X-beams and Computed Tomography (CT) sweeps can be utilized. Rosebrock offers an instructional exercise on the most proficient method to utilize Deep Learning to analyze COVID-19 utilizing X-beam pictures. He mentions that COVID-19 tests are "in short supply and costly," however that "all emergency clinics have X-beam machines."

Many other drives are using this method. Wang and Wong (2020) created COVID-Net, which is a profound convolutional neural organization, which can analyze COVID-19 from chest radiography pictures. It has been prepared on open vault information from around 13,000 patients with different lung conditions, including COVID-19 [11]. Be that as it may, as the writers demonstrate, it is "in no way, shape or form a creation prepared arrangement", and they approach the logical local area to foster it further, specifically to "further develop affectability". Chen distributed a Deep Learning model (not yet peer-investigated, in any case) to analyze Coronavirus from CT filters, presuming that "The profound learning model showed similar execution with a specialist radiologist, and extraordinarily work on the proficiency of radiologists in clinical practice. It holds incredible potential to assuage the pressing factor off cutting edge radiologists, improve early analysis, confinement, and treatment, and hence add to the control of the pestilence".



The potential isn't yet extended into practice, inspite of the fact that it has been accounted for various Chinese emergency clinics "AI assisted" radiology technologies. Radiologists have communicated their concern that there isn't sufficient information accessible to prepare AI models, that the vast majority of the accessible COVID-19 pictures come from Chinese clinics and may experience the ill effects of determination predisposition, and that utilizing CT-sweeps and X-beams might debase gear and spread.

Finally when the infection is analyzed in an individual, the problem is whether and how seriously that individual will be influenced. Everybody diagnosed with COVID-19 do not need meticulous care. If we can predict that who are more likely to be affected will help us in targeting the assistance, locating the medical resources. Yan et al. (2020) developed a prognostic prediction algorithm using machine learning, it predicts the risk to a person that has been infected by COVID-19, this algorithm used data from 29 patients at Tongji hospital in Wuhan, China [10]. Also Jiang et al. (2020) presents an AI model that predicts if a person will be affected with COVID-19 with 80 percent accuracy may go on to develop acute respiratory distress syndrome (ARDS) . However the model they used was can be used only for 53 patients and by 2 Chinese hospitals.

Taking everything into account, the use of AI to analyze COVID-19, and to make a guess of how patients might advance, has prodded a lot of examination exertion yet isn't yet generally functional. Also very small amount of efforts are required to use AI for diagnosis. For example, in distinguishing whether somebody is tainted before it appears in X-rays or CT scans or on discovering information driven diagnostics that have less contamination.

#### 1.5] Cure and treatment.

Indeed, even well before the COVID-19 episode, AI was praised for its capability to add to new drug revelation, see for example, Coldeway (2019) [11]. On account of COVID-19, various exploration labs and server farms have effectively shown that they are selecting AI to look for medicines for and an immunization against COVID-19. The expectation is that AI can speed up both the cycles of finding new medications just as for repurposing existing medications.

#### 1.6] Vaccine discovery.

One more space of interest is antibody revelation. As well as creating infection killing antibodies through B-cells as depicted above (humoral resistance), the body likewise utilizes T-cells to assault the infection straightforwardly (cell resistance). There is a subset of T-cells called memory cells which perceive the antigen of an in the past wiped out microbe, and can rapidly enact more effector T-cells upon re-openness. These cycles advise the objectives for immunization plan. As a feature of the safe reaction, assistant proteins called significant histocompatibility complex proteins (MHC I and MHC II proteins) present the limiting districts of antigens, called epitopes, for antibodies, B-cells, or T-cells to tie to and assault. These MHC I and MHC II proteins are encoded by Human Leukocyte Antigen (HLA) quality buildings, which fluctuate from one individual to another. In this unique situation, immunization configuration includes two key targets: (1) recognizing appropriate epitopes for focusing on, and (2) guaranteeing that these epitopes can be introduced by MHC proteins which are created by various HLA alleles (i.e., variations of a quality) that happen in the populace. For instance, Fast, Altman, and Chen (2020) look for B-and T-cell epitopes. They recognize 405 potential T-cell epitopes that can be introduced by MHC I and MHC II proteins, just as two B-cell epitopes on the S-protein. The quest for the T-cell epitopes depends on two beforehand created neural organizations to anticipate MHC show, NetMHCpan4 (Jurtz et al., 2017) and MARIA (Chen et al., 2019). After distinguishing likely epitopes, the creators inspect 68 unique hereditary variations of SARS-CoV-2 to concentrate how the infection mutates, and distinguish portions of the infection that are pretty much inclined to advancement. They close that S-protein epitopes might be a decent objective for antibodies since they contained no close by changes in the example. In an elective methodology, Ong et al. (2020) utilize their VaxignML structure, which use regulated characterization models like XGBoost (Chen and Guestrin, 2016), with an end goal to anticipate which viral proteins might fill in as powerful immunization targets. While the creators track down that the S-protein is the best up-and-comer, they likewise distinguish five potential NSPs – most promisingly, nsp3 and nsp8 – as great contender for the immunization target. Supposedly, three competitor immunizations that detailed the utilization of ML in their improvement have been supported for clinical assessment (WHO, 2020b). By the by, it is significant that they were made by organizations which distributed extremely restricted information in regards to their procedures for consolidating ML into their antibody improvement pipelines [12].

#### 1.7] Societal control

Artificial intelligence has been, and can additionally be utilized, to deal with the pandemic by utilizing warm imaging to check public spaces for individuals possibly contaminated, and by authorizing social separating and lockdown measures (Rivas, 2020). For instance, as portrayed by Chun (2020) in the South China Morning Post, "At air terminals and train stations across China, infrared cameras are utilized to filter swarms for high temperatures. They are once in a



while utilized with a facial acknowledgment framework, which can pinpoint the person with a high temperature and regardless of whether the individual is wearing a careful veil."

Besides, as Chun (2020) further reports, "This framework is likewise being utilized to guarantee residents submit to self-isolate orders. As per reports, people who ridiculed the request and left home would get a call from the specialists, apparently subsequent to being followed by the facial acknowledgment framework". This sort utilization isn't restricted to China. An AI-based PC vision camera framework checking public regions has been utilized to screen whether individuals in the UK city of Oxford keep to the social separating proportions of the government. A USA PC vision-based startup is previously offering "social separating location" programming, which utilizes camera pictures to identify when social removing standards are penetrated, after which it will convey an admonition (Maslan, 2020). In an outrageous case, the Israeli government has endorsed digital observing by its security administrations to recognize and isolate individuals that might be infected. Though utilizing AI to foresee and analyze COVID-19 is hampered because of absence of verifiable preparing information, AI devices like PC vision and robots are not. In this way, we are more likely over the present moment to see this kind of AI being utilized a lot also for social control. Related innovations, for example, cell phones with AI-controlled applications or wearables that collect area, utilization, and wellbeing information of their proprietors, are likewise bound to be utilized. As indicated by Petropoulos (2020) such applications can "empower patients to get continuous holding up time data from their clinical suppliers, to give individuals counsel and updates about their ailment without them visiting an emergency clinic face to face, and to advise people of potential disease areas of interest progressively so those regions can be stayed away from".

#### IV. CONCLUSION

Artificial intelligence isn't yet assuming a huge part in the battle against COVID-19, basically from the epidemiological, demonstrative and drug perspectives. Its utilization is compelled by absence of information and by a lot of loud and exception information. The making of impartial time series information for AI preparing is fundamental. A developing number of worldwide drives in such manner is empowering; be that as it may, there is a basic for more demonstrative testing. Not just for giving preparing information to get AI models functional yet additionally for all the more adequately dealing with the pandemic and diminishing its expense as far as living souls and monetary harm. At the hour of composing, the huge endeavors of all influenced nations have non-pharmaceutical: to close down their economies through lockdowns, authorizing social removings, and dropping occasions. These actions appear useful, to have prevailed with regards to dialing back the spread and saving lives, but these actions won't support for a long time. At present the number of infected people is unknown (Britt 2020) [6]. Plainly, information is integral to whether AI will be a compelling device against future pandemics and pandemics. The dread is, as I previously referenced, that general wellbeing concerns would best information protection concerns. Governments might need to proceed with the exceptional reconnaissance of their residents long after the pandemic is finished. Accordingly, worries about the disintegration of information protection are legitimized. A full conversation of the lawful and moral components of information the board falls outside the degree of this article. Two astounding ongoing commentaries are, in any case, those of Ienca and Vayena (2020) and Marcus (2020). To put it clearly, given the general wellbeing danger presented by the pandemic, the European GDPR (Article 9) permits individual information assortment and examination, as long as it has an unmistakable what's more, explicit general wellbeing point. Adaptability to accumulate and break down large information speedily is fundamental in combatting the pandemic, regardless of whether it might necessitate that the specialists gather more close to home information than many individuals would feel alright with. Consequently, it is essential that the specialists take specific consideration in their treatment of such information and their avocations and interchanges to general society on the loose. The risk is that individuals could lose trust in government, which will, as Ienca and Vayena (2020) called attention to, "make individuals less inclined to follow general wellbeing counsel or proposals and bound to have less fortunate wellbeing results". At last, in spite of the fact that AI's effect has so far been fairly restricted, the pandemic and the arrangement reactions to it might speed up the digitalization of the economy, including the move towards more noteworthy computerization of human work. All things considered, the developments in AI innovation that might be result of the current emergency, may require quicker advancement in setting down fitting instruments for the administration of AI.

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## REFERENCES

- [1] Akhtar, M., Kraemer, M., and Gardner, L. (2019). A Dynamic Neural Network Model for Predicting Risk of Zika in Real Time. *BMC Medicine*, 17(171):<https://doi.org/10.1186/s12916-019-1389-3>.
- [2] Bogoch, I., A.Watts, Thomas-Bachli, A., Huber, C., Kraemer, M., and Khan, K. (2020). Pneumonia of Unknown Aetiology in Wuhan, China: Potential for International Spread via Commercial Air Travel. *Journal of Travel Medicine*, 27(2):1-3.
- [3] Bullock, J., Luccioni, A., Pham, K. H., Lam, C. S. N., and Luengo-Oroz, M. (2020). Mapping the Landscape of Artificial Intelligence Applications against COVID-19. *ArXiv*, <https://arxiv.org/abs/2003.11336v1>.
- [4] Coldeway, D. (2020). AI and big data wont work miracles in the fight against coronavirus. *Techcrunch*, 26 March.
- [5] Hollister, M. (2020). AI can help with the COVID-19 crisis - but the right human input is key. *World Economic Forum*, 30 March.
- [6] Ienca, M. and Vayena, E. (2020). On the Responsible Use of Digital Data to Tackle the COVID19 Pandemic. *Nature Medicine*, 27th March(<https://doi.org/10.1038/s41591-020-0832-5>).
- [6] Makulec, A. (2020). Ten Considerations Before You Create Another Chart About COVID-19. *Medium: Towards Data Science*, 11 March.
- [24] Rowan, I. (2020). What Happens to AI When the World Stops(COVID-19)? *Medium: Towards Data Science*, 31 March.
- [7] Song, P., Wang, L., Zhou, Y., He, J., Zhu, B., Wang, F., Tang, L., and Eisenberg, M. (2020). An Epidemiological Forecast Model and Software Assessing Interventions on COVID-19 Epidemic in China. *medRxiv*, 3 March(<https://doi.org/10.1101/2020.02.29.20029421>).
- [8] Sarkar, T. (2020). Analyze NY Times Covid-19 Dataset. *Medium: Towards Data Science*, 30 March.
- [9] Taulli, T. (2020). AI (Artificial Intelligence) Companies That Are Combating The COVID-19 Pandemic. *Forbes*, 28 March.
- [10] Yan, L., Zhang, H.-T., Xiao, Y., Wang, M., C.Sun, Liang, J., Li, S., M.Zhang, Guo, Y., Xiao, Y., Tang, X., Cao, H., Tan, X., Huang, N., and A. Luo, B. J., Cao, Z., H.Xu, and Yuan, Y. (2020). Prediction of Criticality in Patients with Severe Covid-19 Infection Using Three Clinical Features: A Machine Learning-Based Prognostic Model with Clinical Data in Wuhan. *medRxiv*, 3 March(<https://doi.org/10.1101/2020.02.27.20028027>).
- [11] Wang, L. and Wong, A. (2020). COVID-Net: A Tailored Deep Convolutional Neural Network Design for Detection of COVID-19 Cases from Chest Radiography Images. *arXiv*, 22 March(<https://arxiv.org/abs/2003.09871>).
- [12] W. Naudé, "Artificial Intelligence Against Covid-19: An Early Review," *Social Science Research Network*, Rochester, NY, SSRN Scholarly Paper ID 3568314, Apr. 2020. Accessed: Aug. 23, 2021. [Online]. Available: <https://papers.ssrn.com/abstract=3568314>



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