



The Survey: Artificial Intelligence (AI) applications for COVID-19 pandemic

Snehal Gaikwad^[1], Rushikesh Gawane^[2]

UG Student, Dept. of Computer Science and Engineering, ADCET Ashta, Sangli, Tasgaon, India^[1]

UG Student, Dept. of Computer Science and Engineering, ADCET Ashta, Sangli, Belanki, India^[2]

ABSTRACT:

Aim and Background: On 8 December 2019, the first corona virus case was discovered in Wuhan at China, and an intensive outbreak incepted in the next month (about January 20). Healthcare delivery requires the support of recent technologies like computer science (AI), Internet of Things (IoT), Big Data and Machine Learning to fight and appearance ahead against the new diseases. We aim to review the role of AI as a decisive technology to research, prepare us for prevention and fight with COVID-19 (Coronavirus) and other pandemics.

Methods: The rapid review of the literature is finished on the database of PubMed, Scopus and Google Scholar using the keyword of COVID-19 or Coronavirus and computing or computer science. Collected the foremost recent information regarding AI for COVID-19, then analysed the dead ringer for spot its possible application for this disease.

Results: We have identified seven various applications of Artificial Intelligence for COVID-19 pandemic. This technology plays an important role to detect the cluster of cases and to predict where this virus will affect in future by collecting and analysing all previous data sets.

Conclusion: Healthcare organizations are in a very important need for decision-making technologies to handle this virus and help them in getting proper suggestions in real-time to avoid its spread. AI works in an exceedingly proficient thanks to mimic like human intelligence. it's going to also play a important role in understanding and suggesting the event of a vaccine for COVID-19.

This result-driven technology is employed for correct screening, analysing, prediction and tracking of current patients and sure future patients. the numerous applications are applied to tracks data of confirmed, recovered and death cases.

I. BACKGROUND

In this worldwide health crisis, the medical industry is trying to find new technologies to watch and controls the spread of COVID-19 (Coronavirus) pandemic. AI is one among such technology which may easily track the spread of this virus, identifies the high-risk patients, and is beneficial in controlling this infection in real-time. It may predict mortality risk by adequately analysing the previous data of the patients. AI can help the peoples to fight with this virus by medical help, notification, population screening and suggestions about the virus infection control [[1], [2], [3]]. This technology has the potential to enhance the look, treatment and reported outcomes of the COVID-19 patient, being an evidence-based medical tool.

Fig.1 shows the final procedure of AI and non-AI based applications that help general physicians to spot the COVID-19 symptoms.

The above flow chart informs and compares the flow of non-AI treatment versus AI-based treatment as well as it explains the involvement of AI within the significant steps of treatment of high accuracy and reduces complexity as well. The specialist isn't only focused on the treatment of the patient, but also the control of disease with the AI application. Major symptoms and test analysis are finished the assistance of AI with the best of accuracy. It also shows it reduces the full number of steps taken within the whole process, making more procurable innature.

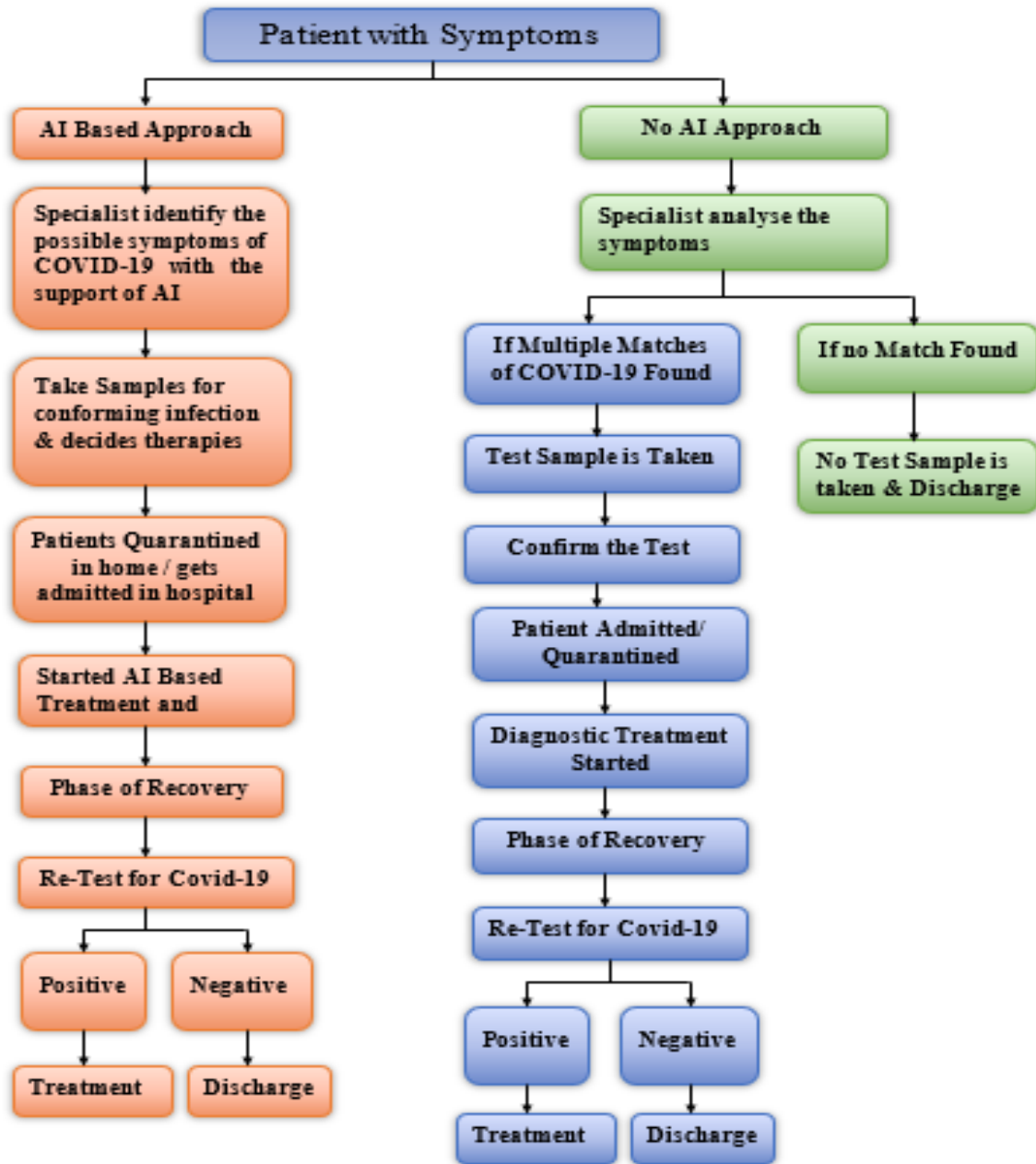


Fig. 1. General Procedure of AI and non-AI based applications that help general specialist to identify the COVID-19 symptoms.

II. MAIN APPLICATIONS OF AI IN COVID-19 PANDEMIC

I) Early Virus detection and diagnosis of the infection

AI can quickly analyse irregular and other multiple matching symptoms and thus alarm the patients and the healthcare authorities [4,5]. It helps to supply faster decision making technique, which is cost-effective. It helps to develop a new diagnosis system for the COVID 19 cases, through higher level algorithms. AI is most helpful in the diagnosis of the infected cases with the help of medical imaging technologies like Computed tomography (CT), Magnetic resonance imaging (MRI) scan of human body parts.

II) Monitoring the treatment

AI can make an intelligent platform for automatic monitoring and prediction of the spread of this COVID-19 virus. A neural network also can be developed to extract the features of this disease, and this is able to help the specialist in proper monitoring and treatment of the affected individuals [[6], [7], [8]]. It has the capability of providing day-to-day



updates of the patients and their health also to provide solutions to be followed in COVID-19 pandemic.

III) Contact tracing of the individuals

AI can help analyse the level of infection by this COVID-19 virus identifying the clusters and 'hot spots' and can successfully do tracing of the individuals and also to monitor those patients. It can also predict the future course of this disease and likely reproduction.

IV) Projection of cases and mortality

This technology can track and forecast the character of the virus from the available data, social media and media platforms, about the risks of the infection and its likely spread. Further, it can predict the quantity of positive cases and death in any region. AI can help identify the foremost vulnerable regions, people and countries and take measures accordingly.

V) Development of drugs and vaccines:

AI is employed for drug research by analysing the available data on COVID-19. It's useful for drug delivery design and development. This technology is employed in speeding up drug testing in real-time, where standard testing takes lots of time and hence helps to accelerate this process significantly, which can not be possible by somebody's [6,7]. It can help to spot useful drugs for the treatment of COVID-19 patients. It's become a robust tool for diagnostic assay designs and vaccination development [[9], [10]. AI helps in developing vaccines and coverings at much of faster rate than usual and is additionally helpful for clinical trials during the event of the vaccine.

VI) Reducing the workload of healthcare workers Due to a sudden and big increase within the numbers of patients during COVID-19 pandemic, healthcare professionals have a really high workload. Here, AI is employed to cut back the workload of healthcare workers. It helps in early diagnosis and providing treatment at an early stage using digital approaches and decision science, offers the most effective training to students and doctors regarding this new disease. AI can seem impactful in future patient care and it has capability to face more potential challenges which will be helpful for doctors and also reduce the workload of the doctors.

VII) Prevention of the disease

With the help of real-time data analysis, AI can provide updated data which is helpful in the prevention and detection of this disease. It can be used to predict the probability of infection, the infection of the virus, need for beds and healthcare specialist. AI is very helpful for the future virus and diseases prevention and detection, with the help of previous mentored data over data prevalent at different time. It identifies threats, causes and reasons for the spread of COVID-19 virus. In future, AI will become a very important technology to fight against the other pandemics. It can also provide a preventive measures and fight against many other viruses. In future, AI will play a vital role in providing more predictive and preventive healthcare.

III. CONCLUSION

Artificial Intelligence is not only helpful in the treatment of COVID-19 infected patients but also for their proper health monitoring. Artificial Intelligence is an upcoming and most important tool to detect and prevent early infections due to COVID-19 virus and also helps in monitoring the condition of the infected patients. It can continuously improve treatment consistency and decision making by developing useful algorithms.

It can track the infection of COVID-19 at different scales such as medical, molecular and epidemiological applications. It is also very much helpful to facilitate the research on this COVID-19 virus using analysing the available data sets. Artificial Intelligence can be helpful in development of proper treatment, prevention strategies, drug and vaccine development.

REFERENCES

- [1] Haleem A, Javaid M, Vaishya. Effects of COVID 19 pandemic in daily life. *Curr Med Res Pract* 2020. <https://doi.org/10.1016/j.cmrp.2020.03.011>.
- [2] Bai HX, Hsieh B, Xiong Z, Halsey K, Choi JW, Tran TM, Pan I, Shi LB, Wang DC, Nei J, Jiang XI, Performance of radiologists in differentiating COVID-19 from viral pneumonia on chest CT. *Radiology* 2020 <https://doi.org/10.1148/radiol.20200823>
- [3] Hu Z, Ge Q, Jin L, Xiong M. Artificial intelligence forecasting of COVID-19 in China. *arXiv preprint arXiv:2002.07112*. 2020 Feb 17.
- [4] Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, Tao Q, Sun Z, Xia L. Correlation of chest CT and RT-PCR testing in



- coronavirus disease 2019 (COVID-19) in China: a report of 1014 cases. Radiology 2020. <https://doi.org/10.1148/radiol.2020200642>.
- [5] Luo H, Tang QL, Shang YX, Liang SB, Yang M, Robinson N, Liu JP. Can Chinese medicine be used for prevention of coronavirus disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. Chin J Integr Med 2020. <https://doi.org/10.1007/s11655-020-3192-6>.
- [6] Biswas K, Sen P. Space-time dependence of coronavirus (COVID-19) outbreak. arXiv preprint arXiv:2003.03149. 2020 Mar 6.
- [7] Stebbing J, Phelan A, Griffin I, Tucker C, Oechsle O, Smith D, Richardson P. COVID-19: combining antiviral and anti-inflammatory treatments. Lancet Infect Dis 2020 Feb 27.
- [8] Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, Iosifidis C, Agha R. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). Int J Surg 2020 Feb 26.
- [9] Chen S, Yang J, Yang W, Wang C, Bernighausen T. COVID-19 control in China during mass population movements at New Year. Lancet 2020. [https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9).
- [10] Bobdey S, Ray S. Going viral: COVID-19 impact assessment: a perspective beyond clinical practice. J Mar Med Soc 2020 Jan 1; 22(1):9.