LETTER

Current applications of artificial intelligence for COVID-19

Dear Editor,

Artificial intelligence (AI) refers to a field of computer science dedicated to the creation of systems performing tasks that usually require human intelligence.[1] AI and its applications have assisted in many areas of COVID-19 and are playing a very crucial role in its management. It is probably for the best that humans have an additional source of intelligence to confront this pandemic. The potential contributions of AI during COVID-19 should be known for a better understanding about this technology and have been discussed below:

Tracking the pandemic

One of the earliest detection of COVID-19 with AI was done with Blue-Dot, a Canadian company. BlueDot not only detected the spread but also predicted the spread of virus to various cities.[2] The United Nations Educational, Scientific and Cultural Organization (UNESCO), in collaboration with International Research Centre for Artificial intelligence launched "coronavirus watch," which provides live updates related to COVID-19.[3] Similarly, China has used AI to predict and forecast the spread of COVID-19.[4]

Pandemic control and detection of cases

AI has been used in various countries for checking temperature using AI enabled infrared cameras; tracking cases and their contacts with facial recognition and smartphones; and tracking the GPS location and itinerary of infected person through mobile phones.[5,6] AI-enabled chatbots are providing information related to COVID-19 to millions of people.

Assisting health care system

The X-rays and computed tomography scans of the COVID-19 patients are being used to train various computational models and neural networks to aid in the diagnosis of COVID-19.[7] In this way, AI can be used to detect severely ill patients as well as predict the prognosis. In addition, AI can help distinguish COVID-19 infection from the community-acquired pulmonary infection.[8] AI-based development of testing kits are helping in rapid production and large scale testing of COVID-19.[9] AI-based robots are helping health care professionals to maintain social distancing by doing temperature screening of the patients and distributing medicines. In addition, these robots have been used to disinfect public places and hospital premises.

Vaccine and drug development

The prediction of RNA structure of SARS-CoV-2 through AI was a major achievement.[10] On similar ground, researchers are exploring the utility of AI for developing vaccine for COVID-19 infection. With AI, the various regions on the viral structure with antibody targets and cell presentation can be identified and used for the development of vaccine. Though in its initial stages, the developments seems interesting.

Streamlining the research

Everyday hundreds of papers on COVID-19 appear on Internet carrying variable and valuable information. The COVID-19 Open Research Dataset has come up with a unique idea of utilizing AI and machine learning for harnessing these diverse papers to discover relevant information quickly.[11] The information retrieved is useful for effective treatment and management of COVID-19.

Adding intelligence to scientific meetings and medical education

Most of the organizing bodies and institutions are shifting towards virtual meetings; e-conferences and digital learning.[12] AI-powered platforms make these meetings more intelligent and interactive. Facial recognition allows organizers to manage large number of attendees. AI-based chatbots acts as virtual assistants and provides useful information as well as answer to questions of the users. AI-enabled meeting calendar sends automated reminders to the users for a scheduled meeting. AI can personalize learning by mapping each user's individual learning plans, preferences, their weaknesses, and strength.

Constraints in the current application of AI to COVID-19

Most of the AI systems are in their early stages. One of the major factors determining the efficacy of AI is data, which are still low as far as COVID-19 is concerned. Privacy, medicolegal, and ethical concerns stemming from AI need to be addressed at the earliest. The key challenges in developing nations includes availability, accessibility, and quality of data; capacity to engage with AI; data ownership and security; governance, accountability, and transparency of AI; and quackery. Formation of laws, code of ethics, code of conduct, and regulatory bodies to prevent the misuse of AI can help sort out some of these issues.

In conclusion, during COVID-19, AI has applications in epidemiology, surveillance, case detection, disease diagnosis, identifying the structure of virus, development of vaccine, and as a research assessment tool. The use of AI for our benefit during COVID-19 implies that it is a tool, which can be utilized for common good. Overcoming the constraints is a laborious job and will require a balance between privacy and health concerns.

Deepak Jakhar (ID)
Ishmeet Kaur (ID)

Department of Dermatology and STD, North Delhi Municipal Corporation Medical College and Hindu Rao Hospital, New Delhi, India

Correspondence

Ishmeet Kaur, Department of Dermatology and STD, North Delhi Municipal Corporation Medical College and Hindu Rao Hospital, New Delhi 110007, India.

Email: dr.deepakjakhar@yahoo.in

ORCID

Deepak Jakhar https://orcid.org/0000-0002-5516-8295
Ishmeet Kaur https://orcid.org/0000-0002-2772-8670

REFERENCES

1. Jakhar D, Kaur I. Artificial intelligence, machine learning and deep learning: definitions and differences. *Clin Exp Dermatol*. 2020;45(1): 131-132. https://doi.org/10.1111/ced.14029.
2. NillerE. *An AI Epidemiologist Sent the First Warnings of the Wuhan Virus*. New York: WIRED; 2020. https://www.wired.com/story/ai-epidemiologist-wuhan-public-health-warnings/. Accessed May 12, 2020
3. CORONAVIRUS WATCH. http://coronaviruswatch.ircai.org/?country=All&dashboard=news. Accessed May 12, 2020.
4. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet*. 2020;395: 689-697.
5. BBC News. Coronavirus: Amazon using thermal cameras to detect Covid-19. https://www.bbc.com/news/technology-52356177. Accessed May 12, 2020.
6. BBC News. Coronavirus: Russia uses facial recognition to tackle Covid-19. https://www.bbc.com/news/av/world-europe-52157131/coronavirus-russia-uses-facial-recognition-to-tackle-covid-19. Accessed May 12, 2020.
7. CastiglioniI, Ippolito D, Interlenghi M, et al. Artificial intelligence applied on chest X-ray can aid in the diagnosis of COVID-19 infection: a first experience from Lombardy, Italy. *medRxiv*. 2020;1.
8. Li L, Qin L, Xu Z, et al. Artificial intelligence distinguishes COVID-19 from community acquired pneumonia on chest CT. *Radiology*. 2020; 19:200905.
9. Watson I, Jeong S, Hollingsworth J, Booth T. How this South Korean company created coronavirus test kits in three weeks. https://edition.cnn.com/2020/03/12/asia/coronavirus-south-korea-testing-intl-hnk/index.html. Accessed May 12, 2020.
10. Baidu. *How Baidu is Bringing AI to the Fight Against Coronavirus*. Massachusetts: MIT Technology Review; 2020. https://www.technologyreview.com/2020/03/11/905366/how-baidu-is-bringing-ai-to-the-fight-against-coronavirus/. Accessed May 12, 2020.
11. CORD-19: COVID-19 Open Research Dataset. https://allenai.org/data/cord-19. Accessed May 12, 2020.
12. BhargavaS, Farabi B, Rathod D, Singh AK. The fate of major dermatology conferences and meetings of 2020; are e-conferences and digital learning the future? *Clin Exp Dermatol*. 2020. https://doi.org/10.1111/ced.14272.