PLAIN LANGUAGE SUMMARY

Intersection of Artificial Intelligence and the COVID-19 pandemic: A Rapid Review

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Summary

This rapid review found out what was in the literature about areas where artificial intelligence has been used and can potentially be used to mitigate, control, or prevent covid-19 and its consequences. There were 133 articles found and analyzed. Most of the studies showed prediction models of the spread of the pandemic. The review did not find reviews for infection prevention which focused mainly on vaccines, neither for studies focused on health management for those whose care was disrupted by the virus. The review did find that AI is helpful in infection control. There were models for better detection of the virus to reduce the risk of community spread, thus helping places with limited testing and few healthcare centers. Overall, the most common use for artificial intelligence during the pandemic has been for machine learning followed by neural networks to predict the spread of COVID-19, do pandemic tracking, and identify and address misinformation.

What does this mean?

The review studied artificial intelligence methods already in place but used for novel applications and those just developed. Artificial intelligence continues to be used in ways that can help manage the spread and effects of covid-19, like adherence to public health measures, like mask-wearing through setting up cameras. Moreover, AI is also successful in broader public health measures. It is used to forecast cases even in small samples. It can also help predict confirmed cases, deaths, future outbreaks, hospital beds and capacity, and impacts of lifting lockdowns and public health measures. Lastly, the review found information on AI used for service planning for COVID-19 treatment. It showed there were models to provide the short-term forecast of intensive care unit usage and ways to redistribute medical equipment to ensure more positive outcomes.

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What is the current situation?

Technology and more specifically, “Artificial intelligence” or AI, and “Digital Technology” are a growing part of modern society. We are all, by differing degrees, in the modern technological age. We have but to realize ways in which technologies have changed our society. We use word processors, information search engines, favorite online books, portable phone devices, social media, and a robot vacuum to clean our floors. Also worth note are applications like diagnostics, disease mapping and health management in our healthcare system.

Since January 2020, all global societies have been shaken to the core by the Covid - 19 virus pandemic. From necessity, “Science” has had to respond to this growing world crisis by technological innovation. Every day we hear of a new device or digital application (app) that has been rolled out to slow the spread of Covid. Many people are using contact tracing apps on their mobile phones. The media, every day, informs the public of predictions of virus spread from forecasting apps. Vaccine platforms have been created, at the ready, to respond to any virus changes that may be coming our way. It is very apparent that Covid - 19 is driving our technological innovations to keep ahead of this pandemic. What is, probably, less well highlighted is the impact that AI and digital technology have on the reduction and control of the Covid - 19 virus.

What questions did we aim to answer in our research?

- Look at proof that AI and emerging Digital Technologies can reduce, control, or prevent Covid 19 outcomes.
- Consider any new applications and developments
- Explore any new applications of already established technologies and processes.

How did we approach these questions?

- Out of 3,357 studies that were searched, 133 studies were chosen for this review.

What answers did we find from our research?

- Artificial intelligence can play a big role in preventing a collapse of the healthcare system during the pandemic. Using some of the models can help predict the availability of beds and beds that will be needed in the ICU, therefore by knowing this in advance public health measures can be implemented to prevent straining the system.
- There are several areas that artificial intelligence can help to mitigate the effects of the pandemic. One of the main areas is in infection control where models of artificial intelligence have the potential to be implemented and help case identification in areas where testing is low or difficult thus controlling outbreaks in rural areas of the world.
- The one result that stands out is the technology showing models which predict the spread of the pandemic. Although there is little evidence to confirm this technology, it shows future promise.
- Research is needed to see how artificial intelligence can be implemented in infection prevention such as implementation of vaccines, which can have the potential to bring the pandemic under control.
- Validation studies are urgently needed to see the effectiveness and applicability of the artificial intelligence models identified by this rapid review. Once validity is identified, implementation of this models at a wide scale can be achieved.

How confident are we in these findings?

- The chosen studies contained moderate to high quality evidence.

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