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A Systematic Review:
Role of Artificial Intelligence During the COVID-19 Pandemic in the Healthcare System

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ABSTRACT

Certainty, artificial intelligence (AI) has a remarkable role in the control of the COVID-19 pandemic globally. This review article aimed to determine the outcomes/benefits associated with the use of artificial intelligence during the COVID-19 pandemic in different specialties in healthcare. Out of 144 articles, 100 publish article abstracts were reviewed using keywords artificial intelligence, intelligent health systems during COVID-19 pandemic, medical education. This review determined that artificial intelligence has a significant role in predicting the spread of disease by chasing the infected population and can prove as a powerful tool for public health professionals. There is a remarkable role of AI-assisted diagnostic features in radiology to specifically diagnose infected cases with COVID-19. AI assists in taking quicker decision making among health professionals through AI operated apps.This review highlights the need for future research which should emphasize determining the effectiveness and challenges of the use of robotics during pandemics.

KEYWORDS

Artificial Intelligence (AI), COVID-19 Pandemic, Intelligent Health Information System, Medical Education, Robotics in Pandemics, Technologies in Healthcare

INTRODUCTION

COVID-19 pandemic is a huge challenge for doctors, public health professionals, epidemiologists, and researchers to bring effective and efficient solutions worldwide. Simultaneously, it is time for digital technologists to deeply engage in bringing optimal solutions in healthcare systems for controlling this devastating pandemic. Certainly, one of the digital health tools in the form of artificial intelligence (AI) has a remarkable role in predicting, tracing, and quickly diagnosing COVID-19 patients. AI is a form of machine learning and in health care innovation AI has gained obvious visibility in different medical fields (Maddox et al., 2019).

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In January 2020, the American center for disease control (CDC) reported a notification to the world health organization (WHO) about the disease flu-like outbreak in China and since then the virus appeared as a COVID-19 pandemic globally. It was observed that the Canadian health authorities AI platform (BlueDot) issued a warning four weeks before this pandemic about the pattern of spread of COVID-19. This helped the Canadian government to take precautionary measures, local isolation strategies, and prepare travel regulations/policies earlier as compared to other courtesies without such AI-assisted platforms. For epidemiologists and public health care, AI is helping to rapidly collect data all over the world and predicting the spread of disease and contact tracing (Boccaletti et al., 2020).

Indeed, the COVID-19 pandemic will be a game-changer and bring major reforms in healthcare through the embracement of AI in different aspects of patient care (Coombs, 2020; Irwin, 2020). Understanding the nature of the disease and control the spread of COVID-19, we need digital technology assistants to support healthcare professionals to avoid future pandemics (Lai et al., 2020). For radiologists, (AI) is proving as a breakthrough revolution to the diagnosis of infected patients accurately and decision making for mechanical ventilation (Ai et al., 2020; Hare et al., 2020). The role of radiologists embraces not only early detection of lung abnormality but also determine the disease severity, predict the possible bacterial co-infection and potential progression to acute respiratory distress syndrome in hospitalized patients. AI models for the chest radiographs and CT scans may ease the load of radiologists and clinicians (Kim, 2020).

Additionally, AI is helping in faster genome sequencing by virologists at infectious disease control units. The advanced AI tools are assisting to find vaccines against COVID-19 and prepare a synthetic copy of the virus and build research requirements for bio technicians. Cutting-edge AI technical support is assisting fast clinical trials and suggesting suitable drugs against COVID-19 with the prediction of side effects. For instance, the AI-based tools may predict drugs/peptides straight from the sequences of infected patients and may contribute in the direction of vaccine design against COVID-19 (Chandra Kaushik & Raj, 2020).

Intelligent Information Systems in Healthcare

In the last two decades, there are multiple groundbreaking intelligent information systems in healthcare organizations to enhance diagnostics and therapeutics in the medical field (Frick, 2020; Yuan et al., 2020). The integration of intelligence systems within the human routine experiences can assist in the quicker solution of routine hitches. For instance, the utilize the user experience as a basis for strategic planning and intelligence systems equipping at airports as assist to manage daily operations more effectively during the COVID-19 pandemic (Tuchen et al., 2020). Internet of Intelligent Things (IIoT) and AI are promising technologies to avert the quick spread of COVID-19 and to make the best use of safety measures during the pandemic (Adly et al., 2020; Ayyoubzadeh et al., 2020). Data mining algorithms through the use of AI can assist policymakers to forecast trends of outbreaks (Castillo & Melin, 2020). This prediction might support legislators and health care managers to design and assign health care resources accordingly (Rahman et al., 2020).

Besides at the national and international levels, there is a pressing need to work towards the standardization of protocols for greater smart city communication (Maserat et al., 2020). There is dire demand to upgrade the smart city technology sphere for providing more possible cooperation in the case of disasters. AI and intelligent information systems can assist to strengthen this smart city communication vision (Allam & Jones, 2020; Radanliev et al., 2020). Also, the organizations need to establish ethical standards for the utilization of intelligent information systems which is imperative for the sustainability and stabilization of tech-oriented culture (Arogyaswamy, 2020; Chesbrough, 2020).

This systematic review investigates the published research papers from January 2020 to June 2020 on the use of AI and intelligent information systems in healthcare during COVID-19. The study aims to focus on the context of research and findings of publishing papers. Moreover, this study aimed to detect the main subspecialties in which AI has been used during the COVID-19 pandemic. Consequently, the authors will identify the area in research gaps and provide recommendations for