The Future of Artificial Intelligence in Healthcare

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INTRODUCTION

Worldwide, doctors are facing significant challenges with burnout, staffing shortages, and excessive administrative workloads, which can compromise the quality of patient care. However, many physicians believe that the technology could ultimately streamline administrative tasks, enhance diagnostic accuracy, and help identify patterns and anomalies in patient data and many more. Therefore, Artificial Intelligence (AI) is being gradually integrated into healthcare, despite the controversial predictions of mass job displacement. Rapidly evolving AI has emerged as a powerful tool in today's era of innovation. The first uses of AI in healthcare trace back to the 1970s with the development of rule-based expert systems. MYCIN was created in 1972 at Stanford University, an AI program which could identify bacterial infections and recommend antibiotics. The emergence of AI in healthcare is nothing short of revolutionary; with the potential to reshape the conventional ways of diagnosis, monitoring and treatment. By analyzing large volumes of clinical data, AI helps medical professionals improve diagnostic accuracy, enabling more personalized treatments and improving overall healthcare outcomes, while still emphasizing the crucial role of human touch and emotion. This technology uncovers disease markers and trends that might otherwise go unnoticed, advancing both research and patient care simultaneously.[1]

In a recent survey, 83% of the participants believed that AI would eventually benefit healthcare providers, while 70% expressed concerns about its use in the diagnostic process.[2] AI has several utilities in healthcare — ranging from radiological image analysis for early detection to speeding up the management and interpretation of electronic patient records, which could significantly improve productivity and reduce physician burnout. The use of predictive analytics is expected to help in providing preventative care against adverse health outcomes. Automation of mundane tasks such as data entry and appointment scheduling will offer a way to streamline administrative processes and deliver faster patient care. **Personalized medicine** — the ability to provide accurate recommendations that are tailored to each individual patient based on their genetic predispositions, lifestyle variables, medical history and risk factors, is one of the groundbreaking feats that has been achieved using Machine Learning, a subset of AI.

One of the prominent examples of the use of AI in healthcare include Google's DeepMind Health project, which created an AI system capable of diagnosing eye diseases from retinal scans with diagnostic accuracy on par with human experts.[1] In the UK, AI is being used to decide drug combinations and predict drug responses in lung cancer patients.[3] DeepDx Prostate Pro, an AI tool aiding in the histopathological diagnosis of prostate cancer is currently integrated into the workflow systems of hospitals in South Korea.[4] AI has also set its footprint in surgical specialties like orthopedics, cardiothoracic and vascular surgery. In several situations, AI has been reported to outperform orthopedic surgeons in fracture identification.[5] ChatGPT-4, a generative AI chatbot was found to have comparable clinical reasoning to that of physicians.[6] However, the lack of sentience could limit the use of AI in some branches like palliative medicine.

The most important challenge for the use of AI in healthcare is that regarding data privacy and security. Since AI systems handle large amounts of personal health information, security measures must be taken to ensure protection against data breaches and misuse. Other possible roadblocks could be training algorithms to recognize patterns in complex medical data which is often varied and unstructured, integrating AI with existing healthcare IT systems, gaining the trust and acceptance of qualified professionals who may be skeptical of AI's reliability and ensuring regulatory compliance for ethical standards.[1]

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THE WAY FORWARD

Integrating AI into healthcare presents significant potential for advancing disease diagnosis, treatment selection, and clinical laboratory testing. By analyzing large datasets, AI can identify patterns that often surpass human capabilities, leading to improvements in several aspects of healthcare. The technology offers benefits such as greater accuracy, cost reduction, time savings, and fewer human errors. AI has the potential to transform personalized medicine, optimize medication dosages, improve population health management, create clinical guidelines, provide virtual health assistants, support mental health care, enhance patient education, and strengthen the trust between patients and physicians. However, to ensure responsible, ethical and effective implementation, challenges related to data privacy, bias, legality and the continued need for human expertise must be addressed. By ensuring ethical and responsible application of AI; the collaboration between humans and AI has the power to drive medicine, innovation and foster a more adaptive workforce for improved healthcare. The future of medicine goes beyond merely accessing information; it involves continuously refining knowledge through advanced AI capabilities. By narrowing the cognitive divide between humans and machines, healthcare can achieve transformative and far-reaching advancements.

CONFLICT OF INTEREST

There are no conflicts of interest.

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