"The Role of Artificial Intelligence in Facilitating the Service Provided to the Patient"

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Abstract:

As artificial intelligence (AI) grows more relevant and technologically sophisticated, a range of ethical questions surrounding its use in healthcare have surfaced. In the past ten years, there have been major efforts made to strike a compromise between moral issues and the AI-driven health transformation. Implementing AI-related technologies and projects responsibly in healthcare settings remains a problem, despite a growing interest in AI ethics. Modern technology has long been strongly backed by the healthcare sector. As they have in business and e-commerce, AI and ML have numerous uses in the healthcare sector. With this technology, the possibilities are almost endless. By using its cutting-edge applications, ML is helping to improve the healthcare sector. Because of mandated practices like Electronic Medical Records (EMR), healthcare systems have already embraced Big Data tools for next-generation data analytics. ML tools are expected to enhance this process even further. In primary/tertiary patient care and public healthcare systems, these enhance the quality of automation and intelligent decision-making.

Keywords: Artificial intelligence (AI), Health-medicine, Digital health

Introduction:

The health services sector is quickly being dominated by artificial intelligence (AI). In order to manage patients and medical resources, it converts the manual health system into an automatic one, where humans still do routine activities. When software engineers design artificial intelligence systems to do tasks, the technological challenges of digitizing health services give rise to new issues (Tursunbayeva & Renkema, 2022). AI has the ability to significantly improve patient care while lowering healthcare expenditures. The need for health services is anticipated to increase as the population grows. The healthcare industry requires creative ideas to figure out how to be more effective and efficient without spending too much money. Technology can provide the answers in this situation. Rapid technological advancements, particularly in the disciplines of AI and robotics, can support the expansion of the healthcare sector. Robotics and AI in healthcare are developing swiftly, especially when used for early detection and diagnostic purposes. At the same time, Ai is becoming more powerful. It makes it possible for them to execute tasks that humans do, frequently more quickly, easily, and affordably. (Kumar, Dwivedi, & Anand, 2021)

Over 30 people from around the world make up the IMIA Telehealth Working Group, including physicians and telehealth specialists who are academics, data scientists, business owners, promoters, and researchers. This invited essay describes the potential range of artificial intelligence (AI) approach applications in the telehealth field. We first discuss the significance and prospective applications of AI before outlining the options for overcoming some of the implementation's system-level difficulties. Following a general discussion of AI's role in telehealth, we present some concrete examples of how AI might improve health outcomes and increase stakeholder adoption. We wrap up by making a few observations about social and ethical issues. (Kuziemsky, Maeder, & John, 2019)

Artificial intelligence (AI) in healthcare and medicine has received plaudits for the immense promise it holds in recent years, but it has also been the subject of intense debate. This paper provides a broad overview of how AI might improve medical diagnosis and treatment, boost clinician productivity, and optimise the use of available human and technology resources. (Kuziemsky, Maeder, & John, 2019)

In further detail, the research outlines and clarifies the key clinical, social, and ethical dangers that AI in healthcare poses, including the possibility of errors and patient harm, the possibility of bias and a rise in health inequities, a lack of transparency and trust, and the susceptibility to hacking and data privacy violations. (Lee & No Yoon, 2021)

In order to reduce these risks and maximise the advantages of medical AI, the study suggests a number of policy options and mitigation measures, including multi-stakeholder engagement throughout the AI production lifetime, increased transparency and traceability, thorough clinical validation of AI tools, and AI training and education for both citizens and clinicians. (Siala & Wang, 2022)

The 'quadruple objective' for healthcare—improving population health, patient experience of treatment, carer experience, and lowering the steadily rising cost of care—presents considerable problems for healthcare systems worldwide. (Bajwa, Munir, & Nori, 2021)

Governments, payers, regulators, and providers are being pushed to innovate and transform healthcare delivery models as a result of ageing populations, an increase in the burden of chronic diseases, and rising healthcare expenditures worldwide. Additionally, in the wake of the worldwide pandemic, healthcare systems are faced with the issue of "performing" (providing efficient, high-quality care) and "transforming" care at scale by integrating data-driven insights from real-world scenarios into patient care. (Javaid, Haleem, & Singh, 2022)

Artificial intelligence (AI) is a term used to describe computing techniques that mimic human intelligence's support mechanisms, including cognition, deep learning, adaptation, engagement, and sensory comprehension. Some gadgets are capable of doing tasks that usually need human interpretation and decision-making. These methods use an interdisciplinary approach and can be used in a variety of disciplines, including medicine and health. Since doctors initially began attempts to use computer-aided programs to enhance their diagnosis in the 1950s, AI has been used in medicine. Due to current computers significantly increased computational capacity and the enormous amount of digital data that is available for collection and use, interest in and advancements in medical AI applications have increased recently. Medical practice is gradually changing because to AI. Numerous AI applications in healthcare are applicable to a range of medical specialties, including clinical, diagnostic, rehabilitative, surgical, and predictive practices. Clinical judgement and disease diagnosis are important areas of medicine where AI is having an influence. Large volumes of data from various modalities can be ingested, analyzed, and reported using AI technology to identify diseases and inform clinical decisions. (Secinaro, Calandra, & Secinaro, 2021)

Related works

Researchers and healthcare professionals are paying attention to artificial intelligence (AI) in the healthcare industry. Few prior research, including those in accounting, business and management, decision sciences, and the health professions, have examined this subject from a multidisciplinary angle.

(Javaid, Haleem, & Singh, 2022), they presented the study about Applications of machine learning (ML) are significantly changing the healthcare industry. The goal of machine learning (ML), a branch of artificial intelligence (AI), is to increase the efficiency and precision of medical work. AI offers great hope for countries now struggling with overcrowded healthcare systems and a physician shortage. The best trial sample can be found using the healthcare data, which can also be used to increase the number of data points collected, evaluate trial participants' ongoing data, and correct data-based errors. ML-based methods aid in spotting the first signs of an epidemic or pandemic. In order to assess whether the illness would spiral out of control, this programme looks at satellite data, news and social media reports, and even video sources. Utilizing ML in the healthcare industry has the potential to revolutionize this industry. It gives healthcare professionals more time to devote to patient care rather than information entry or search. This essay examines machine learning (ML) and its application to healthcare before discussing its properties and fitting pillars for a healthcare organization. In the end, it identified and covered the key ML applications for healthcare. The organization may greatly benefit from the use of this technology in healthcare operations. ML-based technologies are used to offer several treatment options, individualize therapies, increase the general effectiveness of hospitals and healthcare systems, and decrease the total cost of care. ML will soon have an effect on hospitals and doctors. To achieve the greatest results, it will be essential to create clinical decision support, sickness diagnosis, and individualized treatment techniques.

(Tursunbayeva & Renkema, 2022), they study implemented about Artificial intelligence (AI) is being more widely used in the healthcare industry, and AI-based solutions are expected to have an impact on not only patient care but also how healthcare workers perform their jobs. However, it is still unknown how certain AI applications will affect the employment of healthcare workers. We assessed 80 publications from the grey-literature platform "Singularity Hub" using a methodology to analyses AI applications in healthcare and the job design model. Our results show that the various elements of healthcare professionals' jobs, such as job autonomy and control, skill variety and use, job feedback, social and relational aspects, and job demands, are impacted by AI applications in 1) diagnosis and treatment, 2) patient engagement and empowerment, and 3) administrative activities. Future research and practice implications are highlighted.

(Bajwa, Munir, & Nori, 2021), they discussed the study about The field of computer science known as artificial intelligence (AI) has the potential to profoundly alter how healthcare is provided and how medicine is practiced. In this review paper, we explain current developments in the application of AI in healthcare, lay out a road map for creating efficient, dependable, and secure AI systems, and speculate on the potential future of AI-enhanced healthcare systems.

(Lee & No Yoon, 2021), they presented the study about The impact of artificial intelligence (AI)-based technological applications on the healthcare sector is examined in this study. This study examined numerous actual examples of AI

applications in healthcare in addition to doing a thorough analysis of the literature. The findings show that significant hospitals are currently utilising AI-enabled solutions to support medical professionals in patient diagnostic and treatment activities for a variety of ailments. AI technologies are also having an impact on how well hospitals manage their managerial and nursing staffs. Healthcare professionals are welcoming AI, but its applications offer both the utopian (new chances) and the dystopian (challenges to overcome) perspectives. To give a fair assessment of the usefulness of AI applications in healthcare, we analyse the specifics of both those potential and constraints. It is obvious that the quick development of AI and associated technologies would assist healthcare providers in enhancing patient value and streamlining operational procedures. However, in order to fully profit from what technology, have to offer, effective implementations of AI would necessitate excellent planning and strategies to revolutionize the overall care service and operations.

Methodology:

This study discusses the possible range of artificial intelligence methodologies' applicability within the telehealth area. Based on reports of recent advancements, these methods are clinically oriented and offer some insight into current trends. Based on their professional expertise, the authors found recent literature examples of telehealth advances using artificial intelligence to assist or enhance remote health care delivery. An overview of current directions for the perceived function of artificial intelligence in telehealth was produced using observations from the cases.

Clinical diagnosis is essentially a data curation and analysis activity in which professionals try to compile and combine sufficient data points about a patient to ascertain their condition. Clinical diagnosis is both an art and a science that has a long history. The early diagnostic techniques relied heavily on clinical observations of a patient's condition as well as palpation and auscultation techniques.

Leading the way in the adoption of artificial intelligence (AI) technologies has been the healthcare industry. The nature of the services and the susceptibility of a significant portion of end users have led to a great deal of research and discussion on the subject of responsible AI. To identify the components of responsible AI in the healthcare industry and explore its impact on value creation and market performance, we use a mixed-methods study.

Discussion:

Artificial neural networks, machine learning, robotic process automation, and data mining are used to programme artificial intelligence (AI), an algorithm-driven computing technology, to self-learn from data and make intelligent predictions and real-time judgements (Siala & Wang, 2022). The definition of artificial intelligence (AI) in the context of healthcare is the use of intelligent data-driven technologies that more efficiently and effectively utilize healthcare resources and data to support and streamline healthcare decision-making and, as a result, deliver better healthcare services that are tailored to individual needs. AI technologies frequently use machine learning algorithms to conduct 'intelligent' analytical and inferential activities on health data, which are used, among other things, to detect and predict pandemics and disease (infodemiology), diagnose and manage chronic and neurological conditions, interpret medical scans and radiology images, deliver healthcare services and treatments, discover new drugs, and develop new medical technologies. Additionally, AI has the ability to address societal issues specific to global health and hasten the accomplishment of sustainable development objectives for health and well-being. However, due to a number of ethical concerns, including algorithmic bias producing inconsistent results or discriminatory outcomes, privacy violations, disputes over data ownership, and a lack of transparency in data use, there is growing worry regarding AI's usefulness in the field of health care.

Artificial intelligence (AI) is the term used to describe the incorporation of human intelligence into machines. AI holds great promise for having a significant impact in the health-care industry. In fact, healthcare organisations use AI to achieve affordable medical interventions and favourable patient outcomes despite facing unprecedented challenges related to changing demographics, administrative needs, increasing morbidity, changes in information technology demand, workforce shortages, and ageing (Reddy, Fox, and Purohit 2019). For instance, the technology already helps surgeons improve the results of robotic surgery using AI assistance. According to reports, doctors employ AI to make earlier diagnoses of diseases, particularly chronic conditions like cancer.

Information and communication technology (ICT) is a crucial component of digitally transformed businesses that can improve efficiency and competitiveness. Advanced digital technology and devices are widely used for innovation and value generation across industries in the Fourth Industrial Revolution (4IR) age of today.

There is no exception in the healthcare sector. Hospitals and other healthcare facilities are actively implementing digital technologies like artificial intelligence (AI), machine learning, smart sensors and robots, big data analytics, and the Internet of Things (IoT) to enhance operational efficiency and care quality. This trend is particularly pronounced in developed economies. (Sunarti, Rahman, & Naufal, 2021)

The inquiry revealed that there is a growing body of literature in this area. It emphasizes clinical decision-making, patient data and diagnostics, predictive medicine, and management of health services. The most studies were produced by the United States, China, and the United Kingdom. According to keyword research, artificial intelligence (AI) can assist doctors with diagnosis, disease prognosis, and therapy planning. (Secinaro, Calandra, & Secinaro, 2021)

Conclusion:

AI implementation is required to improve the effectiveness of managing health services and making medical judgements. We consider some of the ethical issues that AI clinical applications encounter in order to facilitate early uptake and continuous use in the healthcare system.

Tele-assessment, tele-diagnosis, tele-interactions, and tele-monitoring are a few examples of how artificial intelligence is used to deliver healthcare remotely. Wider usage will necessitate further advancements in the underlying algorithms and method validation. As telemedicine powered by artificial intelligence becomes more prevalent, some important social and ethical issues also need to be taken into account on a larger scale within the healthcare system.

The literature discloses a number of AI applications for healthcare services as well as an unexplored area of research. For example, data-intensive analysis and knowledge-based management in AI initiatives demand skills and an understanding of data quality. Researcher understanding and addressing future research on AI in the healthcare industry might be aided by insights.

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