



EMERGING TECHNOLOGIES AND ITS IMPACT ON THE HEALTHCARE SECTOR: STUDY IN REFERENCE TO ARTIFICIAL INTELLIGENCE

Engineering

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ABSTRACT

Emerging technologies are constantly being developed in healthcare, offering new opportunities for improving patient outcomes, increasing access to care, and reducing costs. The 21st century is witnessing so many changes so far in terms of technology where few like artificial intelligence and Robotics technology have the potential to automate a range of tasks in healthcare, including medication delivery, surgical procedures, and physical therapy. Studies have shown that robotics can improve patient outcomes, reduce costs, and increase efficiency in healthcare delivery. This is an exploration of the facts and findings related to technology and its uses in the healthcare industry wherein an exploratory research design has been used with a theoretical framework based on a literature review.

KEYWORDS

Technology, Healthcare Sector, Artificial intelligence, and Healthcare outcomes

INTRODUCTION

In the 21st century, technology is playing a leading role in the healthcare industry. Medical Procedures are now changing at an unlimited pace where technology is at the centre. Technology has played a significant role in transforming the healthcare industry. It has revolutionized the way healthcare professionals provide medical care to patients and manage healthcare operations. Technology has enabled healthcare providers to provide better and more personalized care to patients. For instance, electronic health records (EHRs) have made it easier for doctors and nurses to access patient information, track medical history, and provide accurate diagnoses and treatments. Advanced medical imaging technologies like MRI, CT scans, and ultrasounds have made it easier for doctors to diagnose diseases and conditions accurately and quickly (Pandey a.k 2018). Similarly, diagnostic tools like blood tests, genetic testing, and biopsies have made it possible to identify health problems early on. Telemedicine and telehealth technologies have made it possible for patients to access medical care remotely. This has made it easier for patients who live in remote areas or who have mobility issues to receive medical care from their homes. Technology has improved communication among healthcare professionals, making it easier for them to collaborate and provide coordinated care. This has led to improved patient outcomes and reduced medical errors. Healthcare providers can use technology to automate administrative tasks, reduce paperwork, and improve operational efficiency. This allows healthcare professionals to spend more time with patients and provide better care. Overall, technology has the potential to transform healthcare by improving patient outcomes, reducing healthcare costs, and making healthcare more accessible to all (Hameed, K. 2003).

Machine learning is a subset of artificial intelligence (AI) that involves the use of algorithms to analyze and learn from data. In healthcare, machine learning has the potential to transform how medical professionals diagnose and treat patients. Machine learning algorithms can be trained to identify patterns in medical images like X-rays, CT scans, and MRIs. This can help medical professionals diagnose diseases more accurately and quickly. Machine learning algorithms can be used to analyze large amounts of data related to drug compounds, their properties, and their effects. This can help pharmaceutical companies discover new drugs and treatments faster and more efficiently. Machine learning algorithms can analyze patient data to develop personalized treatment plans based on a patient's genetics, lifestyle, and medical history. This can lead to better patient outcomes and reduce healthcare costs. Machine learning algorithms can be used to analyze patient data and identify patients who are at high risk of developing certain diseases. This can help medical professionals intervene early and prevent the onset of disease. Machine learning algorithms can be used to analyze electronic health records (EHRs) to identify patterns and trends in patient data. This can help medical professionals make more informed decisions about patient care. Overall, machine learning has the potential to transform healthcare by improving the accuracy and efficiency of diagnosis and treatment, reducing healthcare costs, and improving patient outcomes. However, it is important to ensure that machine-learning algorithms are developed ethically and are based on unbiased data (Haines, A. 2013).

Review of the Literature

Literature suggests that technology has the potential to improve healthcare outcomes, increase access to care, and reduce costs. However, there are also challenges associated with the implementation of technology, including issues related to privacy, security, and data interoperability. Further research is needed to fully evaluate the benefits and limitations of technology in healthcare and to identify best practices for implementation. Overall, the literature suggests that technology has the potential to improve healthcare outcomes, increase access to care, and reduce costs. However, there are also challenges associated with the implementation of technology, including issues related to privacy, security, and data interoperability. Further research is needed to fully evaluate the benefits and limitations of technology in healthcare and to identify best practices for implementation. (Saprou 2021)

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One of the most commonly studied areas of technology in healthcare is the implementation of EHRs. The study conducted by Jensen, P. B., Jensen, L. J., & Brunak (2021), has shown that EHRs can improve patient outcomes by reducing medical errors, improving communication between healthcare providers, and providing access to patient data across different providers. Another area of technology in healthcare that has gained attention in recent years is telemedicine. Studies have shown that telemedicine can increase access to care, particularly in rural or underserved areas, and reduce costs for both patients and healthcare providers. Perednia, D. A., & Allen, A. (1995).

AI has numerous potential applications in healthcare, including diagnosis and treatment planning, predictive analytics, drug development, clinical decision support, virtual assistants, and administrative tasks. Blockchain technology has been proposed as a solution to improve the security and privacy of patient data. Research has shown that block chain can provide a secure and decentralized way to store and share health data, but further studies are needed to evaluate its feasibility and effectiveness. (Pandey, A. K., Dixit, S., Bansal, S. 2017).

AI has the potential to revolutionize healthcare by improving diagnosis and treatment, predicting and preventing disease, and making healthcare more efficient and accessible. However, it is important to ensure that AI is developed and deployed responsibly and ethically, with appropriate safeguards to protect patient privacy and prevent bias (Kamel Boulos, M. N., & Wheeler, S. (2007)..

Artificial Intelligence (AI) has numerous potential applications in healthcare. Here are some ways AI is already being used in the field:

Diagnosis and Treatment Planning: AI algorithms can analyze patient data, including medical history, lab results, and images, to assist with diagnosis and treatment planning. For example, AI-powered tools can help radiologists identify abnormalities in medical images or help doctors diagnose skin cancer.

Predictive Analytics: Machine-learning algorithms can be used to analyze patient data to identify individuals with high-risk diseases or conditions. This can help healthcare providers develop personalized treatment plans or intervene early to prevent disease progression.

Drug Development: AI can be used to speed up the drug discovery process by analyzing large datasets of biological and chemical data to identify potential drug targets or predict drug efficacy.

Clinical Decision Support: AI algorithms can help healthcare providers make more informed decisions by analyzing patient data in real-time and providing suggestions for treatment options.

Virtual Assistants: AI-powered virtual assistants, such as chatbots or voice assistants, can provide patients with information about their health or assist with medication management.

Administrative Tasks: AI can also be used to automate administrative tasks, such as scheduling appointments or processing insurance claims, freeing up healthcare providers to focus on patient care.

The emergence of Robotics in Healthcare

Robotics has emerged as a powerful tool in healthcare, with potential applications in a wide range of areas, including surgery, rehabilitation, diagnosis, and monitoring. Robotic surgery is becoming increasingly popular, especially for complex procedures. Robots can offer greater precision, flexibility, and control during surgery, leading to less invasive procedures, reduced pain and recovery time, and improved outcomes for patients. Robotics can also be used for physical therapy and rehabilitation, helping patients regain mobility and strength after an injury or illness. For example, exoskeletons can assist patients with walking or standing, while robotic arms can be used to help patients perform exercises. Robotics can be used to assist in the diagnosis of medical conditions. For example, robots can perform routine screenings for diseases such as cancer or monitor vital signs, freeing healthcare providers to focus on tasks that are more complex. Robotics can help elderly individuals with daily activities, such as bathing, getting dressed, and preparing meals. Additionally, robots can provide companionship, assist with medication management, and help reduce social isolation among older adults. Overall, the use of robotics in healthcare has the potential to improve patient outcomes, reduce healthcare costs, and enhance the efficiency and effectiveness of healthcare delivery.

Hospitals are increasingly adopting technology-based services to improve patient care, streamline operations, and enhance the patient experience. Telemedicine services allow patients to consult with healthcare providers remotely, using digital tools such as video conferencing, chat, and messaging. Telemedicine services can be particularly useful for patients who live in remote areas, have mobility or transportation issues, or need follow-up care after a hospital stay. Remote patient monitoring involves the use of digital devices to monitor patients' health outside of the hospital setting. For example, patients with chronic conditions such as diabetes or heart disease can use remote monitoring devices to track their blood sugar levels or heart rate, and healthcare providers can receive alerts if there are any abnormalities.

CONCLUSION:

A changing paradigm of the healthcare sector is playing an important role in patient care and technology-based services. A part of that emerging technology is another dimension, which is facilitating medical services providers to maintain an error-free procedure. An error-free procedure enhances the trust of patients and builds a great reputation for service providers. In the era of cutthroat competition, medical services providers are looking for more patients and other hand patients are more demanding in terms of healthcare services. On other fronts, regulations imposed by the government are getting more stringent and mostly in favor of the patients. So abundant uses of technology are helping hospitals and medical services providers to contribute from the front end and maintain the dignity of caregivers and takers both. Finally, it shall be concluded that no one can be denied the contribution of technology in the 21st century.

Limitation of The Technology

While healthcare technology has the potential to revolutionize the delivery of healthcare services, there are also some limitations that need to be considered. Technical issues such as system crashes, software malfunctions, and connectivity problems can disrupt the delivery of healthcare services. These technical issues can cause delays in care, reduce the quality of care, and affect patient safety. Healthcare technology often involves the collection, storage, and sharing of sensitive patient information. Security and privacy concerns can be a significant limitations of healthcare technology, as healthcare organizations must take steps to ensure that patient information is protected from unauthorized access and use. There is also a risk that healthcare technology can contribute to inequality in healthcare services, as not all patients may have equal access to technology-based healthcare services. This could lead to disparities in healthcare outcomes between different populations. Overall, while healthcare technology has the potential to improve the delivery of healthcare services, it is important to consider and address the limitations and potential drawbacks of healthcare technology to ensure that it is used effectively and safely to improve patient care.

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