

Role of Artificial Intelligence in Health Care Sector: A Boon or a Bane

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Abstract: Artificial Intelligence (AI) is in the winning phase nowadays in every sector. Health care sector is complex as well as one of the major sectors globally. This sector contributes around 2 billion dollars to the economy of India. It is further expected to generate the revenue of 193.6 billion dollars by 2032. The advancements in technology have brought a huge transition, globally. The role of AI is significant in clinical practice as well. The way of diagnosis, treatment and monitoring the patients also changed with the introduction of certain AI techniques. The personalized treatments can be the result of advances use of AI. These advances techniques may also help in early detection of ailments or diseases. The system has become more simplified, fast and easy by such technological advancements. The data is more accessible with the use of machine learning algorithms. The advent of 5G has also contributed towards the applicability of AI in healthcare industry. AI and ML, both runs parallel to each other to support health care data and analyse the data faster as compared to human beings. AI is a game changer in today's modern world. There is a gradual shift in technology, but it is a matter of question, whether this invention brings our positive results only? According to a report from the World Economic Forum, "AI and robotics will displace 85 million jobs by 2025". The possible pros and cons of AI technologies will be discussed in the present paper. Also, the role of AI in healthcare sector will be discussed in the paper along with its possible threats and harms on the mankind. Some suggestions will also be provided based on the present study.

Keywords: Artificial Intelligence, Machine Learning, Healthcare Sector, Technological Advancements, Technological Revolution

1. Introduction

Artificial Intelligence developed with the advent of IBM's Watson artificial intelligence system which was invented to solve certain queries quickly and correctly. A technology of natural language processing (NLP) was introduced to interpret human communication more precisely (Petiwala et al., 2021). Besides, IBM, many other companies such as Apple, Microsoft and Amazon also began to invest in AI specifically for healthcare sector. AI is not a new invention; however, the history of AI is traced back in the year 1943 when Warren McCulloch and Walter Pitts present their model of artificial neurons, which is considered the first AI. Basically, AI is a replication of human intelligence designed to perform the same functions which are complex for human beings. AI also has problem solving ability and may act like a human being in certain situations. However, human intervention is somewhat necessary to control AI. Absolute power and control cannot be provided to AI, it will corrupt (Garg, 2021).

Ancient philosophers invented the idea of AI and invented "automatons" which operated without human intervention. So, the idea of AI evolved long time back by the Greeks. With the passage of time, that idea was developed and modified to bring the new invention. Scientists and engineers used the idea and created a novel version of it. With the introduction of new technologies, the older ones are replaced quickly. AI has its own vital role in every almost every sector. Be it a telecom industry, hotel industry or healthcare industry. AI was on boom during the period of 1980-1987(Shahghasemi, 2025).

One of the prominent examples of the significance on AI in healthcare is UK where around 35,000 people die every year due to lung cancer (Chen et al., 2025). According to the researchers, AI may help to ascertain whether or not lung nodules (abnormal growths) seen on a CT scan, are cancerous. Another benefit associated with AI and the Internet of Medical Things (IoMT) in "consumer health applications" is also helping the people. AI can also calculate and observe the day-to-day patterns of patients and provide appropriate feedback.

Another, major development in health care sector is the invention of “robotic surgery” which is introduced to carry on complicated procedure with more accuracy and control as compared to traditional techniques. It includes a camera arm and mechanical arms along with attached surgical instruments with it. this technique was invented for clear and precise surgical process. The benefits include less blood loss, more precision and less complications (Reddy et al., 2023)

According to the American Cancer Society, a substantial percentage of mammograms produce incorrect findings, with one in every two healthy women being informed they had cancer. AI allows for 30 times quicker evaluation and translation of mammograms with 99% accuracy, eliminating the need for unneeded biopsies.

When the world was suffering with Covid-19 pandemic, the early symptoms may be predicted with the use of AI. It plays a vital role in screening and tracking of patients. In addition to this, the future risks may also be ascertained by the use of AI via algorithms to identify the patterns involved in the spread of such infection. The main technology involved in it was; machine learning which plays equivalent role in health care sector. (WIPRO, 2021)

2. Acceptance of AI in Healthcare Sector

The first AI application to identify diabetic retinopathy in the US without a doctor's assistance was approved by the Food and Drug Administration in April 2018. In an effort to improve patient safety, practice quality, patient care management, and health care costs, more and more health care service providers are investing in AI solutions for mobile health devices or health applications. Nevertheless, earlier research has demonstrated that not everyone is open to the use of therapeutic AI (Laï et al.,2020). A thorough analysis of client attitudes and perceptions of AI is necessary for the effective implementation of AI applications (Romero-Brufau et al.,2020).

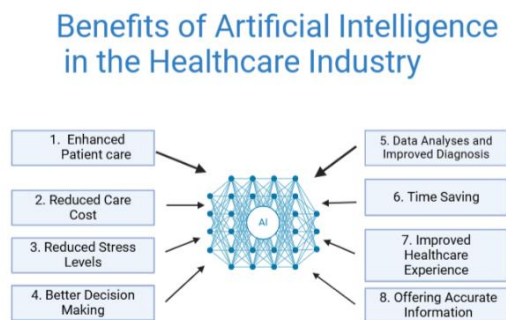


Fig. 1 Benefits of AI in the Healthcare Industry

Therefore, designing AI apps without considering the attitudes and propensity of potential users to utilize them could be a waste of money and possibly lead to a loss of clients. This is particularly true in the medical field, where one of the main factors influencing service quality is patient involvement. People can insist on speaking with doctors if they don't think using AI clinical apps is beneficial, which could lead to the AI apps being underutilized. Therefore, understanding the factors that influence acceptance or rejection of AI clinical applications in healthcare delivery is essential for hospitals and medical professionals that want to employ or grow AI in healthcare delivery (Esmaeilzadeh et al.,2021).

3. Applicability of AI in Healthcare Sector

Artificial Intelligence in healthcare sector plays a significant role in analysing and interpreting the complex data. In some cases, it supersedes the human calibre to detect the problems. It may also provide the faster way to solve the issue as well. However, the use of AI in healthcare sector is a new innovation in various disciplines such as medicines, surgeries and diagnostic techniques. Some of the benefits of the use of AI in healthcare sector are:

- a. **Diagnosis:** AI may help in diagnosis of various health-related issues which can be cost effective, fast and accurate. With the advent in technology, there is a shift from traditional to modern tools for diagnosis and treatment of diseases. AI-powered tools can interpret the medical images such as X-rays, CT scans, MRIs, and ultrasounds to identify the tumours, fractures and infections. For example, there are some AI models which can detect the cancer at an early stage

so that it can be treated on time to save the life of a patient. AI may also help in blood tests and genetic data to identify the disease.

- b. Genomic Data Analysis:** AI technology helps in the detection of genetic diseases. It helps to identify the mutations and markers linked with hereditary diseases. In addition to this, the early-stage detection is also possible through AI.
- c.** AI can monitor various factors which can be a sign of early disease like AI powered devices may identify irregular heartbeat, stress-levels and many more, which may be alarming in some situations.

The use of AI ensures, to a great extent, accuracy, precision, efficient and less time-consuming process. AI has brought a revolution globally in every sector. The uses of AI are not conclusive. With the passage of time, many inventions in technology are making the AI technology better day-by-day. New researches by the scientists are making the innovation effective and productive day-by-day.

Healthcare workers often spend a lot of time engaging in paper work but, with the introduction of AI, it is now possible to work to maintain the administrative documents with less consumption of time. For example, AI can help the clinicians with summarization of medical records in detail. In addition to paper work, AI has its own importance in accomplishing the tasks which are tedious for humans. It was found in one of the studies that, virtual nursing assistants are also introduced to take care of the patients virtually via chat box and apps. AI can also help to reduce the error in dosage in medicines. For example, this technique is used for the patient's taking insulin. An AI-powered tool is used to detect the accurate quantity of medicine taken by the patient. AI and robotics are also used in certain medical surgeries. It helps to reduce the blood flow during the surgery and can also reduce the risk of infection post-surgery. Undoubtedly, we can say that, AI has the potential to improve the experience of the healthcare users. Many remedies are also used by the pharmaceutical companies. For example, Pfizer has introduced a machine-learning system for the treatment of immune-oncology treatments. In addition to this, certain medications for treating metabolic diseases.

Every year, it has been observed that AI and Machine Learning is growing rapidly and have their own significance in almost every sector. This invention will bring a revolution in drug development that is faster, cheaper and effective. Scientists believe that this is crucial for the future.

AI- as curse: Artificial intelligence (AI) in healthcare has many potential benefits, but there are also drawbacks and concerns that might make AI a liability in healthcare institutions.

Dependency on Technology over Human Judgment: While AI systems may analyse data and provide insights, they are devoid of the human aspect and natural judgment that come from professional experience in the medical sector. Over-reliance on AI puts hospitals at danger of undervaluing human skill, clinical judgment, and customized patient care. It is crucial to strike a balance between AI-driven insights and human decision-making (Alyami et al., 2024).

Risks to security and privacy: In order for AI systems to produce reliable findings, they need access to enormous volumes of patient data. However, privacy and security issues are brought up by the handling, sharing, and retention of private patient data. AI systems might be the subject of data breaches or illegal access if they are not adequately protected, endangering patient privacy and perhaps resulting in the misuse of private medical data (Khonde & Kamble, 2023).

Discrimination & Biasness: AI systems are trained on historical data, which may be biased and represent present-day healthcare inequities. AI systems may continue to discriminate and provide unfair patient care if these biases are not addressed. For instance, the AI system may provide biased or inaccurate recommendations for other groups if a certain demographic group is overrepresented in the training data. This would be unfair. (Patil & Patil, 2023)

Legal and Ethical Issues: There are ethical and legal issues with the application of AI in healthcare. It becomes difficult to place responsibility for mistakes or malfunctions brought on by AI when judgments are made automatically. The effect of AI on patient-doctor relationships, informed consent, and algorithm openness are further ethical issues. To overcome these obstacles and guarantee the safe use of AI in hospitals, clear policies and procedures are required (Stahl & Stahl, 2021)

Workforce Displacement and Skill Gap: Healthcare workers may lose their jobs as a result of hospitals implementing AI technology. When automating tasks that were previously completed by humans, retraining or workforce cutbacks may be required. By giving healthcare worker, the assistance and training they need to adjust to the changing environment, healthcare companies may take the initiative to solve these issues (Faluyi, 2025)

Lack of Emotional Intelligence: Two critical components of patient care emotional intelligence and empathy are lacking in AI systems. Relationships and emotional support are essential to a patient's healing and general well-being. Over-reliance on AI systems may result in a loss of human interaction between patients and healthcare professionals, which might negatively impact patient happiness and the standard of care (Alloghani et al., 2022)

Technical limitations and flaws: AI systems have flaws and are prone to errors. The accuracy and reliability of AI systems are greatly influenced by the Caliber and representativeness of the data used to train them. Inaccurate or flawed AI outcomes might put patients in risk and lower the effectiveness of medical treatment. To mitigate these challenges, hospitals need to prioritize patient privacy and security, remove biases in training data, create robust governance structures, provide transparency in AI algorithms, and balance human judgment with AI-driven insights. Hospitals must deploy AI technology sensibly and ethically to avoid any negative impacts and ensure that patient care remains at the center of healthcare delivery (Pavithra & Afza, 2024).

4. Discussion

The phrase "artificial intelligence" is more upbeat when used in reference to medicine, implying that a revolution that benefits both patients and physicians is about to occur. The voice assistants may be somewhat to blame for this. According to British market research firm Juniper Research, voice assistant usage is expected to rise over the next years. Consequently, the number of digital voice assistants in use will increase from 2.5 billion by the end of 2018 to eight billion by 2023. This might be a substantial quantity of patient care for a variety of individuals that may want assistance.

People with disabilities, people with chronic illnesses who experience seizures, and people who live far from medical facilities would all benefit greatly from virtual assistants. There are medically specialized assistants in addition to popular choices like Amazon's Alexa, Alphabet's Google Assistant, and Apple's Siri. Nuance Communications created the Dragon Medical Virtual Assistant, a software application specifically made for use in medical settings. The voice-to-text software that is now used for medical records has this feature (Enchev et al.,2021)

5. Conclusion

The emergence of various new information and communication technologies is one of the many significant events that have occurred in recent years. A remarkable environment for new healthcare prospects is created by digital advances such as the creation of 5G wireless networks, the expansion of telemedicine, and artificial intelligence (AI) techniques. The digital healthcare industry makes it easier to provide high-quality healthcare. Healthcare tasks that might help and support medical personnel are completed by artificial intelligence. There is currently a dearth of quantitative study in the fields of accounting, business, and management studies about the expenses and earnings produced by healthcare organizations utilizing AI technology. The use of AI in the healthcare industry has raised some ethical concerns in recent years.

Future endeavours

Scientists believe that examining the whole amount of money a healthcare institution should spend on AI technology would be helpful for future research initiatives. If these technologies are essential for administering healthcare services and treating patients, then governments must to fund and encourage the modernization of healthcare institutions. Like national investment initiatives like the Next Generation EU project in Europe, fresh investment monies may be made available in the healthcare sector (Picek, 2020). Moreover, this should occur especially in the world's poorest countries, where medical and health-related facilities and services are scarce (Sousa et al., 2021). However, it could be useful to compare the extra revenue made by healthcare organizations that use AI technology to those that don't. Consequently, more study in this area

may deepen our knowledge of the subject and expand the number of healthcare facilities that are able to use AI-based technology. Lastly, as the discussion section notes, further multidisciplinary research is required to fortify the connections between AI and data quality management and ethical issues in healthcare (Secinaro et al., 2021).

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