



Healthcare inclusion in India– Role of Artificial Intelligence

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Abstract

The growing impact of artificial intelligence (AI) on the transformation of healthcare inclusion in India is examined in this paper. India faces many obstacles in ensuring equitable access to healthcare services because it is a fast-developing country with a diverse population and complex healthcare needs.

Promising solutions to close the healthcare access gap, raise the standard of care, and improve overall health outcomes are provided by the integration of AI technologies. This study analyzes the state of healthcare inclusion in India today, identifies the main obstacles, and looks at how artificial intelligence is being used to overcome them. It illustrates the potential of AI-driven innovations to advance inclusivity, efficacy, and efficiency in India's healthcare ecosystem through case studies and examples.

Keywords: Artificial Intelligence (AI), healthcare, inclusion, technology

Introduction

In India, a nation distinguished by its great diversity and intricate healthcare system, ensuring access to healthcare is an essential requirement. With a population of more than 1.3 billion, India has enormous obstacles in providing all of its residents with fair access to healthcare services. There are significant obstacles in the way of attaining universal health coverage due to differences in healthcare quality, affordability, and accessibility that exist across socioeconomic classes, marginalized communities, and urban and rural divides.

In this regard, integrating artificial intelligence (AI) shows promise as a way to address the complex issues surrounding healthcare inclusion in India. AI technologies have the potential to completely change how healthcare is delivered, diagnosed, treated, and managed. Artificial Intelligence (AI) has the potential to improve the efficiency, effectiveness, and accessibility of healthcare services, including personalized medicine, telemedicine, and predictive analytics. This could help close the gap between unmet healthcare needs and available resources.

To promote healthcare inclusion in India, this paper investigates the potential of artificial intelligence. It explores how healthcare is currently accessible, bringing attention to the differences and difficulties that various societal groups encounter. This study tries to clarify how AI-driven innovations can lessen current barriers and promote inclusivity in India's healthcare ecosystem by looking at the various applications of AI in healthcare, such as diagnostic tools, predictive modeling, and remote healthcare delivery platforms.

This study aims to shed light on the possible advantages and ramifications of using AI to promote healthcare inclusion in India through case studies, examples, and critical analysis. To protect patient rights and privacy, it also discusses ethical and legal issues, highlighting how crucial it is to implement AI responsibly. The ultimate goal of this paper is to further the conversation about how to use technology to achieve fair access to healthcare and enhance health outcomes for all Indian citizens.

In the present time, technology has gone one level higher than earlier, due to which every field is moving forward in development, an example of advanced technology is Artificial Intelligence (AI) which has replaced human activities. Along with being used in other industries, AI is also being used in health care, which saves time in health management and provides advanced treatment services. During the time of Covid-19 Artificial Intelligence (AI) was used on a large scale due to which the problems like clinical decision making, diagnosis, operation etc. in health care were found to be reduced. The aim of this study to examine what progress has been made in health care and health treatment with the use of Artificial Intelligence and which areas have been affected by it and also how health management is being maintained in a better form with the help of Artificial Intelligence (AI). To what extent has artificial intelligence proven to be effective in the health system in India and what are its shortcomings compared to other countries? This article also discusses that During a pandemic like Covid-19 when the number of victims was continuously increasing and the infection was also spreading rapidly, Artificial Intelligence played an important role in potentially effective medicines and diagnostics. There is no doubt that countries like India, with all their diversity, will have difficulty reaching healthcare inclusion, which is the provision of quality healthcare to all. But in a report of 2023, it was found that India is at the third place in Artificial Intelligence revolution, which proves that in a big country like India, Artificial Intelligence (AI) is at a high place and is effective in a positive way.

When it comes to the Indian healthcare system, for the mental and physical health of every person, it is necessary to have a uniform healthcare management system in every area and be aware of healthcare inclusion, For the development of a person, a society, and a country, it is necessary to be aware of health care inclusion. In a country like India, which has a large population and is surrounded by diversities, where different types of society are seen, it is impossible to provide health care related resources to every person. But with the use of technology, there has been improvement in the activities related to health inclusion, due to which the health care related systems have been

strengthened and at the same time, inequality in treatment among the people has ended and more and more facilities are being provided to them. In today's time, the use of technology has become a part of daily routine for every person in every field and people have taken it to a higher level in its use, such as use of machines, computer science and robots in place of human activities. Use of all these are examples of artificial intelligence which is taking the technological level up in today's time.

AI is a kind of new general-purpose technology (GPT), that is capable of complementing human labour and human tasks such as reasoning, creativity, and managing multiple tasks altogether. In short, AI uses various technologies such as computer vision, audio processing, cognitive robotics, speech analytics, language processing and machine learning techniques to derive AI-based solutions can unleash the hidden potential of human beings which helps them to contribute more effectively to society and also helps bring in more timely, accurate and fast solutions. The process of health inclusion is being seen changing in India through the use of Artificial Intelligence.

Artificial Intelligence is proving to be influential in health services in a huge way, in detecting complex diseases, obtaining information about patient data, and speeding up health-related responses. Artificial intelligence has an important contribution in bringing and improving public health surveillance. Although the use of artificial intelligence in health care in India is in its initial stages, at present only some technology industries and private companies are taking the initiative in health care, but it cannot be ignored that artificial intelligence with the help of AI, health inclusion can be seen in a better and optimistic form in the future.

In 2019, there was an epidemic of Covid 19 pandemic which affected all the countries. Due to these other industries were affected but this was the most difficult time for healthcare management. The most helpful thing in coming out of this phase was the adoption of artificial intelligence, which was helpful to some extent. The COVID 19 pandemic accelerated the use of artificial intelligence in almost all countries. Within a few months, artificial intelligence became widespread globally. Artificial intelligence is being used in epidemiological detection and diagnosis. Had a huge role To face this sudden challenge, artificial intelligence has been successfully influenced in making a lot of people aware about it, finding new strategies in treatment, emerging from medical and social emergency situations as well as surgeons, doctors, nurses have helped in reducing Gave good performance in time, during this epidemic around 2millions people died all over the world, in order to prevent this figure from increasing further, the use of artificial intelligence proved effective.

Even though artificial intelligence was already in use, it is also true that during Covid 19, people became aware of it and its use became more and more and through this technology, there is a huge contribution in ending this epidemic.

Objectives of the study:

- To understand the role of Artificial Intelligence in healthcare inclusion.
- To develop cost-effective healthcare solutions, such as AI-powered diagnostic tools and remote monitoring devices, to make essential healthcare services more affordable and accessible to low-income populations.

Research methodology

In this study, secondary data has been used from many sources which are journals, reports, websites, articles, and newspapers. The structure of the research is more specific. It is the outline, the scheme, and the paradigm of the operation of the variables.

The Role of Artificial Intelligence in Healthcare:

Healthcare is just one of the industries that artificial intelligence (AI) is revolutionizing as a transformative force. Artificial Intelligence (AI) is changing the face of healthcare delivery, diagnosis, treatment, and management with its capacity to analyze massive volumes of data, spot patterns, and make predictions. This essay examines the various uses, advantages, difficulties, and potential ramifications of artificial intelligence in the healthcare industry.

1. **Diagnosis and Imaging in Healthcare:** AI-driven diagnostic instruments are transforming the identification and diagnosis of diseases. Machine learning algorithms can accurately analyze medical images, including CT, MRI, and X-rays, helping medical professionals diagnose patients on time and spot abnormalities. To help pathologists identify malignant cells and other anomalies more accurately and efficiently, AI systems can also interpret pathology slides.
2. **Personalized medicine and Predictive Analytics:** AI makes predictive analytics possible by evaluating patient data to predict the course of a disease, pinpoint populations that are more susceptible to it, and adjust treatment regimens appropriately. Artificial intelligence (AI) algorithms can forecast patient outcomes, suggest customized treatment plans, and optimize medication dosages by utilizing patient demographics, genetic information, medical history, and lifestyle factors. It is possible to improve patient outcomes and reduce side effects and healthcare costs with this personalized approach to medicine.
3. **Remote Patient Monitoring and Telemedicine:** Outside of conventional healthcare settings, AI-powered remote patient monitoring systems allow for continuous tracking of vital signs, symptoms, and medication adherence. These systems gather health data in real time and offer prompt interventions when anomalies are found by utilizing wearable technology, sensors, and smartphone apps. Furthermore, AI-powered telemedicine platforms enable patients to receive consultations remotely from the comfort of their homes. This is particularly advantageous for those who live in remote or underserved areas.
4. **Healthcare Management and Operational Efficiency:** AI-driven healthcare management systems enhance patient flow, hospital operations, and resource distribution. By forecasting patient admissions, optimizing staffing levels, and streamlining bed management, predictive analytics can guarantee resource efficiency and cut down on wait times. Healthcare personnel can spend more time caring for patients and less time on administrative tasks thanks to automated medical coding, transcription, and

documentation made possible by natural language processing (NLP) algorithms.

5. **Drug Discovery and Development:** By analyzing large datasets, modeling molecular interactions, and identifying promising drug candidates, artificial intelligence (AI) speeds up the process of finding and developing new drugs. By evaluating safety profiles, optimizing drug formulations, and predicting drug-target interactions, machine learning algorithms can shorten the time it takes to develop new drugs and save costs. By matching patients with targeted therapies based on their genetic profiles and disease characteristics, AI also makes precision medicine easier.
6. **Ethics and Regulatory Considerations:** Although artificial intelligence (AI) has the potential to revolutionize healthcare, ethical and regulatory issues need to be properly taken into account. Strong regulatory frameworks and moral standards are required to guarantee responsible AI deployment and safeguard patient rights because of concerns about data privacy, algorithmic bias, transparency, accountability, and patient consent.
7. **Future Directions and Challenges:** Healthcare will face new opportunities and difficulties as artificial intelligence (AI) develops further. Future studies should examine how AI can be used in population health management, health education, and preventive care. The realization of AI's full potential in healthcare will depend on tackling issues like data interoperability, algorithmic transparency, and regulatory compliance, all of which are critical to patient safety and equitable access.

In today's technological era, the use of artificial intelligence and the use of robots in place of human activities is not imaginary, rather it has become an integral part of every person's life. Artificial intelligence also has an important contribution in health care, with the use of artificial intelligence limited resources can be, through this technology, the time taken by doctors and surgeons in treatment has been saved and patients have become aware of their treatment and diseases and the disparity in treatment among patients has also started ending. Similarly, artificial intelligence is also useful in health care as well as in managing a hospital, documentation and managing medical records.

There are many experiments and schemes in the health care sector where artificial intelligence has been used on a large scale and positive results have been achieved.

- In children's hospital uses Alexa to deliver AI Driven voice experiences to delight patients and empower care team.
- Improved clinical diagnostics
- Early Disease Detection.
- Mining medical records.
- Cancer and diabetes screening.
- Personalized treatment plans.
- Innovative medical imaging analysis.
- Optimized drug development processes.
- Improving our understanding of personal genetics.

- Refining information technology systems.
- Streamlining HR and staffing.
- Accurate and fast health diagnostic results.

Understanding the Risks of AI Usage in Healthcare Inclusion:

Artificial Intelligence (AI) has great potential to improve healthcare inclusion by improving care quality, affordability, and accessibility. However, there are risks associated with the widespread use of AI in healthcare that need to be properly recognized and managed. This study examines the possible dangers of using AI for healthcare inclusion, highlighting issues related to ethics, law, society, and technology.

1. Concerns about data security and privacy:

The possibility of compromising patient data security and privacy is one of the main risks connected with the application of AI in healthcare. AI systems depend on a ton of sensitive patient data, such as genetic information, medical records, and private health information. Significant risks to patient confidentiality and trust include unauthorized access, data breaches, and misuse of patient data. To protect patient privacy, strong data encryption, access controls, and adherence to data protection laws like GDPR and HIPAA are crucial.

2. **Algorithmic Fairness and Bias:** Artificial intelligence algorithms can be biased by the biases present in training data, which can produce unfair results and exacerbate healthcare inequities. Inequalities in healthcare outcomes and access may be exacerbated by biased algorithms, which may have a disproportionately negative effect on marginalized communities. To tackle algorithmic bias, open data gathering, varied representation in training datasets, and thorough testing of AI models for equity and fairness are necessary.

3. Accountability and clinical decision-making:

Concerns about accountability and responsibility for patient outcomes are raised by AI-driven clinical decision support systems. Although AI can help medical professionals diagnose conditions, suggest treatments, and forecast patient outcomes, healthcare providers still have the final say in all decision-making.

For clinical decision-making processes to remain trustworthy and accountable, AI algorithms must be transparent, explainable, and accountable.

4. **Legal and Regulatory Difficulties:** As AI in healthcare develops faster than current legal and regulatory frameworks, questions about liability, malpractice, and licensure arise. The complex legal and regulatory environments that healthcare providers and AI developers must navigate present difficulties, including liability for mistakes or unfavorable outcomes caused by AI systems. To reduce legal risks and guarantee patient safety, it is imperative to develop precise standards, guidelines, and regulations for the use of AI in healthcare.

5. **Training and Adoption of Healthcare Professionals:** To successfully incorporate AI into healthcare, healthcare professionals must learn new skills, adjust to

technological advancements, and accept workflows that are enabled by AI. Healthcare professionals' acceptance and adoption of AI technologies may be hampered by resistance to change, fear of losing their jobs, and a lack of training opportunities. To enable healthcare professionals to make the most of AI tools and realize their full potential, they must invest in programs for professional development, education, and training.

6. **Patient Trust and Ethical Considerations:** When using AI in healthcare, it is crucial to respect ethical standards and preserve patient trust. To guarantee that AI-driven healthcare services respect patients' rights and preferences, transparency, informed consent, and patient autonomy must be given top priority. By involving patients in the conception, creation, and application of AI technologies, healthcare practices become more ethically sound and accountable.
7. **Over-reliance on AI and Human-Machine Collaboration:** Although AI can enhance the skills of healthcare providers and help them make better decisions, an excessive reliance on AI can result in clinical judgment being compromised, human oversight being diminished, and complacency setting in. To achieve successful human-machine collaboration, artificial intelligence (AI) automation and human intervention must be balanced, with AI tools being integrated as decision-support tools rather than as stand-ins for human expertise.

Artificial intelligence has proved to be very useful in the field of medicine and health systems. At present, more and more companies are supporting the use of healthcare service solutions with the help of artificial intelligence. But it is important to know the fact that with more and more use of artificial intelligence, risks are also being seen in health inclusion systems which are worth considering such as , The use of artificial intelligence in health care is gaining momentum, contributing to diagnosing chronic diseases, drug discovery and development, and improving doctor-patient communication and writing medical documentation; But it has also come to light that due to the continuous use of artificial intelligence, health services have become dependent on artificial intelligence, which is causing inconvenience in treatment and negativity in patient-provider relationship, due to which the outcomes of health services are declining

The use of artificial intelligence in health care also shows gender bias, with some studies finding that women and minority communities are less likely to receive health care resources. Although solutions are also being found, initiatives are being taken to identify the causes of racial and women discrimination through the use of artificial intelligence, yet health care is still being seen as commercial.

AI is helpful in testing health care related equipment and maintaining health data for a long time, but sometimes it is difficult to keep large amounts of data safe and get them to the appropriate place, as well as the use of the tool. This leads to data breaches which leads to loss of privacy. Although many artificial intelligence tools have been developed in research centres, many private companies are

also working on it, so that health data can be stored securely and patients' information is always available.

Conclusion

In conclusion, there is great potential for improving healthcare inclusion and meeting the wide range of healthcare needs of India's population through the integration of artificial intelligence (AI) into the country's healthcare ecosystem. AI has the power to improve health outcomes, close the healthcare access gap, and raise the standard of care for all citizens—regardless of their location, socioeconomic standing, or demographic makeup—through its transformative potential.

A vast range of applications, such as diagnostic tools, personalized medicine, telemedicine, predictive analytics, and healthcare management systems, are included in the complex role of AI in healthcare inclusion. More effective, efficient, and equitable healthcare services are made possible by these AI-driven innovations, which provide creative answers to persistent problems in healthcare delivery, diagnosis, treatment, and management.

However, overcoming a number of obstacles and factors, such as ethical, legal, and technological ones, is necessary to fully utilize AI in healthcare integration. In order to ensure responsible AI deployment and protect patient rights and safety, it is important to carefully navigate a number of important factors, including data privacy and security concerns, algorithmic bias, accountability in clinical decision-making, legal and regulatory challenges, patient trust, and ethical considerations.

To further encourage AI adoption, innovation, and the sharing of knowledge and capacity building in healthcare inclusion initiatives, collaboration and partnerships between government agencies, healthcare providers, technology developers, researchers, and civil society organizations are crucial.

In order to remove current obstacles and build a more inclusive healthcare ecosystem, India must continue its journey towards achieving universal health coverage and healthcare inclusion for all citizens. To this end, utilizing AI's transformative power will be crucial. In the long run, India can improve the health and well-being of its population for future generations by taking advantage of new opportunities to enhance healthcare access, affordability, and quality through the responsible, ethical, and inclusive adoption of AI technologies.

The use of artificial intelligence in health inclusion has proven effective so far. With the help of artificial intelligence, changes can be made in many aspects of health inclusion, so that new technologies can be adopted in health care. Through this technology, adaptation and management of health services has taken place in a positive manner. The Covid 19 pandemic spread across the world also ended with the use of artificial intelligence. In this growing era of technology, the use of artificial intelligence has now become common, it would not be wrong to say that in the future, machines and robots will take over all human activities.

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