



## Challenges of Applying AI in Healthcare in India

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### Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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### ABSTRACT

With the advent of digitalization, upcoming technologies like Artificial Intelligence (AI) are being utilized by healthcare services to manage various healthcare services to mimic human cognitive functions. This technology is expected to bring about a massive change in healthcare. Patient management, clinical decision support, patient tracking, and health care services are the four main AI-enabled fields of the healthcare industry. The method carrying out the study was based on secondary research by the themes of the studies performed earlier using Artificial intelligence in healthcare sector, through observations, interviews and valid documentations from prominent databases, by means of challenges and its analysis and the last by the issues associated with the study and the target groups are the front line workers in healthcare sectors. The AI applications in health care have gathered much attention, but AI's adoption issues have not been significantly tended. There are several challenges of its implementation, such as resolving the unequal relationship between trained physicians and patients and increasing physicians' efficiency to be more effective in their work; providing AI-enabled healthcare equipment in rural communities; and educating physicians or doctors in handling it. AI technologies have the potential to enhance patient outcomes. Still, they may also pose significant risks in terms of inadequate patient risk assessment, medical error, and suggestions for treatment, privacy violations, and others.

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## 1. INTRODUCTION

Artificial Intelligence has already started making a mark in the healthcare industry. AI includes applications in evaluation and imaging, lifestyle management and tracking, risk analysis, virtual health assistance and health information management, through various technologies such as, deep learning, machine learning, and natural language processing. The trend found in healthcare is the increasing transition of data and resources to the cloud, partially due to convenience (e.g., real-time availability of full medical records for patients) and reliability (e.g., healthcare data management economies). Currently, AI applications bring statistical modeling, computer-assisted coding, and cloud computing power to manage many delegate data. This uses large quantities of digital medical data from electronic health records, prescription records, insurance claim reports, or consumer-generated information such as fitness trackers or purchasing history and is typically spread through several systems. AI's biggest healthcare problem is the issue of privacy and information security. For teaching AI and writing algorithms, data from a patient's disease history is used. This data produced by every patient encounter might be captured into a collective memory of health services and improved the quality of service to a patient. However, measures are taken to let this data leak or go to a third person. To protect against cyber threats, all data should have access control models to resolve security and privacy issues in a cloud-based environment. The requirement of this clinical data for AI implementation creates the motive for developers to collect such datasets from various patients. But some of them may be concerned that this collection may violate their privacy. Other factors such as socio-cultural acceptance, regulation, cost, and infrastructure are also some of the major barriers to applying AI in healthcare in India.

In India, it's not just legislation that hampers creativity. The bulk of healthcare services are funded by the private sector and paid out of their pocket. It means that technology must provide the private sector with a strong short- to medium-term opportunity, rather than explicitly aligning with health outcomes, to be widely embraced. The lack of public health spending means that public health programs are still largely financed outside the country, which often leads to

importing technology rather than creating locally acceptable technologies produced by indigenous people.

We focus on AI's specific problems that may need consideration during an implementation initiative in India.

### 1.1 The Objective of the Paper

The main objective of the paper is:

- To explore the main challenges and healthcare limitations in AI of India.
- To understand the issues about the AI adoption in the healthcare system of India.

## 2. LITERATURE REVIEW

This literature review aims to find the importance of artificial intelligence in the health care sector in India and the key challenges of the same [1].

Trust issues and apprehension with the use of AI, particularly among older people public [2]. Concerns about the loss of human jobs will lead to a lack of confidence [3]. However, throughout India's healthcare market, AI is also seen as solving the supply-demand gap and serving as an assistant to doctors [4].

An insufficient system is ensuring the privacy, protection, efficiency, and AI healthcare accuracy in India. Foreign corporations is gaining access to and exploiting local data for their own needs in India without local benefits. Confidentiality and privacy issues must also be discussed in order to prevent exposing confidential health information [5]. Established public health data governance mechanisms in India are unlikely to be adequate to monitor the combined momentum of AI, deep learning, and data aggregation or channel innovations along societal beneficial and egalitarian lines [6]. The vast amount of confidential health information accessible online in the cloud computing world, which is important for implementing AI in the health sector, also poses a safety risk Cyber security issues are one of the main obstacles to implementing health sector AI adoption [1].

For instance, the hacking of a Mumbai-based diagnostic laboratory database in 2016 led to the leakage of more than 35,000 patients' medical records (including HIV reports). This database

holds patient records throughout India, and many might not be aware that their information has been released. Over the past few months, the database had been the subject of numerous attacks, often up to three times a week. However, the laboratory had not taken any steps to protect the data [7].

The challenges of working with big data, essential for AI-driven healthcare, include a large number of unstructured data sets and interoperability problems; the absence of open medical data sets [8]; insufficient analytical solutions capable of working with big data; and concerns that algorithms can produce data that represent cultural biases [9]. Health records are often hand-written in local languages, which could make digitization more challenging [10].

Weaknesses and contradictions remain an obstacle in regulatory matters. Insistence on proof of fair outcomes in time-consuming and costly clinical trials is a major obstacle for start-ups in India [9]. Liability for AI is also a crucial concern that needs to be resolved because it is solely the doctor's responsibility and not the technology [4].

A key challenge is a large cost, initial investment, and infrastructure needed to integrate AI into health care. India's infrastructure needed to build AI remains inadequate [11].

The absence of AI-trained professionals may also be a primary obstacle to the use of AI in health care [12].

The infrastructure challenges are more pronounced in a developing country in rural areas. Electricity and the internet are not available in some areas, which need to be addressed in the design process [13].

AI is potentially changing healthcare in India. Yet developers, practitioners, and policymakers need to recognize these social, legal, and cultural contexts when developing, using, and to control AI [14].

### 3. RESEARCH METHODOLOGY

The research process will be carried out qualitatively following the principles of secondary research from the databases like google scholar, pubmed, springer orchid and medline. It involves the summary and collation of existing research.

The qualitative research methodology will focus on:

- i) Inductive analysis of earlier studies done on AI of healthcare in India.
- ii) Collection of multiple forms of data through observations, interviews, and documents.
- iii) Perception of the various executives regarding challenges and its analysis.
- iv) Portray a complex picture of the problem or issue under study.

The healthcare industry in India includes hospitals, pharmaceuticals, diagnostics, medical equipment and supplies, medical insurance, and telemedicine. AI has the opportunity to get incorporated in all these fields. The frontline workers are involved in the study because the research area focuses on the health care workers where AI helped them predominantly in sorting out the issues but despite of the modern technology there are many barriers in practicing the AI in healthcare sectors in India.

There are a variety of issues in India about the introduction and acceptance of AI. Some of them are:

#### 3.1 Socio Cultural Acceptance

This is the most common and generic challenge of acceptance of AI is the patients' 'trust issues'. The major concern of people is that AI is going to replace clinicians or not completely. In India, the doctor is always given high authority and is fully trusted by the patients. Patients like the physical presence of doctors. It is particularly the case with a large proportion of the poor and illiterate population. Sometimes the elderly is more averse to embracing modern technologies, too. AI behavior should be explanatory and easy to understand by people to provide a sense of faith or trust when doctors use AI for decisions making. It is particularly relevant in healthcare, where a clear chain of reasoning will support diagnosis and treatment to gain patient trust. Patients may want physically present doctors or older people who could be more skilled or equipped with new technology. The decision-making support system, where ML algorithms are used to give an appropriate form of feedback into human decision-making, is still acceptable to some people compared to fully automated AI, where algorithms are used to predict performance and even take action to achieve a particular outcome system.

All tasks performed by machines must be considered and culture-specific, based on the location or area in which they are located. The dearth of India's technological infrastructure means that AI still needs deep learning capabilities to tackle cultural differences across the country in primary health care. There is a negative perception that AI presents a threat to jobs, which causes difficulties in securing funding for start-ups. There is currently little guidance about what and how to explain the variety of variables on which AI decisions are based the expected outcomes, how AI prioritizes the needs, what making its decisions, and the reason for a decision an AI system makes implies. Employees working in the health sector may still be unsure about the possible advantages of AI in pricing and quicker delivery of services, particularly when some technologies are still in the early stages of development, with unpredictable outcomes. Healthcare-based AI solutions frequently face knowledge imbalance between the doctors who use it and the programmers who developed it, which might result in reluctance among healthcare professionals in implementing the program. AI technologies must work in a simple way. Their result should comply with the definition of justice, equality, and local social values to ensure widespread acceptance by society. Standards should be set for dealing with privacy in the relationship between doctor and patient, written permission for treatments, and personal data access relevant to health and norms for any research related to AI.

### **3.2 Data Safety/ Privacy**

The barrier to introducing AI in healthcare is not technical but data entry. Data management concerns exist with any effort that demands that confidential personal details be processed or exploited. India is a data-rich nation with an excess of virtual and paper-based data. Still, the absence of a comprehensive legal framework for healthcare data exchange allows it harder for businesses to obtain vast volumes of data in circumstances of strict data protection laws. Yet this data's reliability may be unpredictable. While India has implemented an EHR policy, enforcement of this law has remained unchanged, resulting in various definitions of digitizing documents (capturing notes of doctor samples), procedures and lengths of preservation, and thorough application of all hospital details. The hackers may take advantage of AI technologies to gather highly confidential details such as Electronic Health

records. Electronic Health Record (EHR) is a registry that is now regularly gathered from millions of people through various medical facilities. These comprise diverse data types like respondents' medical records, diagnosis, clinical trial reports, and prescriptions for drugs, clinical notes, and medical photos. Because of the data accuracy, data and mark availability, and the variety of data forms, it isn't easy to construct reliable predictive models from EHR data. Modeling current health analytics also relies on extensive work activities, such as professional data analyzing and design development. India still lacks a systematic data anonymization control framework. It has created further autonomy for businesses and has driven start-ups to follow the self-regulatory method of anonymizing information collected before utilizing it. The absence of data control may have both favourable and unfavourable consequences because, on the one side, data processing is simpler for start-ups. Still, the policy void creates confusion as to what potential reforms may be in place.

Machine learning methods may also be exploited to create advanced techniques that endanger certain confidential material's protection and safety. AI systems may threaten privacy by gathering and utilizing a plethora of data sources in real-time that might or might not be revealed to a person in the context of a note obtained with permission illustrates the need for better levels of privacy and protection governing confidential personal details in India, hence the need for provisions such as disclosure of breaches.

The adoption of data security legislation is currently underway in India and encourages local inventors and AI development pioneers. It is a key measure to ensure that India's data analytics is used to motivate and provide assistance to small communities leveraging them for business profits.

The roll-out of India's Aadhaar biometric identification card, introduced in 2009, aimed at creating consolidated and specified database for the objective of service distribution, fraud mitigation, and improved confidentiality and approval. Evidence has found that the absence of security policies has ID to switch from optional to compulsory sufficient data security safeguards. Technology implementation appeared to precede laws, appropriate regulations on anonymity, and restrictions on ethics. The Aadhaar Act (2016) and other

relevant legislation fail to include comprehensive guidelines on biometrics acquisition regarding permission [15].

Another problem confronting healthcare start-ups in India is that India does not have comprehensive, transparent data sources of medical records, and start-ups mostly switch to the freely accessible historical data in the US and Europe. It is troublesome as the populations reflected in the data collection are substantially different, resulting in technologies being built that are educated to a population and therefore need training again on Indian results. While AI is technologically neutral, in drug development instances, demographic-specific training is not optimal.

For instance, the same condition is not going to be feasible for India's people as that of the case of Prostate Specific Antigen (a check for prostate cancer) in the US community. A managed knowledge exchange approach would be a potential solution for enhancing patient information technology for technology companies in India. That will include creating an agency responsible for gathering, organizing, and relabeling data from hospitals and related government agencies before sharing openly with every potential consumer.

The team at Ways works with data protection problems by keeping all contacts with the client private. No information about the identity, age position, or other personal identification is required to continue utilizing the program (which makes for secure memberships). Neither of the information gained from the detectors and contacts with the users is linked to any data that would classify them, particularly to reduce certain threats and instill a more trustworthy partnership between the chatbots and its customers. The IEEE has developed a philosophically compatible programming plan for autonomous and intelligent devices. To identify and set down the absolute basic requirements that engineers and programmers can keep in mind when designing any system. The Ministry of Health and Family Welfare is focusing on Healthcare Data Privacy and Security Act. This legislation will allegedly include civil and criminal redress for a privacy violation, recommend privacy storage and usage criteria, and allow for compatibility with private hospitals.

The GDPR requires that data violations must be disclosed within a given period. That would motivate healthcare practitioners and

organizations to take greater control of the records they carry. Of necessity, the larger penalties in place would serve as another motivation to enhance data protection significantly. GDPR offers a fantastic opportunity to restore partnerships and establish confidence between businesses, employees, consumers, or patients. A large portion of India's population is still not trained, and it would be necessary to have them be aware until they have approvals to use their information or have checked in place to make sure that the data is not abused.

### **3.3 Regulation**

Regulatory deficiencies are a threat to the introduction of such issues includes the absence of a Regulating Authority for AI India in healthcare system and the need for an effective qualification process. Provided it is not restricted to any one topic or aspect, there is also a need for different regulators for specific aspects, the Medical Council of India, and the data aspect, a new regulator under the Data Protection Bill.

Another issue with AI, especially neural networks, is a black box. It is programmable, but its actual functionality from inside is still not properly known by technicians, which raises the question of applicability. Regulatory authorities are trying to keep up with AI's black box existence, which poses a specific collection of regulatory issues. Although some artificial intelligence systems operate under transparency easily understandable, others are unpredictable, thus called black boxes. Regulatory authorities can't review applications involving a black box AI/ML approach without clarification and appreciation of how success has been achieved.

A further regulatory challenge is that AI's continuous learning mechanism modifies their output in response to the new data provided over time. Black boxes and AI algorithms that continuously update themselves pose safety concerns that any regulatory system has yet to address.

For AI-based therapy, conventional healthcare laws cannot be implemented since they are distinct from a drug or vaccine. AI deals with machine learning, and the algorithm continues to develop because of its 'learning' capabilities. By the time a regulatory approval is granted for an algorithm, the algorithm "learns" from more data applied and thus evolves and becomes a completely different algorithm.

As with emerging healthcare technology, AI must be subject to regulatory approval. Start-ups are also expected to provide medical trial evidence while introducing their proposal to healthcare sectors to obtain medical practitioners' interest. Besides, there is no clear rule to adhere to when performing clinical trials of this kind. To address the safety and quality of AI-driven healthcare systems, an appropriate certification program is required and can help create trust among health care practitioners and patients.

A 'regulatory sandbox' may be introduced, a test box that allow people to work in AI and healthcare of India to develop and certified.

India currently lacks an AI Regulatory Authority in healthcare. Medical Council of India, India's General Drug Controller, or a new body explicitly developed for this field could be considered. The option may be allowing the MCI to regulate monitoring data problems by a regulator under the Data Protection Bill.

### **3.4 Cost, Investment, and Infrastructure**

A significant initial investment is needed for the advanced digital health infrastructure and automated technologies to incorporate Artificial Intelligence (AI) in healthcare.

Policymakers continue to neglect the infrastructure necessary for AI to take off in India. For example, cloud computing infrastructure is concentrated largely on servers in foreign countries. Nowadays, healthcare frameworks adjust computerized stages and end up being more patient-centered and data-driven [16].

Slow investment in local infrastructure also contributed to shifting many start-ups of India to outside India, where access to finance and technology has been made easier. The infrastructure issues are more prevalent in developing world rural areas. Electricity and the internet are not available in some areas, which need to be addressed in the design process. Furthermore, India's lack of technical infrastructure results in poor deep learning capabilities, which is a major obstacle to AI adoption in the healthcare sector.

The absence of a large native-install cloud on-demand network in India puts the latest developments in AI beyond the reach of government-funded research laboratories. Many companies cannot risk storing their data outside

India and accessing it through algorithms over which the Indian government has no direct control. This restriction implements AI technologies costing the private sector all the more. Without this vital infrastructure, India has struggled to reach the inflection point in AI output and profitability and will continue to struggle, even while market adoption is marching forward.

## **4. CONCLUSION**

Scaling up and delivering technology in India is a challenge. There is much hope for AI in healthcare, but progress and improvements need to be made in other fields before AI technologies can be implemented healthily and ethically. Society needs to address regulation, privacy, and socio-cultural problems, but some AI software platforms will help reduce some of the technical and technological debt challenges. The government of India takes up several initiatives to mitigate the privacy and regulation issues. The growing need for technology to address capital shortages in India and AI's ability to deliver affordable solutions suggests that India may soon be ready to realize the health outcomes benefits of these technologies. The government should provide funding and opportunities to enable private or public sectors to invest in AI. Aligning the profit incentive of private companies with social responsibility and public health advancement is critical. Innovative, sustainable, and scalable artificial intelligence technology in India can significantly improve health outcomes.

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## **CONSENT**

It is not applicable.

## **ETHICAL APPROVAL**

It is not applicable.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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