

CHALLENGES OF AI DRIVEN HEALTHCARE

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ABSTRACT:

Artificial Intelligence (AI) is defined as machines that exhibit specific aspect of human intelligence, including perception, learning, reasoning, problem solving, language interaction. Over the last decade, AI has been integrated into the sectors like education, finance and even healthcare. The possibility of technology enabling clinicians to help deliver improved patient outcomes will be the driving force in the next decades of precision healthcare that will be powered by bioinformatics, drug discovery, big data analytics and AI. Medical Artificial Intelligence (AI) applications have gained popularity in recent years due to improved computing power and access to large amounts of digital data. India being rapid growing economy has a significant role to play in AI revolution. “#AI for all” aims for effective AI implementation to develop scalable solutions for evolving economies and to confront some global challenges. Advancements in AI is quickly becoming an integral part of our day-to-day life in every sector including modern healthcare. The potential of AI in healthcare is used to uncover insights to improve healthcare outcomes & patient experience. This study provides overview of current status of AI in healthcare practices along with its challenges.

Keywords: artificial Intelligence, healthcare, patient care

INTRODUCTION:

In past few years, there has been significant progress in AI technology which is applied in every sector including education, judicatory services, medical care, environmental protection, urban operations and other sectors. Healthcare services include various member organizations, from pharma to technology companies supported by financial sponsors, that primarily focus on the consumer and health markets. Over the past decade, each of these segments has rapidly grown in number of stand-alone entities and centered profit pools.

Healthcare services and technology

The three areas stand out in terms of opportunities and challenges could be summarized as

1. *Data analytics and artificial intelligence (AI).* The Generative AI has aroused substantial interest in the health services and technology, but use of case improvement and its deployment are in their premature stage. The consumers of health care and health systems who have by now invested in data analytics (also in related infrastructure and governance) are beginning to distinguish themselves from competitors. There is an anticipation of increased focus on use cases that facilitate clear, impending operational value—for instance, AI that supports more rapid from end-to-end imaging equipment.
2. *Outsourcing the.* Strategic group of players, particularly the not-for-profit health systems and consumers, are confronted by financial headwinds. While many refrain to outsource due to its impact on employees, financial value proposition, increasing gaps in capabilities, and the helplessness to access the required talent is undeniable. Outsourcing dealings often involve legal processes that benefit from scale and automation (for example, transactional functions such as human resources and finance), but we are also considering point solutions and adoption in vital healthcare-specific business functions such as revenue cycle management.

3. The volume of *Global private equity* in healthcare has improved by 9 percent annually from the year 2017 to 2022. This period includes a material pull-back in 2022, when contract volume fell by 38 percent year after year. On the other hand, fundraising in healthcare remained resilient, with the first quarter of 2023. We see the following trends in 2024 of carve outs and public-to-private deals, especially as industry expectations of valuations and anticipated rates of return continue to reset: a. *Carve-outs*. As healthcare organizations have reduced R&D spending and completed portfolio evaluations in 2023, these strategic players have shown increasing interest in divesting business units that are further away from the core. Concurrently, the Private Equity Firms have expressed their interest in segments with attractive profit returns. b. *Public-to-private deals*. It is observed that the reduced valuation has increased the probability of opportunistic buying, especially from public assets for which PE has a strong value creation thesis. There is an expected increase in the number of these proposals to include partnerships between PE and strategic investors.

Pharmacy – In the recent years the pharmacy market has undergone major changes, which includes the impact of the COVID-19 pandemic, the connect of partnerships across the value chain, and the introduction of new business models. The revenue of Pharmacy dispensing increased by 10 percent in 2022, and is projected to grow at a 5 percent and CAGR, Compound Annual Growth is expected to reach more than \$800 billion in 2030. But at the same time there is a unrelenting pressure on the retail pharmacy as they continues to face reimbursement challenges, labor shortages, inflationary pressures, and a flattening of rates in generics dispensing. To address these headwinds, it is expected that the pharmacy chains will continue to optimize the store footprints through core operations by investing in technology enablement, such as micro-fulfilment centers and robotics, to develop workforce capacity and streamline dispensing costs, and AI to optimize pharmacist workflows, diversify and expand revenue streams beyond the core dispensing business through other healthcare services and the integration of recently acquired assets into a delivery ecosystem

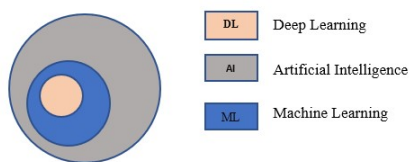
Growth in specialty pharmacy. Specialty pharmacy is one of the fastest-growing subsegments within pharmacy, with revenue rising more than 9 percent annually.⁵ This is due to continued growth in utilization and pricing as well as expansion of the treatment pipeline (for example, cell and gene therapies and oncology and rare disease therapies). The growth is expected to be offset partially by pressure on reimbursements, specialty generics, and increased adoption of biosimilars. Additionally, margins among specialty pharmacy players have been affected by manufacturer contract pharmacy pressures, creating headwinds for larger central fulfilment specialty pharmacies and tailwinds for some health system–owned pharmacies.

Evolving regulatory landscape. The pharmacy segment has seen increased calls from regulators to increase transparency of drug prices and improve affordability. Under the Inflation Reduction Act of 2022, the Medicare prescription drug Part D benefit is being redesigned through 2024–25. The redesign includes a new beneficiary out-of-pocket spending cap of \$2,000 and a substantial increase in plan liability (from 15 percent to 60 percent) in the catastrophic phase of coverage, increasing plans’ imperative to manage high-cost drugs. Additionally, the Centers for Medicare & Medicaid Services (CMS) is set to require pharmacy rebates under Medicare be shared with consumers at the point of sale; it also announced that price transparency rules will apply to prescription drugs.

AI has been used in medicine since the 1950s, when doctors first used computer-aided programs to improve diagnoses. [1]AI applications can be used in various medical practices/fields like diagnostic, predictive, surgical, clinical, and rehabilitation. As AI can determine the relationship in the raw data, it can assist in predictive and diagnostic treatment. AI also can be used in monitoring patients, and new drug invention. It can also support physicians in better clinical decisions while dealing with vast amount of data generated by clinical activities. AI technology can provide helpful insights by analyzing the raw data that will be used for patient treatments. AI tools can enhance accuracy, lower costs, and save time over traditional diagnostic methods.AI can help diagnose and treat medical conditions by analyzing images, X-rays, CT scans, and MRIs.

AI can detect abnormalities using machine learning techniques.

Understanding AI:



AI: broad term involving anything makes machines smart.

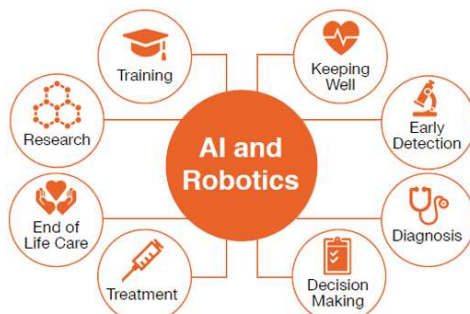
ML: subset of AI

DL: subset of ML

The four areas where AI would impact are: clinical decision support, healthcare administration, healthcare interventions, and patient monitoring.

HEALTHCARE ADMINISTRATION:

By making use of optimized machine learning algorithms, health services can assist clinic scheduling and patient prioritization, resulting in shorter wait times and more effective use of services. AI techniques can assist hospitals in predicting patient duration of patient stay at the pre-admission stage, ensuring efficient use of hospital resources. Clinical decision support: when compared to traditional clinical decision support systems based on traditional software engineering, artificial neural networks are expected to perform better in forecasting many medical conditions such as cancer, cardiovascular disease and diabetes risk. Patient monitoring: Due to Electronic health record and wearable devices yield large volume of digital data which can exploit the potential of AI for monitoring the patients. Healthcare Intervention: With the advancements in robotics in past few years made diagnostic & treatment speedier & less expensive. [2]



[source:<https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf>]

CHALLENGES IN IMPLEMENTING AI

Though AI technology brought revolution in healthcare, it has some shortcomings. Factors like dataset shift, unintentional biases in clinical practice, and the challenge of generalization to different populations. [3] AI has the potential to reform clinical practice, but some challenges must be addressed to comprehend its full potential. Innovations in healthcare with AI comes with its set of challenges regarding data privacy & data security. The basis of huge potential of AI lies in its massive datasets for training. Moreover, the medical data in healthcare institutes is HIPPA complaint & highly secured. Storing such critical medical data on single location can fall prey to the cyber-attack like ransomware. Hence its utmost need for regulations for protecting the patient data while dealing with AI. [4]

Bias: Foremost limitation of AI is the risk of bias in the medical data and algorithms used in AI based diagnosis. When the training data used for AI algorithm doesn't have diverse population, it may lead to biased outcome. Moreover, AI based diagnosis may not consider mental health conditions complexities which can vary patient to patient. Lastly, there is lack of empathy and personalization involved in AI based diagnosis for mental health care that is vital aspect for any successful treatment. [5]

Legal aspect:When it is concerned with medical data access and sharing, there is lack of formal regulation about privacy, security and anonymization of data.
Trust: For desired outcomes and to increase reliability, supply of AI training data sets should be augmented while maintaining its data availability, and addressing the security and privacy issues. To address these issues, one solution to have a trusted third-party host data. But then storing data remotely won't be feasible due to cost and trust issues.

Lack of Dataset: when developing robust set of AI application, it seems contextual to the sector. Talking about healthcare, different hospitals have adopted different ways of digitizing records. Also, there is absence of robust open clinical data set. Thus, sharing of data between various hospital chains remains challenging. [6]

Validations from experts:

To get the desired results, an appropriate methodology is needed. The design and application of AI tools is based on human contribution which is subject to bias, that AI may amplify if not closely monitored. Finally, human expertise and involvement are required to ensure the appropriate and practical application of AI to meet clinical needs, and a lack of this expertise may impede the practical application of AI.

Ethical issues:

Ethical concern related to privacy and security of medical data, regulations of anonymization of data. There has to be balance in between privacy & ownership of data. [7]

Consent: There are few points that remain unanswered like informed consent to use. It did not receive enough attention as far as ethical issues are concerned. Few questions arise during the said course of the patient treatment like a) Do clinicians have a responsibility to educate patients about the complexities of AI, such as type of ML used, potential biases, and data inputs or other shortcomings in the data? b) under what situation clinicians should disclose to the patients that AI being used for the treatment. C) To what extent clinicians should disclose that they can't interpret recommendations by AI? How much transparency should be there during the treatment? What if patient is not agree to allow certain category of the data? How much should user agreements resemble informed consent documents? What should be the content of ethical agreement?

Safety: When AI is involved in healthcare safety is the prime concern. For example, IBM kept Watson's treatment recommendations for oncology secret for over a year, which were unsafe and incorrect. Transparency builds trust among stakeholders which is a key to successful implementation of AI. There may be some legal issues related to intellectual property for this government or third-

party auditing can be a possible solution. To make AI safe developers need to make sure validity & reliability of datasets, and Transparency. To make accurate results, datasets must be valid and reliable along with further refined algorithm. Another issue is data sharing.[8]

CONCLUSION:

In this paper, researcher gave the overview of AI primarily focusing on the ethical and legal challenges of AI in healthcare. AI expenditure in India is expected to rise at a 39% CAGR to \$11,781 million by 2025. With the introduction of AI and its applications around the globe, AI is enabling various segments to thrive and changing the way we predict the future. While implementing the AI driven healthcare services, its associated challenges must be addressed. Challenges in the areas of healthcare like Data analytics and artificial intelligence (AI) its use of case improvement and its deployment are still in their premature stage. While considering outsourcing, Strategic players, particularly not-for-profit health systems and consumers, face financial headwinds. Many people are hesitant to outsource because of the impact on employees, the financial value proposition, the growing gaps in capabilities, and the inability to access the necessary talent is undeniable in which legal aspect is also involved. Further, the four areas where AI would impact has been discussed which are clinical decision support, healthcare administration, healthcare interventions, and patient monitoring followed by challenges in healthcare. The foremost challenge is the Bias comes into the picture when the training data doesn't belong to diverse population. Secondly, there is lack of formal regulation when it comes to privacy and confidentiality of the data. And then trust, lack of dataset, safety, legal aspect is discussed. To make this AI healthcare paradigm fruitful for societal needs it should be based on public trust. Thus, to exploit full potential of AI in healthcare, first we need to address its ethical and legal challenges.

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