

AI in Healthcare: Privacy, Trust and Ethical Challenges

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Artificial intelligence is an ever-growing technology that has proved its usefulness in the field of healthcare. However, AI has also raised several challenges and ethical concerns in relation to privacy and trust. Embedding this system in AI has raised some serious concerns from the unethical use of user data to taking responsibility in case of a mishappening. In this paper, we will give an overview of some of the facilitation of AI in healthcare and a review of some major areas of concern regarding the correct and ethical usage of this technology. The goal of this research is to state some approaches to the challenges introduced by AI in the healthcare industry.

Keywords: Privacy, Ethical challenges, Trust, Dangerous AI, Ethics.

1 Introduction

Artificial intelligence has the potential to transform the way it has been portrayed by patients and the public in general. It has the ability to manage tasks that can be as simple as keeping track of a person's weight and evaluating fitness to making clinical diagnoses and treatment plans. AI is not only performing tasks that would otherwise need human intervention but is also helping clinicians in pattern recognition, medical diagnosis, and analyzing big amounts of data in medicine and healthcare. It is not only reducing the burden of overwork and shortage of staff but is also helping in finding out signs that could otherwise be missed by a physician[1].

Various research and development in AI have proven their significance in AI. For example, IBM Watson, a question-answering computer system, is being employed for the task of finding treatments in the field of immuno-oncology[2]. Watson helps in assisting clinicians and practitioners with decision-making with the help of its hypothesis creation and evidence-based learning[1].

Another such emerging AI application is Google's Deep Mind Technologies has taken an initiative in researching in the field of healthcare. The motto of this department is to provide support to doctors and clinicians and develop tools that can have a positive impact on patients and care teams by building applications that can help detect diseases at an early stage when there is a possibility of it being hidden from the human eye[3].

2 Literature Review

The rapidly advancing technology is the primary tool for the creation of ideas in this dynamic age. Authors in [4]discussed how AI applications are transforming not only the way care is delivered to patients in terms of diagnosis and treatment, but also the way people are changing their lifestyles. Since machine learning algorithms in the systems require a significant amount of data for an effective diagnosis, it is critical to gather and evaluate data of various sorts (e.g., incorporating ethnic and cultural features of patients). Some approaches have been discussed to manage the applicability of AI in healthcare which includes structuring a proper legal framework to monitor access to information and metadata, encouraging public participation to acquire quality data, and lastly the involvement and close participation of nurses, doctors, pharmacists, and social workers from the development stage.

Authors in [8] have exhaustively discussed the various applications of AI in the healthcare sector and have discussed its potential to provide healthcare providers with help for areas like treatment, diagnosis, and administrative tasks. While some highly believe that AI is performing just like a human and in some cases even better, others believe that it will be a long time before AI replaces humans.

Authors in [13] have asked more ethical questions related to emerging medical issues like Will the integration of robots and AI in healthcare release humans from their medical duties or will they be replaced? Would people deteriorate and lose motives like curiosity and the spirit of inquiry and discovery that underpins many scientific breakthroughs?

Authors in [15] discussed the current state of patient safety and debated who or what should be held morally accountable in this complex socio-technical system. It further stated that there is a need to properly define the concept of moral accountability and to consider that all aspects of safety cannot be resolved during the process of designing these artificial systems.

3 State of Art of AI in Healthcare

With the rapid advancements of AI and related technologies, it is no doubt that we have entered an era where AI is making huge improvements and impacts on the activities of the healthcare system and care services.

With its foot rightly set in healthcare for enhancing the quality of lifestyle or the way how these technologies work in optimizing and interacting with patients, AI is gradually transforming how healthcare systems are operating[4]. Described below in the section, are the various real-world applications of Artificial Intelligence in healthcare:

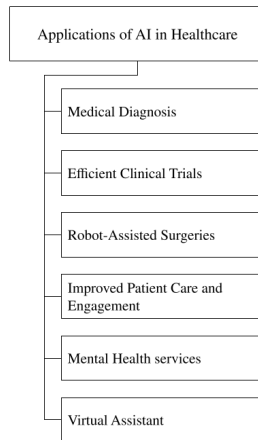


Figure 1. Applications of AI in Healthcare

3.1 Medical Diagnosis

The usage of AI has been anticipated in assisting doctors in diagnosing specific diseases. A study conducted by Taylor in [5] concludes that medical miscalculations and inaccuracy are the primal cause for fatalities up to 80,000 each year in U.S. hospitals. The UCL Institute of Ophthalmology and Moorfields Eye Hospital had a breakthrough with their AI system, which predicted the correct referral decision for over 50 eye conditions with 94% accuracy, matching expert opinion[7]. It is, therefore, possible with the help of AI-based systems, to eradicate these errors made by human judgment. Wang in [9] reported that in a colonoscopy exam, an AI-supported system was able to detect 20% more polyps than those discovered by gastroenterologists. This examination indicated that AI systems help in detecting these problematic polyps in the colon that could have been missed by physicians. These smart AI systems help in reducing the error rate and possibilities while improving care facilities side by side.

3.2 Efficient Clinical Trials

The traditional method of clinical trials, which involves randomized controlled trials, has been considered the go-to method for establishing the efficiency and immunity of drugs. However, this linear and sequential approach has taken a tremendous amount of money and effort by clinicians and the success rate is relatively low. With the advent of clinical trial automation, AI-assisted clinical trials

have proven to be more efficient in handling large amounts of data and producing detailed and valid results.

Another example is of Biopharma Businesses that deal with real-world data(RWD)[8]. Earlier these companies lacked the necessary tools for analyzing such dynamic data. But now, with the assistance of predictive AI models, they have been able to successfully analyze and understand diseases and patient-related data deliberately.

3.3 Robot-Assisted Surgeries

Another major step of AI in healthcare is the utilization of Robots in surgeries. These have allowed surgeons to use small tools and aim for high precision in surgeries that were previously impossible to perform. It has enabled surgeons to perform operations with more control and flexibility and draw benefits from real-time data and previous successful data from them. Thus, they are benefitting a lot through AI-based technologies.

3.4 Improved Patient Care and Engagement

Active participation of the patient is essential in the treatment process to ensure patient safety and constant trust towards the medical staff. It has been noted that the active involvement of patients in medical sessions promotes a positive experience for them leading to satisfaction regarding care facilities [10]. This further leads to positive treatment results and improved care quality.

Building trust regarding AI-supported medical systems can be done by first familiarizing the patients with this technology. Social media or mass media platforms can play a major role in helping the public acquaint themselves with this concept. Clinicians, on the other hand, can provide more Clinicians, on the other hand, can elaborate on this direction of treatment that has a prospect of faster and accurate diagnosis as well as educate them about the merits and demerits of relying on these new systems [4].

3.5 Mental Health

Over the period of two years, we have seen that the healthcare sector has digitalized, mainly in the form of telehealth services. There has been a huge rise in the number of individuals requiring mental health care because of the ongoing pandemic [11]. A need for extensive availability and accessibility for mental health services has been recognized, especially for the young LGBTQ people. According to the statistics collected by The Trevor Project, which is a suicide prevention organization, it is estimated that one LGBT youth commits suicide every 45 seconds, with over 1.8 million of them considering suicide each year. To take necessary action, The Trevor Project and Google.org recently announced a collaboration called The Crisis Contact Simulator (CCS), which has been built up with the help of a team of 30 Google.org fellows, not only acts a simulated counselor for LGBT youth in crisis but also allows aspiring trainers and volunteers to practice realistic conversations to acquire the necessary skills before taking live ones [12].

4 Trust and Ethical Issues with AI in Healthcare

With a significant increase in the deployment of AI-based systems and tools in the domain of healthcare, concerns and questions have been raised regarding its impact on the patients, medics, and ethical boundaries of cultures. The use of AI in the medical industry poses several privacy and ethical issues, including the protection of patient data, the ethical limitations of innovation, and the real influence of technology on doctors and patients. Since healthcare is an area that is directly related to a

patient's immediate well-being, there are certain aspects of law and regulations that it must comply with to guarantee that the technology is being used for the greater good of all.

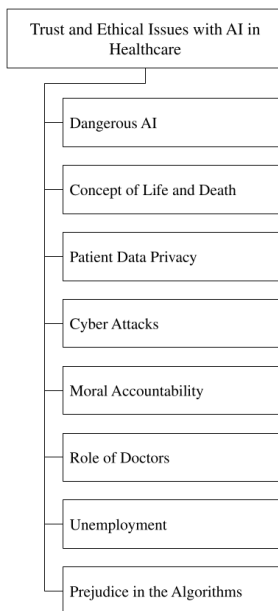


Figure 2. Trust and Ethical issues with AI in healthcare

4.1 Dangerous AI

There are also special challenges we may encounter while applying AI in healthcare, taking into account the social and safety elements. With embedding AI into healthcare and introducing it to a broad range of people can, there is a possibility of receiving criticism and prejudice because of the common culture's perception of "scary AI," [13]. This worry stems from the idea given in Čapek's play that an artificially made species might develop autonomy, become more intelligent perhaps physically powerful, and rise up against and destroy its creator.

4.2 Concept of Life and Death

One of the first ethical dilemmas came into the picture with the advent of machine-aided regarding life support. While many believe that these man-made tools extend the life and have the potential to improve lifespan and happiness, others disagree by stating that death is a natural process and hence, inevitable. Their strong belief that death should come as a natural consequence questions the concept of life and death and what meaning it holds.

4.3 Patient Data Privacy

Integrating AI with healthcare brings about another challenge that is associated with the privacy of patients' data. Data has now become a real currency. Data from our smartphones and information about our whereabouts through tracking phone location are some of the data points that we have

become familiar with. It is no doubt that citizens are being weary of someone else possessing this kind of sensitive information about themselves. This mistrust has increased because of the increasing awareness of people about the misuse of data for microtargeting and behavioral advertising, which is eroding public faith in how private and public entities manage our personal information. They need to be made aware that their information is being used to feed an AI algorithm[14].

4.4 Cyber Attacks

Another important aspect of privacy is safeguarding information and people from cyberattacks. Since this area directly affects human life, there is always a fear of AI turning into a weapon to harm individuals physically. The risk can come in the form of a remote cardio stimulator being hacked or an error in the algorithm that could lead to prescribing the wrong drug or procedure that may turn deadly.

4.5 Moral Accountability

Following these discussions, another question arises about accountability for these errors. Who will be held responsible if an incident happens? Who will be held morally accountable for an artificial intelligence system's decision? Since actions like blaming and praising are common in social practice, people tend to hold the clinicians responsible as they have sufficient understanding of the actions and know about the likely consequences[15]. Moreover, it is the responsibility of the clinician to interpret the result.

4.6 Role of Doctors

Doctors are faced with yet another problem. With the introduction of AI diagnostic systems, their role as a physician has been affected. We cannot disagree that AI-based tools have been able to do better in disease diagnosis and analyzing patient medical data accurately, but such involvement has raised questions about whether AI is replacing doctors.

4.7 Unemployment

The dilemma about the role of doctors and physicians raises another question of unemployment. A real-world example is a Japanese health insurance company that fired about 34 employees after it introduced Watson Explorer, IBM Watson's remote interface[16]. Moreover, a patient's participation may reduce if doctors are excessively replaced by technology. We must keep in mind that AI's most powerful use is to enhance human capabilities, not replace them[6].

4.8 Prejudice in the Algorithms

AI has the potential to create biases. While some may believe that focusing on objective facts will eliminate prejudices against minorities, a new study reveals disparities in AI systems. According to a study published in Science in 2019, a U.S. hospital algorithm consistently discriminated against black patients by allocating less care to them. It will only be possible to achieve consistent progress if consumers and healthcare systems view each other as trusted partners[19].

5 Conclusion

As artificial intelligence (AI) grows more common in modern business and everyday life, it is increasingly being applied in healthcare. The implementation of AI in the medical field is promising and hopeful. But it is also a field that has sparked concerns and ethical challenges[17].

To improve the accuracy of AI-assisted systems in diagnosing patients, the market should build systems for each specialized field using machine learning algorithms. These systems should be designed to handle diverse sets of cases to improve the accuracy of their diagnosis.

While many patients may not be aware of AI or AI-supported systems, their participation in the treatment process is more likely if they learned about the potential advantages of these systems.

Final decisions about whether to integrate certain technologies are usually made by people who are not computer experts and have little idea about AI.

For safeguarding the safety of user data, Data Privacy Assessments should be conducted to determine the right technology that should be used.

- Algorithms should be thoroughly checked for any kind of bias that might be embedded into them due to historic data or any kind of class associations.
- Authentication and authorization should be taken seriously through maintaining records and logs of who is analyzing what data or the modifications done are permissible to that individual.
- Procurement law in the healthcare setting must ensure that third-party purchases of AI systems follow strict procedures, including evaluations of how the algorithms have been trained and assigned a Trustmark recognizing due process in their algorithm processing[18].

The application of XAI techniques (Explainable AI) can also help in explaining the reasons behind the AI-based system's predictions.

- XAI methods provide adequate transparency to understand why the AI system came to this decision. These explanations are not only useful for end-users but also for clinicians in the medical field[20].
- The explanations provided by XAI approaches can be utilized to track down the elements that influenced the AI system's decision-making. This feature helps in backtracking and tracing results.
- The explanations and reasoning provided in models further form the basis for developing a better version of the existing system to eliminate erroneous predictions and generate better results.

Lastly, we feel that some of the primary positive and negative concerns associated with the use of AI-based technologies should be investigated in order to ensure that AI is used wisely and widely in the healthcare business.

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