

Forum: General Assembly 3 (Social, Humanitarian and Cultural)

Issue: Measures to insure patient privacy and ethical considerations in AI-driven healthcare

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Introduction

Insuring patient privacy and ethical considerations in AI driven healthcare is a predominant issue in today's world. Artificial intelligence (AI) has revolutionized the healthcare field. The use of AI in healthcare can benefit medical practices by enabling faster diagnoses, personalized treatments, and more efficient resource management. AI has changed the world of medical imaging and diagnostics, drug discovery and development, robotic surgery and automation, predictive analytics, risk assessment and so much more. It has the potential to reduce emergency room visits and hospitalizations by 79.2% and healthcare workers' errors by 86% ("AI in"). It is a game changing tool that can save lives and increase the proficiency of healthcare systems. In recent years AI in healthcare has seen skyrocketing growth, AI's market which is currently valued at 26.69 billion USD is expected to be valued at a around 613.81 billion USD by 2034, growing at a CAGR of 36.83% from 2024 to 2034 ("Precedence Research").

However, with AI being a relatively new technology, it still faces some shortcomings. The extent to which AI should be used in healthcare is still being debated as Artificial intelligence phases many ethical issues such as, job loss, digital amplification, widening social gaps, and arguably the most important, privacy concerns. Cybersecurity in AI, much like AI itself, is still developing and the ethical issue of privacy in healthcare is not to be taken lightly. Ethical considerations and privacy in healthcare are globally significant as they affect human rights, social trust and are currently diminishing ethical standards and data privacy laws. Patients' private information is being unconsensually leaked and shared due to flaws in AI systems. AI is

the future of the world and innovative solutions, international policies, and resolutions need to be set in place in order for future generations to thrive

Definition of Key Terms

Artificial intelligence (AI):

A digital computer or computer-controlled robot's capability to execute tasks often associated with human intelligence.

Ethics:

“The branch of knowledge that deals with moral principles, duties and obligation”
 (“Oxford Dictionary”)

Healthcare:

Efforts made by trained and licensed experts to preserve, restore, or promote someone's physical, mental, or emotional well-being

Privacy

The right to keep one's personal life or information secret or known only to a small number of people.

Patient

An individual undergoing or registering for medical treatment

Informed consent

“The process of communication between a patient and health care provider, which includes decision capacity and competency, documenting informed consent, and ethical disclosure” (“Farhud and Zokaei”)

Cybersecurity

Protection Of systems, networks, and programs, against illegal use of electronic data

Background Information

AI's position in healthcare is to analyze health data, medical device images and improve diagnoses and outcomes, it is also beneficial to accelerating health research activities. AI applications in healthcare have changed the medical field. It has benefited imaging and electronic medical records (EMR), laboratory diagnosis, treatment, enhancing intelligence of the physicians, new drug discovery, providing medicine, biological extensive data analysis, speeding up processes, data storage and access for health organizations ("Farhud and Zokaei"). However, patient privacy is a large struggle when using AI and has had various ethical and legal challenges. The use of AI in healthcare transcends borders, and it is therefore important to explore how different nations and regions approach the ethical considerations. Regulatory frameworks and ethical guidelines have extreme diversity, seen in various cultural, societal, and regulatory contexts

Ethics

Under the umbrella term of ethics there are many different issues that need to be addressed when using AI in healthcare.

Social gaps and justice

Less economically developed countries (LEDC) do not have access to the latest technologies. This is an ethical struggle as it could raise the issue of social gaps and justice. AI widened the gap between LEDC's and more economically developed countries (MEDC). This is something to take into consideration for the future prospect and security of less economically developed countries.

Joblessness/ unemployment

Joblessness and unemployment have been byproducts of the rise of AI. Many people will continue to lose their jobs as robot technologies develop, which could also further socially gaps in communities and countries. Without the correct regulations, support systems, and tackling of the issue many people's livelihoods could be ripped apart.

Digital Amplification

Another struggle is digital amplification. This indicates that depending on the programming of AI systems, they may overlook some information and prefer/point out information that matches their prejudice. This can be extremely harmful in regard to medical healthcare as it could diminish the thoroughness of spotting medical issues and potential for misinformation.

Lack of Empathy, and Sympathy

Robots and AI have yet to evolve to have empathy, and sympathy to the extent of humans. This can have significant consequences as AI tools do not understand the gravity of the information and data provided to them in the same way medical professionals do. This raises a large ethical concern towards the trust and power these tools are given as they lack understanding of the emotional responsibility they hold.

Healthcare professional's ethical implications of using AI tools in their practice

Ethical considerations also extend to healthcare professionals who use AI systems regularly. It is important to educate doctors, nurses, and other healthcare practitioners about the ethical implications of using AI tools in their practice and how to correctly use it.

Transparency and accountability

Furthermore, transparency and accountability have large ethical implications. In critical fields like health care transparency is vital to be informed on how decisions are made and who holds responsibility for them. Clarifying accountability is critical when AI systems make errors or cause harm, ensuring appropriate disciplinary actions can be taken.

Privacy

Arguably, the most significant ethical challenge in AI application is cybersecurity and its impact on informed consent of patient data and patient privacy.

Informed Consent and Autonomy

Informed Consent and Autonomy is another ethical issue faced when using AI. Healthcare patients have the right to be informed of their diagnoses, health status, treatment

process, test results, costs, health insurance share, or other medical information. With the advance of AI in healthcare, protecting individuals' private data is becoming progressively more challenging as the need for large-scale data sharing increases the risk of data breaches and privacy violations.

Patient data Privacy and anonymity

Forced attacks by third parties and data reconstruction attacks harm the relationship between medical practitioners and patients, as well as the willingness of more participants to disclose personal information with AI models. Since the future success of AI models is dependent on volunteers to test the systems, this could have large effects on AI's development in healthcare. More importantly an attack could cause a breach of patient data privacy regulations. The privacy risks include data breaches, DNA phenotyping, pedigree analysis, and re-identification through data linkage attacks. Although data privacy regulations and protection of healthcare data vary depending on the country globally, they are considered highly important.

Major Countries and Organizations Involved

The challenge of shaping ethical grounds in AI healthcare is a duty shared among various stakeholders. Including healthcare providers, technology corporations, governments, and individual patients.

United Nations (UN)

The United Nations General Assembly (UNGA) passed the first global resolution regarding artificial intelligence on the 21st March 2024. Led by the United States, the resolution urged member states to protect human rights and personal data while also monitoring AI for possible risks so that the technology can benefit everyone. This resolution is a global effort to ensure the ethical and sustainable use of AI.

European Union (EU)

The European Union's General Data Protection Regulation declares the protection of personal data as a fundamental right. The General Data Protection Regulation (GDPR) is the strongest privacy and security law in the world as it amended the privacy legislation in other countries. Following these regulations, all personal data and the activities of foreign

communities and companies are processed by the union-based data processor to protect the information of everyday citizens. Notably, some of the laws put in place to cause the removal of personal identifiers such as, name or date of birth, de-identification which hope to offer sufficient protection have proved to have many shortcomings in their attempts.

The African Union (AU)

The African Union's (AU) Development Agency (AUDA) released a official report on a pan-African AI policy. It aims to facilitate the adoption and deployment of AI technology throughout Africa. The report has many goals but most importantly one of its aims is to minimize risks, it emphasizes ethical development of AI, the prioritization of human rights, cultural diversity, and social well-being while still maintaining legal and regulatory safeguards.

European Institute of Innovation & Technology health

EIT Health was established in 2015, as a branch of the European Institute of Innovation and Technology (EIT) that focuses on knowledge and innovation. EIT Health is a collection of public and private experts across the healthcare chain that advocate for advancing AI in order to transform healthcare delivery safely and responsibly. They have approximately 120 EIT healthcare partnering organizations that come together to solve some of the biggest health challenges Europe faces. They empower innovators to “overcome barriers, challenge convention and take action to put innovative products and services into the hands of those that need them the most.” (“EIT Health”)

The International Telecommunication Union

The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies. The ITU is one of the main organizers of the AI for Good summit. The platform was founded in 2017 and identifies the “practical applications of AI to advance the United Nations Sustainable Development Goals and scale those solutions for global impact.” (“ITU”) It created a space for international collaboration on a global AI framework, and prioritized transparency and standards for responsible AI adoption. The ITU also worked collaboratively with WHO to form a focus group on artificial intelligence for

health (FG-AI4H).

The Global Initiative on AI for Health (GI-AI4H)

The Global Initiative on AI for Health (GI-AI4H) is also a collaborative institutional structure fronted by three specialized agencies of the United Nations, which are the World Health Organization (WHO), the International Telecommunication Union (ITU), and the World Intellectual Property Organization (WIPO), which each bring skill specific skill sets and contributions to the initiative. Its mission is to enable, facilitate, and implement AI in healthcare and it strives to “to establish robust governance structures, policies, and normative technical guidance, policies, and standards, that guide the evidence-based adoption of AI for health, ensuring trust and ethical practices”(“Global Initiative on AI for Health”) . GI-AI4H wants to format a global community of experts and resources to share knowledge, develop sustainable models, take action in order to accelerate the power of AI in healthcare and, make AI solutions accessible across different healthcare systems.

Timeline of Events

Date	Description of events
1956	The term "artificial intelligence" was created during the Dartmouth Summer Research Project, laying the conceptual foundation for AI. (“Team”)
1960s	Early explorations into AI's potential in healthcare begin, focusing on basic pattern recognition to aid in diagnostics. (“Team”)
1970s	Development of expert systems like MYCIN, designed to diagnose bacterial infections and recommend treatments, showcasing AI's potential in medical decision support. (“Team”)
1980s-1990s	Advancements in computing power to enhance AI research, leading to improved data collection, processing, and the implementation of electronic health records. (Xsolis)

early 2000s	Significant progress in deep learning models addressing previous limitations, enabling AI systems to analyze complex datasets and support clinical decision-making more effectively. (“Team”)
2010s	AI's role in healthcare expands notably, with systems capable of analyzing vast amounts of data, assisting in diagnostics, personalizing treatment plans, and improving patient outcomes. (“Team”)
2020s	AI becomes integral to various healthcare applications, including diagnostics, patient care, administrative processes, and telemedicine, continually advancing to enhance clinical practices and patient outcomes. (“Team”)

Previous Attempts to solve the Issue

Anonymization

Various protective strategies are used in an attempt to combat these privacy risks such as controlled access, anonymization, federated learning, differential privacy, and blockchain technology (“Zhou et al.”). Nonetheless, these AI technologies face various challenges, such as model training weaknesses. Data extraction can be possible through the recovery of training samples, which risks private information being leaked. When malicious third parties attempt to access privately kept information they commonly get passed de-identification techniques such as anonymization by doing re-identification attacks. For the case of medical imaging data facial contours of patients can be found by reconstructing MRI scans even when patients names are removed, therefore allowing for the re-identification of the patient through publicly available photographs

Possible Solutions

AI systems that process sensitive data should not only rely on de-identification techniques. A study by Na et al. found that an algorithm could be used to re-identify 85.6% of adults and 69.8% of children in a physical activity cohort study, despite data aggregation and removal of protected health information (“Murdoch”). In attempt to solve the issue professionals have begun using a wider variety of privacy-enhancing technologies (PETs) in order to protect

sensitive medical data while maintaining a diagnostic model performance. These systems can give professionals objective or formal guarantee of privacy protection.

Differential Privacy (DP)

Differential Privacy (DP) is a type of PET that has a leading method for protecting patient privacy when using AI. It adds “noise” to data or the results which prevents the identification of individuals, even if attackers have extra information. In DP noise is a way of saying that it adds random changes to the data or the results of computations in a controlled way. This makes it harder to identify or infer any specific individual's information, even if someone has access to additional data or knowledge. Its purpose is to keep anonymity and prevent attacks. The noise is carefully calibrated to balance privacy and utility and ensures that the output is similar but not too similar that individual's data can be easily found. Unlike other methods, DP provides useful insights while ensuring a controlled level of privacy. A study found that a DP privacy-protected model may offer robust privacy protection while losing only around 10% of the model's efficacy, performing at 90% of the level of the non-private model. In other words, they were able to add strong privacy protection while only losing about 10% of the model's effectiveness (“Ziller et al.”)

Additionally, the successful implementation of new possible solutions require stakeholders to focus on, protecting patient privacy, maintaining data security, promoting transparency, and ensuring fair access to AI use.

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