

Forum:	Special Conference 2
Issue:	The question of AI as a potential means to transform healthcare
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Introduction

Artificial Intelligence is now an ubiquitous tool which has been integrated in almost all aspects of daily life. One of these sectors in which AI's use has been and is being explored is healthcare.

The concept of artificial intelligence was first introduced in 1955 with AI applications entering the healthcare field in the early 1970s, one of the first being MYCIN¹⁸. In recent years, it was found that around 4.5 billion people lacked access to essential healthcare services globally. There is a projected shortfall of 11 million healthcare workers by 2030¹⁶. These are gaps which AI technology has the potential to help close. The global AI healthcare market is projected to grow from \$39.25 billion in 2025 to over \$500 billion by 2032³. The World Health Organisation frames AI as a “game changer” for public health. Its advantages in this sector are disease diagnostics, optimisation and faster drug development. However, privacy, data collection, algorithmic bias and the nature of Black Box AI¹⁰ all raise concerns regarding to what extent AI should be implemented in healthcare.

Definition of Key Terms

Algorithmic Bias

Algorithmic bias in a computer system are errors that create prejudiced outcomes, often caused from the select/biased data which was used to train the algorithm¹⁸.

Artificial Intelligence

The term artificial intelligence, often abbreviated as AI, refers to a computer system which is able to perform tasks by simulating human intelligence¹⁸.

Black Box AI

A Black Box is an AI system in which only the inputs and outputs are visible, while the inner workings are illegible. This also means that the developers of the AI cannot properly understand how the AI makes its decisions and arrives at its conclusions. The opposite of this is an explainable AI¹⁰.

Deep Learning (DL)

A specialized type of machine learning (ML) that uses artificial neural networks with multiple layers to learn from large amounts of data⁴.

Machine Learning (ML)

A type of artificial intelligence that allows computers to learn from data and improve their performance over time without being programmed to do so⁵.

MYCIN

MYCIN was a system used to identify types of bacteria that caused infections. It influenced the development of numerous subsequent expert systems and was a key step in the evolution of medical AI, though it was never actually used in practice¹⁸.

Project Nightingale

Project Nightingale was a 2019 initiative where Google Cloud partnered with the healthcare provider Ascension to collect and analyze health records of millions of patients without their direct knowledge or consent, aiming to develop AI-powered healthcare tools¹¹.

World Health Organisation

The World Health Organisation, often abbreviated as the WHO, is the United Nations' specialized agency for global health.

Background Information

The integration of artificial intelligence in healthcare is a complex topic with perspectives that cover both opportunities and notable challenges.

Some of the main difficulties lie in accessing enough of the relevant data that AI models and processors need. For machine learning and deep learning models to accurately classify or predict various patterns, large datasets are required. Fields that have had easy access to large amounts of data have seen the most substantial advances in refining ML

algorithms. These algorithms are immensely beneficial; they can find medical results that have been overlooked by human doctors, allowing for premature diagnosis. These ML models can thus reduce the probability of error in diagnosis caused by human mistakes, while simultaneously being able to process huge amounts of data at once¹⁸. However, due to the confidentiality of patient records, healthcare institutions are usually reluctant to share such data.

Moreover, the opposite problem also exists: the mismanagement and nonconsensual use of such data. This is when healthcare providers might permit the use of patient data for AI research without explicit approval from the patients. An example of this occurred in 2018 when Google acquired DeepMind, a software company at the forefront of healthcare AI; the data of 1.6 million patients were uploaded to DeepMind servers by the United Kingdom's National Health Service without the patients' consent to develop and construct their medical algorithm, Streams⁷. A patient data privacy investigation on Google's Project Nightingale, which raised privacy fears *because* of Google's involvement with the DeepMind controversy, was carried out by the United States of America. It found that Google had partnered with Ascension, which allowed it to store and process the personal medical data of up to 50 million customers of Ascension to develop AI models for the project¹¹.

The issue of AI integration into healthcare is especially complicated, as the world is still struggling to strike a balance between ethically collecting data (so that the AI can perform its job to its highest potential) and collecting *sufficient* data.

Major Countries and Organisations Involved

The United States of America

The United States is the world's biggest investor in AI. From 2013 to 2024, the U.S. has raised \$471 billion in AI private investment⁹. American companies like Nvidia have led the way in developing the powerful computing chips and large language models that form the foundation of today's generative AI chatbots. President Donald Trump claimed that "AI is taking over the world" at his second state visit to Britain in 2025 where he and U.K. Prime Minister Keir Starmer signed a "Tech Prosperity Deal" to jointly develop AI models for healthcare, among other things¹³, reflecting the U.S's views on the matter.

The United Kingdom

As evidenced by the aforementioned events concerning the NHS and DeepMind, as well as the deal between Trump and Starmer, the United Kingdom has consistently found itself at the forefront of AI implementation in healthcare. They are the third biggest investor in AI development in the world, with an investment of \$23 billion (2013-2024)⁹. Through their signed deals and activities it is evident that the U.K. clearly recognises the inevitable truth that AI is benefiting the healthcare system. One official from the U.K.'s Medicines and Healthcare products Regulatory Agency stated that:

“AI has huge promise to speed up diagnoses, cut NHS waiting times and save lives...”⁶

China

China is the world's second biggest AI investor with an investment of \$119 billion between 2013 and 2024⁹. China's AI healthcare sector operates within a broader framework of state-driven strategies. Initiatives are deeply embedded into national policies like Healthy China 2030 and the New Generation AI Development Plan¹. These programs make sure the development and deployment of AI in healthcare are closely aligned with government priorities for public health and technological advancement. China's views were made clear by an issued Chinese State Council guideline on developing AI⁸, which suggested that the widespread application of AI would improve the level of precision in medical services and achieve intelligent medical care.

Viable Solutions

Multiple complex problems arise from the increasing use of AI in healthcare, including patient privacy, addressing the commonly used black box algorithms, as well as ethically collecting data. Federated learning and differential privacy could be solutions for protecting sensitive data, and explainable AI perhaps could instill more trust in AI algorithms, but these approaches are still fragmented and a more comprehensive one is undoubtedly required. This involves establishing regulatory frameworks and could even include a human-AI hybrid type of machine learning system. Leading intergovernmental organizations like the WHO, which have already achieved the first step of reducing fragmentation by allying member states together under common guidelines, must further push for global standards on ethical AI practices, and must encourage private tech

developers to uphold strict privacy protocols. It is indubitable that achieving the full potential of AI in healthcare requires a multilateral effort to balance technological innovation with legal and ethical safeguards.

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