Editorial

The Artificial Intelligence Revolution and Healthcare: Challenges and Opportunities

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The end of 2022 and the beginning of 2023 witnessed one of the most important developments of the modern era, represented by OpenAI's launch of its ChatGPT model. Many companies followed suit, launching numerous Large Language Models (LLMs), commonly referred to as Artificial Intelligence. While the world was preoccupied with these amazing developments, we in Sudan were preoccupied with an unfortunate war that erupted during the same period. Hopefully, the war is nearing its end, and this is a good opportunity to return to and discuss Artificial Intelligence.

Despite the recent popularity of the term, Artificial Intelligence began with the creation of computers in the middle of the last century. At that time, scientist Alan Turing posed his famous question: Can a machine think? (1)

DOI: https://doi.org/10.69993/2025.3.1.en1

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The term was first used in 1956 at the Dartmouth Conference. Artificial Intelligence (AI) can be defined as advanced computer systems capable of simulating human mental abilities, such as thinking, problem-solving, and decision-making. (2)

One of the defining moments in human history was the computer IBM's Deep Blue's victory over the world chess champion in 1997, and the same thing happened again in 2016 when Google's AlphaGo defeated the world champion in the game of Go. This demonstrates the great capabilities these machines possess, prompting talk of super-intelligence that could control humanity in the future, as science fiction writers have long envisioned. (3)

The field of medicine and health, like many others, has benefited from AI in countless applications. Three examples of its applications can be cited: disease diagnosis, treatment, and medical data management.

AI has contributed significantly to the diagnosis of many diseases with an accuracy that matches or exceeds human capabilities. Examples include its use in radiological diagnosis of lung diseases in X-rays, and breast cancer in mammograms, as well as diabetic

retinopathy with retina images. Tests are also conducted in the process of genetic analysis, predicting future diseases, and developing personalized medicine. (4)

In treatment, AI has accelerated the development and testing of many drugs, especially during the COVID-19 era. Surgical robots like Da Vinci Surgical System are examples that use AI, demonstrating high capabilities in complex surgical operations. (5)

In medical data management, AI has contributed significantly to rapidly analyzing massive medical data and promptly producing results and predictions that were previously very difficult to achieve. This has helped develop tools to aid timely decision-making. Furthermore, electronic medical records have evolved significantly with the help of AI, partnering with healthcare providers at various stages of patient diagnosis and treatment. (6)

Despite its promising uses in the medical field, AI is not without risks and drawbacks. For example, over-reliance on machines can lead to medical errors for which the machine cannot be held accountable. Furthermore, incomplete data in medical records can lead to biased or inaccurate results. Among the biggest challenges are the privacy and confidentiality of patient data, as well as the ethical issues related to AI. (7)

Concerning this matter, AI offers significant benefits in medical education. Future doctors are fortunate to have these tools, which have saved them hours of searching. Professors have also benefited from customizing educational content, automated test-scoring, and academic analysis to predict student performance. Nevertheless, many caveats remain, including the lack of reliability of the information provided to students and a lack of reliance on the important human element in education. (8)

Not far from medicine and healthcare, a revolution has taken place in the field of scientific research and publishing with the use of AI tools. However, many challenges have emerged, which we, particularly at the *Journal*, have faced in setting the necessary guidelines for dealing with scientific research. These developments are too numerous to list in words.

The Sudan war inflicted many tragedies, destruction, and devastation of infrastructure, yet there is still an opportunity to catch up with the World in AI. Here, we acknowledge the role of the numerous national institutions that worked during the war to provide healthcare with impartiality and dedication.

Sudan, like other developing countries, needs to adopt AI more widely. This begins with its inclusion in university curricula, in addition to increasing support for the acquisition of AI-based devices and technologies. Most importantly, the enactment of laws and regulations that facilitate and regulate the use of AI.

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A Publication of Alfajr College for Sciences and Technology

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Volume 3, Issue 1, Jan – Apr 2025

ISSN: 2948-3026

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