## EDITORIAL

# ARTIFICIAL INTELLIGENCE IN MEDICINE

MAHMUD HASAN

The ability to learn, make decisions and solve problems is considered to be part of human thinking capacity. It called artificial intelligence (AI) when a machine can achieve these capacities autonomously. Storage capacity of computers have advanced so far that great parts of human knowledge can now be kept in store and accessed readily. Vast stores of information and much faster computing have enabled practical and real time relationships to be found in the data that was not possible in the past[1,2]. Although the computers were much slower and the storage capacity much more limited in the early stages, it was possible to perform some repetitive human tasks that were prone to human error even in the 1990s and the early 2000s.Reading of ECGs, white cell counts, analysis of retinal photographs and skin lesions had been introduced in daily clinical practice. From the beginning of the development phase there was recognition by researchers and developers that AI systems in healthcare needed to recognize that perfect data is absent and the system should be based on the expertise of physicians. Development included fuzzy set theory, Bayesian networks and artificial neural networks in building up intelligent computing systems in medicine.

Machine learning is a type of AI where the computer can learn and improve its performance without programming.Deep learning is AI in which multiple layers of networks can continue to learn as it performs routine work. These systems have the ability to analyze much greater amount of data than humans. One application of AI in North London is being used to determine priorities in emergencies in one million patients. Such systems can analyze much more data than one physician can in his or her whole lifetime. Remarkable progress have been made by AI in the field of medical science, providing a powerful tool for improving healthcare delivery, patient outcomes, and disease prevention. AI has the potential to transform the way doctors diagnose and treat illnesses, and its impact is already evident in several areas of health care.

One of the most significant applications of AI in medical science is in disease diagnosis. AI algorithms can analyze vast amounts of medical data and identify patterns and anomalies that may be difficult for human doctors to detect. This technology can help doctors make more accurate and timely diagnoses, leading to better treatment outcomes for patients. In the interpretation of several imaging modalities, such as ECGs, plain radiographs, computed tomographic (CT) and magnetic resonance imaging (MRI) scans, skin images, and retinal photographs, the application of AI and machine learning has already become accepted. For instance, AI can analyze images of medical scans to identify tumors or lesions in the body, which can help doctors make more informed decisions about treatment options. That is true for processing of radiological and other images. AI has been shown to diagnose lung carcinomas in computerized tomography scans better than humans[3].

Use of AI is also being made to diagnose polyps during colonoscopy[4].AI has been shown to make the diagnosis of skin cancer from photographs of skin lesions with equal efficiency compared to humans. Although these tasks often require oversight by a specialist, it does reduce the time needed for diagnosis in locations where expertise is not available. One AI system developed in China has been shown to make a diagnosis based on available clinical data in paediatric diseases with similar proficiency to clinicians. The use of wearable devices with smart phones using AI is being used to diagnose cardiac arrhythmias and epilepsy in real time and can give warning[5]. In addition, AI has a significant role to play in personalized medicine. By analyzing a patient's genetic data and medical history, AI algorithms can

**Address of Correspondence:** Prof. Dr. Mahmud Hasan, National Professor, Email: hasan.m.1@hotmail.com

help doctors develop customized treatment plans that are tailored to the patient's unique needs. This can lead to better treatment outcomes and fewer adverse reactions to medication.

Another area where AI is revolutionizing medical science is drug development. AI algorithms can help scientists identify potential drug candidates by analyzing large datasets of molecular structures and predicting their efficacy and safety. This can significantly reduce the time and cost required to develop new drugs, potentially leading to faster treatments for diseases[6].

Potential for clinical trials to be simplified and speeded up by AI and machine learning has been created. This may be through more efficient recruitment and matching of participants of the study and more detailed analysis of data. Moreover, there is a potential for creation of synthetic control groups by matching historical data that will target trial enrollment criteria. Prediction of adverse events and patient subpopulations may be better understood by the application of AI and machine learning. It may also be possible to generate "synthetic patients" so that diagnostic and therapeutic outcomes can be simulated.

A computer program named Chatbot has been developed. In this programme, AI and natural-language processing is used to understand questions and automate responses to them, simulating human conversation. Chatbots are in use in many different areas besides medicine. Today's powerful computers, language models and the availability of a sea of data on the internet has made it possible to generate scientific compositions that are difficult to differentiate from human generated text.

The new generation of chatbots can help with medical documentation, thereby giving the clinician more time to spend with the patient[7]."Ambient Clinical Intelligence" is a programme that can analyze the conversation between a doctor and a patient and then prepare an electronic health record. A programme called "Babylon" in the United States makes appointments for patients and arranges for routine tests. Key questions about differential diagnosis can be answered by chatbots and thus help in making a diagnosis. The answers may not be based on appropriate facts and will need interpretation. If the user is not knowledgeable enough, mistakes can be made.

There are many other ways in which AI and machine-learning programs

have also entered medicine. One of these areas is helping to identify infectious disease outbreaks that may have an impact on public health. AI can also be used to diagnose both common and rare conditions by combining clinical,genetic, and other laboratory outputs. Moreover, the AI simulation-based surgical training system that combines AI and simulation together for studying surgical techniques has created a new educational tool with objective feedback, which is beneficial for student learning.

AI is also being used to improve healthcare delivery by optimizing hospital workflows and resource allocation. For example, AI can help hospital administrators allocate staff and resources more efficiently, reducing wait times and improving patient outcomes. Additionally, AI can help doctors and nurses prioritize patient care by analyzing medical data and alerting them to patients who may require urgent attention.

However, AI in medical science is not without its challenges. One of the primary concerns is the potential for bias in AI algorithms. If the training data used to develop the algorithms is biased, the results may be skewed, leading to incorrect diagnoses or treatment recommendations. Additionally, the use of AI in medical science raises questions about patient privacy and data security.

There are concerns among some health professionals that AI and machine learning will reduce the need for doctors. Others think that AI will add to and expand the scope of work of doctors. The need for doctors who have knowledge about AI will continue to grow. Already some medical schools in developed countries have changed the curriculum to include relevant parts of physics, mathematics, computer science, coding and algorithm to prepare doctors better[8].

Development of AI and machine learning is advancing very fast. This has the potential to transform the field of medical science by improving disease diagnosis, drug development, personalized medicine, and healthcare delivery. While there are challenges that must be addressed, the benefits of AI in medical science are clear. As technology continues to evolve, we can expect to see even more innovative applications of AI in the field of medical science, leading to better health outcomes for patients worldwide.

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