MEDWIN PUBLISHERS
Committed to Create Value for Researchers

Clinical Pathology & Research Journal
ISSN: 2642-6145

Artificial Intelligence (AI) and Machine Learning (ML); A Revolutionary Game Changer in Clinical Laboratory Diagnosis

Ojedokun SA*

Department of Chemical Pathology, Lautech Teaching Hospital Ogbomoso, Nigeria

***Corresponding author:** Samson Aderemi Ojedokun, Department of Chemical Pathology, Lautech Teaching Hospital, Ibadan-Ilorin Road, P.M.B.4007, Ogbomoso, Oyo State, Nigeria, Tel: +2348065117527; Email: samson.ojedokun@yahoo.com

Editorial

Volume 8 Issue 1

Received Date: June 12, 2024

Published Date: June 25, 2024

DOI: 10.23880/cprj-16000194

Keywords: Artificial Intelligence; Diagnosis; Machine Learning

Abbreviations: AI: Artificial Intelligence; ML: Machine Learning; LLMs: Large Language Models; NLP: Natural Language Processing; DL: Deep Learning; MRI: Magnetic Resonance Imaging; CT: Computer Tomography; NGO: Non-governmental Organization

Editorial

Brief Concept

The first artificial intelligence (AI) program was developed by Christopher Strachey in 1951, though primitive. The term "Artificial Intelligence" was formed by John McCarthy at the Dartmouth Conference in 1956 marking the beginning of modern AI popularity. About two decades later, AI research focused on rule-based and expert systems. However, in the 1990s, AI research drifted into machine learning (ML) and neural networks, which allowed machines to learn from data with improved performance over time [1].

Artificial intelligence in medicine is the use of machine learning models to process medical data generating medical professionals with compelling insights to improve health outcomes and patient satisfaction. It is a digital evolutionary trend that uses machines to perform human logical tasks in a quick, smart and efficient fashion [2]. There are more techniques such as machine learning (ML), deep learning (DL), and natural language processing (NLP) [1]. Also, Large Language Models (LLMs) are forms of AI algorithms using deep learning techniques in large data sets to interpret, enumerate, present, and ascertain new text-based information [1]. It could be said that AI limits the risk of human errors by giving more accurate outputs in less time.

Roles in Medical Practice

The role of AI cannot be overemphasized, AI launched by artificial neural networks is effective in radiological techniques, especially in medical diagnosis and treatment, such as analyzing diagnostic images like X-rays, CT scans, MRIs, etc. With the use of ML models, AI can identify bone abnormalities, tumors, and the like, providing quantitative measurements for prompt and more accurate medical diagnosis. It speeds up time spent assigning medical codes to patient findings during clinical trials and updating the relevant datasets. AI could reduce the cost implications of developing novel drugs by creating better designs and recommending new drug combinations. The use of AI and robots has revolutionized surgical techniques from open laparotomy to minimally invasive laparoscopic procedures and many more.

The Game-Changing Clinical Laboratory Impact

Despite all the advances in medicine, effective disease diagnosis remains a global challenge. The development of risk assessment and early diagnostic tools is challenging due to the complex nature of the pathogenesis/pathophysiology of various diseases and the underlying clinical features. ML is an area of AI that uses data as an input resource in which the accuracy is highly dependent on the quantity and quality of the input data to tackle some of the challenges in making accurate diagnoses.

By increasing the accuracy, speed, and efficiency of laboratory procedures artificial intelligence has the potential

to revolutionize clinical laboratory investigations. Numerous machine learning (ML) algorithms have been created to recognize, categorize, and quantify microorganisms, diagnose and predict clinical outcomes. These machine learning (ML) systems employed a variety of data sources, including gene sequencing, metagenomic sequencing results of the original specimen, genomic data of microorganisms, and microscopic imaging, to generate the AI diagnosis. Automated techniques in clinical chemistry, hematopathology, tissue pathology, blood cultures, susceptibility testing, and molecular platforms have become standard in numerous laboratories globally, contributing significantly to laboratory efficiency and improving turn-around time. Automation and AI such as point-of-care testing or automated analyzers/processors have substantially improved laboratory outputs facilitating prompt treatment protocols.

The Rise of AI and its Downside Effects on Humanity

The advent of AI has brightened the road map for future work output with its increasing popularity across the globe however, its use in medicine has invoked some ethical, moral, and social concerns, some of which revolve around regulation, accountability for decisions, bias, data privacy regulations, and intellectual property rights [3].

Artificial intelligence is promising not only in medicine but in economic growth as well. However, an average simulation projects that by the year 2030, about 70% of companies will have embraced the AI revolution and adopted at least a form of AI technological know-how and about half will have fully integrated the various AI categories into their system. It was also noted that AI has the potential to be among the most disruptive technologies ever developed across global economies [4]. The future of AI offers unlimited possibilities and applications that will help simplify individual life to a great extent. It will remodel the future and fate of humanity positively with far-reaching economic transformative impact on society and legal, political and regulatory implications on all types of jobs and companies; as we anticipate the outblow of AI, these impacts need to be in constant discussions with adequate preparation for the future.

One of the banes of Artificial intelligence is that it could replace an equivalent of 300 million full-time jobs [4]. It could also replace a quarter of work tasks in the US and Europe and conversely, it may also imply new jobs and productivity boom. It was also projected that AI will replace as many as two million manufacturing staffs by 2025 [4]. The McKinsey Global Institute reported that by 2030, at least 14% of employees globally may need to change their careers due to digitization, robotics, and advancements in AI evolutions [4].

Conclusion

Public perception of AI in healthcare varies, with individuals expressing willingness to use AI for health purposes while still preferring human practitioners in complex issues. Trust-building and patient education is crucial for the successful integration of AI in healthcare practice. The advent of AI is also welcoming among medical professionals, which implies their readiness to accept or adopt technological innovation for medical practice [3]. Therefore, more effort is required at the individual level and especially from the government, corporate organizations and NGOs to vest resources towards this direction to actualize and upgrade the healthcare sector, particularly in underdeveloped and developing countries, to internationally acceptable medical standards and clinical laboratory practices.

References

1. Alowais SA, Alghamdi SS, Alsuhebany N, Alqahtani T, Alshaya AI, et al. (2023) Revolutionizing healthcare: the role of artificial intelligence in clinical practice. BMC Medical Education 23: 689.

2. What is Artificial Intelligence in Medicine? (2024) IBM.

3. Ojedokun S, Afolabi S, Olukoyejo O, Alatishe T (2024) Perceptions and Opinions of Medical Professionals on Artificial Intelligence in Optimizing the Healthcare Sector. Asian Journal of Medical Principles and Clinical Practice 7(1): 279-288.

4. Mark Talmage Rostron (2024) How Will Artificial Intelligence Affect Jobs 2024-2030. Nexford University.