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ADVANCEMENTS IN HEALTH THROUGH ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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ABSTRACT

The implementation of artificial intelligence (AI) is driving significant transformation inside the administrative and clinical workflows of healthcare organizations at an accelerated rate. This modification highlights the significant impact that AI has on a variety of tasks, especially in health procedures relating to early detection and diagnosis. Artificial Intelligence in healthcare helps to enhance patient diagnoses, improve prevention and treatment, increase cost efficiency, and serve as a way to provide equitable access and treatment for the entire role of artificial intelligence in the healthcare industry. On the positive side, artificial intelligence presents several opportunities in healthcare industry, including improved patient monitoring, managing patient data, predictive medicine; improved teamwork and decision-making, improved patient engagement and compliance; rehabilitation; and administrative applications. Ethical issues, such as data privacy and bias, are among the most significant challenges. While AI enhances efficiency and outcomes, human oversight remains essential to ensure safe, equitable, and ethical deployment. The future of healthcare will increasingly depend on responsible AI adoption that balances innovation with patient-centred values.

Keywords: *Artificial intelligence; healthcare; biomedicine; artificial neural network; clinical diagnostic: healthcare systems.*

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1. INTRODUCTION

Since the beginning of the industrial revolution, there has been a significant increase in the importance placed on technology in terms of both output and growth [1]. This trend is expected to continue. According to Kaplan and Haenlein's research from 2020], technological advances in machines have supplanted laborious and manual tasks, hence contributing to the progression of human growth. In a variety of industries, people can now replace manual labour with greater mental abilities and cognitive levels thanks to artificial intelligence (AI), a crucial technical advancement [2]. Beyond the assistance that machines provide for physical labour, AI is an important technological development that has allowed people to replace manual labour with more complex mental and intellectual levels [3]. AI has made rapid advancements and has been deployed to provide many benefits across a variety of industries, including the essential healthcare industry. In addition, the significance of artificial intelligence applications in healthcare industry cannot be overstated. technological advancement that can be achieved through the digitization of the healthcare industry can assist in overcoming additional problems if the developers can successfully develop AI systems to accomplish certain tasks. For example, AI has the ability to significantly enhance patient services as well as minimize the expenses linked to the healthcare industry. The constantly rising human population is expected to increase the demand for medical services to be delivered at a fast pace; therefore, new AI solutions are needed within the medical field in order to enhance both efficacy and effectiveness without an increase in costs Artificial intelligence has the potential to revolutionize how we diagnose diseases, tailor treatments to individual patients, monitor health conditions in real time, and manage the operational aspect of healthcare delivery. For instance, artificial intelligence driven diagnostic tools can accurately images, often identifying subtleties that may elude human eyes. This precision translates into earlier and more accurate diagnoses, significantly affecting patient outcomes [4]. It operated symmetrically with the human brain which consists of an interconnected neuron network that has a weight communication channel in between the neurons. The

stimulation of one neuron towards multiple neurons in the neighbourhood changes with the state as per the reception of input from the surroundings with these consequences, the brain network operates by generating output after responding to the environment which functions similarly to the human brain's response to the environment. [5].

- Machine Learning (ML): Systems learn from data to make predictions
- Deep Learning (DL): Neural networks modelled after human brain structures
- Natural Language Processing (NLP): Understanding and generating human language
- Computer Vision: Image and video interpretation

2. ALL ABOUT AI

Prior to delving into the practical uses of artificial intelligence, it is crucial to possess a comprehensive understanding of the subject matter at hand. Put simply, an autonomous entity, such as a machine or system, possesses the ability to independently make judgments and predictions, hence exhibiting intelligence. In essence, it is a collection of algorithms that rely on mathematical and statistical equations, collaborating to tackle intricate real-world issues, given adequate computer capacity. In order to properly acquire decision-making capabilities, algorithms depend on data presented in many formats such as numerical, textual, auditory, visual, and video. The algorithms acquire distinct parameters from the dataset, and this process of acquiring knowledge is referred to as training. The recent surge in artificial intelligence may be attributed to the extended development of algorithms, which have become more effective due to the availability of a substantial quantity of data. Nevertheless, the proliferation of the internet has led to increased accessibility of datasets, hence creating favourable conditions for the flourishing of artificial intelligence.

3. ROLE OF ARTIFICIAL INTELLIGENCE IN THE HEALTH CARE INDUSTRY

2.1Health services management using artificial intelligence

One of the notable aspects of artificial intelligence techniques is potential support for comprehensive health services management. These applications can support doctors, nurses and administrators in their work. For instance, an artificial intelligence system can provide health professionals with constant, possibly real-time medical information updates from various sources [6].

3.2 Diagnosis and patient monitoring

The potential of artificial intelligence in early diagnosis has been the subject of a significant number of studies [7] Early detection of certain diseases, such as cancer, can dramatically influence the course of treatment and recovery. Artificial intelligence is used for personalized medicine and predictive analytics to identify diseases early and monitor their progression, resulting in better patient outcomes and reduced healthcare costs. For instance, predictive analytics can be applied to determine patients who are at risk of developing complications and estimate the probability of deterioration of the patient. By doing so, healthcare professionals can enhance patient outcomes and avoid the onset of critical situations [8].

3.3 patient data and predictive medicine

Artificial intelligence techniques can help medical researchers deal with the vast amount of data from patients (i.e., medical big data). Artificial intelligence systems can manage data generated from clinical activities, such as screening, diagnosis, and treatment assignment. In this way, health personnel can learn similar subjects and associations between subject features and outcomes of interest. These technologies can analyze raw data and provide helpful insights that can be used in patient treatments [9].

3.4 Teamwork and clinical decision-making

Current healthcare environments require healthcare providers to collaborate and work in teams, which requires strong communication, shared decision-making, coordinated actions, and progress evaluation. Artificial intelligence chat bots can be used to handle problems related to coordinating and scheduling medical appointments, providing reminders, and notifying providers of a patient's condition based on symptoms.

3.5 virtual health assistants, patient care and technological advancements

Artificial intelligence can help identify patient symptoms and provide them with appropriate care recommendations, such as self-care advice or a referral to a healthcare professional. In addition, artificial intelligence can help patients manage their medications by providing reminders and alerts about when to take their medications and possible side effects [10].

3.6 Drug discovery and development

Artificial intelligence has the potential to greatly enhance the efficiency and effectiveness of the drug development process. One specific opportunity is virtual screening, which can analyze large amounts of data on drug interactions and identify new drug targets. This can greatly accelerate drug discovery, allowing researchers to identify potential drug candidates more quickly and at a lower cost. A previous study suggested a smart sensor system based on a combined sensor network to monitor a person's home and environment and to gather information on a person's health status and behaviour. The suggested platform utilizes sensors that are unobtrusive, biomedical, and wearable. Artificial intelligence-based health monitoring technology can assist patient by ensuring timely delivery of health care, allowing health care providers to extend patient care efforts outside ice hours and encourage self-management [11].

3.7 Medical research

Artificial intelligence can be used to analyze and identify patterns in large and complex datasets faster and more precisely than has previously been possible. It can also be used to search the scientific literature for relevant studies, and to combine different kinds of data; for example, to aid drug discovery. Researchers have developed an artificial intelligence 'robot scientist', which is designed to make the process of drug discovery faster and more economical.

3.8 patient engagement and compliances

Healthcare providers use their clinical experts to develop treatment plans to improve patients' acute or chronic health. Nevertheless, mostly, it does not matter when a patient misses the required behavioural changes, such as controlling weight, scheduling a follow-up visit, and obeying a treatment plan. Such conditions raised the implementation of artificial intelligence to successfully enhance patient engagement

3.9 Rehabilitation

Artificial intelligence has innovative applications in the field of rehabilitation. It is an idea that includes physical (robotics) and virtual (informatics) branches. As a result of technological advancement, artificial intelligence and robotics are transforming approaches and competencies in rehabilitation research and practice.

4. EVALUTION OF THE AI ALGORITHM

In World War II, the Germans implemented the Enigma machine as a means of encrypting messages. In 1942, Alan Turing and his colleagues at Bletchley Park in the UK pioneered the application of Artificial Intelligence to decipher the codes of Enigma. This was the first instance of employing machine intelligence to tackle intricate problems. In 1950, Turing proposed the Turing Test as a means to evaluate the capacity of a computer to exhibit human-like intellect, thereby paving the way for the advancement of Artificial intellect. In 1964, the first machine human interaction occurred with the creation of the first chatbot. This chatbot utilized pattern matching and substitution methodology, which demonstrated the potential of Natural Language Processing (NLP). In 1997, a significant advancement occurred when the former grandmaster Garry Kasparov was defeated by the machine intelligence Deep Blue on the chessboard, showcasing the exceptional prowess of AI As the area progressed, human-robot interaction became more intricate with the introduction of the emotionally endowed robot. AI acquired its speech recognition capability in 2008, hence enhancing the ability of humans to interact with robots. In 2011, IBM Watson was unveiled as a question-and-answer computer system, taking human-machine interaction to a higher level in 2020, OpenAI created ChatGPT, an impressive conversational AI powered by the LLM (Large Language Model AI As the field developed, human robot interaction became more complex with the development of the emotionally charged robot. AI received its speech recognition technology in 2008, thus improving the capability of humans to interact with robots [12].

5. CLASSIFICATION AND FRAME WORK ANALYSIS

5.1 Health care activities using AI

For those aspects of healthcare that make use of AI in the healthcare industry, AI technology can serve a variety of purposes, including for clinics, patients, and the industry for those aspects of healthcare that make use of AI in the healthcare industry, AI technology can serve a variety of purposes, including for clinics, patients, and the industry as a whole. The use of technology in clinics enables them to make decisions, collect up-to-date information, and share information. as a whole. The use of technology in clinics enables them to make decisions collect up-to-date information, and share information. Furthermore, machine learning helps enhance decision making by offering an apparatus for medical practitioners and academics to extract concealed information from the enormous quantity of data that is available addition, telehealth networks are becoming increasingly significant, particularly in light of the COVID19 epidemic [13].

5.2 Advantages and drawbacks for healthcare sector

AI provides a number of advantages to people, some of which in stream lined health surveillance, including monitoring of elderly patients, early diagnosis and process simplification which will ultimately benefit patients in their care, diagnosis, and therapeutic options. It helps lower the amount of time and money spent on therapy as well as the number of resources that are used. In addition, it shortens the amount of time needed to make a diagnosis and, as a result, the process of making a decision. This has a significant effect on treatment strategies and outcomes, and it may even be lifesaving in extreme circumstances. Doc tors make the ultimate choice, and the interaction between medical practitioners and the AI frameworks may result in inaccurate diagnoses and treatment outcomes [14].

5.3 social sustainability and AI

If a healthcare institution develops AI algorithms, either intentionally or unintentionally, that threaten human rights and wellbeing, then the business's reputation and credibility could be severely damaged. The economic and social sustainability of healthcare organizations should be prioritized, and AI should be used to build solutions that support this goal. More specifically, they need to establish ethical governance policies that take socially undesirable behaviour into account, address ethical issues during the early stages of the design of AI systems as well as after they have been put into operation, and incorporate AI ethics into their social responsibility strategy

5.4 AI in hospital management

Recently, AI-supported technologies have been widely used in healthcare institutions to increase the effectiveness of medical resources and the quality of care provided. Healthcare personnel are held to a high standard, and investigations must be conducted correctly Inters of patient data management, advanced and speedy diagnosis, disease investigation, proposed therapy, and improved results, AI-enabled e-health systems outperform conventional systems it has the ability to transform narration into a task that may be completed immediately [15].

5.5 AI and machine learning in disease diagnosis

AI techniques, from machine learning to deep learning, play a critical role in many areas related to health, such as the development of new health care systems, the management of patient data, and the treatment of illnesses. The diagnosis of various diseases can also be made most effectively using AI approaches. it is clear that AI has a huge and diverse range of possible applications, ranging from the simplest operational process improvement to the most complex emergency patient therapies. When these algorithms or programs are in operation, they assist in decision-making and even unseen data assists in the prediction of precise disease-related information. Breast cancer, liver cancer, cervical cancer, kidney-related issues, hepatitis, dermatological, cataract, heart-related issues, pancreatic disorders, etc., are only a few of the diseases that need to be diagnosed. Concepts from a range of fields, such as computational learning theory, artificial neural networks, statistics, stochastic modelling, genetic algorithms, and pattern recognition, are drawn upon in machine learning [16].

5.6 AI and machine learning in patient monitoring

The world is currently expanding quickly as new technologies transform many industrial sectors. One of the many scientific tools that has a big impact on the healthcare sectors AI. One of the divisions of e-health, which has expanded dramatically, is remote patient monitoring. AI-powered remote patient monitoring is a highly effective technique for managing common to-chronic diseases. In order for remote patient monitoring to function, data must be gathered and sent to healthcare professionals via a linked device. As a result, the majority of healthcare institutions have implemented remote patient monitoring, shifting the traditional method of treatment in that direction. Patients have demonstrated trust, and even for high-risk patients, issues, diagnoses, health improvements, and other patient data may be easily tracked. As soon as the disease is diagnosed, treatment can be started much earlier and with less cost. The amount of data related to healthcare is increasing at an incredible pace. The AI system helps in recognizing the characteristics of a massive amount of medical data that are are essential for clinical procedures to be aided by. Apart from this, these algorithms have the capability of self-correction which increases their accuracy and efficiency based on feedback. The system developed on the basis of AI approaches can also assist medical professionals in generating the most updated medical knowledge available from different sources such as journals, books, practices, and so on, which will ultimately lead to effective patient care [17].

6. DIAGNOSIS ACCURACY AND PATIENT MONITORING

The application of artificial intelligence (AI) in non-axial imaging research reveals that the domain of patient selection had the most unknown potential for bias, while the domain of the index test had the highest potential for bias among the 89 publications included in the five systematic reviews. The majority of studies included in all five evaluations had modest concerns regarding their applicability. Paige Prostate's study found that out of the 32 patients without carcinoma or glandular atypia, 26 of them did not have any cores labelled as suspicious. However, out of the 86 patients with adenocarcinoma, 84 of them had at least one core classed as alarming. Found that among the 1876 core biopsies, 489 cores showed a clear diagnosis of either adenocarcinoma, PIN-ATYP, ASAP, or FGA. The remaining cores were classified as benign or as lacking prostatic glandular tissue. The accuracy of AI-assisted CT imaging in diagnosing COVID-19 disease, the diagnostic odds ratio (DOR) was 88.98 (95% confidence interval [CI], 56.38140.44) in the 37 studies that employed image-based analysis.

7. ETHICAL ISSUES AND OTHER RISK

In the past few years, there has been an increasing amount of discussion on the ethics of AI in healthcare research. A number of different ethical concepts have been recognized as potentially appropriate candidates for the design and development of A systems. These systems are responsible for data collection, processing, storage, monitoring, and collaboration. Despite the fact that these systems offer a number of benefits, there are also a number of obstacles associated with them, including ethical concerns, security concerns, consequences for users' privacy, and cybersecurity concerns. In most cases, healthcare institutions and governments provide ethical guidelines for the collection and distribution of data. Even for research purposes, it is necessary to seek approval from a government-recognized authority in order to collect and utilize data. Inequality, unemployment, humanity, commitment to cause, regulatory methods, behavioral biases, demographic biases, and linking biases are some of the other ethical issues that have been raised in connection with AI in the context of healthcare and other sectors. Research on minimizing negative side effects, reward hacking, safe exploration, and robustness is being carried out as part of initiatives to minimize the number of ethical issues raised by the applications of AI in the medical sector. Concerns have been raised by government representatives regarding the effect that these

automated systems are expected to have on the rights of patients. These concerns have led to the formulation of a number of regulations regarding the collection, processing, and use of technology, as well as the quality of such data and the methods of gathering and analysis. Privacy and surveillance, bias and discrimination, and possibly the most profound and challenging philosophical challenge of the day, the function of human judgment, are the three main ethical issues that AI raises for society. We are all aware of discussions regarding privacy protections and ways to eliminate bias in algorithmic decision making for sentencing, parole, and employment practices [17].

8. APPLICATIONS OF AI IN HEALTHCARE

Currently, AI is showing a versatile role in medical situations. The analysis of impulses and images in addition to the prediction of functional changes, like urinary bladder, convulsions and heart attacks, have all been done with it**.** AI is ready to help medical professionals with a variety of tasks, including organogram processing, taking clinical reviews, helping patients and professional stand including image processing, medical product robotization and mentoring and investigating patients**.** In a 2018 Accenture report, the same subjects were explored, along with smart devices, dosage process optimization and cybersecurity. Robotics-assisted surgery, linked and cognitive devices, targeted and patient care and electroceuticals are some of the pertinent subjects [18].

9. CURRENT USAGE AND OPPORTUNITIES IN AI

Starting to Integrate Artificial Intelligence into Healthcare. The integration of AI into healthcare has progressed through several key epochs. The first, AI 1.0, was characterized by symbolic AI, which involved encoding human knowledge into computational rules and probabilistic models. The AI 2.0 era saw the rise of deep learning, leading to significant advancements in healthcare and everyday life worldwide. Currently, in the AI 3.0 era, we have innovative and potentially transformative models, but they also come with new risks, such as hallucinations. These models can perform a wide range of tasks without needing retraining on new data. For instance, a simple text instruction can alter the model's behaviour [19].

10. LIMITATIONS

The limitation we faced in this study was that many original articles related to the future challenges and opportunities of AI were not published, and we had to include review articles, editorials, and book sections. It is also noteworthy that the articles were limited to those published only in the English language. Furthermore, our sample of reviewed articles was smaller in size, and most included articles were review articles. The conclusion of this study remains broad, stating that AI holds promise for enhancing healthcare systems; however, for further research, it would be beneficial to conduct specialized studies focusing on individual medical subspecialties

11. CONCLUSION

In the paper, the latest development regarding the application of AI in healthcare is mentioned which included the application in biomedicine, bladder volume prediction, development of precise medicine, epileptic seizure prediction, cancer diagnosis, target drug interaction, detection of fatal blood conditions, livelihood help, processing of biological data, biomedical research, automatic image diagnosis, diagnosis of rare illness and development of new drugs. The AI has been applied interestingly to many other biomedical purposes. We found that most studies indicate the potential of artificial intelligence to assist healthcare professionals in their duties, and improve medication precision, as well as enhance decision-making and teamwork. In addition, the study revealed that artificial intelligence has proven beneficial in medical imaging, diagnosis and treatment, virtual health assistance, drug development, and medical research. However, accessing and utilizing patient data is a challenge due to privacy concerns. latest development regarding the application of AI in healthcare is mentioned which included the application in biomedicine, bladder volume prediction, development of precise medicine, epileptic seizure prediction, cancer diagnosis, target drug interaction, detection of fatal blood conditions, livelihood help, processing of biological data, biomedical research, automatic image diagnosis, diagnosis of rare illness and development of new drugs. The AI has been applied interestingly to many other biomedical purposes.

12. Author contributions

All authors are contributed equally.

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14. Declaration competing interest

The authors have no conflicts of interest to declare.

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15. REFERENCES

1. Hwisa NT, Katakam P, Chandu BR, Ismael MH, Bader A. Pandemic influenza A (H1N1) vaccination among libyan health care personnel: A cross-sectional retrospective study. Journal of Pharmacy and Bioallied sciences. 2014 Jul 1;6(3):192-7.
2. Ramalingam P, Reddy YP, Kumar KV, Chandu BR, Rajendran K. Evaluation of metformin hydrochloride in Wistar rats by FTIR-ATR spectroscopy: a convenient tool in the clinical study of diabetes. *J Nat Sci Biol Med*. 2014;5(2):288-91.

3. Schmidhuber J. Deep learning in neural networks: an overview. *Neural Netw*. 2015;61:85-117.
4. Hunter B, Hindocha S, Lee RW. The role of artificial intelligence in early cancer diagnosis. *Cancers (Basel)*. 2022;14(6):1524.
5. Khalifa M, Albadawy M. Artificial intelligence for clinical prediction: exploring key domains and essential functions. *Comput Methods Programs Biomed Update*. 2024;5:100148.
6. Dasari V, Awen BZ, Chandu BR, Khagga M. In-vitro and in-vivo evaluation of multi unit stavudine gastroprotective dosage forms. *Res J Pharm Dos Forms Technol*. 2010;2(5):344-53.
7. Jeddi Z, Bohr A. Remote patient monitoring using artificial intelligence. In: Bohr A, Memarzadeh K, editors. *Artificial Intelligence in Healthcare*. London: Academic Press; 2020. p. 203-234.
8. Parvathaneni V, Kulkarni NS, Muth A, Gupta V. Drug repurposing: a promising tool to accelerate the drug discovery process. *Drug Discov Today*. 2019;24(10):2076-85.
9. Gade R, Vanampadi A, Makineni A, Murthy TE, Rao CB, Nama S. Design and development of pravastatin sodium fast dissolving films from natural mucilage of *Ocimum basilicum* seeds. *Int J Pharm Res Rev*. 2014;3:17-27.
10. Ladgham A, Torkhani G, Sakly A, Mtibaa A. Modified support vector machines for MR brain images recognition. In: *Proceedings of the International Conference on Control, Decision and Information Technologies (CoDIT)*; 2013. p. 32-35.
11. Roa D, Bautista J, Rodríguez N, Villamil MD, Jiménez A, Bernal O. Data mining: a new opportunity to support the solution of public health issues in Colombia. In: *Proceedings of the 6th Colombian Computing Congress (CCC)*; 2011. p. 1-6.
12. Rong G, Mendez A, Assi EB, Zhao B, Sawan M. Artificial intelligence in healthcare: review and prediction case studies. *Engineering*. 2020;6(3):291-301.
13. Hwisa NT, Assaleh FH, Gindi S, Melad FE, Chandu BR, Katakam P. A study on antiurolithiatic activity of *Melia azadirachta* L. aqueous extract in rats. *Am J Pharmacol Sci*. 2014;2(1):27-31.
14. Kumar Y, Koul A, Singla R, Ijaz MF. Artificial intelligence in disease diagnosis: a systematic literature review, synthesizing framework and future research agenda. *J Ambient Intell Humaniz Comput*. 2023;14(7):8459-86.
15. Kumar Y, Koul A, Singla R, Ijaz MF. Artificial intelligence in disease diagnosis: a systematic literature review, synthesizing framework and future research agenda. *J Ambient Intell Humaniz Comput*. 2023;14(7):8459-86.
16. Gade R, Makineni A, Murthy TE, Rao CB, Nama S. Design and development of hydroxyzine hydrochloride controlled release tablets based on microsponges technology. *Caribb J Sci Technol*. 2013;1(1):172-84.
17. Xu Y, Wang T, Chen Z, Jin L, Wu Z, Yan J, Zhao X, Cai L, Deng Y, Guo Y, et al. The point-of-care testing of nucleic acids by chip, cartridge and paper sensors. *Chin Chem Lett*. 2021;32(12):3675-86.
18. Kanala K, Hwisa NT, Chandu BR, Katakam P, Khagga M, Challa BR, et al. Bioanalytical method development and validation of milnacipran in rat plasma by LC-MS/MS detection and its application to a pharmacokinetic study. *J Pharm Anal*. 2013;3(6):481-8.
19. Howell MD, Corrado GS, DeSalvo KB. Three epochs of artificial intelligence in health care. *JAMA*. 2024;331(3):242-4.