WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 24, 967-975. Review Article ISSN 2277–7105

COMPREHENSIVE LITERATURE SURVEY ON INTERFERENCE OF ARTIFICIAL INTELLIGENCE IN MEDICINE AND HEALTHCARE

Shreyas Gore[1]*, Supriya Darandale[2], Sahil Inamdar[3], Virag Patni[4] and Vilas Sawale[5]

[1,3,4*]Student, Usha Dwarkadas Pathrikar Institute of Pharmacy, Dongargaon (Kawad), Phulambri, Chatrapati Sambhajinagar – 431111.

[2]Assistant Professor, Usha Dwarkadas Pathrikar Institute of Pharmacy, Dongargaon (Kawad), Phulambri, Chatrapati Sambhajinagar – 431111.

[5]Principal, Usha Dwarkadas Pathrikar Institute of Pharmacy, Dongargaon (Kawad), Phulambri, Chatrapati Sambhajinagar – 431111.

Article Received on
04 November 2024,

Revised on 24 Nov. 2024,
Accepted on 14 Dec. 2024

DOI: 10.20959/wjpr202424-35017

***Corresponding Author**
Shreyas Gore
Student, Usha Dwarkadas Pathrikar Institute of Pharmacy, Dongargaon (Kawad), Phulambri, Chatrapati Sambhajinagar – 431111.

ABSTRACT

Artificial intelligence may be able to assist when conventional medical science has run out of choices and doctors are unsure of where to turn. These days, computers are helping doctors in more and more extreme situations, especially when it comes to critical cases. We're not talking about superpowers here, but rather useful tools. Artificial intelligence is the synthetic regeneration (reformation) of machine learning and human intelligence. The goal of the technology is to replicate human cognitive processes because it has several benefits over conventional analytics and other clinical decision-making instruments This chapter is an overview of the use of artificial intelligence in health care sector and how it is helping us in medical field.

KEYWORDS: Artificial Intelligence, Modern Science, Drug Development, Data Collection, Healthcare system.

INTRODUCTION

Although the term "artificial intelligence" was initially used in a 1956 conference proposal from Dartmouth College, its use in the healthcare industry did not begin until the early 1970s[1] when research led to the development of MYCIN, an AI program that aids in the diagnosis and treatment of blood infections. As AI research continued to grow, the American Association of Artificial Intelligence (now known as the Association for the Advancement of

Artificial Intelligence, or AAAI) was established in 1979.[2] The years 1970–1990 had advancements in Artificial intelligence Electrocardiography[3] The scientific community in America, Britain, and Japan had multiple periods of inactivity between late 1950s and 1990 due to lack of funding and lost interest. These periods of inactivity were later referred to as "AI winters"[1] with the introduction of deep learning in the early 2000s, many of these restrictions were removed.[4]

Types

Because software developers are creating AI for very specific purposes, the types of AI are highly function-based. However, AI is a flexible tool, we can modify it to suit our needs. The following types of AI are the most effective for their respective purposes.

1. Machine learning/machine intelligence
2. Natural language processing/natural language interpretation
3. Rule based expert systems/expert systems based on rules
4. Physical robots
5. Robotic process automation
6. Diagnosis and treatment applications
7. Patient engagement and adherence applications
8. Administrative applications

These artificial intelligence techniques offer special capabilities, and each of them has distinct advantages and uses, such as data analysis and decision-making. The state of healthcare is changing, improving patient care.[5]

Benefits

Knowledgeable patient care: It is the duty of healthcare providers to guarantee that AI applications offer practical technologies to enhance patient care. Assists in reducing errors: There is evidence that artificial intelligence (AI) can enhance patient safety. A recent systematic assessment of 53 peer-reviewed papers investigating the effects of artificial intelligence (AI) on patient safety discovered that AI-powered decision support systems can enhance medication administration and error detection. Providing pertinent context: The ability of AI systems to utilize context to discern between various types of information in the healthcare sector is a significant benefit of deep learning. AI can function as a virtual assistant for you.[3] A virtual assistant who may respond to inquiries according to the patient's needs and medical history.

1) Surgery (Use of AI robotics)
2) Medical imaging (Image scanning and Analysis)
3) Diagnosis and treatment (Use of algorithmic data for treatment)
4) Accelerated drug development
5) Clinical decision making
6) Data collection

Disadvantages[6]

We can see some disadvantages of Artificial Intelligence and they are as follows. High cost, No creativity, Unemployment, Make humans lazy, No ethics, Emotionless, No improvement.[6]

Ideal characteristics

AI encompasses a range of abilities including Deep learning, Fraud prevention, Natural language processing, Clinical trials, Automation, Accurate cancer diagnosis, Administrative workflow, Automated image diagnosis, Better patient care, Dosage error reduction, Health care, Mining medical records, Diagnosis, Surgery, Targeted treatment.

Factors

Following factors significantly alter how artificial intelligence (AI) is used in healthcare:[2][16]

1. Interconnected medical services: AI in healthcare will facilitate system connectivity and pattern recognition. This will make it possible for data to be seamlessly shared across a network, from anywhere. Globally, this shared data and knowledge will establish life-saving connectedness.
2. Improved anticipatory care enabled by AI: Better information will assess the likelihood and risk of a person being sick in the future.
3. Better experiences for staff and patients

Constituent

There are three primary types of artificial intelligence (AI) depending on what it can do. Constituent AI simulates human intelligence in machines to perform tasks for which humans would typically be responsible. Super AI, powerful AI, and weak AI

Weak AI can only concentrate on a single task and is limited in what it can do.

Robust AI - has the capacity to comprehend and acquire knowledge in any intellectual endeavor that humans can (scientists are working toward AI)

Super AI still a concept beyond human intelligence and is capable of performing any work more efficiently than a human.[6]

Applications[7]

AI in cardiology

AI in radiology

AI in ophthalmology

AI in drug discovery[7]

Diagnosis and Treatment using artificial intelligence applications

Diagnosis and treatment of disease has been at the core of artificial intelligence AI in healthcare for the last 50 years. Early rule-based systems had potential to accurately diagnose and treat disease, but were not totally accepted for clinical practice. They were not significantly better at diagnosing than humans, and the integration was less than ideal with clinician workflows and health record systems.

But whether rules-based or algorithmic, using artificial intelligence in healthcare for diagnosis and treatment plans can often be difficult to marry with clinical workflows and EHR systems. Integration issues into healthcare organizations has been a greater barrier to widespread adoption of AI in healthcare when compared to the accuracy of suggestions. Much of the AI and healthcare capabilities for diagnosis, treatment and clinical trials from medical software vendors are standalone and address only a certain area of care. Some HER software vendors are beginning to build limited healthcare analytics functions with AI into their product offerings, but are in the elementary stages. To take full advantage of the use of artificial intelligence in healthcare using a stand-alone HER system providers will either have to undertake substantial integration projects themselves, or leverage the capabilities of third party vendors that have AI capabilities and can integrate with their EHR.

Artificial intelligence application in modern science

1) Artificial intelligence for diagnostics: Inaccurate diagnoses and medical mistakes continue to be major causes of death in the United States. Thus, the potential of AI to enhance the diagnostic process' effectiveness is regarded as a crucial healthcare application. Both physicians and medical researchers benefit from the use of AI. Deep Learning is helping to improve test results and prevent diagnostic errors.

2) Artificial intelligence in health imaging: For many years, the healthcare sector has employed medical imaging tools to diagnose illnesses. However, by enabling greater automation and enhanced productivity, artificial intelligence is currently advancing medical imaging technology. It has also been claimed that medical imaging systems driven by AI are more adept than physicians at spotting abnormalities and illnesses! At the moment, artificial intelligence (AI) is being used to diagnose early cancer and other malignancies, identify abnormalities in standard medical tests like chest X-rays, indicate a patient's risk of cardiovascular disease, and detect neurological illnesses like amyotrophic lateral sclerosis (ALS). It is also helping to provide visualization and quantify blood flow. And also One of the most sensitive pieces of personal information is information about one's health in collecting their personal images for research and study.[11]

3) AI in Drug Development and Pharmaceuticals: The way pharmaceutical companies create medications and treatments is being revolutionized by AI. A significant advancement was made in 2007 when scientists hired Adam, a robot, to study the functions of yeast. Adam made predictions concerning nine new, accurate ideas regarding the roles of nineteen genes in yeast by consulting billions of data points available in public databases. AI is now used to explore biological systems and comprehend the potential effects of drugs on a patient's tissues and cells. Rather than looking at a larger group of patients, applications like precision medicine and predictive medicine are used to predict a patient's course of therapy. Healthcare professionals may now digitally profile patients thanks to AI. This may contribute to our understanding of immune-sequence and lead to the development of a new class of immunological cancer diagnostics. It is also being utilized to conduct repeatable research in the fields of life science, genetics, and bioinformatics.

4) Hospital Information System (HIS) utilizing AI: In the healthcare industry, as in many others, time is money! 96% of patient complaints were centered on poor front desk experiences, unclear paperwork, and a lack of customer service, according to a recent study involving 35,000 physician reviews. The majority of hospitals and clinics today use HIS software to integrate with patient to manage appointment scheduling, treatment follow-up, and other administrative tasks. These systems have a lot of potential for providing excellent healthcare services. AI in healthcare also helps physicians with real-time predictive analytics and resolves operational issues with various hospital

departments. It also eliminates paper-based processes, down on stages, and saves staff time by using automated data gathering, analysis, reporting, and communication.

5) Artificial intelligence in health sciences: Most people agree that one of the next great data frontiers to conquer is healthcare. Amidst trillions of data points, sometimes extremely important information might get lost. Furthermore, the creation of novel medications, preventive medicine, and accurate diagnosis is being slowed down by the inability to connect crucial data points. Artificial intelligence is being viewed by many in the healthcare industry as a solution to halt the "data hemorrhaging." It used to take years to handle data, but now days, technology can connect information and break down data silos in a matter of minutes. You may have read about how we used AI to forecast COVID-19-driven death as well as how we anticipated the early onset of sepsis.

6) AI in Surgery and Emergency room: The use of robots in surgery is becoming more and more common. Robots are being used in hospitals for a variety of tasks, including open cardiac surgery and minimally invasive operations. Robots assist physicians in carrying out intricate treatments with accuracy, adaptability, and control, claims the Mayo Clinic. With the use of robotic assistance, surgical problems have decreased, discomfort has decreased, and recuperation times have shortened.

7) Artificial intelligence in mental health: One in four persons worldwide suffer from mental illnesses. Some of the biggest developments in AI in healthcare have recently included early mental health symptom detection. When analyzing a person, a few things are taken into account, like their tone, word choice, and sentence length. AI can therefore foster resilience, provide support, and even save lives for the millions of individuals who experience loneliness and require the help of friends and mental health professionals.

8) Artificial intelligence in nutrition: There are currently a plethora of apps with varying features and levels of accuracy that are related to nutrition accessible. Nutrition apps can now provide personalized recommendations and suggestions based on an individual's behaviors and interests thanks to AI integration.[1]Additionally, these technologies can find novel medications for patient care and health services administration.[12][15]

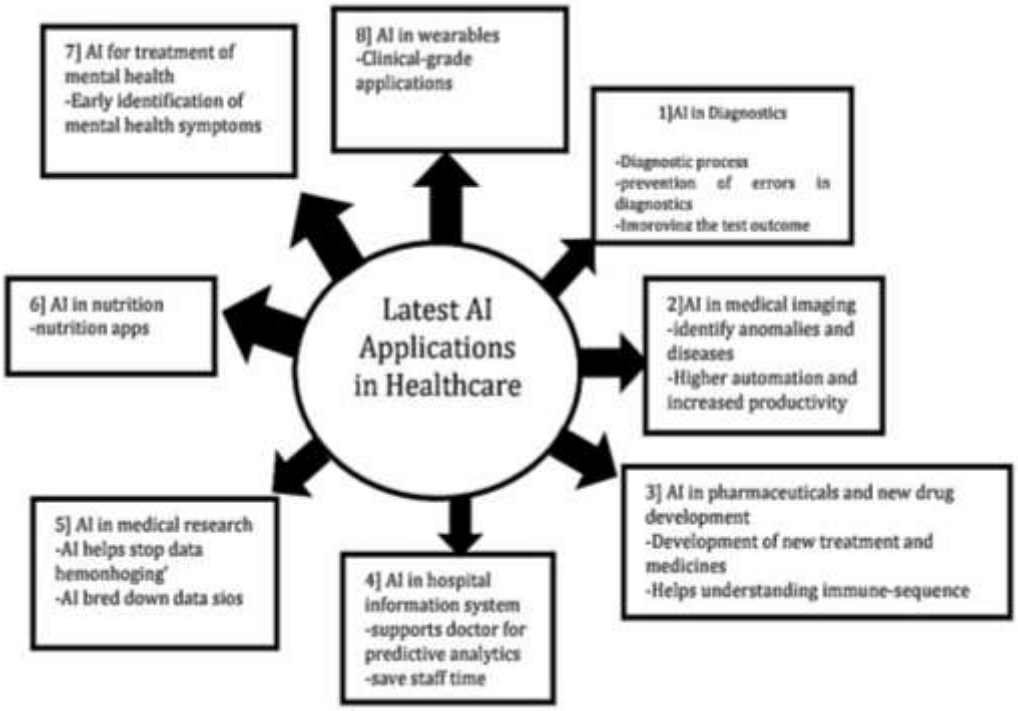

Fig.: AI Applications in Healthcare.

Artificial intelligence in indian healthcare

In India, radiography was the first field to apply artificial intelligence (AI), mostly for the treatment of diseases like tuberculosis (TB). Artificial Intelligence has become the mainstay of technology development in the healthcare industry in recent years. With a population of more than 1.4 billion, India continues to fall behind in terms of health infrastructure. Compared to the global average of 150 doctors per 100,000 people, India has just 64 doctors per 100,000 people. The hospitals are severely strained by this. Automation and artificial intelligence (AI) can greatly lower pressure and speed up the diagnosis process even while AI in healthcare is still in its infancy in India, its proportion of the industry is expanding pretty quickly. NASSCOM estimates that by 2025, the use of data and AI in healthcare could boost India's GDP by almost $25 billion. It is anticipated that the healthcare AI market will increase from $14.6 billion in 2023 to $102.7 billion by 2028. Hospitals are also quickly getting on the AI bandwagon. AI-powered robotic procedures, which are typically less invasive and need shorter recovery times, are becoming popular in many hospitals Some mental health firms, like wysa, are leading the way in utilizing AI to better identify a patient's or user's emotional condition and offer help.

Pro Health has been introduced by Apollo medical, a renowned medical network in India. It gathers a patient's health status and forecasts any threats using a predictive AI algorithm.

Additionally, it has partnered with Google Cloud to use Vertex AI and Generative AI in the development of the Clinical Intelligence Engine (CIE).

AI is already being employed by the Columbia Asia hospital in Bengaluru, which focuses on bariatric surgery and critical care. The facility's procedures are already automated.[8] Some countries are more advanced in this domain that others[9] Moral quandaries, prejudice against Al, compatibility of machine and human value assessment, and trust issues with Al and human behavior are examples of ethical concerns.[10]

CONCLUSION

Everything has two sides to it similar to how all coins have two sides additionally artificial intelligence has two sides positive is the first and negative is the second. We already seen the negative and positive aspects of artificial intelligence in a healthcare sector in above article if we ignore negative aspects of artificial intelligence Then we have more beautiful and an un imaginary future in the field of healthcare services by using artificial intelligence And we can say that this bright future has started because it is being used in many fields and it is also widely used in medical fields All that is needed is to accept it and move forward with it After all, it is a man-made object that helps us move towards a healthy future of humans and we are proud of it Considering the future the World Economic Forum (WEF) predicts that, between now and 2030. As AI develops, it will continue to enhance the experiences of patients and providers, cutting down on patient wait times and increasing overall system and hospital efficiency.

REFERENCES

1. Ideas2it technologies, industry: technology, information and internet, Viewed, 2024; 23. Https://www.ideas2it.com/blogs/artificial-intelligence-in-healthcare
2. Xsolis founded in 2013 co-founders joan butters and jim sohr, Viewed, 2024; 22. Https://www.xsolis.com/blog/the-evolution-of-ai-in-healthcare/#:~:text=the %20origins%20of%20ai %20in, identify%20blood%20infections%20treatments.
3. Konstantinos c. Siontis1, Peter a. Noseworthy1, Zachi i. Attia orcid: orcid.org/0000-0002-9706-79001 & Paul a. Friedman orcid: orcid.org/0000-0001-5052-29481, Artificial intelligence-enhanced electrocardiography in cardiovascular disease management Nature Reviews cardiology volume, 2021; 18: 465–478.
4. Vivek kaul, sarah enslin, seth a gross History of artificial intelligence in medicine, Vivek kaul et al. Gastrointest endosc, 2020 oct

Https://pubmed.ncbi.nlm.nih.gov/32565184/#:~:text=artificial%20intelligence%20(ai)%20was%20first,the%20advent%20of%20deep%20learning

5. Foresee medical viewed, 2024; 22. Https://www.foreseemed.com/artificial-intelligence-in-healthcare.
6. Advantages and disadvantages of artificial intelligence [ai], By nikita duggalLast updated on feb, 2024; 16: 21. Https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article
7. Syed shahwar anwar, usama ahmad, mohd muazzam khan, md. Faheem haider and juber akhtar Artificial intelligence in healthcare: an overview Submitted: 23 december 2021 reviewed, 2022; 19: 12. Https://www.intechopen.com/chapters/81238#:~:text=john%20mccarthy%2c%20one%20of%20the,intelligent%20machines%e2%80%9d%20%5b1%5d.
8. Digital health news dhn Written by : arti ghargi january 7, 2024 How ai is redefining healthcare promises in india: a case study Https://www.digitalhealthnews.com/how-ai-is-redefining-healthcare-promises-in-india-a-case-study?gad_source=1&gclid=cj0kcqia5-uubhdzarisaaa21t8mykvc8yy04vlcocqgavjitzljquqd6rkqdfmtvqse4go4ek6kukeaairnealw_wcb
9. Pauwels e, vidyarthi a. Who will own the secrets in our genes? A us-china race in artificial intelligence and genomics, 14.
10. Dwivedi yk, hughes l, ismagilova e, aarts g, coombs c, crick t, et al. Artificial intelligence (ai): multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. Int j inf manag, 2019; 101994. In press.
11. Pouyan esmaeilzadeh, Use of al-based tools for healthcare purposes: a survey study from consumers' perspectives, Published: 22 july 2020 Bmc medical informatics and decision making 20, article number, 2020; 170.
12. Yang x, wang y, byrne r, schneider g, yang s. Concepts of artificial intelligence for computer- assisted drug discovery | chemical reviews. Chem rev, 2019; 119(18): 10520-94.
13. Burton rj, albur m, eberl m, cuff sm. Using artificial intelligence to reduce diagnostic workload without compromising detection of urinary tract infections. Bmc med inform decis mak, 2019; 19(1): 171.
14. World economic forum : health and healthcare, Hare are 3 ways ai will change healthcare by, 2030; 7, 2020: 23, 2024 Https://www.weforum.org/agenda/2020/01/future-of-artificial-intelligence-healthcare-delivery