International Journal of Scientific Research and Engineering Development-– Volume X Issue X, Year

Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

A review on Applications of Artificial Intelligence In Healthcare

Akanksha N Desai*, Mrutyunjaya S Emmi**

*(Master Of Computer Application, KLS Gogte Institute Of Technology, Belgavi
Email: akankshadesai932@gmail.com)

** (Master Of Computer Application, KLS Gogte Institute Of Technology, Belgavi
Email : msemmi@git.edu)

----------**********----------

Abstract:

Artificial intelligence (AI) is a digital technology that has made significant advances in a number of industries, including robotics, computer vision, gaming, mathematics, education, and healthcare. The Paper reviews an application of AI and also few developments in healthcare from both business and academics point of view. The usage of AI in several healthcare fields is explained in some detail. The discussion continues by outlining the potential uses of AI in the future and how those uses can improve quality of life. It concludes by identifying ways in which AI for healthcare can still provide difficulties for software businesses and medical professionals alike by addressing a few significant difficulties.

Keywords —**Deep Learning, Artificial Neural Network, Artificial Intelligence, Image Processing, ASD (autism spectrum disorder)**

----------**********----------

I. INTRODUCTION

Machine learning, deep learning, and robots are collectively referred to as artificial intelligence ("AI"). As such, it's a bit of a misnomer - AI isn't a system, it's a tool embedded in one. At its core, artificial intelligence (AI) is a tool that attempts to emulate human brain power and decision-making processes through the initial development of algorithms that learn from themselves and continue to learn from their own experience - much like people. This enables the system (powered by AI) to use that knowledge to perform particular activities better, faster, or more efficiently than people.[2]

The field of artificial intelligence has made significant recent Steps. New developments in healthcare intelligence technology. made us wonder if artificial intelligence (AI) tools will replace. Human future doctors will practice medicine. In essence, AI covers a range of technologies. several of these. Patient care, health monitoring, diagnosis, and treatment. Ex. machines that learn. AI is a technique that you use to instruct models. Preexisting information, ensuring that when someone enters. Data that you are using for testing, based on earlier. The system will be able to identify the test input through learning Machine education'.[1]

The healthcare sector is witnessing a fast-paced rise in the application of Artificial Intelligence (AI), which is bringing transformative changes to industries across the globe. AI in the field of healthcare refers to the utilization of AI or machine learning algorithms to imitate human cognitive abilities to collect and comprehend intricate

medical and healthcare information. This is achieved through the implementation of diverse machine learning algorithms, computer vision, natural language processing, robotics, and deep learning techniques. These algorithms have the ability to detect patterns in behaviour and subsequently devise their unique logic in order to deliver clearly defined results to end-users. Machine Learning enables us to obtain significant insights and make accurate predictions by processing vast quantities of input data. [3]

In recent years, the healthcare sector has begun to use information technology to develop new apps and improve diagnosis and treatment processes. The major entities that generate massive amounts of digital data are advanced procedures and scientific theory. Following that, advanced clinical applications are the brainchildren of information technology that have recently been produced.[4]

II. APPLICATION OF AI IN HEALTHCARE

There are certain ways through which we can see that how AI is helpful in healthcare. in the below fig1 shown the application of AI.

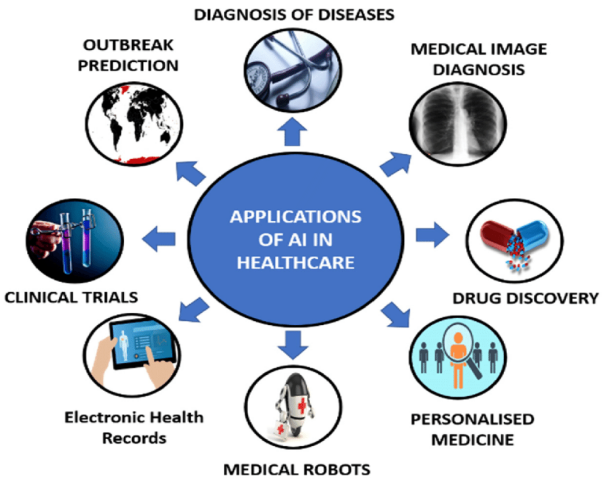

Fig1: The areas where AI Used

A. Diagnosis And Treatment Design

AI is increasingly being used in healthcare to generate treatment strategies for patients. AI can develop greater techniques for treating patients and monitoring treatment programmers by analysing data from prior patients. AI can recognize indicators of disease more precisely and quickly with the use of medical imagery such as CT scans, MRI, X-rays, and ultrasound. It benefits patients by allowing for more accurate disease detection and treatment options.[1]

The timing of cancer identification, the accuracy of cancer diagnosis, and staging are al-l important predictors of tumor aggressiveness and influence clinical decision-making and outcomes. In just a few years, AI has made substantial contributions to this critical area of oncology, sometimes outperforming human expertise and with the added benefit of scalability and automation.[5]

B. Electronic Health Record

Electronic health records are important in healthcare since they help analyse data from the past to the present, which helps enhance various forms of therapies and medicine usage to an illness.[1] Computer-based intelligence could be used to decipher records and provide info to clinicians. Calculations can use EHR to predict the likelihood of a disease based on prior data and family ancestry.[7] AI algorithms are trained using massive volumes of data, and throughout this process, the algorithm develops a set of rules that connects its observations to the final diagnoses. When new patient data is sent into AI, it can evaluate the patient based on past data and forecast the likelihood of a condition or disease [1].

The Google Deep Minds health team is always working on some of the most complicated health problems with AI in order to provide extremely good and timely health services. As a result, the

first step in the medical area is to collect and analyze data; data management is the most extensively used use of AI and digital automation in healthcare.[6]

C. Detecting Mental Condition

Chatbots that use AI technology to mimic human behavior are being investigated for depression and anxiety. The latest AI development technologies can be used to identify psychological disorders in children.[1] one of the latest Technology used is A eye tracking technology (Right Eye LLC) is one such common technique. Recently, AI experts uncovered an AI-generated Autism experiment that uses eye-tracking technology to detect the early stages of ASD (autism spectrum disorder) in children aged 12 to 40 months. During a child's test, an eye tracking device displays a variety of visuals on the screen. Using this technique, a psychiatrist can determine which children have healthy brains and which do not. As a result, AI aids in the detection of mental illnesses that impact children globally.[6]

D. Radiology

Computer-based intelligence is being used in the field of radiology, and by utilizing CT examinations, MR imaging, and Xbeam illnesses are analyzed inpatients, and the amount appropriate to exploration distribution has been increasing over the last couple of years. Stanford developed a method that might detect pneumonia in patients with normal F1 metric better than radiologists who participated in preliminary testing.[7] Robots designed with AI technologies can do X-rays and CT scans more quickly and precisely. IBM devised another calculation called Medical Sieve and the basic point relevant to this is to construct a "mental colleague" with thinking and insightful capabilities, as well as clinical information.[1]

Fig2: Image that show how the radiology work in healthcare

E. Treatment Design

Artificial intelligence is advancing medical care therapies by, for example, revamping the association of therapy strategies, breaking down data to provide prevalent therapy systems, and testing therapies Artificial intelligence can quickly
and precisely detect signs and indications of illness in clinical images, for example, MRI, CT Scan, ultrasound, and x-beams, allowing for faster diagnostics, reducing the time patients must wait for a conclusion from weeks to hours and assisting doctors in making treatment decisions quickly.[6] AI can recognize indicators of disease more precisely and quickly with the use of medical imagery such as CT scans, MRI, X-rays, and ultrasound. It benefits patients by allowing for more accurate disease detection and treatment options.

IBM's Watson recently gained global attention for its capacity to focus on precision medicine, particularly cancer detection and treatment. Different types of AI approaches, such as neural networks, support vector machines, and decision trees, are being utilized to diagnose various diseases. ANN (Artificial neural network) shown greater accuracy in identifying diabetes and CVD. [1]

III. ARTIFICIAL INTELLIGENCE FOR ASSISTING CANCER DETECTION

Because of their fatal nature, diseases like cancer are referred to as chronic fatal diseases. The root cause of cancer. Cancer is referred to as fatal if it spreads more quickly, and in the majority of cases, these cells are found at an advanced stage. It is located. that reducing the death rate from cancer requires early detection.[8] systems that are equipped with artificial intelligence and either operate independently or assist humans in carrying out tasks. They are deemed suitable for efficiently and accurately analysing extensive sets of data to detect cancer. These systems can aid in conducting diagnosis and treatment.

AI is having a profound impact on the field of cancer research and is revolutionizing personalized treatment strategies at a fast pace. medical treatment the availability of datasets with high dimensionality, along with advancements in The combination of advanced computing capabilities and groundbreaking deep learning designs has resulted in a remarkable surge. of the application of artificial intelligence in various domains of oncology research. These applications cover a wide range of detection and classification -cancer detection [5].

In this we can see how Artificial intelligence is assisting for various types of cancer diagnosis.

Cancer is one of the most devastating and destructive diseases to humans worldwide, amid a wide range of diseases. Cancer is the second-leading cause of death in the world, accounting for 0.3 million fatalities every year. Cancer claimed the lives of 413,519 men and 371,302 women, bringing the total number of cancer deaths to 784,821 [8].

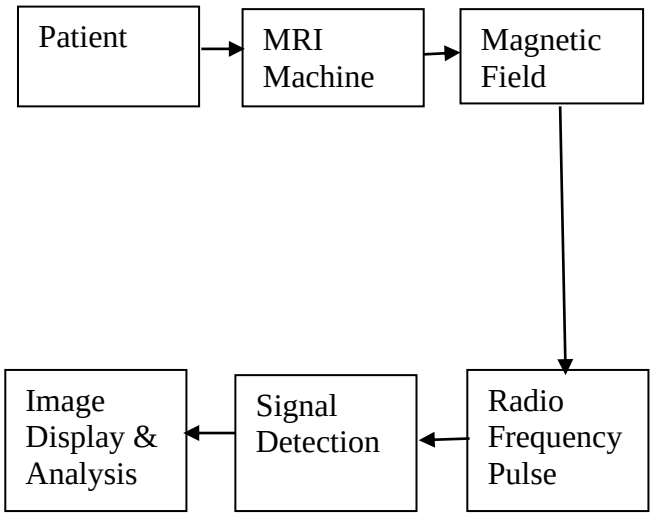

Fig3: Block Diagram for Proposed AI MRI Machine For Detecting Tumor, Brain Disorders etc.

Proposed Algorithm

1.The patient lies on the MRI table, and the body portion to be imaged is placed within the MRI machine.

2.The MRI machine houses the strong magnets and radiofrequency coils required for imaging. It creates a strong and homogenous magnetic field around the target area.

3.Protons (hydrogen nuclei) in bodily tissues are aligned by the magnetic field.

4.The MRI machine sends out a radiofrequency pulse, which briefly breaks the protons' alignment. The protons revert to their aligned state after the RF pulse and release faint radiofrequency signals.

5.These impulses are detected by sensitive coils in the MRI scanner which is developed by AI Technology.

6.The detected signals are transmitted to a computer, where they are analyzed and used to build detailed images of the internal structures. These images are presented on a monitor and evaluated by a radiologist or other medical practitioner in order to make a diagnosis or to assess the patient's health.

Implementation of Various Techniques on Different Types of Cancer are:

A. lungs cancer

Lung cancer is the leading cause of death in all cancer types worldwide. The primary reason for this is the difficulty in detecting the disease in its early stages, and defeating this malignant condition in later stages is extremely tough. The main cause of detection difficulty is the emergence of symptoms after a long period of time. Lung cancer was recognized as a unique disease for the first time in 1761, and its many characteristics were later characterized in 1810. Prior to the invention of cigarette smoking, it was a rare disease [8].

Lung Cancer Is Detect In Different Different Types small cell lung cancer (SCLC): non-small cell lung cancer (NSCLC): NSCLC accounts for roughly 80-85% of all lung cancer cases. The major subtypes of NSCLC are adenocarcinoma, giant cell cancer, and squamous cell cancer.[8] Adenocarcinoma: Adenocarcinomas begin to develop in the cells that normally produce mucus. Adenocarcinomas begin to form in the cells that normally secrete mucus. Despite the fact that it is the most frequent type of lung cancer among non-smoker's, this type of cancer primarily affects smokers [9]. Squamous cell carcinoma: Squamous cells are flat cells that cover the inside of the lungs' airways and are the source of squamous cell carcinomas [9]

B. Liver Cancer

The liver is both the largest gland and the largest internal organ in the body. Hepatocellular carcinoma (HCC), the most prevalent kind of liver cancer, is the sixth most common cancer and the third most common cause of cancer mortality. Liver cancer is the second most common cancer in males who die from it worldwide. The American Cancer Society estimates that more than 40,000 Americans received liver cancer diagnoses in 2017 [8]. A type of cancer known as cholangiocarcinoma frequently develops both inside and outside the liver's bile duct. Due to clinical issues, cholangiocarcinoma is one of the cancers that most frequently results in patient mortality. Chronic viral hepatitis infection, alcoholic and non-alcoholic fatty liver disease, various chronic inflammatory liver disorders, diabetes, obesity, etc. are the main risk factors for HCC[10].

By contrasting the aforementioned optimization strategies on CT scan pictures, tumor categorization is accomplished. Research's main goal is to identify the liver tumor and contrast the 6 Page 4 of 10 Augmented Human Research (2020) 5:6 123 accuracy and turnaround time of PSO and SOA results. The noise from the CT scan images is removed, and the image quality is then improved. Segmentation distinguishes liver from tumor. Region-based techniques separate comparable images based on predetermined standards. It improves contrast-enhanced image results and is noise-insensitive. The optimization phase comes next, and PSO and SOA techniques are applied. The process of maximizing or minimizing a function is called optimization [8].

IV. VIEWS OF DOCTORS WITH RESPECT TO AI TECHNOLOGY

The empirical research on AI in healthcare that has been published focuses primarily on themes directly relevant to medical practice and career, such as the Future of Employment, AI Education, and Accountability.

It has been observed that medical students and practitioners recognize the growing importance of AI in healthcare and have favorable attitudes towards the clinical application of AI but primarily as a diagnostic assistance system.[14]

Despite the positive sentiments towards AI, it has been claimed that students and medical physicians receive inadequate training in these technologies. According to one study, while a small sample of UK medical students who got AI training felt more

confident in working with AI in the future than students who did not, a significant number of taught students felt poorly prepared. Scholars appear to believe that medical school AI instruction should be mandatory in order to fully exploit these technologies.[14]

In this empirical investigation, we polled medical experts on a wide range of ethical problems concerning AI in healthcare. We discussed Privacy, Fairness, Accountability, Transparency, Safety, Human Oversight, Explainability, the Future of Work, Responsible Research Funding, AI Education, Human Autonomy, AI Product Certification, and Ethical Design. The wide range of Health AI ethics investigated in this empirical study helps us to discern medical physicians' thoughts and moral attitudes on the application of AI in healthcare.[14]

V. CHALLENGES IN AI FOR HEALTHCARE

Even while the multidisciplinary nature of AI proved to be a revolution in technology and a catalyst for hard jobs, it has many hotly contested drawbacks.[11] some of the drawbacks are:

A. Data Bias

The AI model needs a lot of input during training, whether it be health data or something else. When insufficient or incomplete data is used to train AI models, there may be unrepresentative data due to social discrimination (lack of access to health-care facilities, for example) and relatively small samples (for example, minority groups). Such bias may occur when the data used for training does not reflect the target population.[12]

B. Missteps and accident

The most obvious issue is that erroneous AI systems might occasionally cause patient injury or other problems in healthcare.. A patient could suffer harm if an AI system prescribes the incorrect medication, fails to spot a tumor on a radiological exam, or chooses to give one patient a hospital bed over another based on an inaccurate prediction of which patient would benefit most from it.[13]

C. Concern About Privacy

The security and legal ramifications of obtaining medical data come next. Despite the importance of the data sector, concerns about anonymity, data security, and distribution, as well as regulatory requirements for healthcare and monitoring, are still crucial.[11] Even if a person has never told anybody else they have Parkinson's disease (or was unaware), an AI system may be able to detect the condition from the slightest movement of a computer mouse. Particularly if the AI system's findings are disclosed to outside parties like banks or life insurance companies, patients may perceive this as an invasion of their privacy.[13]

D. Data Accessibility

A large amount of data is necessary to train AI algorithms from sources such as electronic health records, pharmaceutical records, insurance claim paperwork, or consumer-generated data such as activity trackers or purchase histories. Health statistics might be hard to find, though. Frequently, data is scattered across various platforms. In addition to the aforementioned variety, people frequently change doctors and insurance providers, resulting in data fragmentation across multiple systems and formats. This fragmentation raises the chance of inaccuracy, reduces the comprehensiveness of the dataset, and raises the cost of data collection, all of which limit the types of entities that could successfully create health-care AI.[13]

I. CONCLISION

In order to make medical judgements, particularly in the management of health services, including predictive analysis for patient diagnosis and treatment, it is necessary to apply AI to the field of health services.

The difficulties include promoting early acceptance, long-term implementation in the healthcare system, disregard for the user's perspective, and inefficient use of technology despite its necessity for the adoption of AI in the public health sector. Safety, efficacy, privacy, information, permission, the right to choose, "the right to try," the expenses, and access are a few of the ethical issues that AI clinical applications must deal with.

REFERENCES

[1] Application of Artificial Intelligence in Healthcare: Chances and Challenges
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4393347

[2] Overview AI and Health Care
https://sharepoint.healthlawyers.org/find-a-resource/HealthLawHub/Documents/AI/I_Overview_AI%20and%20Health%20Care.pdf

[3] https://www.javatpoint.com/artificial-intelligence-in-healthcare

[4] Artificial Intelligence and Internet of Things Enabled Disease Diagnosis Model for Smart Healthcare Systems
https://ieeexplore.ieee.org/abstract/document/9380633/

[5] Artificial Intelligence in Cancer Research and Precision Medicine
https://aacrjournals.org/cancerdiscovery/article-abstract/11/4/900/665825

[6] Application of artificial intelligence in medical field A review
https://www.researchgate.net/profile/Himanshu-Gupta-100/publication/370159147_Application_of_artificial_intelligence_in_medical_field-_A_review/links/6442ad56377c1657541737a3/Application-of-artificial-intelligence-in-medical-field-A-review.pdf

[7] A Survey on Application appropriate to Artificial Intelligence in Medical Sectors
https://kalaharijournals.com/resources/Special_Issue_April_May_63.pdf

[8] Implementation of Artificial Intelligence Techniques for Cancer Detection
https://link.springer.com/article/10.1007/s41133-019-0024-3

[9] SVM based analysis of lung cancer ct images.
https://sjcjycl.cn/article/view-2023/pdf/02_847.pdf

[10] A Review on Liver Cancer Detection Techniques
https://ieeexplore.ieee.org/abstract/document/9358362/

[11] Applications, Scope, and Challenges for AI in healthcare
https://www.academia.edu/download/83792568/ijeter041042022.pdf

[12] Artificial intelligence in healthcare: opportunities and risk for future
https://www.sciencedirect.com/science/article/pii/S0213911120302788

[13] AI in Healthcare: medical and socio-economic benefits and challenges

[14] A healthy debate: Exploring the views of medical doctors on the ethics of artificial intelligence
https://www.sciencedirect.com/science/article/pii/S0933365721001834

