ROLE OF ARTIFICIAL INTELLIGENCE IN HEALTH CARE SYSTEM

Abstract

A new multipurpose technology that is Artificial Intelligence that capable of alter dramatically in every sector. Machine can accomplish any complex or simple task with greater efficacy and greater speed than humans would through artificial intelligence. Artificial intelligence can arrange better treatment for many patients and it can also provide information with full explanation to the Physician. In assisted life living generation, AI innovation amalgamation with Intelligent robotic systems lead to better life quality for elderly and disabled persons. The use of Ai in medicine and healthcare has been praised for its great achievement it offers now a days but has also been at the center of heated controversy. It has many advantages like health event forecasting, reducing the medical records, scheming treatment idea, helping repetitive jobs, and also the doctor consultation through online mode etc. at the same time it has some risks in medication and therapy like due to some AI errors patients can be harmed, AI tools can lead to be misused, following that privacy and security issues are also a major issues. For the solution of these major issues some automated systems and tools like Biomarkers, Machine Learning (ML), Brain Computer interfaces, SVM, Neural networks, Natural Language Processing (NLP), and a number of algorithms help to errors minimization and control disease progression. During the COVID-19 AI technology plays an important role in India. In COVID-19 Cases preliminary screening, contact tracing, containment of coronavirus, tracking of suspects and remote monitoring of COVID-19 Patients,

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enforcing quarantine and social distancing, vaccine and drug development etc. AI technology played a major role.

Keywords: Artificial Intelligence, Machine Learning, Health, Drug Development, Vaccine.

I. INTRODUCTION

The combination of two words ie. “Artificial” that means objects that are produced by human beings, and “Intelligence” is the capability of form tricks to achieve goals by interacting with huge information, defines the word Artificial Intelligence. In India now a days Artificial Intelligence is the new electricity which is an emerging focus point. The consequent tasks like thinking, problem solving, decision-making, perceiving, and learning can be smoothly carried out by the AI machines. AI system works on large historical sets of data for predicting future trends and outcomes at a pace that humans would not be able to match. Recently, the government of India has taken various initiatives related to AI such as the establishment of the Artificial Intelligence Task force, National Strategy for Artificial Intelligence #AIFORALL, formulation of NITI Aayog’s, setting up of four Committees for AI under the Ministry of electronics and Information technology, etc. Few initiative steps like the establishment of the Centre of Excellence for Data Science and Artificial Intelligence (CoE-DS& AI) by Karnataka, the Safe and Ethical Artificial Intelligence Policy 2020 and Face Recognition Attendance System by Tamil Nadu, AI-Powered System For monitoring driving behavior By West Bengal, AI System to fight Agricultural Risks By Maharashtra etc. have taken by some of the India’s state governments.

AI has a widely known field in computer science as it has developed human’s lifestyle in many areas. In healthcare AI has a great hope, and it may allow for better prevention, detection, diagnosis, and treatment of disease. During COVID-19 AI technology has helped a lot in case of preliminary screening of COVID-19 cases, contact tracing, containment of coronavirus, enforcing quarantine of COVID-19 patients, vaccine and drug development, etc. (1)

AI is growing at an amazing rate. In clinical oncology research field, understanding the complex biological construction of the cancer cell proliferation and decoding the molecular onset of cancer cell is now more focused. It also process the similar kind of millions cases in big data and computational biology to tackle the current scenario of expanding number of cancer mortalities around the world. (2)

Artificial Intelligence can also give therapy to breast cancer patients by Biomarker assistant. As personalized medicine has advanced, and some combining approaches like omics such as transcriptomics, genomics, metabolomics, proteomics, etc. are grown for detection of cancer. And further enhanced by advances in technology and methods that include next generation sequencing, circulating tumor cells, mass spectrometry, and cell- free DNA. The diagnostic biomarkers are divided into two types: prognostic biomarkers and predictive biomarkers. Prognostic biomarkers gives information against treatment, whereas predictive biomarkers respond to the outcome of the treatment. (3)

Around the world healthcare system faces significant challenges in achieving the four-fold aim for healthcare: improve the patient’s experience of care, enhance caregiver experience, improve population health, and minimizing the rising cost of care. The important application of technology and artificial intelligence (AI) in healthcare has the potential to address some of these supply and demand challenges. Here, we discuss the recent advances in the AI application in healthcare system, describe a roadmap to building effective AI systems and discuss the possible future direction of AI- augmented healthcare systems.

II. ADVANTAGES OF AI IN HEALTHCARE SYSTEM

1. AI can reduce time by doing some time-consuming tasks like MRI, CT scan, ultrasound, etc. Biomarkers technology helps to detect certain diseases within a few seconds in the human body. The bigger part of the manual work can be done by using these specific biomarkers algorithms.
2. AI is also a cost-reducing system such as someone doesn't need to run to the hospital for exposing their health report, as one of the features of AI that give Personalized assistants who can suggest to the patients on health issues. Patients can even connect directly to doctors for advice which can reduce the cost of visiting the hospital.
3. AI also plays a role as a virtual health assistant. It can assist the Physician as well as the patients on several issues.
4. AI will reduce human mistakes by finishing some of the complicated tasks like data positioning, regular inspecting, etc. It can store peoples data in a single place which will be store as a history data, will be helpful for the further comparison of previous and current health problems and such comparison of disease information's makes easy for the physician to make more accurate diagnosis.
5. AI helps in the prevention of diseases at macro level forecasting that calculates the probability of spreading the disease.
6. Robot assisted surgeries can also be performed by the help of AI technologies. Most of the complex operation are conducted with blood loss, minimal pain, and low risks of side effects as this AI surgical system performing the most accurate movements.
7. Wearable healthcare technology also adopted by the AI technology for better serving for patients. Numbers of software like FitBits and Smart watches adopt AI to update the user also their health Professionals on the potential health risks and problems.
8. The name SOPHIA is widely known social robot that was developed to serve as a companion for senior citizens. This robot is the best example of AI potential technology that justify how robots can operate on a human-like things. So in some cases AI also can replaces the nurses.

III. LIMITATION OF AI IN HEALTH CARE SYSTEM

The term security breach and data privacy are the most highlight weakness of AI in healthcare system. As the gathering of information is the main criteria for the development of and growth of AI system, so there are many chances of data abused and taken by wrong hands. Now a days millions of people are there who have experienced similar symptoms and conditions which are difficult to identify the exact disease, so machine learning algorithm should learn the see patterns similar to the way doctors see them, for that the algorithms need a lot of concrete example to learn. This is one of the main limitation of the AI technology.

AI database needs sufficient information related to the patients of a particular group for the proper comparison of data. AI will provide the imprecise diagnosis, if there is any lack of information about a person from certain background, which is the major drawback of AI, as a result the doctor provides the wrong treatment and care to the patients.

AI technology based machines can perform many activities very easily on large scale, which are traditionally carried out by the human beings, which shows the rise in unemployment rates among healthcare workers. Many people may lose their jobs due to the

advancement of AI tools likes chatbots and robots which gives activities like analyze the condition of a patient's health, mental health help etc. the AI software detects diseases from the X-rays with higher accuracy as compared to the radiologists.

IV. TYPES OF AI AND ITS APPLICATION

The combination of different types of AI technologies are made to play an important and great role in the healthcare field, but some of them play a vital role in this field, they are discussed below.

1. **Machine Learning:** Data is the main source of this broad technique, where data are stored as a statistical model for the further learning and training purposes. According to a Deloitte survey of 1,100 US managers the most common and popular forms of AI is Machine learning. In 2018 this survey was carried out, among 1100 US organizations Machine Learning application is used by around 63% companies in their Businesses. In healthcare field, the major popular application of traditional machine learning is to find out the exactness of medicine and which treatment Protocols should be followed to get a high success rate based on the Patients disease symptoms and the treatment context. It's mainly based on the supervised learning principle where a training data set for which the outcome variable is unknown was fixed. The most compound form of machine learning is the neural network that views problems in terms of inputs, outputs, and weights of variables that are related to inputs and outputs. Another complex form of machine learning is deep learning used for the potentially cancerous lesions recognition in radiology images.

2. **Natural Language Processing:** Since 1950 the main goal of artificial intelligence is to make sense of human language such as translation, language detection, text mining, and other objective related to language. The main application of Natural language processing involves the understanding, creation, and categorization of clinical documentation and published research. It is a machine learning based program, particularly based on deep learning neural networks.

3. **Rule-based expert system:** Another commercially used system is rule-based expert systems based on the collection of IF-THEN procedure were the controlling gadget for artificial intelligence in the 1980s and it is universally used in current and in alter phase. This system will consume time and will replace healthcare based on data and machine learning algorithms with more approaches.

4. **Physical Robots:** Robots with physical appearance are plays a breathtaking role in the surgery field. Surgery like gynecologic, prostate, and head and neck can be done by robots by following the common surgical procedures however human surgeons are still taking the important decisions. In 2000 initially, the USA approved a multi tasked system who can complete many task and provide Superpowers to surgeons for their improvement of ability to see, create precise and minimally invasive incisions, stitch wounds etc. are called as surgical robots.

5. **Robotic Process Computerization:** This system is based on a scripted rules which are fixed by the human user. This innovation can execute some organized digital activities for

administrative purpose that is those associated with information system as the robots were used by the personage user only.

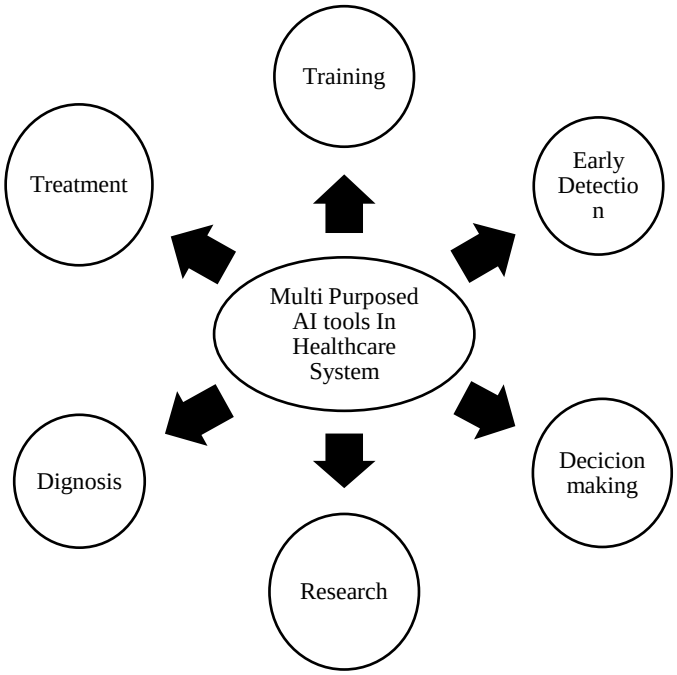

Figure 1: Multi Purposed AI tools In Healthcare System

V. CHALLENGES IN AI DEVELOPMENT

Artificial Intelligence in healthcare has several obstacles. A large set of data is required to train machine learning algorithms or neural networks. Generally, we do not get accurate data or unbiased data, as it was collected from different sectors which contain noise, bias, imbalance or incomplete information, etc. The model trained on one hospital data may not be generalizable to another. As a result, researchers must ensure that the data they collected represents the intended patient group. Another important challenge is the decision-making ability, patients may die due to wrong insight given by the AI. So it is necessary to provide accurate information to AI when any action is to be carried out by the AI.

VI. CONCLUSION

From the above study, it was concluded that AI tool will occupy a major part in future trend in health care sector. Through machine learning, we can initially develop precision medicine which is a widely needed advancement in care. However, there are some limitations are there but by developing software and security guidelines these limitations can be preventable. So we can expect that AI tools will master at the healthcare domain by accomplishing and reducing the various challenges like early detection and providing diagnosis and treatment recommendations, and some limitations like security guidelines etc. Hence, AI will take part as a major tool in the healthcare system due to its several advantages in future trends.

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