



# APPLICATION OF ARTIFICIAL INTELLIGENCE IN MEDICINE- PROGRESS AND CHALLENGES

**Kaushal Kumar Mahato<sup>1</sup>, Ravi Ranjan<sup>2</sup>, Pawan Kumar Mahto<sup>3</sup>**

**Assistant Professor, Pharmaceutical Biotechnology Laboratory, Radha Govind University, Jharkhand, India**

**Assistant Professor, Department of Zoology, Radha Govind University, Jharkhand, India**

**Assistant Professor, Department of Social Science, Radha Govind University, Jharkhand, India**

**Corresponding Author-Kaushal.bme@gmail.com**

*Abstract* : The Current review explores about artificial intelligence, common methods and its challenges in medicine. Current healthcare challenges include its complexity, delay in data exchange, high cost, less manpower. These issues can be resolved by implementing Artificial intelligence (AI) in existing healthcare System. AI can assists in early disease diagnosis, pharmaceuticals manufacturing and other applications in medicine. AI has some limitations, ethical issues that need to be addressed for its versatile applications.

*Key Words* - AI, Machine Learning, Medicine

## 1. Introduction

Artificial intelligence (AI) means development of intelligent machine with the help of different algorithms, So that it performs human cognitive functions such as learning and Problem Solving. AI System has the ability to learn from diverse datasets. These datasets may be multimodal and multidimensional. AI has several subfields such as deep learning, machine learning. These Subfields are used to develop intelligent machine. In some cases, these subareas are applied either individually or Combining these subareas to achieve intelligence in machine. [1-4]

In current scenario, a global health system witnessed major challenges due to COVID-19 pandemic. Due to pandemic, major problems encountered by healthcare industries are insufficient diagnostic tests, lack of information exchange, overworked physicians and high costs. As we emphasize on these problems, we found that these are well connected to each other. Beside this, the existing healthcare system is complex and not patient Centric. To overcome the complexity & improve the healthcare for patient Centric, AI must be integrated lo the existing system.[5]

## 2.Types of AI methods

The most common AI methods applied in healthcare are machine learning, natural language processing, neural network, deep learning machine vision.

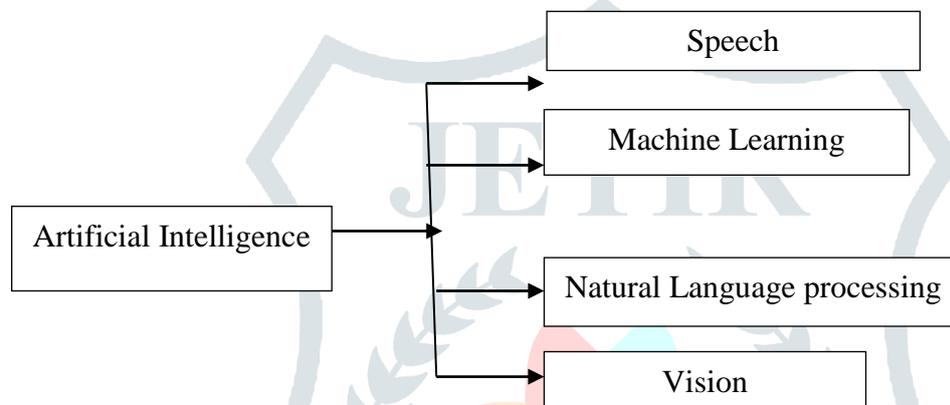
**2.1 Natural language processing-** Using natural language processing tools and technique, computers can be trained to read, understand and extract meaning from human languages. The most common application of NLP in healthcare is disease prediction based on patient's speech.

**2.2 Neural network-**It consists of several hidden layers of connected artificial neurons. In this method, digital input such as image or speech is allowed to pass these neural networks (NN). whereas, in Deep neural network (DNN) in different with respect to NN on the basis of convolutional, transfer, recurrent, reinforcement generative adversarial and representation. DNN is useful in different AI solution in medicine such as to interpret data from various clinical images such as skin lesions, endoscopy and retinal images.

### 2.3 Machine vision/computer vision-

In this method, information is automatically extracted from an image. The extracted information can be either good part of image or bad part of image. It can also provide various information from image such as position of object, orientation and identity. [6]

Figure - Different Types of Artificial Intelligence Methods



### 3. Applications of Artificial intelligence in Medicine-

The major applications of artificial intelligence in medicine are as follows-

#### 3.1 Clinical trials-Clinical trials are performed for new developed drug on human beings to test its effects.

It takes time and financial burden for the manufactures company. Besides, the Success rate of clinical trial rates is very low. To overcome these shortcomings, AI is used in clinical trials. Using AI tools, we get more accurate results in less time.[7]

#### 3.2 Drug Discovery- AI has significantly improved drug discovery process. It assists in identification of target and off-target compounds. Besides, it also reduces repeated work during drug discovery process.

Therefore, now a day's pharmaceutical companies utilising AI in drug discovery. AI is also used in various automation process in pharmaceutical companies. Both AI & machine learning will play a significant role in drug development process to make it cost effective, faster and more effective.[8]

**3.3 Diagnostics-**The most prominent applications of AI in diagnostic imaging is classification of medical images. Using convolution neural network, we can easily identify pneumonia, dermatology, using clinical images. In addition, a deep learning algorithm can be used to detect heart attack. AI also assists in diabetic retinopathy screening. It is important to identify diabetes induced vision loss at early Stage for prompt treatment. Due to large numbers of diabetes patients, and limited manpower, screening of diabetes retinopathy is slow. Using FDA approved AI algorithm, IDX-DR Screening of diabetes retinopathy is easy can performed easily with 90%. Specificity. AI also assists clinicians in image preparation and planning task prior to radiotherapy cancer treatment. During this, segmentation is perform performed by clinicians, manually, and is time consuming process.[9]

**3.4 Physical robots-**Physical robots can perform various tasks such as repositioning, lifting and delivery of various requirements in hospitals. Robots can easily collaborate easily with human & can be trained to perform new tasks. AI can be integrated into physical robots to enhance its intelligence and performance. USA has approved surgical robots in 2000 to empower surgeons. These robots can perform various tasks such as in small incisions, wound stitching.[10]

**4. Challenges-**There are some challenges associated with application of AI in medicine. The major difficulties include transparency, permission and privacy. Besides, mistakes may be made by AI assisted

diagnosis. In addition, machine learning System may be algorithmic biased on the basis of gender or race. We may face several medical, ethical, occupational and technological changes with AI in medicine. Therefore, healthcare organizations, government and regulatory body to develop structure to monitor important issues and limit negative application.

### Conclusion

As we found that, integration of AI into existing healthcare can be beneficial for various aspects such as low treatment cost, early detection of disease, less workload to existing healthcare workers including Surgeons. Beside, variable age structure of population is also an important factor for implementation of AI. In addition older age groups in developed countries are more prone to chronic disease, leads to high costs in their treatment. This issue can be resolved by appropriate use of Artificial intelligence. Before approving any medicines for clinical application, it undergoes various clinical trial stages, which is time consuming and expensive too. AI can reduce the clinical trial duration and its cost as well.

### References

1. Mac Carthy J. What is artificial intelligence? John Mac Carthy, 1998.
2. Shukla ss,Jaiswal V.Applicability of Artificial Intelligenece in difrerent fields of life.IJSER 2013:1:28:35.
3. Denge J,Dong W,Socher Ret al.Imagenet:a large scale hierarchical image database .2009IEEE Conference on computr Vision and patteren Recognition 2009:248—55.
4. Quinn TP, Senadeera M,Jacobs S,Coghlan S,Le V.Trust and medical AI:the cahllanges we face and the expertise needed to overcome them .J Am Med Inform ASSOC2021:28:890—4.
5. Pavli,A.,Theodoridou,M.,& H.C.(2021).POST-COVID Syndrome :Incidence ,Clinical spectrum ,and challanges for primary healthcare professionals.Archieves of Medical Research.
6. AI in healthcare :A narrative review,Anttivaananen,Keijohaataja,Katrivehvilainen-Julkunen,pekka Toivanen,F1000Research 2021,
7. Lee,E.(2021).How do we build trust in machine learning models?Available at SSRN 3822437.
8. Chan,H.C.S.,shan.,H.,T.,Vogel,H.,&Yuan.,(2019).ADVANCING DRUG DISCOVERY.Via artificial intelligence .Trends in pharmacological Sciences ,40(8),592—604
9. Artificial Intelligence in health care :Transforming the practice of medicine.Junai Bajwa,AU smanMunir Bryan Williams Future Health care Journal 2021 vol8,no2:e1888-94
10. The potential for artificial Intelligence in health care Thomas davenport and Kalakota Future health care journal 2019 vol 6No2,:94-4