



---

## THE ROLE OF ARTIFICIAL INTELLIGENCE IN TRANSFORMING THE HEALTHCARE SECTOR

*Shweta Sinha<sup>a</sup>, Ayush Soni<sup>b</sup>, Vishwa Pratap Singh<sup>c</sup>*

<sup>a</sup>Teacher, Department of Computer Science, NPGC, Lucknow

<sup>b,c</sup>Student, Department of Computer Science, NPGC, Lucknow

---

### ABSTRACT

The science of making intelligent machines work similar to human brain by computer programs without including the biological operations is called Artificial Intelligence. There are many definitions for Artificial Intelligence. Historically, making machines with intelligence is called Artificial Intelligence. Making machines with environmental acceptability is also called Artificial Intelligence. The term Artificial Intelligence was introduced by John McCarthy in 1956. However the idea of turning machines to have human behaviour was developed earlier by Alan Turing. The evolution of Artificial Intelligence started after the idea proposed by Alan Turing. Problems that are solvable by Artificial Intelligence are classified into five categories: Search, Pattern-Recognition, Learning, planning and induction. Normally Artificial Intelligence based machines develop a model to solve the particular problem. When a problem is detected first the machine searches through the large set of solutions. This process is made more efficient by using pattern recognition techniques. Then the machine starts learning the situation which is called Deep Learning technique. Model construction is done in Artificial Intelligence by using induction process.

AI Have Ability To Understand, Learn, Think, Analyze and Take Action Accordingly. Today Research Is Going On How The Human Intelligent Is Different From Artificial Intelligent. AI Uses Tools like Machine learning, Deep Learning for Analysis of The Problems. It is the project of Developing system with intellectual to learn from past and implement in present without any error. AI has mainly two types Artificial. Narrow Intelligence (ANI) which is used in autonomous vehicles, Google home, amazon Alexa. Another one is Artificial General Intelligence (AGI) which is not practically used today but in future it will be in peak position of AI. According to researchers (AGI) will have ability to develop superhuman, computer assistant system etc.

**Keywords:** *Artificial intelligence, health appliances, robotics, artificial neural network*

---

### 1. HISTORY OF ARTIFICIAL INTELLIGENCE

The complexity of human undertakings is infinite. As a result, writing history necessitates the adoption of a viewpoint that allows for simplification and standardization. The usual framework for understanding science history is in terms of significant scientific events and discoveries, as well as the people who were responsible for them. Both human minds and modern digital computers, according to Herbert Simon and Allen Newell, acts as same species, can be termed as symbolic information processing systems that take information in symbolic representation as input, change them according to the rules, so that they can solve problems with judgments and accurate decisions. Whether or not we ever fully comprehend 'intelligence,' we face a tremendous challenge in bringing software's and people together in ways that improve people's lives. While some see this difficulty as a prelude to the development of artificial intelligence, others see it as the birth of a new discipline of Engineering. This new field, like civil and chemical engineering in the past, aspires to harness the power of a few fundamental ideas, providing new capitals and competences to people while remaining safe.

In short, the concept of AI was born of friction and imagination, and the invention of technology and other elements also influenced the development of AI. Some milestones included problem-solving tasks such as knowledge representation, reasoning, language and comprehension demonstration programs, translations, basic learning tasks, proof of theorem, associative memory, and knowledge-based systems. AI captured multiple flavors in the field during this era. This is a clear part of the field paradigm or research program in a particular area. Intellectual topics have certain sharpness that make writing and speaking fun. The rapid development of AI is much debated today. AI is a breakthrough technology that is changing every aspect of human life and creating great expectations. Many even suspect that AI poses a threat to human existence. AI has definitely come a long way since its inception, but we are no longer aware that AI has become a part of our daily lives. The latest developments include the concepts of machine learning, supervised learning, reinforcement learning, and unsupervised learning. The biological neural networks in our brain were the inspiration for artificial neural networks that helped machines understands patterns from specific input data to predict future datasets. Recently, a multi-layered artificial neural network, also known as a deep neural network, has been implemented to improve accuracy. Some AI applications, such as Deep fake and AI bots have fake accounts that can be counterfeited.

### 1.1 The growth of Artificial intelligence in recent years

The effects of man-made intellectual (AI) and mechanization on progress and occupation depend mostly on administrations and arrangements. In the first part, AI can prickle growth by displacing work with capital, both in the formation of labor and products and in the expansion of thoughts. Still, AI might delay expansion whenever combined with an inappropriate opposition strategy. Given experimental examination of French data shows that robotization reduces total effort at the business zone level, and second that non-taught workers are more unpleasantly impacted by robotization than directed workers. Prominent organizations are using man-made intellectual to enhance and expand their efficiencies. The ability to intrude AI into the national economy is huge and this cannot be restricted to individual companies. As a matter of first importance, it is the chance of key planning on the size of the entire economy, that is, the quest for ideal replicas, building objective indicators for huge businesses, forecasting of total demand and supply, optimization of the monetary-crediting framework, and so forth. Accordingly, the introduction of vital planning dependent on man-made reasoning into the national economy framework, would accumulate a prototypical of protracted imitation, without falsifications between diverse areas of the budget, and subsequently apply a replica of its maintainable, emergency permitted development.

It is believed that when the Technological Singularity arrives, artificial intelligence will supplant the capacity of human brain. At present, AI has limited number of functions, hence called Weak or Narrow AI. Weak AI is used for specific task. However, it is predicted that AI with consciousness has intelligence as strong as humans and can take intelligent decisions and execute multiple functions. To obtain AI with complete functions, efforts has augmented quickly over the past years. AI is constantly increasing its influence in various fields like big data, cloud computing, medical, etc. Amazon Eco, Microsoft – Equivio, Google-Smart Contact Lenses, etc. are the best examples of AI that can be seen these days. Due to development of AI and technology, Cortana and Siri, driverless cars, IBM Watson, Automated Trading and Deep Learning have become common these days. Various companies like Yahoo, Google and Amazon are providing open-source tools which helps a lot in the development AI and various other related technologies.

---

## 2. APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE HEALTHCARE INDUSTRY

One of the crucial applications of artificial intelligence is considered as medicinal science. Researchers developed many decision support systems since the mid of 20th century. In 1970, rule based approaches were a huge success and was used to interpret ECGs, choosing the correct treatment, diagnose disease and even to assist physicians. Since the required the frequent addition of rules and updates, this rule based systems are costly. Also, it was difficult to encode the different knowledge obtained from different experts. The first generation medical AI was completely depended on expert knowledge and robust rules. But the modern AI made changes in the learning methods by which it can have many interactions and identify pattern. Machine learning algorithm is categorized into two: supervised and unsupervised; depending on the type of task which they are assigned to solve. In supervised learning, it collects large number of cases which has the input and output that we desired. This input and output is analyzed and produces an output for new cases. In unsupervised learning, in order to find the sub clusters of original data it looks for the different patterns in the unlabeled data. Machine learning method has helped AI in its development in such a way that, it does not have to specify rules for every task in order to find unrecognized patterns. Thus, machine learning has become the key framework in building AI machines. In modern world health care sector, Artificial Intelligence, big data, algorithms, robotics are used for monitoring, detecting, measuring risks. Healthcare industry depends on data and analytics so that they can improve practices and therapies. There have been a rapid growth in the rate of the medical information gathered over the years. Medical professionals, researchers, patients, produces huge amount of data like electronic health records (EHR), medical imaging etc. from different devices, almost every day. Artificial Intelligence technology has the ability to gain information, process and provide defined output to the user. This function is obtained through machine learning algorithm, data storage and computation power. By daily monitoring, the behavioural patterns can be recognized and predictions can be made. Thus, AI can analyze prevention, treatment, patient outcome in various stages of his diagnosis, drug development etc. To increase the accuracy and precision of the medical reports generated modern hospitals go for AI empowered technologies. It also brings cost effectiveness. AI provides the choice for therapy by presenting various recommendations. The online patient education shows the journey of patient, early disease condition, health goals, therapy choices and outcomes and also the future goals. The advancement on big data helped to have health risk warning system on mobile apps and thereby we can know the early risks. Using the electronic health records, physicians can give medical advice by referring the previous data. Using AI based technologies in the area mental health also produces excellent results. A program called the Artificial emotional intelligence has been created to understand, simulate, calibrate human emotions. These tools are provided to patients to have companions to talk, to control anxiety etc. Also, certain AI based tools have the power to detect future occurrence of depression episodes in patients. Recent years, the popularity of telemedicine and its applications has been considerably increased. They collect data from places like the wearable sensors. Some AI has the function of recognizing speech and responding orally or via text. After collecting the information, recommendations about what to do are provided to the user or directly gives the information to doctor.

---

## 3. IMPLEMENTATION OF AI TOOLS IN HEALTHCARE APPLIANCES

Cardiac vascular is the most common disease in present generation as increase in consumption of junk food, low grade street food which are leading to blood clots in artery which in turn causing cardiac disease and heart attacks. Treating a cardiac vascular patient involve in Artificial respiration which require regular monitoring that is achieved with help of integrating many devices such as ventilator, ECO, ECG machine, Oxygen concentrator. The AI helps in monitoring and controlling the oxygen levels of patient on Ventilator with help of data provided by ECO and ECG machine, to do so the system initially make some assumptions of data and diagnose the patient, through this Health unit can provide best health care to their patients. In present generation with the advancement of technology from wrist bands to laptops are collecting lot of data such as heart rate, network usage and so on, in field of dietary the information and data of patients collected is also increase drastically, processing of such huge amount of data by Artificial Intelligence integrated software helping the dentists to Identify and treat the patients more accurately in less time by spending less

time on analysis. The AI induced in smart devices also creating awareness in people regarding oral hygiene and other common dental diseases. Development of ultra-Sensitive Pressure sensors has its negative effects such as recording of False values or inaccuracy while taking measuring. The rapid growth in electronics lead to development of Pressure sensor receptors that are capable of processing large area, consume less power and flexible which can detect pressures our human skin cannot detect. These are used in Robotics, human assisting machines, biomimetic prosthesis, this also helped in advancement of AI. The Data processing by AI is making the idea of creating E-Skin possible with addition of Temperature sensor in between the flexible pressure sensors that are arranged in matrix or array fashion.

One of the important applications of AI in Healthcare appliances is using Cryptographic Systems using Internet Of Things (IOT) using Robust Encryption Algorithms against Side Channel Attacks which helps to protect the financial and medical records data of hospitals. [9] In 2018, Google has created an AI research branch which is called as Google Deep and Health project which is to maintain a medical statistic which help to provide best and excellent health services.

AI organizes patient treatment data and information.

- Managing medical records and data- AI is used in data management in which data are gathered, stored, normalized, and access all previous records quickly.
- AI analyzes all test reports, x-rays reports; ct scans reports, data entry and other tasks that are required for patient, with accurate results.
- Many Healthcare organizations use AI based surgery tools and treatment methods. AI also rapidly recognizes symptoms and sign in CT scans, medical images such as MRI, XRAYs etc. Artificial intelligence is mostly used by dentists for appointment booking, tele-assistance for dental emergency, clinical diagnosis and treatment planning. In dentistry online appointment booking and coordinating appointment as required by patients. Pop up notifications for checkup using AI. AI provides assistance, if patients have any dental emergency, a tele – assistance is always available for drug creation, machine learning algorithm area unit is used that is part of Artificial Intelligence. This algorithm is used to decrease drug recovery time. Elements of drug recovery are cheaper and safe. It does not fully works in ending all stages of drug creation; it only assists with stages like-discovering new compounds that have a need of medication.

#### 4. AI IN MONITORING COVID-19

Due to AI there is a huge innovation in medical science field due to which some life-threatening diseases get cured and mortality rate decreases. The Google Duplex Artificial Intelligence (AI) is used as personal assistance which helps people to give information. Using the Sensors and Internet of Things (IOT) emergency module is developed for patients which helps caretaker or family members to monitor body conditions in state of emergency. With the help of AI there is advancement in medical field. It is used in patients check –in process while visiting hospitals, maintaining patient's records, monitoring disease, assistance in surgical process, mental health therapy, optimizing staffing, image interpretation, billing. Coronavirus disease 2019 (COVID 19) affected entire world. During COVID-19 the AI and Machine Learning (ML) played a vital role in healthcare. It is used for vaccine development, diagnosis strategies designing and predictions of disease spread. The real time monitoring system is used in hospital to keep track of health of patients using AI, ML, and Internet of Things (IOT).

##### 4.1 Pattern Prediction of Covid-19 Using Machine Learning Approaches

Various AI and machine learning approaches that can be used to predict and analyze the patterns related to COVID-19. Some of these approaches which have been used by researchers are :

- 1) The effect of quarantine measures can analysed by the Time series analysis.
- 2) Implementation of classification algorithms can be done to keep a check on the number of active or increasing cases.
- 3) The geographical spreading of cases can be tracked by implementing clustering algorithms.
- 4) The time series analysis can also be used to analyse the varying pattern of the virus both linear and non linear.
- 5) Death rate can be tracked and recorded using logical regression.
- 6) Using time series analysis and linear regression the upcoming outbreak can be detected.
- 7) Number of cases that are home quarantined can be identified by Structured data classification and Classification algorithms.
- 8) Binary classification algorithms can be used to check the access of treatment using a particular drug based on criticalness of the infection.

#### REFERENCE

- [1] Chen, M., & Decary, M. (2020, January). Artificial intelligence in healthcare: An essential guide for Health leaders. In Healthcare management forum (Vol. 33, No. 1, pp. 10-18). Sage CA: Los Angeles, CA: SAGE Publications.
- [2] Dhanabalan, T., & Sathish, A. (2018). Transforming Indian industries through artificial intelligence And robotics in industry 4.0. International Journal of Mechanical Engineering and Technology, 9(10), 835-845.

- 
- [3] Bhandayker, Y. R. (2018). Achievements and Future Growth of Artificial Intelligence. *International Journal of Scientific Research in Science and Technology*, 4(9), 389-396.
  - [4] Bhbosale, S., Pujari, V., & Multani, Z. (2020). Advantages And Disadvantages Of Artificial Intelligence. *Aayushi International Interdisciplinary Research Journal*, 227-230.
  - [5] Amisha, P. M., Pathania, M., & Rathaur, V. K. (2019). Overview of artificial intelligence in Medicine. *Journal of family medicine and primary care*, 8(7), 2328
  - [6] Strong, A. I. (2016). Applications of artificial intelligence & associated technologies. *Science [ETEBMS-2016]*, 5(6).
  - [7] Thenral, M., & Annamalai, A. (2020). Telepsychiatry and the role of artificial intelligence in mental
  - [8] Health in post-COVID-19 India: A scoping review on opportunities. *Indian Journal of Psychological Medicine*, 42(5), 428.
  - [10] Hossain, M. S., Muhammad, G., & Guizani, N. (2020). Explainable AI and mass surveillance System-based healthcare framework to combat COVID-19 like pandemics. *IEEE Network*, 34(4), 126-132