

# ARTIFICIAL INTELLIGENCE AND ITS INNOVATIVE TRENDS

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**Abstract-** *Artificial Intelligence (AI) is a term that can be used to describe a system that has the ability to learn from its environment and make decisions based on this knowledge. AI is an emerging technology which it comes in many forms such as machine learning, deep learning etc. All of these types of AI have been developed for different purposes, however they all have some common element: they are all intended to assist people in making better judgments. In the last few years, there has been exponential growth in Artificial Intelligence, as it has captured our daily life by spreading out in all possible directions. This review paper offers a detailed overview upon the Artificial Intelligence and some of its recent innovations.*

**Keywords:** Artificial Intelligence, Machine Learning, Deep Learning, Innovations.

## 1. INTRODUCTION

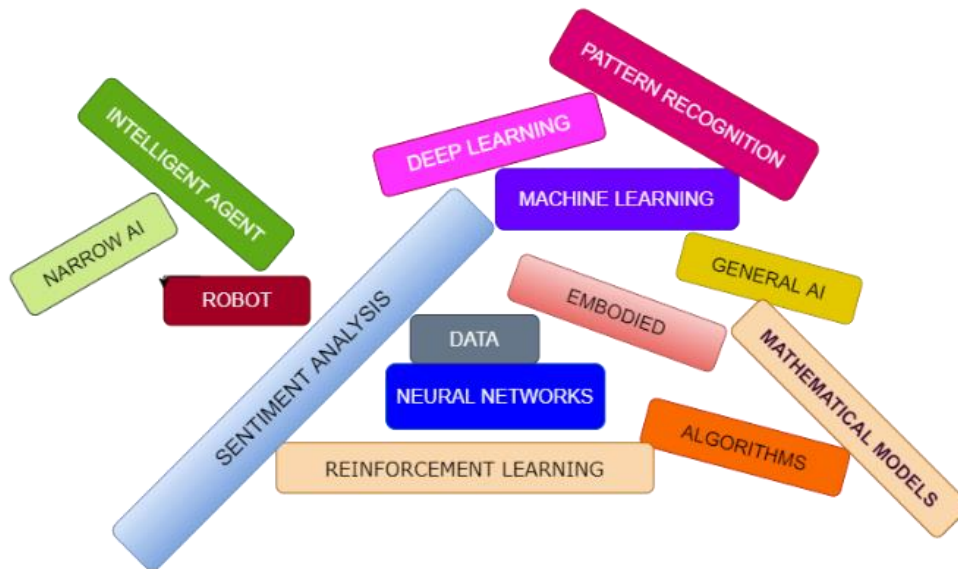
Humans are the only creatures in the world that have been given the brain, as well as the capacity and talent to use it. Humans have progressed far with the power of this intelligence and skills. They invented a variety of items, including computers, smart phones, and the internet [1]. We are now living in the age of Artificial Intelligence (AI). AI is a branch of computer science that deals with intelligent behavior, learning, planning and perception. In layman's terms, AI refers to computers that have a brain, and it now comprises sub-branches such as machine learning, deep learning, and natural language processing to name a few. The first AI programs date back to the 1950s when researchers started to investigate the possibility of creating machines that could think like humans. John McCarthy considered to be the "father of artificial intelligence" coined the term Artificial Intelligence at the Dartmouth conference in 1956. He defined AI as "the science and engineering of making intelligent machines". The term Artificial Intelligence is a constitution of two word viz., Artificial and Intelligence where "Artificial" means anything that is made by human, and that does not exist naturally and "Intelligence" means an ability to understand think and learn. Artificial Intelligence can be further divided into several areas as illustrated in figure 1.

AI is advancing at a rapid pace and has become trendy in recent years. Our lives have become a lot easier and more efficient as a result of Artificial Intelligence. Thanks to AI, new inventions are emerging in a variety of industries, including financial, educational, healthcare, manufacturing, transportation, infrastructure, public security, energy, robotics, marketing, and business analysis, among others [2]. Because of the enormous number of advancements, it is critical to have a thorough understanding of Artificial Intelligence. This review paper offers a comprehensive overview of Artificial Intelligence and some of its recent innovations.

## 2. MACHINE LEARNING (ML)

Machine learning is one of many subfields or subsets of artificial intelligence. It mainly emphasizes upon the design of systems so that they can learn and make predictions through some experience (such as machine data) without explicitly programmed. Machine Learning is a set of algorithms to make machines, predict & make decisions.

Machine learning is further divided into three categories: supervised, unsupervised, and reinforcement learning.



**Fig 1:** Areas of AI

- **SUPERVISED LEARNING**

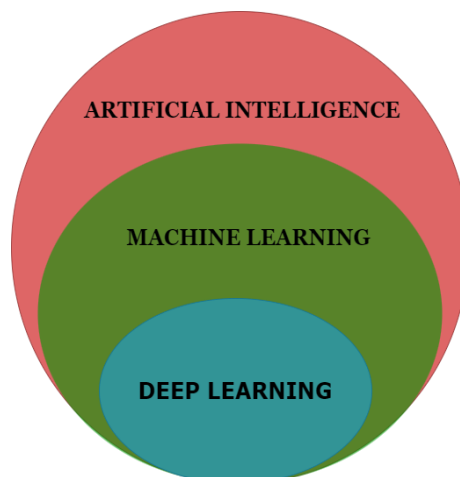
It's a type of machine learning in which labels help the computer learn under the supervision of labelled data. There is a training data set on which the machine is taught, and it produces results based on that training.

- **UNSUPERVISED LEARNING**

The use of artificial intelligence (AI) algorithms for discovering patterns in data sets with no classified or labelled data pieces is known as an unsupervised learning approach. Unsupervised learning is used to recognize patterns in data and create clusters of related entities. When fresh input data is introduced into the model, the entity is no longer identified, but rather placed in a cluster of related objects.

- **REINFORCEMENT LEARNING**

In reinforcement learning, the model learns and traverses in order to find the best move. On the basis of the reward and punishment principle, reinforcement learning algorithms identify the best potential action.



**Fig 2:** AI vs ML vs DL

### 3. DEEP LEARNING (DL)

AI has been around for many years, but the last few years have seen a lot of new developments in the field. The most recent development is known as deep learning and it uses neural networks to process information with several hidden layers. These neural networks can be used for things like predicting what will happen next or finding patterns in large data sets. Deep learning is now being used by business houses. The difference between Artificial Intelligence, Machine learning and Deep learning can be explained with the help of Venn diagram illustrated in figure 2.

### 3. AI INNOVATIONS

- *SOPHIA ROBOT*

Hanson robotics' Sophia is a social humanoid robot. It was made possible by David Hanson and his colleagues at Hanson Robotics in Hong Kong, who pioneered groundbreaking robotics and artificial intelligence technology. It is the first AI robot to get the citizenship of a country. She turned into a resident of Saudi Arabia in 2017 [3]. Sophia was designated the United Nations Development Program's inaugural Innovation Champion in November 2017. But Sophia is something beyond Technology. She is an electronic girl in every sense of the word. She wishes to travel the world and live among people. She can undoubtedly amuse them, as well as assist the elderly and teach children about human expressions. She's starting to understand the emotions and feelings behind those faces, which is why she wants to live among people and learn from them.

- *ALPHAGO*

Google's Deepmind Project AlphaGo is a computer programme that has become invincible at Go, the world's most difficult strategic game [4], [5]. While a game of checkers has to the power of 20 different outcomes, a game of chess has to the power of 40 different outcomes, and a game of Go has to the power of 80 different possibilities. AlphaGo has been taught to assess situations on its own by dissecting the game into little chunks and picturing all potential plays. It defeated the world's top Go player, Ke Jie, with the assistance of a human handler a few years ago. He was defeated three times by AlphaGo.

- *SELF DRIVING CAR*

The self-driving car is currently the most well-known driver assistance system in the world, and its features have impressed millions of people [6]. By autopilot, it means that the car can handle nearly every driving situation on its own, including reacting to stop lights and stop sign boards, change lanes on its own, and take highway exits on its own. From picture capture through their cameras to road navigation, autopilot does it everything. Generally, these vehicles feature eight cameras, which allow the vehicle to view its surroundings.

- *AI VIRTUAL ASSISTANTS*

An AI virtual assistant is a software that recognizes natural language voice instructions and performs activities for a user while also delivering a number of remote services to a business. Siri is an AI based voice control personal assistant developed by Apple for their products. On similar lines there is Amazon's Alexa, Microsoft's Cortana, and Google's Assistant [7]. They all are based on machine learning and voice recognition system.

- *BRAINBOX AI*

For commercial heating, ventilation, and air-conditioning systems, BRAINBOX AI is the most advanced artificial intelligence technology [8]. Brainbox AI can make the building structure more astute and more productive. Brainbox AI connects rapidly into the existing building management system pulling internal data securely into the cloud server every five minutes through an encrypted IOT network without the need for additional sensor deployment. Relevant external information including weather forecast, utility tariff structures, emissions data and more are fed into the AI engine adding immense value to the existing internal dataset. With this data, AI deep learning neural networks predict the future condition of each zone in a building with over 99 percent accuracy, as well as the needed optimization techniques to decrease the desirable temperature variations.

- *GPT – 3*

Recently the most influential discovery of Artificial Intelligence is Generative Pre-Trained Transformer (GPT) [9]. It is an autoregressive language model which is constructed using deep learning and is used to produce human-like text. Currently GPT - 3 can write simple formulas of Microsoft Excel but the research suggests that soon it will be able to write code automatically for anything we want.

- *PANDORA*

Pandora is a unique music streaming service that employs artificial intelligence to help discover less songs to listen to [10]. This is clearly not an unusual decision. Pandora's creators have analyzed nearly every song on the planet and then split it down into 450 musical attributes. So after, the user of the service selects a song or two the AI will analyze the songs they pick and select music of a similar style floor substance and more. Because of this in-depth search many have found new musicians that they never heard before and have liked their music. Pandora, however has slipped behind competitors like as Spotify and Apple Music in past few years.

- *TRAILJECTORY*

TrialJectory is a patient-centric digital health firm on a goal to make advanced cancer therapy more accessible to everyone. Artificial intelligence (AI) is used by TrialJectory to educate and involve illness patients in their treatment journey [11]. The treatment of the cancer is evolving every day, to better understanding of the disease, new research and new trials. It becomes impossible for anyone and the oncologist to be aware of the latest treatments. That's why cancer patient and scientists have developed TrailJectory. A smart AI technology that represents various treatment available today. In TrailsJectory, first patients fill out a cancer type and complete the questioner with current condition then TrailJectory engine analyzes huge amount of information, treatment and the central database of trails and finally it provides the best treatment match for patients and it also informs what, where and how of the treatment and even compare patient's journey to other patient's journey with the same conditions.

#### 4. AI IN VIRTUAL REALITY

Virtual reality (VR) is a type of human-computer interaction in which a real or imagined world is replicated. Users interact with and alter that reality. Currently, use of AI technologies in graphical simulation and gaming are being investigated [12]. With the aid of AI algorithms, VR may also be deployed in Industry 4.0. One such product is HTC Vive Pro Eye. The device tracks the eye activities, where the eyes are spending the most time looking or focusing.

- *OPEN AI's JUKEBOX*

The Open AI jukebox is a ground-breaking model that creates raw audio music that imitates a wide range of styles and performers. It may condition this music on specified artists and genres, as well as specify the sample's words [13]. It creates a new music sample from scratch using a machine learning architecture.

- *NEURALINK*

Neuralink Corporation is a neurotechnology business firm that creates brain-machine interfaces (BMIs) that may be implanted. Since its inception, the firm has engaged a number of well-known neuroscientists from a variety of organisations. The researchers are now developing a "sewing machine-like" technology that can implant very fine threads into the brain and have developed a system that can read data from a lab rat. They intend to begin human tests in 2022.

#### CONCLUSION

Artificial intelligence is a branch of computer science concerned with the development of intelligent machines or software programs, and now it is finding its usage in almost all disciplines including commerce, health, and research. It is a disruptive technology. Concerns about job loss as a result of AI are also prevalent in society, despite the fact that AI will generate several of the new jobs that no one has ever heard of. There is no reason to believe that humanity's heavy dependence on AI will lead to its demise. Artificial Intelligence is the future and it is only going to get more advanced.

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