ARTIFICIAL INTELLIGENCE - A REVIEW FOR BEGINNERS

Pratiksha Kuhikar,Pratibha Sakhare, Kiran Ambaskar
Department Of Electronics
Kamla Nehru Mahavidyalaya,Nagpur Maharashtra India
kuhikarpratiksha@gmail.com

ABSTRACT:

Do You Know What AI Is? Do we use AI? How it work? What is AI's application? Is it connected to laypeople? Many more questions arise? Even though artificial intelligence is a technical idea, it is helpful and simplifies daily living. We use artificial intelligence (AI) without realizing it in our daily lives, but we are afraid of it since we aren't familiar with it. Artificial intelligence (AI) has recently made an impact on a wide range of industries, including the world of technology and mobile app development. Artificial Intelligence has the capacity to transform numerous sectors and offers an extensive array of uses, ranging from self-driving automobiles to virtual personal assistants. [1]

In general, AI systems operate by collecting in huge quantities of labelled training data, examining it for correlations and patterns, and then applying these patterns to forecast future states. AI defines the process by which a machine replicates human thinking in technological terms. In other words(AI) process that machines, particularly computer systems, simulate. Learning, reasoning, planning, self-correction, problem-solving, knowledge representation, motion, manipulation, and creativity all have to be covered by this. It is a science and an array of computing methods that draw inspiration from the ways in which humans use their bodies and neural systems to sense, understand, reason, and behave.The main objective of this chapter is to understand the concept of artificial intelligence from Layman's perspective.

KEYWORDS: Intelligence, Technology**,** Layman's perspective.

1. INTRODUCTION:

Technology known as artificial intelligence makes it possible for computers and software to replicate human intelligence by using algorithmic training and iterative processing to learn from experience.

Any action or operation carried out by a computer or program that would require human intelligence to complete is known as artificial intelligence (AI). Making machines exhibit intelligence is a field of study and engineering, with a focus on speech recognition, visual perception, decision-making, and language translation similar to that of humans. Artificial Intelligence is defined as the machine, particularly computer system, emulation of human intelligence processes. Knowledge representation, learning, planning, self-correction, problem solving, perception, motion, manipulation, and creativity are all included in this. Inspired by the way the human nervous system functions, it is a science and a collection of computer approaches. [1] AI closer to the goal of enabling machines to think and work as human as possible. Above explanation for technological and engineering student but our main aim to explain the concept of AI for layman also [1].

The simulation of human intelligence in robots that are designed to think and behave like people is known as artificial intelligence, or AI. It entails the creation of computer programs and algorithms that are capable of carrying out operations like speech recognition, visual perception, decision-making, and language translation that normally demand for human intellect. To put it briefly, we use AI to try and construct an artificial brain. [2]. Let's first discuss the definition of intelligence before moving on to the concept of artificial intelligence [3].

The capacity to learn and solve issues is intelligence. From Webster's Dictionary, this definition was obtained. Making computers smarter so they can act intelligently is the most common response that one anticipates, but how smart should they be? How does intellect get measured? As sophisticated as people. We

would refer to computers as "intelligent" if they could somehow solve real-world problems by learning from their past mistakes. As a result, AI systems are more versatile, more generic, and capable of "thinking" [3].

We all know that intelligence is the capacity to learn and use knowledge. Experience imparts information, which is known as knowledge. Knowledge acquired through exposure (training) is referred to as experience. In summary, artificial intelligence can be defined as a "replica of something natural (i.e., humans) 'WHO' is capable of acquiring and applying the information it has gained through exposure."

The term intelligence consists of following components.

- Reasoning
- Learning
- Problem-Solving
- Perception
- Linguistic Intelligence

AI draws from a wide range of disciplines, including artificial psychology, neuroscience, computer science, mathematics, psychology, languages, and philosophy. In actuality, most humans come into contact with artificial intelligence from dawn to dusk. Here are some of the best examples of how AI is already used in our everyday lives.

- Maps and Navigation. AI has drastically improved traveling
- Facial Detection and Recognition
- Text Editors or Autocorrect
- Search and Recommendation Algorithms
- Chatbots
- Digital Assistants
- Social Media
- E-Payments.
- Smart home devices
- Amazon recommendations

2. NEED FOR ARTIFICIAL INTELLIGENCE

1. To build a machine capable of intelligent behaviour, learning, explaining, demonstrating, and offering advice to its users.

2. To assist the machine in solving complicated problems similarly to how people do by implementing them as computer-friendly algorithms.

3. To Increase Human Efficiency: Artificial intelligence can automate labour-intensive, time-consuming jobs and procedures that demand a lot of human labour. People will be able to concentrate on higher-level and more creative work as a result of increased productivity and efficiency.

4. Better decision-making: AI is capable of doing extensive data analysis and producing insights that can help in decision-making. In fields where decisions can have a big influence on results, including banking, healthcare, and logistics, this can be quite helpful.

5. Improved accuracy: By processing data fast and precisely, artificial intelligence systems can lower the possibility of errors that can happen during manual processes. This might raise the calibre and dependability of the outcomes [3].

6. Personalization: By adjusting interactions and recommendations based on unique user preferences and behaviours, artificial intelligence can be utilized to make users' experiences more tailored to them. Customer loyalty and satisfaction may increase as a result.

7. Discovery of new knowledge and frontiers: Artificial intelligence can be utilized to find new knowledge and frontiers that are hard or impossible for humans to reach. This may result in novel discoveries in domains such as astronomy, genetics, and pharmaceutical research [3].

3. HOW DOES AI WORK?

Although theAI is difficult to understand and operate, but how does it works? So it can easily understand by the laypeople. Let's discuss from many books theory, paper and article to understand the AI concepts.

To put it simply, AI works by initially merging big data sets with user-friendly processing algorithms. Then, by identifying patterns in the data set's behaviour, AI is able to modify these algorithms. Realize that artificial intelligence is more than just one algorithm. However, the complete machine learning system is capable of issue solving and outcome suggestion.

Understanding human behaviour and performance is artificial intelligence's primary objective. The creation of computers with intellect and powers like to those of humans can accomplish this. This covers facial analysis, robotics, and natural language processing. Although computing, healthcare, and the military are currently the main industries using AI, it is anticipated that these industries will soon begin to use AI in everyday life [4].Let's understand the working of AI step-by-step.

4.1 Input The first step of AI is input. In this step, an engineer must collect the data needed for AI to perform properly. Data may be in form of text, speech or image. However, it's important to ensure the algorithms can read inputted data. It's also necessary to clearly define the context of the data and the desired outcomes in this step.

4.2Processing AI uses the data and makes decisions about what to do with it during the processing stage. Depending on the specific AI technology, during processing, AI analyses the pre-programmed data and applies the behaviours it has learnt to identify the same or comparable behaviour patterns in real-time data.

4.3Data Outcomes: The AI system makes predictions after processing the data. In this step, the success or failure of the data and its predicted outcomes is determined.

4.4Adjustments If a failure is produced by the data set, AI technology can learn from the error and carry out the procedure in a different way. AI Makes necessary modification the algorithms' rules in order to make them fit the data collection.

4.5 Outcome: During the adjustment phase, results may also change to reflect a more appropriate or desired outcome**.**

4.6Evaluations: Evaluation is the final phase after AI completes the task it was given. Through data analysis and prediction-making, the technology is enabled to perform the assessment step. When the algorithms are run again, it can also offer essential and beneficial feedback.

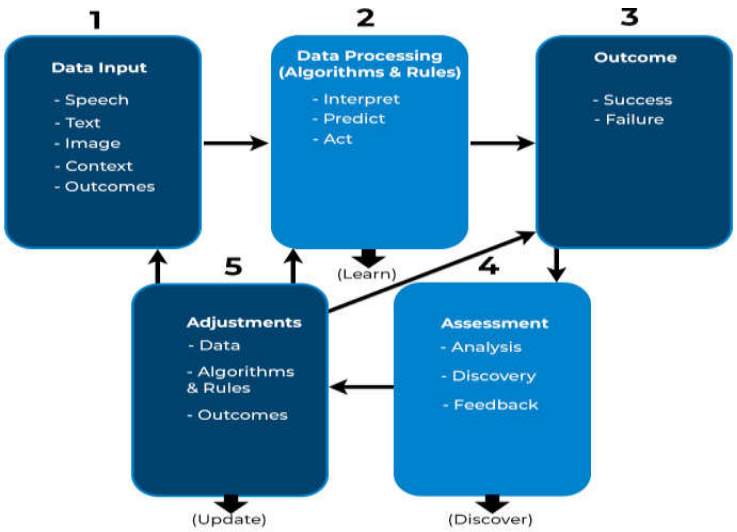

Fig: 1 AI working Model

5. FORMS OF AI:

Depending upon the nature of task AI divided into different forms.

5.1Weak AI:

Weak AI is AI designed to do a single task or address a specific problem. It serves a single goal and is not a general artificial intelligence.

For example, the AI that was used to beat the chess grandmaster is a weak AI as that serves only 1 purpose but it can do it efficiently [1].

5.2Strong AI:

Strong AI is difficult to create than weak AI.

It is a general purpose intelligence that can demonstrate human abilities.

Human abilities such as learning from experience, reasoning, etc. can be demonstrated by this AI. [1]

5.3Super Intelligence:

Super intelligence refers to artificial intelligence (AI) that, in almost every domain, outperforms the greatest human intellect. A machine could be only marginally smarter than a human being, or it could be a trillion times smarter than a human being. The pinnacle of AI power is super intelligence.

6. TECHNOLOGIES BASED ON ARTIFICIAL INTELLIGENCE

6.1Machinelearning (ML): Machine learning is a branch of artificial intelligence that makes use of algorithms to let systems learn from data and come to conclusions or predictions without needing to be explicitly programmed.

The goal of ML is to increase accuracy in performing specific tasks rather than aiming for overall intelligence.

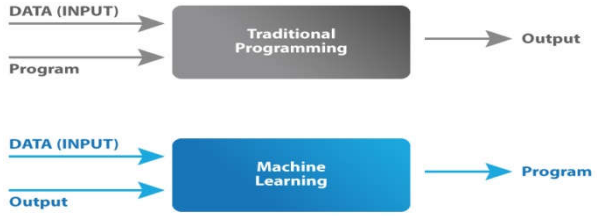

Fig 2: Machine learning

6.2 Natural Language Processing (NLP): One area of artificial intelligence that aims to make computers able to comprehend, translate, and produce human language.NLP integrates statistical, machine learning, and deep learning models with computational linguistics, which is rule-based modelling of human language. When these technologies are combined, computers can process text or speech data including human language and fully "understand" the meaning, including the speaker's or writer's intent and sentiment [5]

NLP tasksdeconstruct human text and speech data so that the computer can understand what it is consuming. Among these tasks are the following [5]:

- **Speech recognition:**The process of consistently turning voice input into text data is known as speech-to-text**.**
- **Part of speech tagging:**Also referred to as grammatical tagging, this procedure identifies the part of speech of a word or text depending on its usage and context
- **Word sense disambiguation:**is the process of choosing a word's meaning from among several possible meanings by using semantic analysis to identify the word that makes the best sense in the particular situation**.**
- **Co-reference resolution:**involves determining whether two words refer to the same thing at different times**.**

6.3 Computer Vision: An area of artificial intelligence that works with computer algorithms for the processing and analysis of visual data [6]

Computer vision is categorized into 3 broad categories:

- Classification:
  Based on the way the computer vision model performs in categorizing a particular image, each categorized output in computer vision has a probability (accuracy of prediction) associated with it.

  Classifying the output into a certain class is the aim of classification. Our problem is a classification problem if its objective is to divide the data set into discrete or categorical classes.

- Detection:
  The purpose of detection is to locate an object within an image or input video. To accomplish this, first identify which object(s) are in the picture, and then draw bounding boxes around each object's location.

- Segmentation: Segmentation is the process of separating an image into various subgroups according to the similarities or variations in the properties of the pixels in order to recognize objects or draw borders within the image. It facilitates simplicity and facilitates picture analysis.

6.4Robots: AI-driven automation and robot systems that can carry out jobs in the manufacturing, healthcare, and retail sectors, among others.

6.5Neural Network: The structure and operation of neural networks, a class of machine learning algorithms, are based on those of the human brain.

7. PROS OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence is currently contributing to the development of sophisticated automation systems that free up human time for more productive endeavors. The several benefits of artificial intelligence will thus be covered in this section on the pros and cons of AI.[7]

7.1. Error-free Processing

When tasks are carried out by humans, mistakes are more likely to occur. When performing a certain task, we frequently make mistakes. This could be the result of an individual's differences in intellectual capacity. However, this is not the case with machines that use AI. We program the devices to carry out a particular function. As a result, the precision is dependent upon how well the machines are designed and programmed to complete the task.[7].

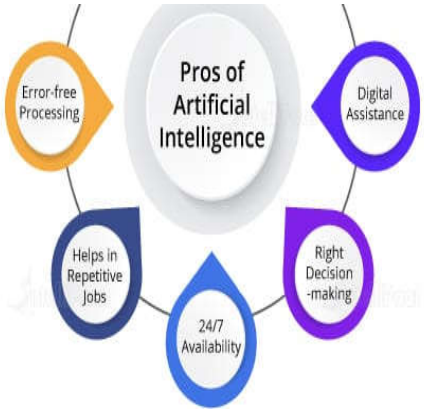

Fig3:Pros of Artificial Intelligence[7]

7.2 **Helps in Repetitive Jobs**

Machines are more productive than humans since they do not need breaks to recharge. A human being does a lot of repetitive duties on a daily basis. When a human performs the same task again and over again, their efficiency decreases. It is also a reality that a human worker can only produce for 8 to 10 hours a day. Conversely, AI-powered devices facilitate the long-term, uninterrupted completion of monotonous jobs. Artificial intelligence contributes to the machines' continuous operation without sacrificing productivity. Among the main benefits of AI that have contributed to its widespread adoption is this one. Manufacturers utilize artificial intelligence to create products consistently in order to match consumer demand and maximize profitability**.**

7.3. 24/7 Availability

A typical worker can only devote seven to eight hours a day to their task. People need to balance their job and personal lives and take time for self-reflection. They are unable to work nonstop.

Here, Artificial Intelligence helps deliver 24/7 services to an organization. In a different case, customer support apps can employ AI-based chatbots to manage several inquiries at once, continuously. AI is capable of providing services quickly and effectively. Artificial Intelligence is used for support chat in every ecommerce application, e-learning website, healthcare industry, educational institution, etc. these days. This contributes to improving customer service.

7.4Right Decision Making

The capacity for intelligent decision-making is one of artificial intelligence's benefits. AI-based devices that help avoid compromising efficiency are emotionless. Additionally, logical decisions can be made by machines that are constructed with artificial intelligence. Humans analyse situations by taking a variety of elements into account. Emotionally or practically, these considerations may affect the decision. But because the machines are designed to reason, they provide correct findings. Computers with artificial intelligence (AI) employ cognitive computing to assist them in making timely and useful decisions**.**

7.5Digitalassistants:

AI also offers the benefit of digital help. Applications with AI capabilities can also offer digital help. Digital assistants are used by the majority of enterprises nowadays to carry out automated tasks. This preserves human resources. We can train certain digital assistants to create a website for us. The healthcare sector has also undergone a transformation thanks to the usage of digital aides. Thanks to digital assistants that give real-time patient data, doctors may now manage their patients from a distance.

We also get assistance from digital aides in our daily lives. AI-powered digital assistants, like Grammar, Alexa, Google Maps, and many more, have a wide range of useful uses. While Alexa conducts voice searches to provide results, Google Maps facilitates our travels. An additional fascinating digital assistant

7.6. Faster Decision-Making

AI's lack of emotions is one of the reasons it is renowned for its impartial decision-making. AI and other technologies are capable of making decisions and acting more quickly than humans. AI is capable of reviewing all pertinent information far more quickly than a person, even though making conclusions requires extensive analysis that may take some time. Businesses benefit from having an advantage over rivals because AI gives them more time to make wiser decision**s.**

7.7. Implementing AI in Risky Situations

Where humans cannot, AI has gone. The domains of investigation and testing encompass scenarios that are susceptible to hazards. The use of AI in hazardous situations can reduce the amount of human intervention.When applied properly, artificial intelligence (AI) can aid scientists in making discoveries and creations with little to no risk to human life

7.8New Inventions

It should come as no surprise that artificial intelligence is driving a number of global breakthroughs that will aid people in solving challenging issues. For instance, doctors have recently used AI-based technologies to predict breast cancer in its early stages.

8. CONS OF AI

The real-world benefits of artificial intelligence have previously been covered. As we've already discussed, artificial intelligence has a number of benefits and drawbacks. We shall thus go over each and every disadvantage of artificial intelligence in this section of the advantages and cons of AI [7].

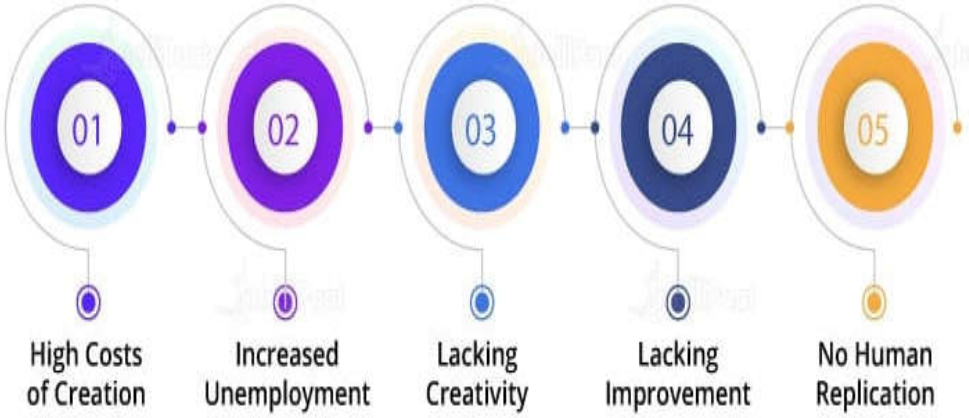

Fig4: Cons of Artificial Intelligence. [7]

8.1High Costs of Creation

Building artificially intelligent machines is an expensive endeavor. The cost might be as high as millions of dollars for a major project. Artificial Intelligence cannot therefore be implemented in a small firm. Because of the features, functionality, or breadth of the project, firms with substantial income streams may find the expense of developing an AI project to be prohibitive. Also, the hardware and software that the businesses utilize affect the development costs**.**

8.2 Increased Unemployment

Algorithms and robots are replacing many of the traditional jobs that traditionally required diligent workers, as machines get more and more adept of handling complex tasks. People who once found dignity and meaning in their profession now have to deal with the harsh reality of unemployment, and the effects are all too real. In addition to having an impact on livelihoods, losing a job erodes the feeling of community and interpersonal relationships that are established by meaningful war.

8.3Lacking Creativity

Human creativity is unmatched by machines. While artificial intelligence can offer features for data-driven learning, it is unable to replicate the precise functions and mentality of a human. The degree of analytics employed by the machine's developer determines how accurate the machine's results will be. Nothing can be invented by artificial intelligence. It can simply carry out the work for which it was designed and gain experience.

While AI can work in tandem with other technologies, including IoT, Big Data, sophisticated sensors, and many more, to provide optimal automation, the intelligence and inventiveness of AI-powered devices rely on how clever and imaginative the algorithms designed by humans are. As a result, AI is restricted by laws and algorithms and is unable to develop human-level creativity.

8.4Lacking Improvement

Because of the way AI algorithms are made, robots can learn on their own by analysing data. The machines then make an effort to learn and get better. However, any redundancy in the data could lead to learning problems and unpredictable outcomes from the robots. The algorithms must then be taught to adapt to unusual circumstances or redesigned for the new collection of data. Because of the incapacity to process fragments of information, the outcomes could be inconsistent. Furthermore, AI-generated findings may be inaccurate and result in significant losses due to a lack of development**.**

8.5No Human Replication

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9. USES OF ARTIFICIAL INTELLIGENCE:

Artificial Intelligence has many practical applications across various industries and domains, including:

- **Healthcare:** AI is used for medical diagnosis, drug discovery, and predictive analysis of diseases.
- **Finance:** AI helps in credit scoring, fraud detection, and financial forecasting.
- **Retail:** AI is used for product recommendations, price optimization, and supply chain management.
- **Manufacturing:** AI helps in quality control, predictive maintenance, and production optimization.
- **Transportation:** AI is used for autonomous vehicles, traffic prediction, and route optimization.
- **Customer service:** AI-powered chatbots are used for customer support, answering frequently asked questions, and handling simple requests.
- **Security:** AI is used for facial recognition, intrusion detection, and cybersecurity threat analysis.
- **Marketing:** AI is used for targeted advertising, customer segmentation, and sentiment analysis.
- **Education:** AI is used for personalized learning, adaptive testing, and intelligent tutoring systems.

This is not an exhaustive list, and AI has many more potential applications in various domains and industries. Following table shows the contribution of AI in **various sectors in India.**

Contribution of AI in different Sectors in India

Industry	Percentage share of jobs
IT	26%
Education	14%
Manufacturing	9%
Retail	5%
Advertising, Market Research & PR	5%
Healthcare	4%
BFSI	3%
Oil/Gas/Power/Energy	3%
Telecom	2%
Logistics/ Courier/ Freight/ Transformation	1%

Source: foundit

Table 1.Contribution of AI in different sectors in India[8].

10.CONCLUSION

Artificial Intelligence (AI) has rapidly evolved and become an integral part of various aspects of our lives, influencing industries, technology, and societal dynamics. AI is not confined to a single industry; its applications span healthcare, finance, manufacturing, education, and more. From predictive analytics to autonomous systems, AI is transforming how businesses operate and how individuals interact with technology. AI has witnessed remarkable progress, fueled by advances in machine learning, neural networks, and computational power. This has led to the development of sophisticated AI systems capable of complex tasks such as natural language processing, image recognition, and decision-making.

These are some of the advantages and disadvantages of AI. It is no brainer that AI is an extremely powerful tool for businesses. In fact, not only business, AI can also have significant value in providing invention or breakthrough. But we also need to consider the other side of the coin. While AI is a great tool and can be revolutionary, it can also be used against us and cause maximum damage.

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