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THE CURRENT TRENDS OF ARTIFICIAL INTELLIGENCE

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***Abstract*:** A detailed description of the then research work of Artificial intelligence has been presented under the presented research paper. At present, Data Science is being used very fast in the Internet world, in which the contribution of artificial intelligence is important. Natural language processing and natural language understanding are also being established to make computers efficient. Human-like behavior will be demonstrated by making the software and hardware made in the future efficient by artificial intelligence. The present research paper is completely describing the detailed form of artificial intelligence in the current scenario.

Keywords: **Artificial Intelligence, Data Science, Natural Language Processing, Machine learning, deep learning etc.**

I. INTRODUCTION

Artificial intelligence is such a field of knowledge, under which the machine is made capable of reasoning, learning, solving any problem, making its own decisions and thinking etc. It can also be understood in such a way that such an expert system has to be created, by which not only dialogue can be established between man and machine; Rather, all the activities entrusted to him by the command of the human could be accomplished by the machine with great alertness and scholarship. For the construction work of this expert system, where on one hand the processing of written, spoken and visual language is being done, on the other hand such a hardware structure is being built, which can see, hear, read, feel and think. Able to do Artificial intelligence is the result of integrated knowledge of all the three disciplines of Computer Engineering, Computer Science and Computational Linguistics. In fact, scientists of artificial intelligence have considered the problem of language as a problem of communication that is why, while on the one hand general linguistic science throws light on special aspects of language, on the other hand syntactical, semantic and contextual elements are coordinated under artificial intelligence.

According to Slokan (1979), the real purpose of artificial intelligence was to study knowledge. Formulate common knowledge related to the acquisition, representation and application of knowledge within a expert system that can be expanded as needed. For a machine that could efficiently communicate with different types of people, it was also necessary to learn what types of information people ignore in different situations.

II. Feature: Under artificial intelligence, the following techniques are incorporated to enable the machine:

- **LOGIC:**

The way a human is given knowledge from childhood, it is trained, so that a human can take the right decision on the basis of logic at the right time. In the same way, after equipping the machine with knowledge, logic is needed to make the right decisions in the right time, so that the knowledge can be presented and interpreted properly.

- **LEARNING:**

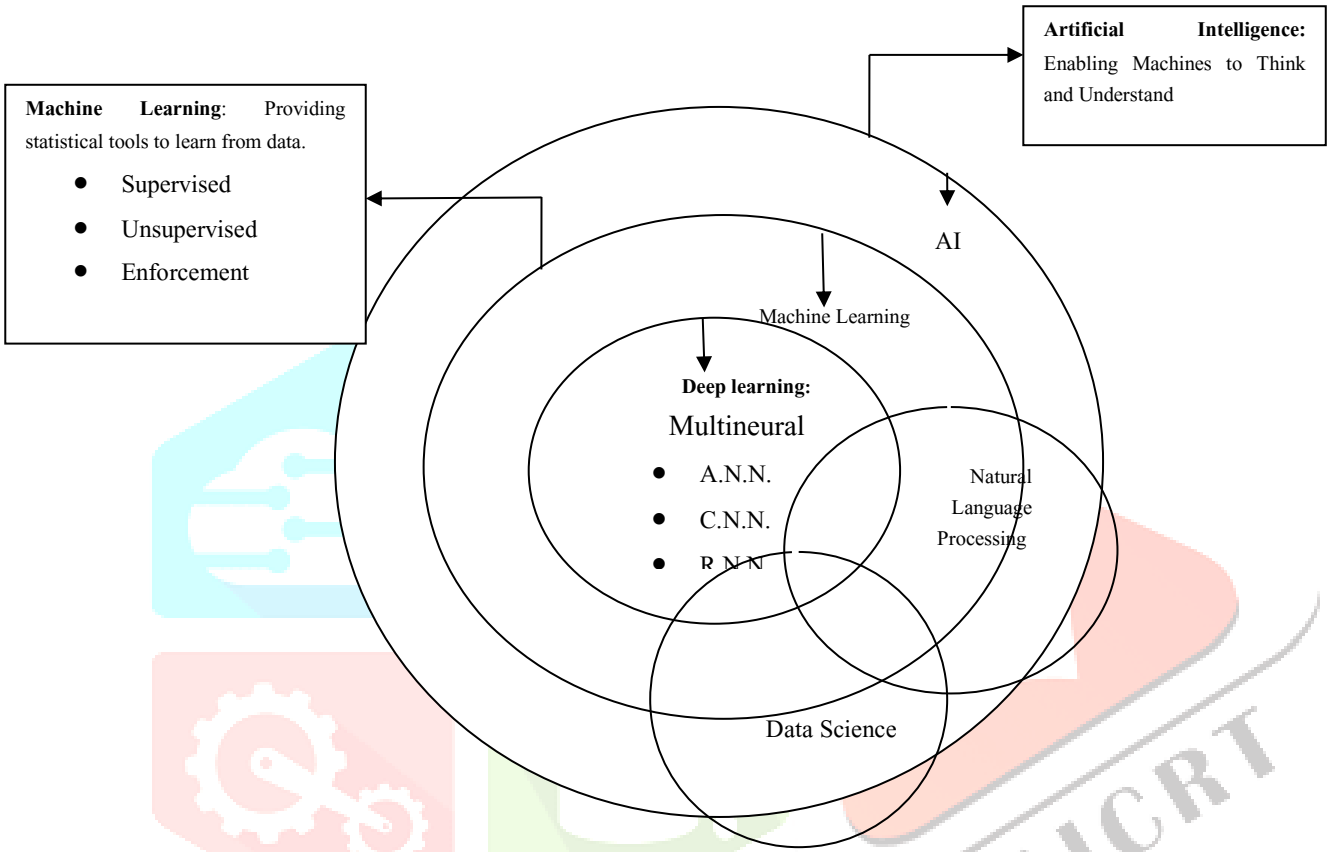
The machine is made capable of self-learning to make new decisions from the set of data and rules stored in the machine. Where the machine can learn, reason and take decisions by itself.

- **PROBLEM SOLVING:**

All the information about the global knowledge for the machine is a problem, which is solved step by step. To solve the problem, the ability to store knowledge and take decisions through logic is also developed.

- **PERCEPTION:**

The machine also has to be made empirical, so that it can help in taking the right decision. Like: Just as human experiences with all the senses like eyes, nose, ears etc., in the same way, by developing empirical systems in the machine, it is made capable to decide to see, hear, understand etc. Artificial intelligence can be easily understood in the following diagram:



Through the above picture, the subject matter of artificial intelligence, machine learning, deep learning, natural language processing and data science has been explained. Whereas making the machine capable of thinking and understanding under artificial intelligence, providing statistical tools (supervised, unsupervised and reinforcement) related to data learning under machine learning, making correct decisions to the system through multi-neural networks under deep learning. Subjects like making capable to take are read and understood with depth. Natural language processing is the most important topic in artificial intelligence, without which no system can be made expert. The analysis, synthesis and processing of language is accomplished through this subject. This whole methodology is called Data Science, under which subjects like artificial intelligence, machine learning, deep learning and natural language processing are included.

III. **HISTORY**

Modern artificial intelligence has been seen in history for the purpose of defining the human thought system of philosophers. The year 1884 is very important for artificial intelligence. Charles Babbage worked on this date on a mechanical machine that displayed intelligent behavior. However, as a result of studies in this area, he decided that he would not be able to produce a machine that behaved as a human, and postponed his work. In the 1950s, Claude Shannon introduced the idea that computers could play chess. Work on artificial intelligence continued very slowly until the early 1960s.

The rise of artificial intelligence officially dates back to 1956 in history. In 1956, for the first time, a session on 'Artificial Intelligence' was introduced at a conference at Dartmouth College. Marvin Minsky states in his book "Stormed Search for Artificial Intelligence" that "the problem of modeling artificial intelligence will be solved within a generation". The first artificial intelligence applications were introduced during this period. These applications are based on logic theorems and the game of chess. Programs developed during this period were different from the geometric forms used in intelligence tests; which has given rise to the idea those intelligent computers can be made.

In 1950, a scientist named Alan Turing conducted an experiment to determine whether a machine could be made intelligent enough to make its own decisions. This test shows the intelligence given to the machine. At that time the intelligence level of the machines passing the test was considered sufficient. In 1957, John McCardie developed a programming language called LISP (List Processing Language), with the help of which artificial intelligence could be provided functional form in the machine. It was one of the oldest and powerful programming languages, allowing creating simple programs. The period between 1965 and 1970 was called winter or dark period, because artificial intelligence could not be developed during this period. It was a period in which the haste and optimism fueled by expectations led to the idea that it would be very easy to give machines intelligence. That's why this time was also called the dark period because of not getting the expected results, because the artificial intelligence systems were being made intelligent by uploading data, which could not be successful. Between 1970 and 1975, artificial intelligence gained momentum and work on topics such as disease diagnosis was achieved to a great extent, and this result established the basis of artificial intelligence. During the years 1975 to 1980, it was considered that artificial intelligence can be established along with other branches of science.

In the 1980s, artificial intelligence began to be used in large projects with practical applications, and substantial successes were achieved in all fields of science, allowing artificial intelligence to be adapted to human life to solve real-life problems. Put. Even now, more affordable software and other tools are being created using artificial intelligence according to the needs of the users, whose nature has become very wide and elaborate.

IV. HISTORY OF ARTIFICIAL INTELLIGENCE IN CHRONOLOGICAL ORDER

- 1206: One of the pioneers of cybernetic science, Abru izz bin Razzaq al-Jazari, created self-controlled machines powered by water.
- 1623: Wilhelm Schickard invented a machine and a calculator capable of performing four functions simultaneously.
- 1672: Gottfried Leibniz developed a binary counting system, which briefly became the basis for today's computers.
- 1822–1859: Charles Babbage built a mechanical calculator. Ada Lovelace is considered to be the first self-replicating program.
- 1950: Alan Turing, the founder of computer science, introduced the concept of the Turing test.
- 1951: The first artificial intelligence program was written for the Mark-I device.
- 1956: A program for solving mathematical problems is introduced by logic theorists Newell, Shaw, and Simon. This system is considered as the first artificial intelligence system.
- A schematic network for machine translation systems was developed by Margaret Masturman and others in the late 1950s and early 1960s.
- 1957: John McCardie of MIT created the LISP (List Processing Language) language. He is also known as the father of artificial intelligence.
- 1960: JCR Licklider described the human-machine relationship in his work.
- 1962: Unimation was established as the first company to manufacture robots for the industrial sector.
- 1965: An artificial intelligence program 'Eliza' was written.
- 1966: The first animated robot "Shaky" was created at Stanford University.
- 1973: DARPA begins development for a protocol called TCP/IP.
- 1974: Internet was used for the first time.
- 1978: Herbert Simon earned the Nobel Prize for his theory of finite rationality, a seminal work on artificial intelligence.

- 1981: IBM created the first personal computer.
- 1993: Production of human-like robot 'Cog' began at MIT.
- 1997: Supercomputer named Deep Blue defeated world famous chess player Kasparov.
- 1998: The first artificial intelligence player named Furby was launched in the market.
- 2000: Kismet, a robot that could use gestures and mimic movements to communicate; was introduced.
- 2005: Robot 'Asimo', closest to human ability and skill of artificial intelligence, was introduced.
- 2010: 'Asimo' made to work using brain power.
- 2011: IBM's Watson won Jeopardy and a quiz show where it had to solve complex questions as well as riddles. Watson had proved that he also has an understanding of natural language and has the ability to solve complex questions in the shortest possible time.
- 2012: Google has launched an Android app feature "Google Now", which is also capable of providing secret information to the user in the form of predictions.
- 2014: Chatbot "Eugene Goostman" won a competition in the famous "Turing test."
- 2018: IBM's "Project Debater" debated a tough topic with two master debaters, whose performance was commendable.
- Google demonstrated an AI program "Duplex", a virtual assistant that automatically made hairdresser appointments on calls. This hairdresser's appointment didn't realize she was talking to a machine.
- 2023: OpenAI released GPT-4, which is used with both the API (with waiting list) and features ChatGPT Plus.

V. CLASSIFICATION OF ARTIFICIAL INTELLIGENCE

(A). BASED ON GENERAL PURPOSE

i. ARTIFICIAL NARROW INTELLIGENCE

These types of trained systems represent almost all types of systems currently in operation, including even the most complex and capable systems ever built. Artificial micro-intelligence refers to systems that are capable of performing only one specific task automatically, using human-like abilities. These types of systems are made for a particular task only, whose capacity and limits are already determined. These types of systems use machine learning and deep learning methods to learn from themselves and provide us with the output. Presently built and working 'Google Assistant' and 'ALEXA' are similar systems.

ii. ARTIFICIAL GENERAL INTELLIGENCE

Artificial general intelligence includes all systems that are capable of self-learning, understanding, and decision-making like humans. Such systems would be able to perform all but one specific task independently. Such systems would be equipped with multi-functional capabilities capable of making decisions like humans.

iii. ARTIFICIAL SUPER INTELLIGENCE

Systems with artificial superior intelligence will represent the highest pinnacle or final stage of research and these systems will be called the most intelligent systems on Earth. Such systems will have high memory, fast data processing, analysis and accurate decision making, apart from being multi-functional. These types of systems will be considered the most popular and unique, which will make human life convenient. However, such systems can also prove to be the biggest threat to human life.

(B). BASED ON HISTORICAL

a. REACTIVE MACHINE

These types of systems are the oldest, which have very limited working capacity. Memory was not used at all in these systems. The machine did not learn anything from the previous tasks performed to complete the current task. In these, the ability to 'learn' was absolutely negligible. Data sets were created in the machines of this time, which automatically gave their response by combining the inputted data. To make this operation more efficient, their memory was not used. The best example of this type of machine was the Deep Blue system built by IBM, which defeated chess great Garry Kasparov in 1997.

b. LIMITED MEMORY

Such systems are an advanced version of Reactive Machines, in which they make decisions based on the characteristics of reactive machines as well as by learning from historical data. Limited memory is used in this, where the data is stored. Machines find it difficult to learn from stored data by themselves. Almost all the systems in use at present fall under this category. The best example of such systems is smart phones, which allow your smart phone to automatically open and access the phone once your face is recognized. Almost all current trained systems, from chatbots, virtual assistants to self-driving vehicles, are powered by limited memory.

c. THEORY OF MIND

There is a new generation of training systems under the theory of mind, the development of which is currently being researched by researchers. In these types of systems, a human-like brain is being created, so that communication between humans and machines can be established. These types of systems understand all the needs of human beings interact with humans and take their own decisions. Building systems using theory of mind is a challenging process, which involves understanding human needs, understanding their emotions, taking informed decisions and providing desired outputs.

d. SELF-AWARE

This is the last stage of such artificial intelligence systems, which are only a concept at the present time. Self-aware Trainable Systems are such systems, which will be self-aware like the human brain, that is, it will be capable of thinking and thinking on its own. Such systems would not only be able to understand and develop human emotions, but such systems would also be able to express their own feelings, needs and possibly even desires after communicating with humans. Many scholars have also expressed or are expressing their deep concern regarding the development of such systems. This is also because after such systems become self-aware, such systems would also be capable of having thoughts of self-preservation.

VI. APPLICATION OF ARTIFICIAL INTELLIGENCE

1. **NATURAL LANGUAGE PROCESSING**

Natural Language Processing is an area under which natural language spoken by humans can be analyzed, synthesized and language understanding can be established on the basis of computer. Its applied areas include text-to-speech systems, speech-to-speech systems, machine translation, OCR and other linguistic applications that use natural language.

2. **IMAGE PROCESSING**

Digital image refers to prototyping a digital image through a digital computer. We can also say that it is a use of computer algorithms, in order to get a better image or to extract some useful information. Digital Image uses Formulation and Institute models to prototype and analyzes digital images. Enhancing the Diversity of Targeting Digital Images

3. AI IN HEALTHCARE

In the field of medicine, artificial intelligence has to be used to promote the medical system and also to reduce the cost. Detect patterns to make diagnosis more secure and faster for different types of diseases. IBM Watson understands natural language and answers all kinds of questions posed. This system creates a new concept in the field of medicine and represents a new scenario through scoring scheme. There are many AI software available in the medical field that help patients and healthcare customers complete important tasks like finding diagnostic records, booking appointments, etc. A range of AI systems are also being used to detect, understand and treat pandemics such as COVID-19.

4. AI IN BUSINESS

AI is being used in abundance in the field of business. With its help, it is being used to find customer information, integrate chatbots into websites, etc. In the academic world and various I-Analysts, there is also an emphasis on automating the various types of task situations.

5. AI IN EDUCATION

In the field of education, important tasks such as simplifying the evaluation process, providing sufficient time to the instructors, providing education automatically through online medium are being accomplished by AI. Being able to

analyse and adjust the content of the concerned subject according to the needs of the students, so that they will be able to work at their full speed.

6. **AI IN FINANCE**

   Using AI in the banking sector, systems like Mint or TurboTax are becoming able to work with new changes. These types of applications collect personal data and are also capable of providing financial advice for the future. The method of buying a house and other types of financial services can be obtained using software such as IBM Watson. Artificial intelligence systems today carry out most of the Wall Street business.

7. **AI in law**

   In the field of law, artificial intelligence is being used for the purpose of knowing rules and securing records. Helping to make the tedious process of legal labour much simpler through AI system. Due to which the customer support is going to improve a lot. Law enterprises use methods like machine learning to identify documents and extract knowledge from them as needed.

8. **AI IN MANUFACTURING**

   Manufacturing tops the list of industrial and scientific uses for building robotic systems. Take for example cobots which are capable of completing one or multiple tasks at the same time as in modern workplaces.

9. **AI IN BANKING**

   In the banking sector, automated chatbots are being created using artificial intelligence, which are used to perform banking transactions. No human interaction is required to complete this task. Artificial intelligence is being used for important work like giving bank loans, determining the creditworthiness of customers.

10. **AI IN TRANSPORTATION**

    Self-driving vehicles are being built, which are increasingly capable of driving without a driver using AI. Through AI, traffic forecasting, flight delay planning and increasing the productive capacity of maritime shipping are being carried out.

11. **AI IN SECURITY**

    Automation and machine learning methods have emerged as a big word in the field of network security as well. With their help, not only has the theoretical side been strengthened, but the practical side has also been strengthened. Using artificial intelligence and machine learning, they are bringing real value to security by detecting attacks, malware and other threats on the network. SIEM software uses machine learning methods to identify suspicious activities. By collecting information from different sources, A.I. will detect links to events and attack campaigns. Thus AI security technology is being used to reduce the chances of theft, fraud, data tampering etc. and authenticate various transactions faster. The technology is ripe for organizations to counter the various types of cyber-attacks being carried out.

VII. TOOLS OF AI

1. **Machine Learning:** It is a subject area that provides statistical tools to analyse and synthesize any language. Machine learning is a new knowledge discipline, which provides useful and necessary algorithms for artificial intelligence. It mainly includes three types of techniques namely supervised, unsupervised and enforcement.
2. **Deep Learning:** It is a discipline that helps intelligent systems makes the right decisions. This technology includes important algorithms such as Multineural Networks (ANN, CNN, RNN), which help the computer system to make deep decisions as much as possible.
3. **Programming Language:** A programming language is also needed to apply artificial intelligence to a computer, with the help of which the machine is made efficient by rules. At present, Python programming language is mostly being used for artificial intelligence. The reason for this is also because natural language can be applied simply and easily under the Python programming language.
4. **Database:** Artificial intelligence requires a strong database, with the help of which data can be stored in the server. In the field of artificial intelligence, there are many databases working in the field of services related to cloud computing, mainly Google Cloud SQL, Azure etc.

VIII. CONCLUSION

Therefore, in conclusion, it can be said that in the present scenario, the work area of artificial intelligence is becoming very wide and vast. The use of artificial intelligence is not only in health but in all those areas where computers are being used today. The coming future will be completely robotic, in which all the work will be dependent on the machine and with the help of the machine, the work can be done very quickly, which will make human life easier and simpler.

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