

# An Overview of Artificial Intelligence Techniques

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**ABSTRACT:** Artificial Intelligence is a growing area of research nowadays. It basically makes computer systems mimic a particular application. Computer systems can ease down the manual efforts in many different ways, somehow like the robots, and so can artificial intelligence. The artificial intelligence technologies discussed and compared in this research paper are Support Vector Machines, Artificial Neural Networks, Markov Decision Process and Natural Language Processing. After performing the training of a classifier algorithm on the data points to which the class was identified, the model can be used to evaluate the class of attest and unknown data points. Support vector machines and Markov Decision process deal with input database while Artificial Neural Networks and Natural Language Processing proves out to be efficient for real time image processing tasks. Comparisons are done in terms of Accuracy percentage. Artificial Neural Networks is found to have maximum accuracy percentage of 95.78% and Markov Decision Process is found to have least accuracy percentage of 90.05%. Support Vector Machines and Natural Language Processing achieve an accuracy percentage of 92.61 % and 95.66% respectively.

**KEYWORDS:** Artificial intelligence, Artificial Neural Networks, Markov Decision Process, Natural Language Processing, Support Vector Machines

## I. INTRODUCTION

Artificial Intelligence is a branch of computer science that seeks to answer the Turing problem. It is an attempt by computers operating on computer systems to mimic or estimate human intelligence. Since using the words artificial intelligence, the very first phrase that pops into mind is for robotics. That's how big budget movies and novels spin robotic tales that act like human beings and wreak havoc on earth. Yet little above the truth may be there[1].

The uses of artificial intelligence are infinite. It can be applied to different businesses and different parts of the globe. In the healthcare sector, AI has been studied and used in hospitals to administer drug doses into patients and to treat patients in different ways. It has also been used for numerous forms of surgical procedures in operating theatres[2].

The playing of chess in computer systems and self-driven vehicles are some other examples of Artificial-Intelligence controlled computers. The key goal of the game is to prevail over the other player and in self-driven cars for chess; a computer machine can take into account all the external data available around it and interpret it to respond in a way that prevents a crash. Chat-bots and intelligent personal assistants, text recognition, speech to text translation, machine vision, augmented reality, IoT solutions, robotics, and emotion analysis and risk management of suppliers are these broad fields[3].

It appears to be incredibly useful for the AOD to use artificial intelligence in simulators. Airplane simulators use artificial intelligence to process the data taken from simulated flights. Other than virtual flight, there is also virtual aviation combat. The computers will come up with the best scenarios for success in these situations. Computers may also create techniques dependent on the positioning of forces and counter forces, size, distance, and strength. During war, pilots can be aided in the air by machines[4].

The artificial intelligence algorithms would filter the data and give the pilot the best possible manoeuvres, not to mention getting rid of those manoeuvres that a human will be hard to perform. In certain calculations, several aircraft are needed to achieve exact approximations in order to acquire data using computer-simulated pilots. These virtual

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robot pilots are often used to train future air traffic controllers. IFDIS, or the Combined Fault Detection and Isolation Process, was the method used by the AOD to determine performance[5].

There are a few simple inventions that are powered by artificial intelligence. These are classified as Help Vector machines, Artificial Neural Networks, Method for Markov Judgment and Analysis of Natural Language. The primary aim of all these strategies of artificial intelligence is to determine whether or not a certain data falls under the category of a certain class. A very good example of such a labeling question is whether or not an email is spam. The model can be used to determine the class of attestation and uncertain data points after training a classifier algorithm on the data points for which the class has been defined.

### *Top Four Methods of Artificial Intelligence:*

Based on the ability of the computer to use previous experiences to anticipate future behavior, memory, and self-awareness, Artificial Intelligence can be categorized into multiple groups. Deep Blue, a chess programme that can recognize the pieces on the chessboard, was developed by IBM. It does not, though, have the memory to foresee future behavior. This software is beneficial, but it cannot be tailored to another case. An example of this type of AI system can be seen in the decision-making functions for self-driving vehicles. The findings here aid with the acts to be done quickly, and are not indefinitely preserved since the observations shift regularly. It could be possible to provide computers with a sense of conscience at the same time as the development of technology, where the machines perceive the actual state of affairs, and can be used to decide what to do. Yet there are no other programmes[6].

### *The various kinds of Artificial Intelligence:*

#### *I. Machine Learning:*

It is one of AI's applications where computers are not designed specifically to execute such tasks; rather, they naturally learn and develop from experience. Deep Learning is a branch of machine learning for statistical processing focused on artificial neural networks. There are several algorithms for machine learning, such as Unsupervised Learning, Supervised Learning, and Reinforcement Learning. In Unsupervised Learning, without any instruction, the algorithm does not use sensitive knowledge to operate on it. It deduces a function from training data in Supervised Learning, which consists of a collection of an input object and the output desired. Machines use reinforcement learning to perform reasonable steps to maximize the incentive in order to find the right option that can be taken into account[7].

#### *II. Natural Language Processing (NLP)*

When machines are designed to process natural languages, it is the relations between computers and human language. Machine learning is a reliable tool to derive meaning from human languages for Natural Language Analysis. In NLP, the computer records the recordings of a human conversation. Then the conversation between audio and text takes place, and then the text is interpreted where the input is translated into audio. The computer then uses the audio to respond to humans. In order to verify the consistency of grammar in text, Natural Language Processing technologies can be used in IVR (Interactive Voice Response) applications used in call centres, language translation applications like Google Translate and word processors like Microsoft Word. However, regardless of the laws that are involved in exchanging knowledge using natural language, the existence of human languages makes natural language transmission complicated and it is not possible for machines to comprehend. In order to understand and abstract the laws of natural languages, NLP uses algorithms to translate unstructured data from human languages into a format that is understood by the machine[8].

#### *III. Automation and Robotics*

Automation aims at bringing computers to do monotonous and routine activities that also increase efficiency and produce cost-effective and more productive performance. Machine learning, neural networks, and graphs are used in automation by many companies. Such automation can avoid fraud problems by using CAPTCHA technologies when financial transactions are online. Robotic process automation is designed to perform routine tasks of high volume that can respond in various circumstances to the transition[9].

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## IV. Machine Vision

Machines are able to record and then interpret visual information. Cameras are used to record visual imagery, analogue to digital transfer is used to transform images to digital data, and the transmission of digital signals is used for data processing. Then a machine is fed with the resulting data. Two critical features of machine vision are flexibility, the ability of the machine to detect weak impulses and resolution, the range to which the objects can be identified by the machine. Signature detection, object recognition, and medical image processing, etc., can be found with the application of machine vision[10].

### *The Comparison of Various Techniques:*

#### 1. Support Vector Machines:

The core concept behind Support Vector Machines (SVM) is to try to locate a boundary line that divides the two classes, so that the boundary line allows a complete separation of classes somehow. For our classification problems, a sample data of green circles and red squares has been used to demonstrate this by being interpreted as two separate parts. A line keeping on the left side the green colored circles and on the right side the red colored squares is known to be a justified boundary line for the classification problem under classification. An infinite number of these kinds of lines can be drawn.

#### 2. Markov Decision Process:

The Markov Decision Process is a decision-making and simulation system where the outcome is partly random in some instances and partly based on the input of the decision-maker in other instances. One more application of MDP is the optimization of the planning process. The central aim of the MDP is to define a plan for decision-makers that can specify specific steps to be taken in different states. The model is made up of different sets, such as potential states, possible acts, probabilities of change and incentives.

#### 3. Natural Language Processing:

Natural Language Processing is a technique used in the field of artificial intelligence that uses natural mother language to deal with communication between computers and humans, usually translated as NLP. The ultimate aim of NLP is to interpret, decode, understand and make sense of the natural language of humans in order to make it valuable. The majority of NLP methodologies rely on machine learning algorithms in order to infer context from different human languages[11].

### *The Various Applications of Artificial Intelligence:*

The different implementations of artificial intelligence are below.

- In the finance sector, AI is used where personal data is obtained, and can be used later to provide financial advice.
- In the field of education, AI is used where the evaluation system can be automated, and student success can be measured on the basis of which the learning process can be strengthened.
- AI is used in the area of healthcare to perform a better evaluation in which the tools used are used to interpret the natural language and address the questions raised. Computer systems such as chat-bots are often used to help clients arrange meetings and simplify the billing process, etc.
- In Industry, AI is used with the assistance of Robotic Process Automation to automate routine activities performed by humans. Machine learning algorithms are combined with analytics to capture knowledge that helps identify consumer desires in order to improve customer loyalty.
- In Smart Home applications, AI is used for protection and monitoring, navigation and ride, streaming music and television, video games, etc.

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## II. CONCLUSION

To evaluate the classification strategies called Help Vector machines, Artificial Neural Networks and Markov Decision Method, the authors used a database of cat images. To do Natural Language processing experiments, a Hindi language text archive is used. Features are removed after pre-processing of the files. The characteristics extracted depend on the technique of classification under investigation. Results are obtained using the matrix of Precision. The percentage of the ratio of matched data samples to total data samples is known as accuracy. The minimum percentage of precision is that of the Markov Decision system. Help vector machines followed, reaching an accuracy of 92.66 percent. The next higher degree of specificity is achieved by the processing of natural language for our experiments. Artificial neural networks reach the highest degree of accuracy, which is 95.78 percent. ANN has therefore been considered to be the best of all the classification methods based on artificial intelligence evaluated in this research article.

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