Artificial Intelligence Intuition Techniques

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Abstract— Artificial Intelligence is incorporating human intelligence in machines. The machine operated robot performs the tasks that is instructed by the human beings. There are huge data operated applications which processes based on the criteria. Artificial Intelligence has the capacity to draw a meaningful word, sentence or paragraph from the data provided which in turn act as human characteristics. Artificial Intelligence consists of many techniques which are associated with business applications, and potential issues. Many techniques are involved in Artificial Intelligence like heuristic, Support Vector Machines, Neural Networks, the Markov Decision Process, and Natural Language Processing and many real time examples have been discussed related to the techniques.

Index Terms—heuristic, Optimality, Reinforcement, Support Vector Machines, Neural Networks, Markov Decision Process, Natural Language Processing.

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1 INTRODUCTION

Artificial intelligence is a computer-based system that exists with many behaviours that is based on human intelligence. It is the science of making machines do things that would require intelligence if done by human. Artificial Intelligence refers to a kind of ability to react, plan, reason and learn, to sense and build perception of knowledge and communicate using natural language. Artificial Intelligence is a machine being programmed on the basis of human intelligence so, decision done is based on human minds in machines. Artificial Intelligence is a natural language comprehension, which is understandable by humans. As recent machines are increasingly capable of task handling on their own without human intuition. Artificial intelligence was introduced by John McCarthy in the year 1956.

Artificial Intelligence involves the study of lexical analysis programming, problem solving, and searching. Typically, Artificial Intelligence programs focus on tokens and symbols rather than numeric processing. Problem solving used for achieving goals. Searching includes a variety of techniques which in turn involves seldom access a solution. During programming observations are made to compare with many different patterns.

2 INTUITION TECHNIQUES IN ARTIFICIAL INTELLIGENCE

From a perspective view of programming, AI involves the symbolic programming, problem solving, and search involved in it. Typically, AI programs focus is on symbols rather than numeric processing. Problem solving involves in achieving goals. Search involves seldom access a solution directly. Search may include a variety of techniques. Some of the AI techniques associated are:

2.1 Heuristic
2.2 Support Vector Machines
2.3 Artificial Neural Network
2.4 Markov Decision Process
2.5 Natural Language Processing

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These techniques are the advanced form of Artificial intelligence forms which are used within the domain subjective to statistics and mathematical models. All these models mainly act as a tool for many tasks those were done by humans in previous days

2.1 HEURISTIC

Heuristic provides a solution that is sufficient for the problems that has been raised immediately but it will not assure to provide an optimal solution for the immediate problem by using the optimization algorithm that increases the efficiency so that it provides the efficient result. The main objective of Heuristic is to give the solution to the problem in an accurate time so that delay is avoided and solution to the given problem is obtained within the allotted time interval. Example: Suppose we have currency in the form of ponds like 4 ponds, 5 ponds, 3 ponds and 1 pond with us. We want to compute minimum number of ponds to create the amount of 7 ponds. So, to compute this we use Heuristic techniques.

Based on the following constraints we can decide when to use Heuristic
• Optimality: For the given problem if solutions exist, we check whether heuristic provide optimal solution or not.
• Accuracy: Checking whether heuristic provides a accurate solution for the given problem.
• Time of Execution: Heuristic provides the solution to the problem faster in the allotted time interval.
• Completeness: When there is possibility of many solutions to the given problem then whether Heuristic provides only one solution to the given problem.

2.2 SUPPORT VECTOR MACHINES

The problem of classification of data is always being questioned whether the data belongs to class or not. So, to address

these kinds of problems is a challenging role, which can be solved by using a powerful technique called Support vector machines. Support vector machines are used mainly for classifying, pattern recognitions and predictions. Support vector machines operates based on drawing the decision boundaries between the data points which classifies the data based on the boundary. When implementing support vector machine, the decision boundary between the data points is very large like the distance between the given data point and the boundary line will be maximum.

The main objective of support vector machine is as follows:

- Binary classification: The main objective of a support vector machine is that it not only draws the hyperplanes and divide data points, but it also draws the hyperplane that separates data points containing large margins.

For Example: when dividing the districts in the states we are dividing based on boundary values with accuracy and large margins.

Calculating hyperplanes can be accomplished by using the formulae.

Y = ax + b

- Multiclass classification: The binary classification has been done when the data sets are classified based on criterion. Support vector machines can also be used for many criterion tasks classifications. When performing support vector machines classification on a dataset with three or more classes takes place and many boundary lines have been used.

For example, suppose if the data set has three or more classes to classify, two dividing lines will be used to divide the data points into classes and the re-organizing that will comprise a class that will fall in between two dividing lines instead of one. Instead of only calculating the distance between just two classes and a decision boundary, the classifier can also consider the margins between the decision boundaries and the multiple classes within the dataset. (Fig 1)
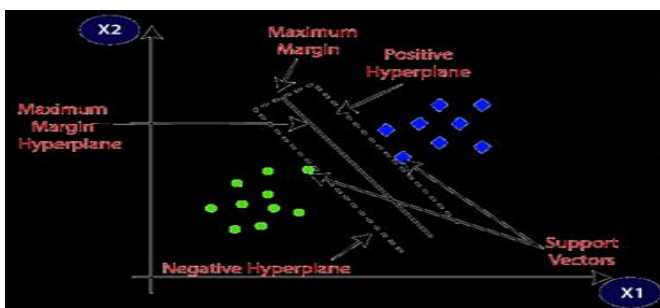

Fig 1: Classification of dataset based on margins using support vector machine.

2.3 ARTIFICIAL NEURAL NETWORK

Artificial Neural Network consists of thousands of neurons that processes the devices that are loosely coupled for modelling of the neural structure of the brain. By using neurons, the nervous system can be modelled and react to similar kind of behaviours in artificial systems. Artificial Neural Network is a computing device which consists of many inter connected elements for the processing of data or information to deliver the

response.

For Example: Based on the neural structure of both human beings and animals. Both human beings and animals react to the situations based on their external views and react accordingly as the human beings and animals brain consists of billions of neurons (Fig 2). The neural structure consists of many neurons which are connected to each other with the other neurons.
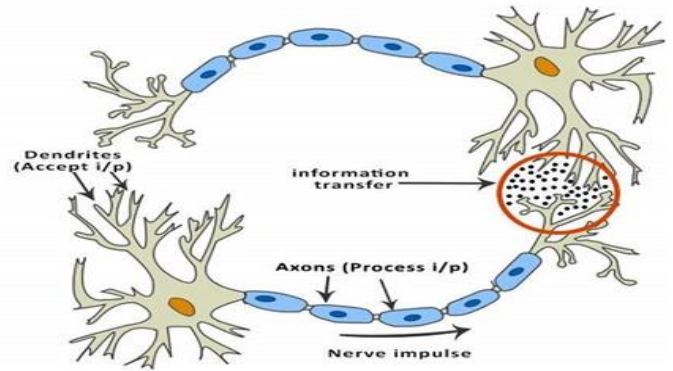

Fig 2: Neural structure of brain

Whenever the inputs are provided that processes those input as the output to the other neurons, the neurons react in the form of output which again being processes as input to other neurons, this process repeats until it responds to the situation. Artificial neural network processes the strength for the inter connection of neurons.

2.4 MARKOV DECISION PROCESS

Markov Decision Processes is a framework for used for modelling sequential decision problems under uncertainty and for Reinforcement Learning problems. Markov Decision process is a best approach used mainly to model the Artificial Intelligence environment. In some situations for a problem the solutions obtained is partly random and is mainly based on the input provided. Markov Decision Process can also be used for optimized planning. Markov Decision process consists of many parts as follows:

- The number of possible states: The different states that exists for a particular problem.

For Example: States of the switch whether its ON or OFF.

- The number of possible actions: The different actions that are performed.

For Example: The action of the door whether it is closing or opening.

- The probability of transactions: The change in state that is the probability of change from one state to another.

For example: The probability that the door is opened, after the action of opening the door has been performed.

- Rewards: these are used to direct the planning. For instance, a robot may want to move north to reach its destination. Actually, going north will result in a higher reward.

For Example: When a robot car wants to travel faster, there exists three states by incorporating Markov Decision Process

that is it can travel fast by which it may reach three states cool, warm and overheated states. So, going faster or slow only two actions can be performed to enter any of the three states(Fig 3).
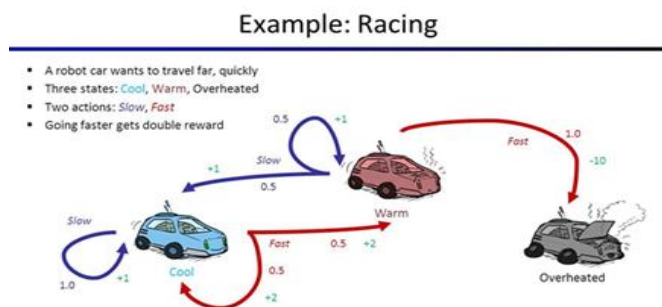

Fig 3: Incorporating Markov Decision Process in Robot Car

2.5 NATURAL LANGUAGE PROCESSING

Natural Language Processing is mainly a communication process with the intelligent systems by using the natural language like English. This natural language interacts with the intelligent system like robot to respond as per the instructions. The natural language can be through speech recognition and Written text as input, which is parsed, it allows computers to understand and perform the requested task. Natural Language Processing first step is converting to Lexical Analysis by using Part of Speech (POS), once it has been converted to tokens it has been tagged to correspond to words or paragraphs or sentences which is accepted as input and it sends the response as output. Natural Language Processing is a process used to produce meaningful phrases and sentences which is in the form of natural language. There are many internal representations as follows:

- Planning of Text − It is a way of retrieving the related contents from knowledge base.
- Planning of Sentences − It is a way of choosing required words to form a meaningful sentence.
- Realization of Text − It is a way of mapping sentences to form a sentence structure.

For Example: Email filters is one of the trending example of Natural language Processing online. Initially it started out with spam filters that signal a spam message. Natural Language Processing has been adopted in Gmail's email classification where the system recognizes if emails belong to any one of the three categories that is either primary, social, or promotions based on their contents. The Gmail users helps the inbox to manage the e-mails received by classifying them as important, relevant emails.

3   END SECTIONS

Conclusion

The Artificial Intelligence Techniques are used with the domain to provide the advanced form of models. These models have been put together mainly to provide the tools to compute the allocated tasks that were the intuition of human characteristics. The business applications that are associated with the trending technology.

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