

Theoretical Investigation on Artificial Intelligence: Classification and Aspects

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Abstract

Whether it is voice recognition by Siri or obtaining desired output for millions of simultaneous search made on Google everywhere directly or indirectly artificial intelligence plays a very vital role. Soon possibly everything around us, even our clothing will be connected to internet. In coming decades there will be agile escalation of artificial intelligence in our day to day life. This review paper aims to provide an encyclopedic analysis of artificial intelligence. It also describes the functionality of artificial intelligence and aspects related to its forthcoming challenges.

Keywords: Siri, Machine Learning, NLP.

Introduction

The term artificial intelligence was coined by John McCarthy along with Marvin Minsky, Allen Newell and Herbert A. Simon in 1955 at summer conference organized at Dartmouth. Artificial intelligence is basically a machine with the ability to solve problems which are solved by natural human intelligence. Artificial intelligence develops ability such as learning and problem solving in machines which are solved by humans. Although research in artificial intelligence was done since decades but it came in headlines when a computer program named alpha Go written by Google-deep mind was able to beat experts of game go. Go is a board game competitionally far more difficult than chess. In this way artificial intelligence showed the signs that it can make machines work even smarter than humans. Self-driving cars, trucks, drones, robots formally fixed with factory floors are like young sea squirt getting out and about and exploring their environment. As they do we see that the artificial intelligence that makes that possible becomes smarter and start to look something we would recognize as brain.

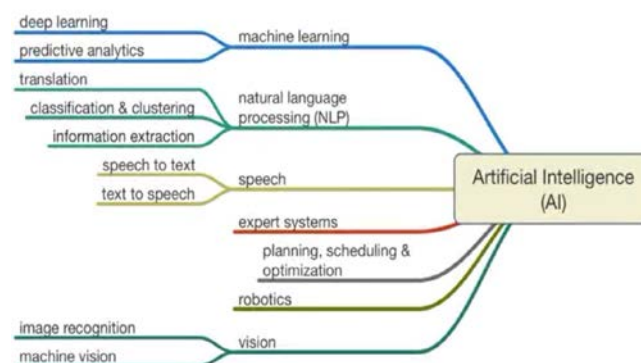


Fig. 1: Artificial Intelligence and its sub – parts

As mentioned in the above image artificial intelligence is a diversified field. Fields like machine learning, natural language (NLP), speech, expert systems, planning scheduling and optimization, robotics, computer vision combines together and forms artificial intelligence.

Machine Learning

Machine learning is a branch of artificial intelligence where we predict the output on the basis of given dataset. A dataset can be further divided into training dataset and test dataset. We use training dataset to train the model where the model is an unknown function, which is used to predict the output. There are many ways to train the model like supervised, unsupervised, semi-supervised, reinforcement.

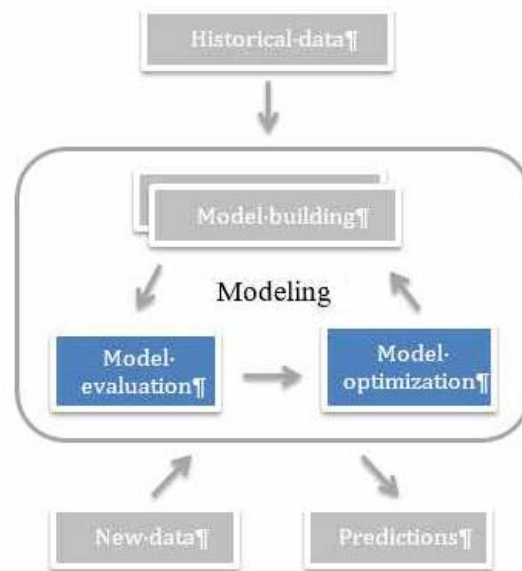


Fig. 2 Models in machine learning

A. Supervised Learning

It contains classification and regression. The common algorithm which comes under the supervised learning are: -linear regression, multiple regression, k-nearest neighbor (KNN), logistic regression, support vector machine (SVM), decision tree. These are the common famous algorithms used in supervised learning.

B. Unsupervised Learning –

It contains clustering and association. We have sets of different data sets and we have to find suitable methods that predict the output. The common algorithms for unsupervised learning are K-clustering, HC- clustering.

C. Reinforcement Learning –

It is environment based learning. We have given state and we change the state according to rewards and policies. The commonly known algorithms for reinforcement learning are bellman equations, Markov decision power, temporal learning, Q- learning and Monte-Carlo.

Natural Language Processing

NLP stands for Natural Language It is an area that is confluence of artificial intelligence. It involves intelligent analysis of written languages. It provides interaction between human language and computer language. Some open libraries for NLP are apache open, Natural Language Toolkit (NLTK), Stanford NLP.

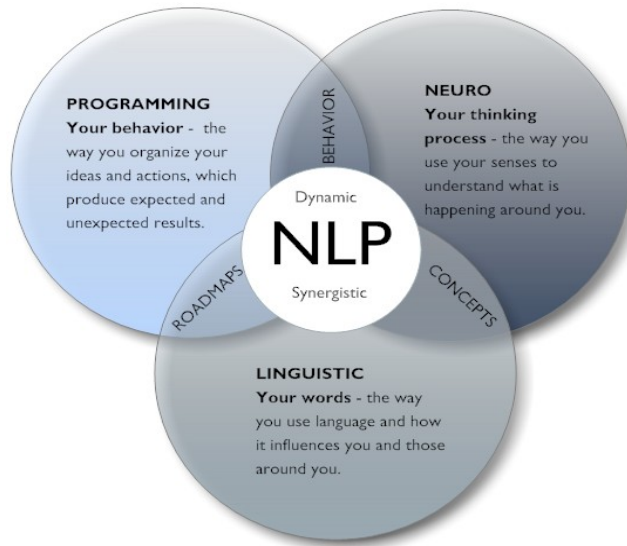


Fig. 3 Natural Language Processing

Expert System

An expert system of the system that evaluates the decision making abilities of human experts. It is designed to solve complex problems by reasoning. It stimulates the judgments and behavior of a human or an organization that has expert knowledge and experience in a particular field. Expert system may be previewed as a computer simulation of a human expert. It is organized in three distinct level i.e.— knowledge base, working memory and inference engine. knowledge base consists of problem solving rules. working memory refers to task specific dates for the problem under consideration. Inference is comprehensive control mechanism applies the undeniable knowledge in knowledge based task.

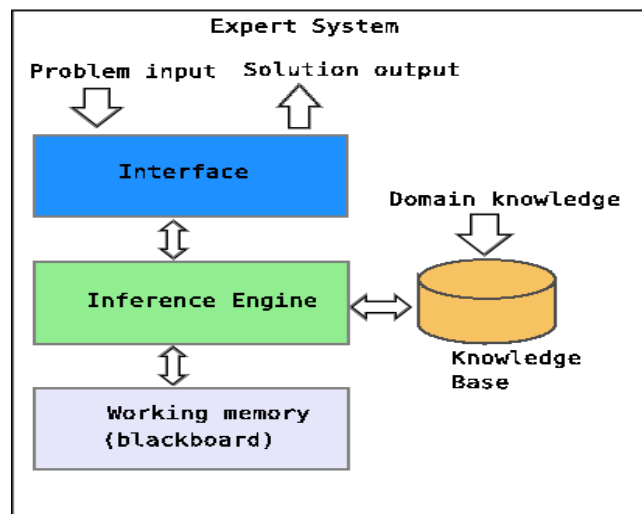


Fig. 4 Expert System

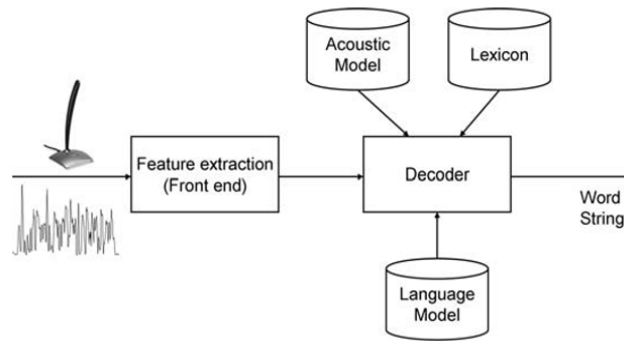


Fig. 5 Speech Recognition

Speech Recognition

It is known as automatic speech recognition. STT (speech to text) or simply speech recognition is used to design computer systems in order to recognize the spoken word. It is the approach of converting a speech of words with the help of different algorithms and techniques. Models that are used for speech recognition are AM (Acoustic model), LM (language model), Lexicon model and hidden Markov model.

Computer Vision

The study permitting computers to understand and elucidate visual information from static images and video sequences. Computer vision emerged in late 1950's and early 1960's. It is closely related to image related computation and relates to the areas like image processing, robot vision, medical imaging, and database pattern recognition. Computer vision has dramatically changed productivity and enhanced the living standards of the people.

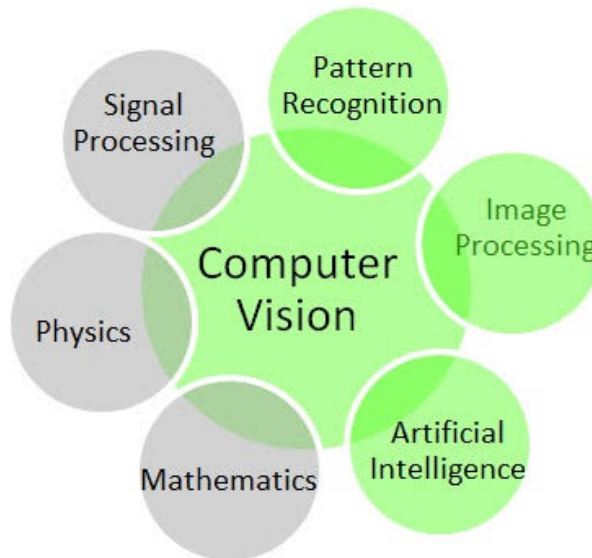


Fig. 6 Computer vision and its sub parts

Conclusion

The motive of developers is to decrease the human effort as far as possible by increasing the use of artificial intelligence. Artificial Intelligence is boom or doom for human kind is still a question for many, but nowadays—the artificial intelligence is seen as a boom for human comfort. Siri and Bixby is virtual assistant developed by apple and Samsung

electronics that learns, evolves, and adopts the behavior of its user. Self-driving cars which are powered by artificial intelligence will be used in future. These will decrease the rates of fatal accidents and will secure the safety of the commuters.

The term “artificial intelligence” includes within its horizon a wide range of technological operations, making it problematic to understand and hence create policy for. This literature synthesis attempts to provide an overview of the key technologies that formulate the patronage term referred as AI and the key factors related to its different disciplines.

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