APPROACHES OF MACHINE LEARNING

Mrs.Jyothish Abraham,Mrs.Aparnamol C.D
Assistant Professor,Assistant Professor,
Department Of Computer Science
Christ College, Puliyanmala, Kattappana, Idukki, Kerala, India.

Abstract : This study has been undertaken to understand the concepts regarding machine learning.The goal of machine learning is to program computers to use example data or past experience to solve a given problem. Many successful applications of machine learning exist already, including systems that analyze past sales data to predict customer behavior, optimize robot behavior so that a task can be completed using minimum resources.

Index Terms: **machine learning,subsets of machine learning,approaches to ML.**

I.INTRODUCTION

Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed. ML is one of the most exciting technologies that one would have ever come across. As it is evident from the name, it gives the computer that makes it more similar to humans: The ability to learn. Machine learning is actively being used today, perhaps in many more places than one would expect.Machine learning is an application of artificial intelligence which provides systems the ability to automatically learn without human intervention or assistance. Machine learning usually refers to the changes in systems that perform tasks associated with *artificial intelligence (AI)*. Such tasks involve recognition, diagnosis, planning, robot control, prediction, etc. The "changes" might be either enhancements to already performing systems or synthesis of new systems.the role of machine learning is very vast,which includes AI,big data analytics,data mining and advanced technologies.There are four main subsets of AI such as supervised learning, unsupervised earning, reinforcement learning and deep learning.

II.SUBSETS OF ML

Besides the subsets such as supervised learning, unsupervised earning, reinforcement learning and deep learning other subsets are also there like reasoning, natural language processing(NLP) and planning as shown in the figure given below.

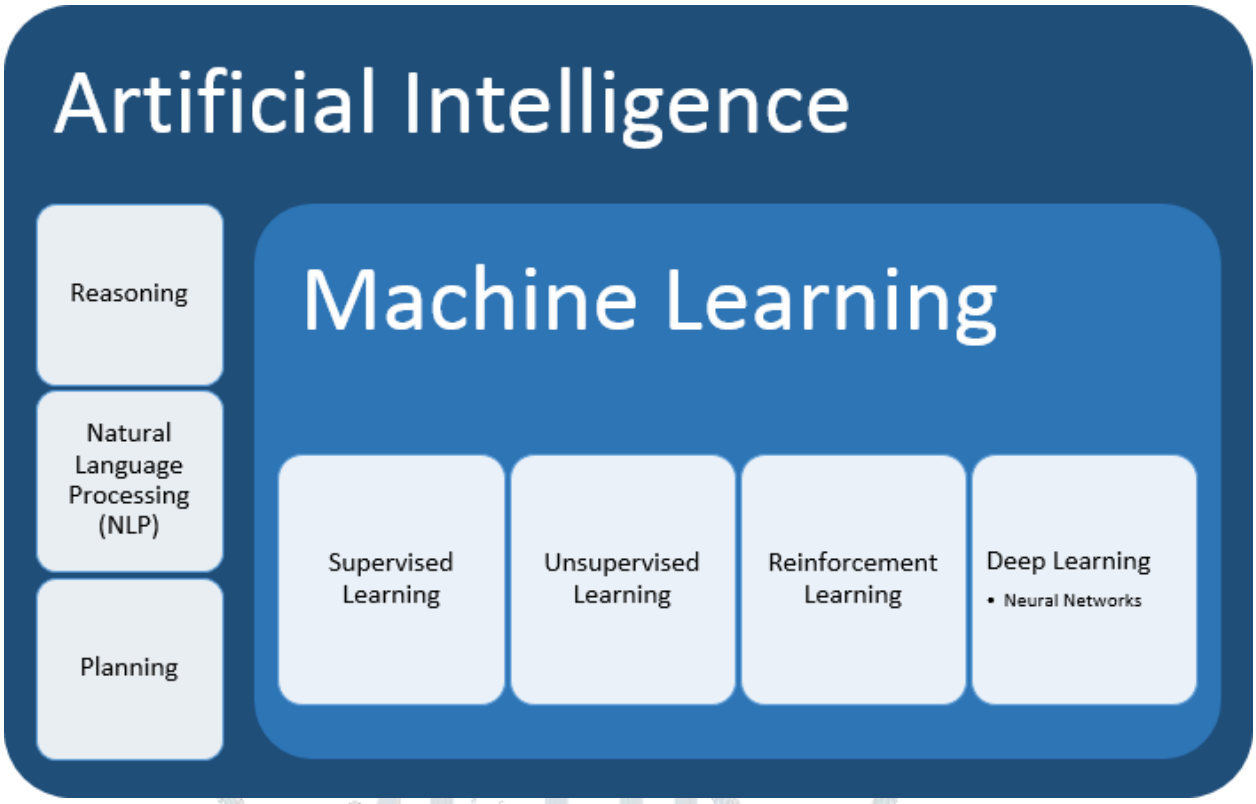

Figure1.1 Subsets of machine learning

More details regarding the subsets of AI is given below:

1. Reasoning

It means that, a system can make inference based on data.In essence, reasoning helps fill in the blanks when there is incomplete data. Machine reasoning helps make sense of connected data.

2. **Natural Language Processing (NLP):** NLP is the ability to train computers to understand both written text and human speech. NLP techniques are needed to capture the meaning of unstructured text from documents or communication from the user. Therefore, NLP is the primary way that systems can interpret text and spoken language. NLP is also one of the fundamental technologies that allows non-technical people to interact with advanced technologies.

3. **Planning:** Automated planning is the ability for an intelligent system to act autonomously and flexibly to construct a sequence of actions to reach a final goal.

III. APPROCHES TO MACHINE LEARNING

Depending on the nature of the business problem being addressed, there are different approaches based on the type and volume of the data. In this section, we discuss the categories of machine learning.

1. **Supervised learning**

Supervised learning typically begins with an established set of data and a certain understanding of how that data is classified. Supervised learning is intended to find patterns in data that can be applied to an analytics process. This data has labeled features that define the meaning of data. For example, there could be millions of images of animals and include an explanation of

what each animal is and then you can create a machine learning application that distinguishes one animal from another. By labeling this data about types of animals, you may have hundreds of categories of different species. Because the attributes and the meaning of the data have been identified, it is well understood by the users that are training the modeled data so that it fits the details of the labels. When the label is continuous, it is a regression; when the data comes from a finite set of values, it known as *classification*. In essence, regression used for supervised learning helps you understand the correlation between variables. An example of supervised learning is weather forecasting. By using regression analysis, weather forecasting takes into account known historical weather patterns and the current conditions to provide a prediction on the weather.

2. **Unsupervised learning**

Unsupervised learning is best suited when the problem requires a massive amount of data that is unlabeled. For example, social media applications, such as Twitter, Instagram, Snapchat, and so on all have large amounts of unlabeled data. Understanding the meaning behind this data requires algorithms that can begin to understand the meaning based on being able to classify the data based on the patterns or clusters it finds. Therefore, the supervised learning conducts an iterative process of analyzing data without human intervention. Unsupervised learning is used with email spam-detecting technology. There are far too many variables in legitimate and spam emails for an analyst to flag unsolicited bulk email. Instead, machine learning classifiers based on clustering and association are applied in order to identify unwanted email.Unsupervised learning algorithms segment data into groups of examples (clusters) or groups of features. The unlabeled data creates the parameter values and classification of the data. In essence,this process adds labels to the data so that it becomes supervised.Unsupervised learning can determine the outcome when there is a massive amount of data. In this case, the developer doesn't know the context of the data being analyzed, so labeling isn't possible at this stage. Therefore, unsupervised learning can be used as the first step before passing the data to a supervised learning process

3. **Reinforcement learning**

Reinforcement learning is a behavioral learning model. The algorithm receives feedback from the analysis of the data so the user is guided to the best outcome. Reinforcement learning differs from other types of supervised learning because the system isn't trained with the sample data set. Rather, the system learns through trial and error. Therefore, a sequence of successful decisions will result in the process being "reinforced" because it best solves the problem at hand.

4.Deep learning

Deep learning is a specific method of machine learning that incorporates neural networks in successive layers in order to learn from data in an iterative manner. Deep learning is especially useful when you're trying to learn patterns from unstructured data.Deep learning — complex neural networks — are designed to emulate how the human brain works so computers can be trained to deal with abstractions and problems that are poorly defined. The average five-year-old child can easily recognize the difference between his teacher's face and the face of the crossing guard.In contrast, the computer has to do a lot of work to figure out who is who. Neural networks and deep learning are often used in image recognition, speech, and computer vision applications.

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