MACHINE LEARNING

Unit – 1 Fundamentals of Machine Learning

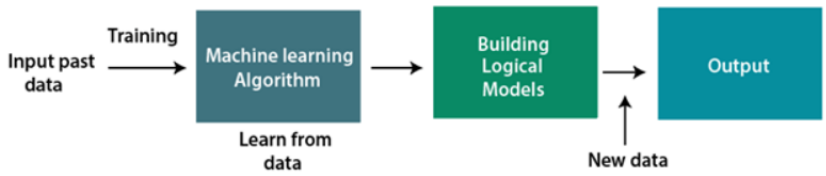
What is Machine Learning?

Machine learning is a field of computer science and artificial intelligence (AI) that involve developing algorithms and statistical models that enable computer systems to automatically learn and improve from experience without being explicitly programmed. In other words, machine learning is a subset of AI that focuses on teaching machines to recognize patterns and make predictions or decisions based on data.

The machine learning process typically involves several steps, including data collection and preparation, algorithm selection, model training and evaluation, and deployment. During training, the algorithm is fed with input data and learns to recognize patterns in the data that can be used to make predictions or decisions. Once the model has been trained, it can be used to make predictions on new, unseen data.

A Machine Learning system **learns from historical data, builds the prediction models, and whenever it receives new data, predicts the output for it**. The accuracy of predicted output depends upon the amount of data, as the huge amount of data helps to build a better model which predicts the output more accurately.

Suppose we have a complex problem, where we need to perform some predictions, so instead of writing a code for it, we just need to feed the data to generic algorithms, and with the help of these algorithms, machine builds the logic as per the data and predict the output. Machine learning has changed our way of thinking about the problem. The below block diagram explains the working of Machine Learning algorithm:



Features of Machine Learning:

- Machine learning uses data to detect various patterns in a given dataset.
- It can learn from past data and improve automatically.
- It is a data-driven technology.
- Machine learning is much similar to data mining as it also deals with a huge amount of data.

Need for Machine Learning

The need for machine learning is increasing day by day. The reason behind the need for machine learning is that it is capable of doing tasks that are too complex for a person to implement directly. As a human, we have some limitations as we cannot access a huge amount of data manually, so for this, we need some computer systems, and here comes machine learning to make things easy for us.

We can train machine learning algorithms by providing them with a huge amount of data and letting them explore the data, construct the models, and predict the required output automatically. The performance of the machine learning algorithm depends on the amount of data, and it can be determined by the cost function. With the help of machine learning, we can save both time and *money.

The importance of machine learning can be easily understood by its uses cases, Currently, machine learning is used in **self-driving cars**, **cyber fraud detection**, **face recognition**, and **friend suggestion by Facebook**, etc. Various top companies such as Netflix and Amazon have built machine learning models that are using a vast amount of data to analyze user interest and recommend products accordingly.