

# MACHINE LEARNING FUNDAMENTALS

Machine learning enables a machine to automatically learn from data, improve performance from experiences, and predict things without being explicitly programmed.

Machine learning is a growing technology which enables computers to learn automatically from past data.

Machine Learning is said as a subset of artificial intelligence that is mainly concerned with the development of algorithms which allow a computer to learn from the data and past experiences on their own.

Applications of Machine Learning:

1. Recommendation System
2. Image Recognition
3. Speech Recognition

Types of Machine Learning Models

1. Supervised Learning
2. Unsupervised Learning
3. Reinforcement Learning

## Supervised Learning

Supervised learning is a technique where the machine is given labelled input data and the expected output data. It gets the data from training data containing sets of examples.

There are 2 types of supervised learning:

- i- Regression
- ii- Classification

### i-Regression

Regression is a type of supervised learning technique used to predict a continuous numeric value based on input data.

For Example : House price

### ii- Classification

Regression is a type of supervised learning technique used to predict a discrete numeric value based on input data For example: **Email filtering:** spam or not spam.

## **Types of Classification**

1. Binary Classification – Two categories (Yes/No, True/False).
2. Multiclass Classification – More than two categories (e.g., predicting a fruit type).

## **Unsupervised Learning**

This type of algorithm consists of input data without labelled response. There will not be any pre existing labels and human intervention is also less. It is mostly used in exploratory analysis as it can automatically identify the structure in data.

### **Types:**

Clustering

### **Clustering**

Clustering is the task of dividing the population or data points into a number of groups such that data points in the same groups are more similar to other data points in the same group and dissimilar to the data points in other groups. It is basically a collection of objects on the basis of similarity and dissimilarity between them.

## **Reinforcement Learning**

This model is used in making a sequence of decisions. It is an learning by interacting with the environment. It is based on the observation that intelligent agents tend to repeat the action that are rewarded for and refrain from action that are punished for. It can be said that it is an trail and error method in finding the best outcome based on experience.