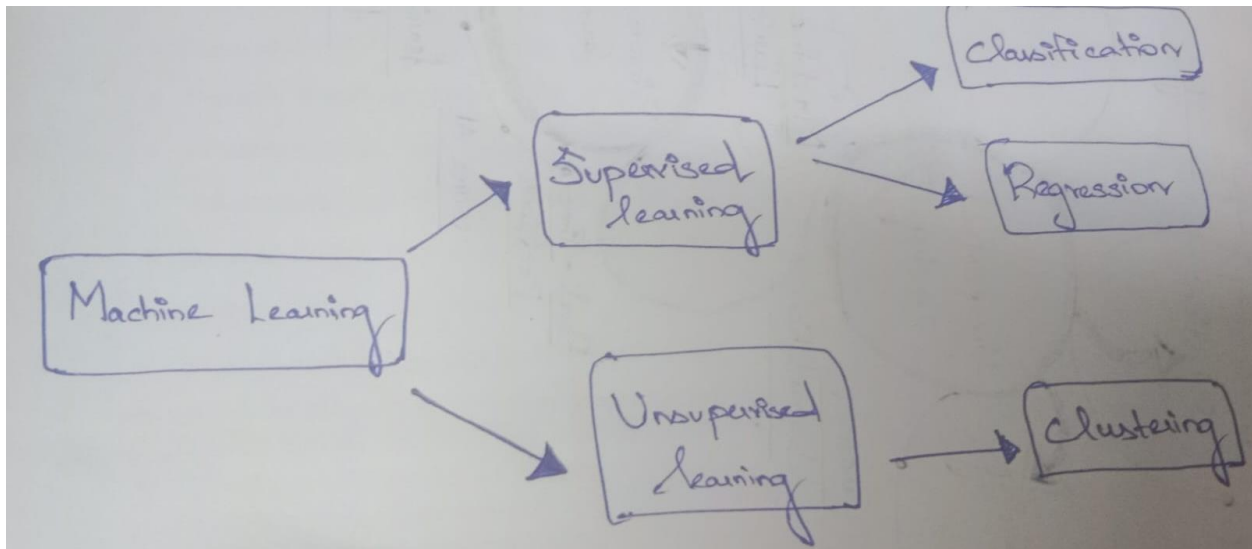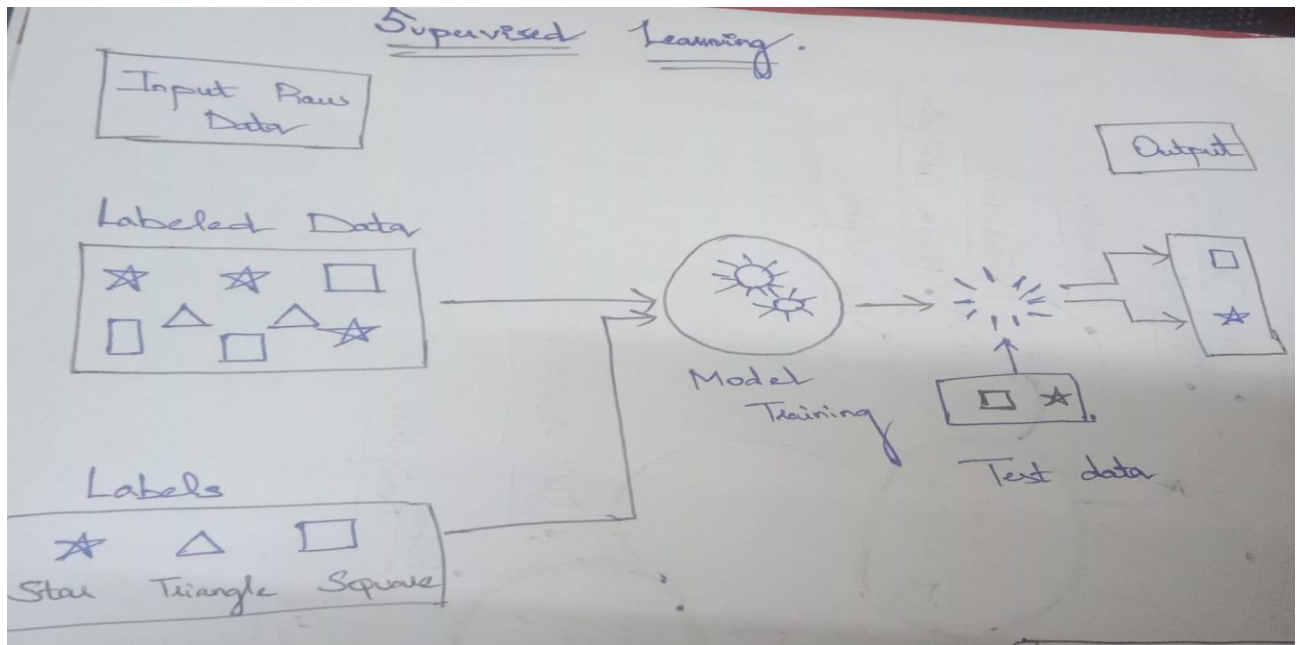# Day22: Supervised Machine Learning

By: Loga Aswin

Supervised machine learning is a type of machine learning in which an algorithm learns from a labeled dataset, which contains both input and output, where the input known as feature or X-Variable and the output known as Target or Y- Variable.

How Supervised Works?

In supervised learning, models are trained using labeled datasets, allowing them to understand the patterns inherent in each data type.

Following the completion of the training process, the model's effectiveness is evaluated using a subset of the training data known as the test data. Subsequently, the model employs this information to generate predictions.

The working of supervised learning can be comprehended through the following example and diagram:

There are two types of supervised learning algorithms:

1. Classification
2. Regression

Classification in Supervised Learning

Classification is a fundamental type of supervised machine learning in which algorithms are employed to analyze data and predict discrete outcomes or categories. It is widely used in various applications. Let's consider a practical example:

Example: Email Spam Detection

Suppose you work for an email service provider, and your task is to develop a spam filter for incoming emails. You have a dataset containing email samples, each labeled as either "Spam" or "Not Spam" (often represented as 1 or 0).

Classification algorithms are used for predicting discrete outcomes, if the outcome can take two possible values such as True or False.

There are many machine learning algorithms that can be used for classification tasks. Some of them are:

- Logistic Regression
- Decision Tree Classifier
- K Nearest Neighbor Classifier
- Random Forest Classifier
- Neural Networks
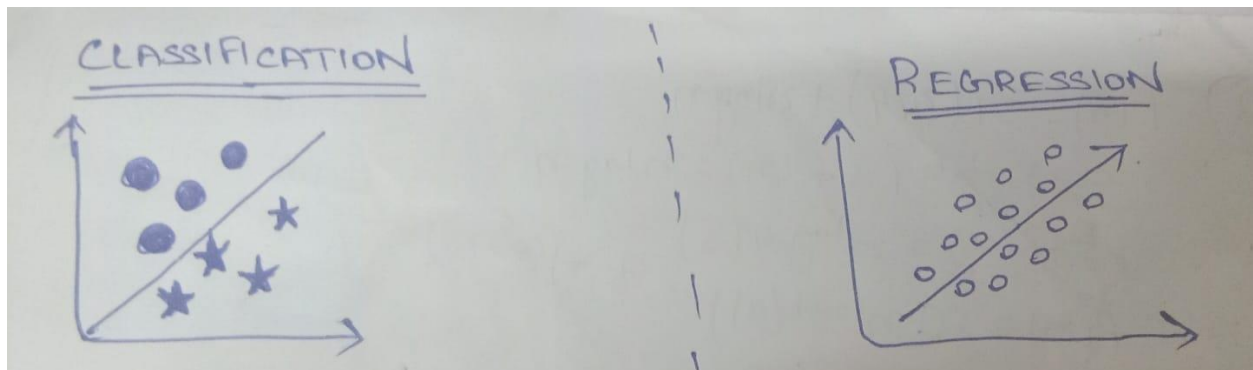
Regression in Supervised Learning

Regression is a supervised machine learning approach in which algorithms analyze data to make predictions about continuous variables, such as sales, salary, weight, or temperature.

Example:

Using regression, you can build a model that predicts a student's exam score based on the number of hours they study. This helps you understand and quantify the relationship between study time and exam performance."

There are many machine learning algorithms that can be used for regression tasks. Some of them are:

- Linear Regression
- Decision Tree Regressor
- K Nearest Neighbor Regressor
- Random Forest Regressor
- Neural Networks