**WHAT IS MACHINE LEARNING?**

Machine Learning (ML) is a branch of Artificial Intelligence (AI) that allows computers and systems to learn and improve automatically from experience without being explicitly programmed for each task. Rather than executing strictly coded instructions, ML systems employ data to identify patterns, make predictions, and improve their performance over time.

The fundamental concept behind ML is to create algorithms that can take input data, process it, and apply statistical techniques to forecast outputs or make choices. These algorithms create mathematical models from sample data—also referred to as "training data"—to make proper predictions or decisions without any intervention.

Machine Learning has a few branches, including:

**Supervised Learning**: in which the model learns from labeled data.

**Unsupervised Learning**: in which the model learns to find hidden patterns in unlabeled data.

**Reinforcement Learning**: in which the model learns by trial and error by being rewarded or penalized.

**What is Supervised ML Algorithm?**

**Supervised Machine Learning** is a type of machine learning where the model is trained using labeled datasets. In this approach, each training example includes both an input and a correct output, which helps the algorithm learn a mapping function from inputs to desired outputs. The goal of supervised learning is to predict the output for new, unseen inputs based on the patterns it learned from the training data.

The learning process continues until the model achieves an acceptable level of accuracy. After training, the model is evaluated using test data (also labeled) to measure how well it generalizes to new information.

There are two main types of problems in supervised learning:

* **Regression**: Predicting continuous numeric values (e.g., predicting the price of a house based on its features).
* **Classification**: Predicting discrete labels or categories (e.g., classifying emails as spam or not spam).

**Examples of Supervised Learning Algorithms:**

* **Linear Regression**: Used for predicting continuous values based on the linear relationship between input variables.
* **Decision Trees**: A tree-like model used for both classification and regression tasks.
* **Support Vector Machines (SVM)**: A powerful classifier that finds the optimal boundary (hyperplane) to separate different classes in the data.

Supervised learning is widely used in real-world applications such as medical diagnosis, fraud detection, image classification, and customer behavior prediction.

**What is Regression and Classification?**

* **Regression** is a type of supervised learning that predicts continuous outcomes.  
  Example: Predicting house prices.
* **Classification** is a type of supervised learning that predicts categorical outcomes.  
  Example: Spam vs Non-Spam emails.