**🎯 Goal of Machine Learning**

The main goal of Machine Learning is to **enable computers to learn from data and make decisions or predictions** without being explicitly programmed for each task. It helps systems **improve performance** on a task over time with experience.

### 🧠 ****Types of Machine Learning****

#### 1. **Supervised Learning**

* **Definition:** The model learns from labeled data (input-output pairs).
* **Goal:** Predict output (label) from new input data.
* **Examples:**
  + Spam email detection (Spam or Not Spam)
  + House price prediction (based on size, location, etc.)
* **Common algorithms:**
  + Linear Regression, Decision Trees, Support Vector Machines (SVM), Neural Networks

#### 2. **Unsupervised Learning**

* **Definition:** The model learns from unlabeled data (no predefined outputs).
* **Goal:** Discover hidden patterns or structure in data.
* **Examples:**
  + Customer segmentation (grouping similar customers)
  + Anomaly detection (e.g., fraud detection)
* **Common algorithms:**
  + K-Means Clustering, Hierarchical Clustering, Principal Component Analysis (PCA)

#### 3. **Reinforcement Learning**

* **Definition:** The model learns by interacting with an environment and receiving feedback (rewards or penalties).
* **Goal:** Learn a sequence of actions to maximize cumulative reward.
* **Examples:**
  + Game-playing AI (e.g., AlphaGo)
  + Robotics (e.g., walking robot)
* **Key Concepts:**
  + Agent, Environment, Action, Reward
* **Common algorithms:**
  + Q-Learning, Deep Q Networks (DQN), Policy Gradient Methods