Machine Learning - Class 1

1. What Is Machine Learning?

Machine Learning is a branch of artificial intelligence that enables computer systems to learn patterns from data and make predictions or decisions without being explicitly programmed. Instead of following fixed rules, machine learning models improve their performance as they are exposed to more data.

2. Main Types of Machine Learning

Machine Learning is broadly classified into three main types based on the nature of learning and the availability of labeled data.

- **Supervised Learning:**
  The model is trained using labeled data, where both input features and correct outputs are known. It is commonly used for prediction and classification tasks.

- **Unsupervised Learning:**
  The model works with unlabeled data and discovers hidden patterns or groupings within the data.

- **Reinforcement Learning:**
  The model learns by interacting with an environment and receiving feedback in the form of rewards or penalties.

3. Difference Between Classification and Regression

Classification and regression are two major types of supervised learning tasks.

- **Classification:**
  Used when the target variable is categorical. The goal is to assign input data to predefined classes or categories.

- **Regression:**
  Used when the target variable is continuous. The goal is to predict a numerical value.

Key Difference:
Classification predicts categories, while regression predicts numerical values.

4. What Is a Feature in Machine Learning?

A feature is an individual measurable property or characteristic of the data that is used as input to a machine learning model. Features represent the information that helps the model learn patterns and make predictions.

Importance of Features:

- Directly influence model accuracy
- Help capture meaningful patterns
- Good feature selection improves model performance

5. What Is a Label or Target Variable?

The label or target variable is the output variable that a machine learning model is trained to predict. In supervised learning, labels provide the correct answers during training.

Key Points:

- Represents the outcome or result
- Used to evaluate model performance
- Also called dependent variable or response variable