**Edunet Foundation- Week1**

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**1. What is Machine Learning (ML)?**

Machine Learning (ML) is a subfield of Artificial Intelligence (AI) focused on creating systems that can automatically learn and improve from experience without being explicitly programmed.

* In traditional programming, we give the program rules and data, and it produces output.
* In ML, we give the system data and output (or labels), and it learns the rules or patterns from the data.

ML enables computers to:

* Recognize patterns in large datasets
* Make predictions or decisions without human intervention
* Adapt and improve with new data over time

There are different types of ML:

* Supervised learning
* Unsupervised learning
* Reinforcement learning

**2. What is a supervised machine learning algorithm?**

Supervised learning is a type of ML where the algorithm is trained using a **labeled dataset**. That means every input data point has a corresponding **correct output** (also called the label).

**How it works:**

* The algorithm learns the relationship between the input (features) and the output (label).
* It creates a model that can be generalized from the training data.
* Once trained, the model can predict outputs for new, unseen inputs.

**Example:**

* Input: Hours studied
* Output (label): Exam score
* The model learns how study time affects scores, and can predict future scores based on study time.

**Common supervised algorithms:**

* Linear Regression
* Logistic Regression
* Decision Trees
* Support Vector Machines (SVM)
* Neural Networks

**3. What is regression and classification?**

Both regression and classification are types of supervised learning.

**Regression:**

* Used when the output is a continuous numerical value.
* The goal is to predict a quantity.
* Example: Predicting temperature, stock prices, or the price of a house.

**Algorithms used:**

* Linear Regression
* Polynomial Regression
* Support Vector Regression
* Decision Tree Regression

**Classification:**

* Used when the output is a category or class label.
* The goal is to assign the input to one of several predefined categories.
* Example: Predicting if an email is "spam" or "not spam", or classifying handwritten digits.

**Types:**

* **Binary classification** (e.g., Yes/No, Spam/Not spam)
* **Multi-class classification** (e.g., Cat/Dog/Bird)

**Algorithms used:**

* Logistic Regression
* Decision Trees
* Random Forest
* K-Nearest Neighbors (KNN)
* Naive Bayes
* Neural Networks