**MACHINE LEARNING**

Machine Learning (ML) is a branch of artificial intelligence (AI) that enables computers to learn from historical data without being explicitly programmed. Instead of following hardcoded rules, an ML model analyzes large amounts of data to identify patterns, trends, and relationships. Once trained, the model can use what it has learned to make predictions or decisions about new, unseen data. This makes ML useful in many areas, such as predicting stock prices, recommending products, detecting fraud, and recognizing speech or images.

**SUPERVISED ML ALGORITHM**

A supervised machine learning algorithm is a type of ML where the output (or target) is already known. The model is trained on a labeled dataset, which means each input comes with the correct output. By learning from these input-output pairs, the algorithm can then predict the output for new, unseen inputs.

**Example:**  
If you're training a model to recognize handwritten digits (0–9), the training data would include images of digits along with their correct labels (e.g., "this image is a 7"). The model learns the patterns associated with each digit and can then classify new images accurately.

**CLASSIFICATION**Classification is used when the output (label) is a category or class. The goal is to predict which category an input belongs to.

Examples:

* Email spam detection: *spam* or *not spam*
* Tumor diagnosis: *benign* or *malignant*
* Handwritten digit recognition: *0 to 9*

Output:   
Discrete (fixed classes)

**REGRESSION**Regression is used when the output is a continuous value. The goal is to predict a numerical value based on the input data.

Examples:

* Predicting house prices
* Forecasting temperature
* Estimating a person’s age from a photo

Output:   
Continuous (real numbers)