ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DAY – 2   **24 June 2025**

Types of Machine Learning

There are several types of machine learning, each with special characteristics and applications. Some of the main types of machine learning algorithms are as follows:

1. Supervised Machine Learning

2. Unsupervised Machine Learning

3. Reinforcement Learning

Additionally, there is a more specific category called semi-supervised learning, which combines elements of both supervised and unsupervised learning.
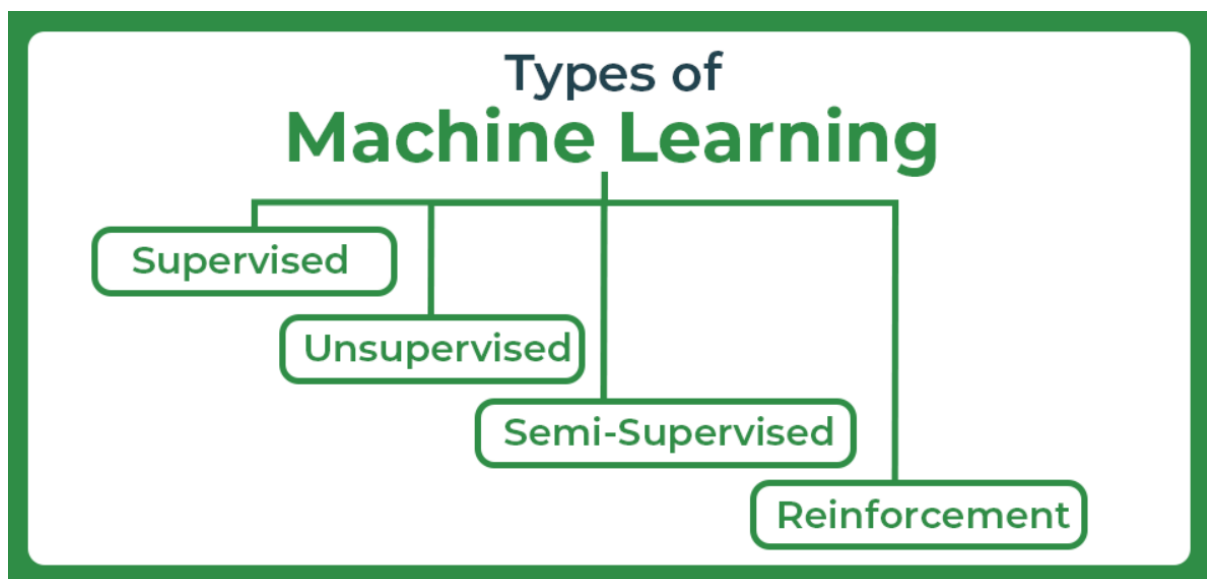
1. Supervised Machine Learning

Supervised learning uses labeled data to train models, meaning both inputs and correct outputs are known. The goal is to learn patterns that map inputs to outputs.

Example: An image classifier is trained on labeled images of cats and dogs. When given a new image, it predicts whether it's a cat or a dog.

Applications:

- Image and speech recognition

- Email spam detection

- Medical diagnosis

- Fraud detection

2. Unsupervised Machine Learning

- Unsupervised learning finds hidden patterns in unlabeled data. It's used for exploring data, clustering, and uncovering relationships without predefined outputs.
- **Example:** A retail store groups customers by purchase behavior to find target segments—without knowing categories in advance.

Applications:

- Customer segmentation
- Anomaly detection
- Recommendation systems
- Topic modelling

3. Reinforcement Machine Learning

Reinforcement Learning (RL) is a trial-and-error-based learning method where an agent learns by interacting with an environment and receiving **rewards or penalties** based on its actions.

Example: Training an AI to play chess—moves leading to a win are rewarded, and over time, the AI learns optimal strategies.

Applications:

- Game playing (e.g., AlphaGo)
- Robotics and self-driving cars
- Smart recommendation systems
- Healthcare and drug discovery

4. Semi-Supervised Learning:

Semi-supervised learning combines elements of both supervised and unsupervised learning. It uses a small amount of labeled data and a larger amount of unlabeled data to train the model. This approach is useful when labeled data is scarce or expensive to obtain.

By : Aditi Tangri   URN : 2302460   CRN : 2315004