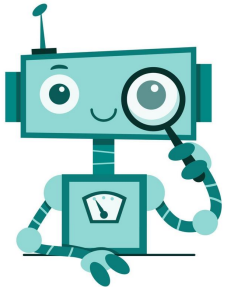
Artificial Intelligence (AI)



Week-9

Agenda

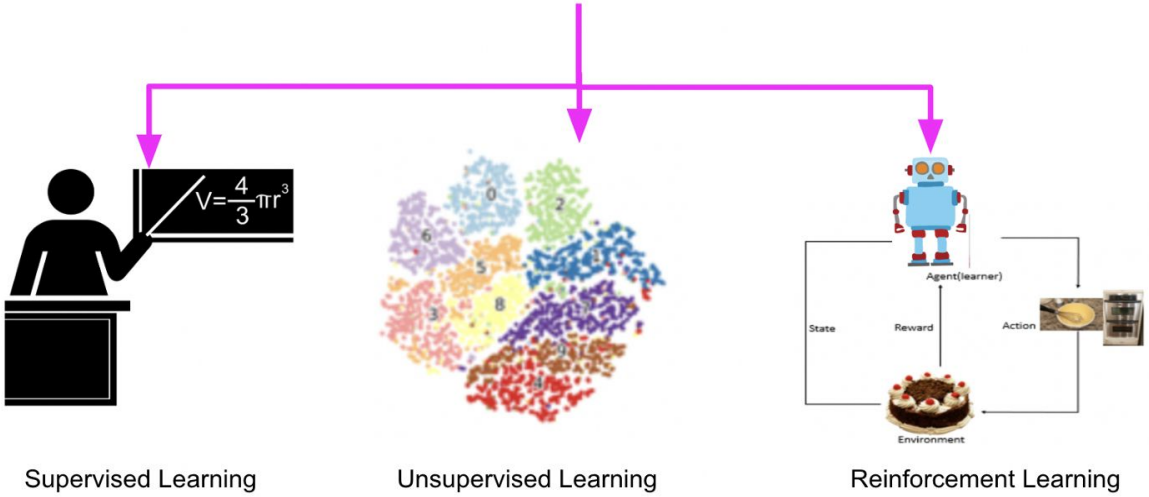
- Machine Learning
- Types of Machine Learning
- A * Search Algorithm

Machine Learning :

- Machine learning is a field of computer science that empowers computers to learn from data without being explicitly programmed.
- It enables systems to improve their performance over time by learning from experience.
- ML algorithms can automatically identify patterns, make predictions, and adapt to new data.

Types of Machine Learning

1. Supervised Learning (learning with **labeled data**)
2. Unsupervised Learning (discover patterns in **unlabeled data**)
3. Reinforcement learning (learn to act based on **feedback/rewards**)

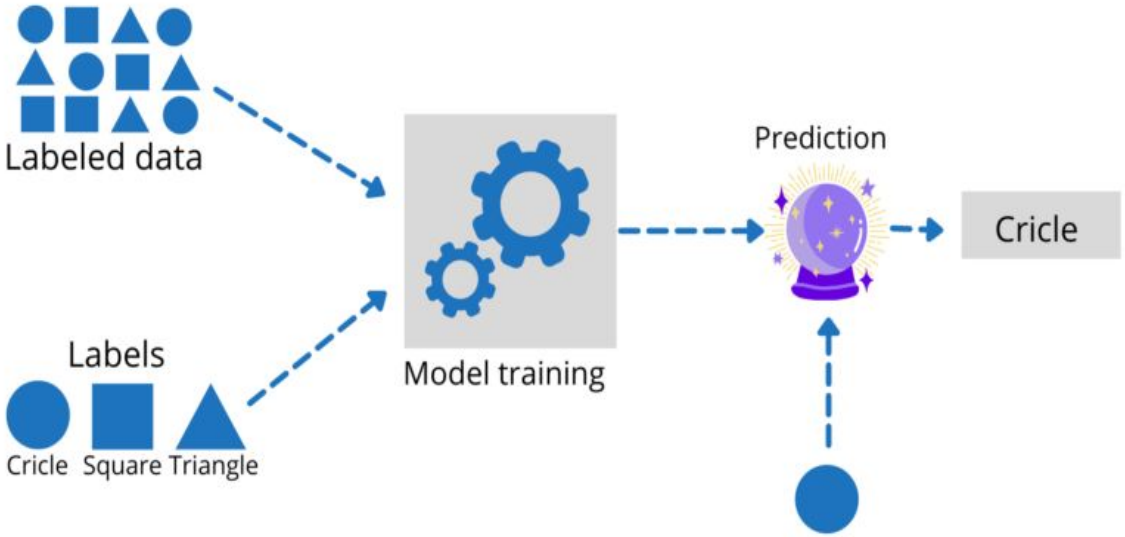


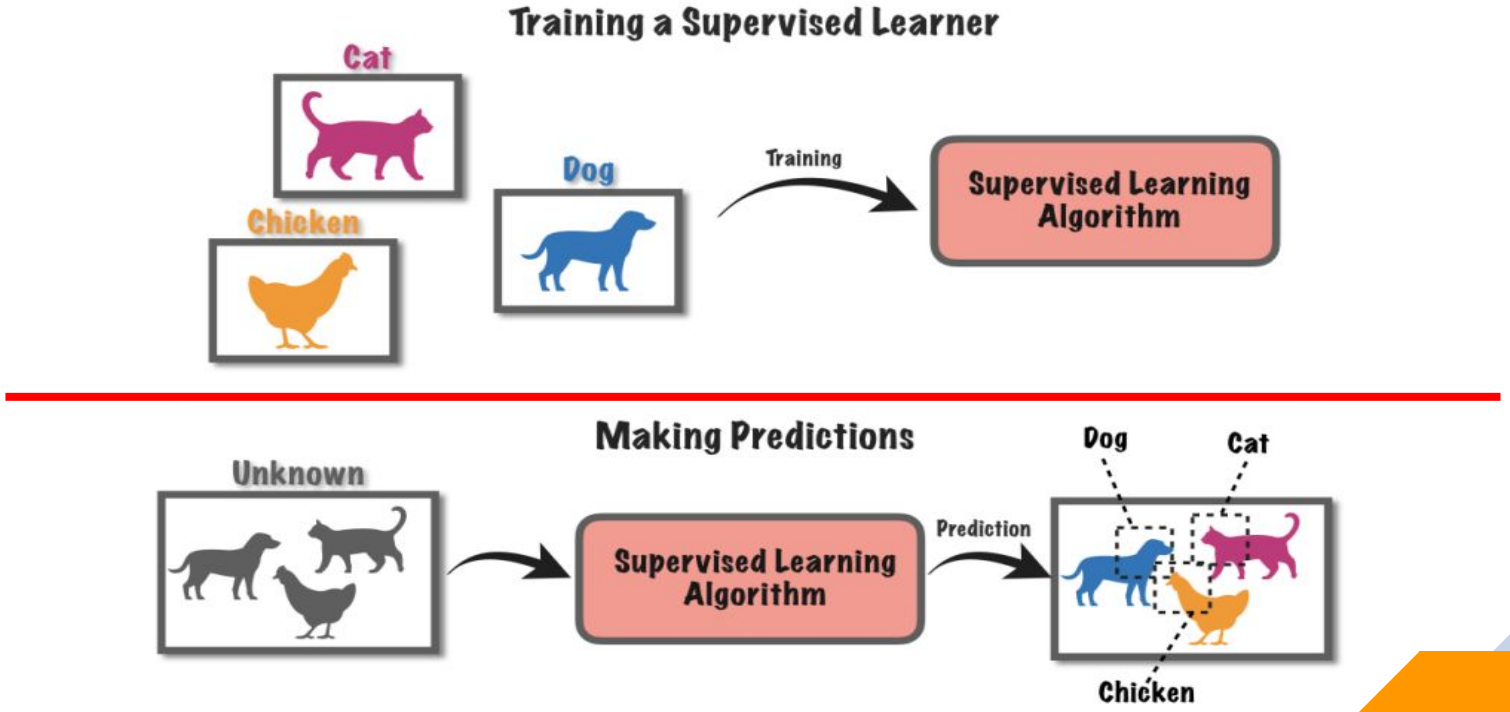
Supervised Learning Unsupervised Learning Reinforcement Learning

Supervised learning

- Supervised learning is a type of ML algorithm that learns from labeled data.
- **Labeled Data:** Labeled data consists of examples with known correct answers or classifications.
- **Training Process:**
  - The machine is trained using a set of labeled data.
  - Each data point has an associated label (output value).
  - The algorithm learns the relationship between input features and corresponding outputs.

Supervised learning



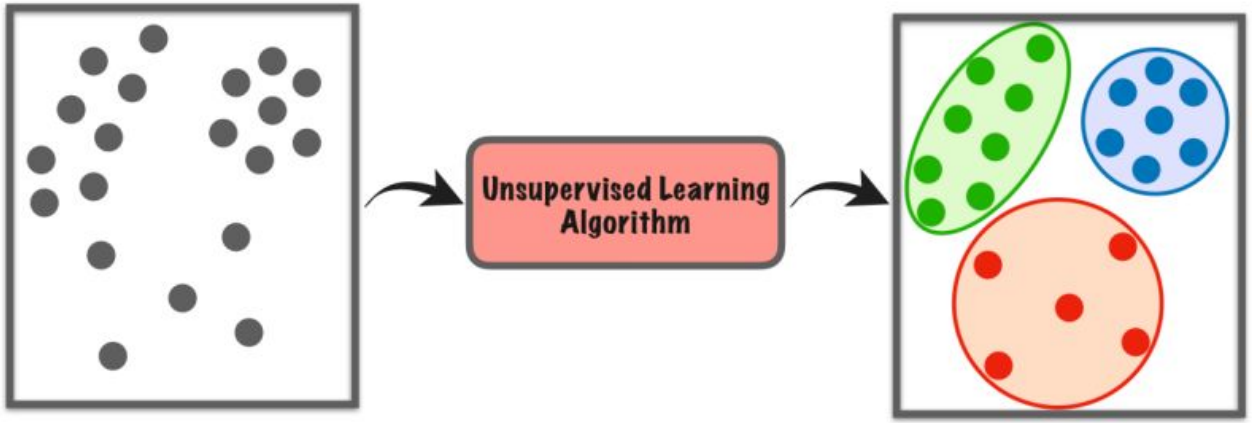

Training a Supervised Learner
Cat
Dog
Chicken
Training
Supervised Learning Algorithm
Making Predictions
Unknown
Supervised Learning Algorithm
Prediction
Dog
Cat
Chicken

Unsupervised learning

- Unsupervised learning involves training a machine on unlabeled data.
- **Unlabeled Data:** Unlabeled data lacks explicit output labels.
- **Learning Objective:**
  - The goal is to find patterns, structures, or relationships within the data.
  - Clustering similar data points together is a common task.

Unsupervised learning

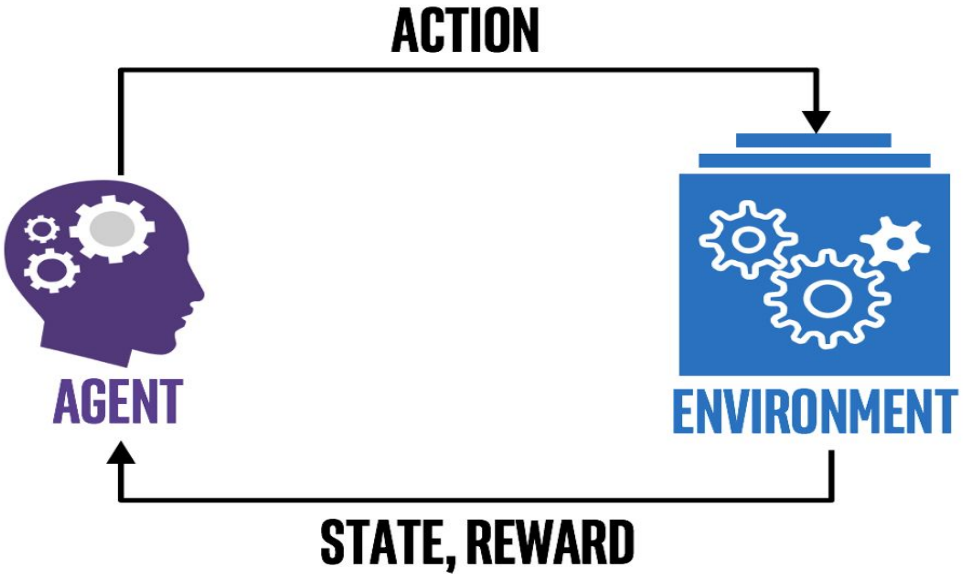
- Clustering
- Anomaly Detection



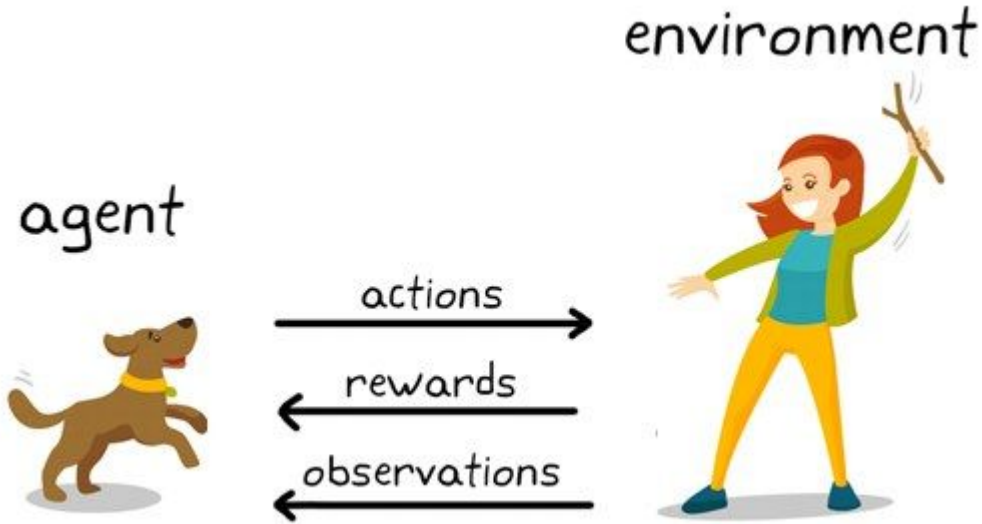
Reinforcement Learning

- Reinforcement learning is a paradigm where an agent learns to take actions in an environment to maximize a cumulative reward.
- **Components:**
  - Agent: The learner that interacts with the environment.
  - Environment: The external system with which the agent interacts.
  - Reward Signal: Feedback received by the agent after each action.

Reinforcement Learning



Reinforcement Learning



A * Search Algorithm

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Intelligent Criminology Research Lab

Lets move to Jupyter Notebook