



**SNS COLLEGE OF TECHNOLOGY**

**Coimbatore-35**



**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with  
'A+' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University,  
Chennai

**DEPARTMENT OF AI&ML**

**FOUNDATIONS OF ARTIFICIAL INTELLIGENCE**

**II YEAR - III SEM**

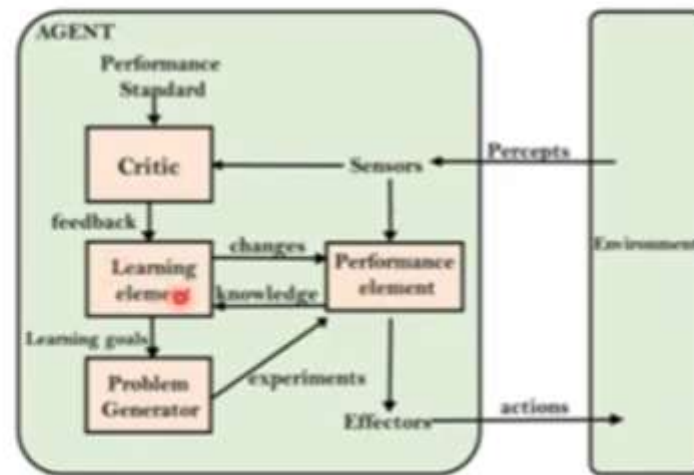
**UNIT 5 – Learning Observation**

# Learning

- **Learning** is Agent's percepts should be used for **acting**,
- It also used for improving the **agent's ability to act in the future.**
- Learning takes place as the agent **observes**, its interactions with the **world and its own decision-making processes.**

# Forms of Learning

- **Learning Agent** can be thought of as containing a **Performance Element**, that decides, what actions to take, and a **learning element** that **modifies the performance element** so that it **makes better decisions**.



# Components of Learning Agents

- The components of learning agents include the following
  1. A **direct mapping** from conditions on the **current state** to **actions**.
  2. A means to infer **relevant properties** of the **world** from the **percept sequence**.
  3. **Information** about the way the world evolves and about the **results of possible actions** the agent can take.
  4. **Utility information** indicating the **desirability** of world states.
  5. **Action-value information** indicating the **desirability** of actions.
  6. **Goals** that describe classes of states whose achievement **maximizes the agent's utility**.

## Automatic Taxi Driver

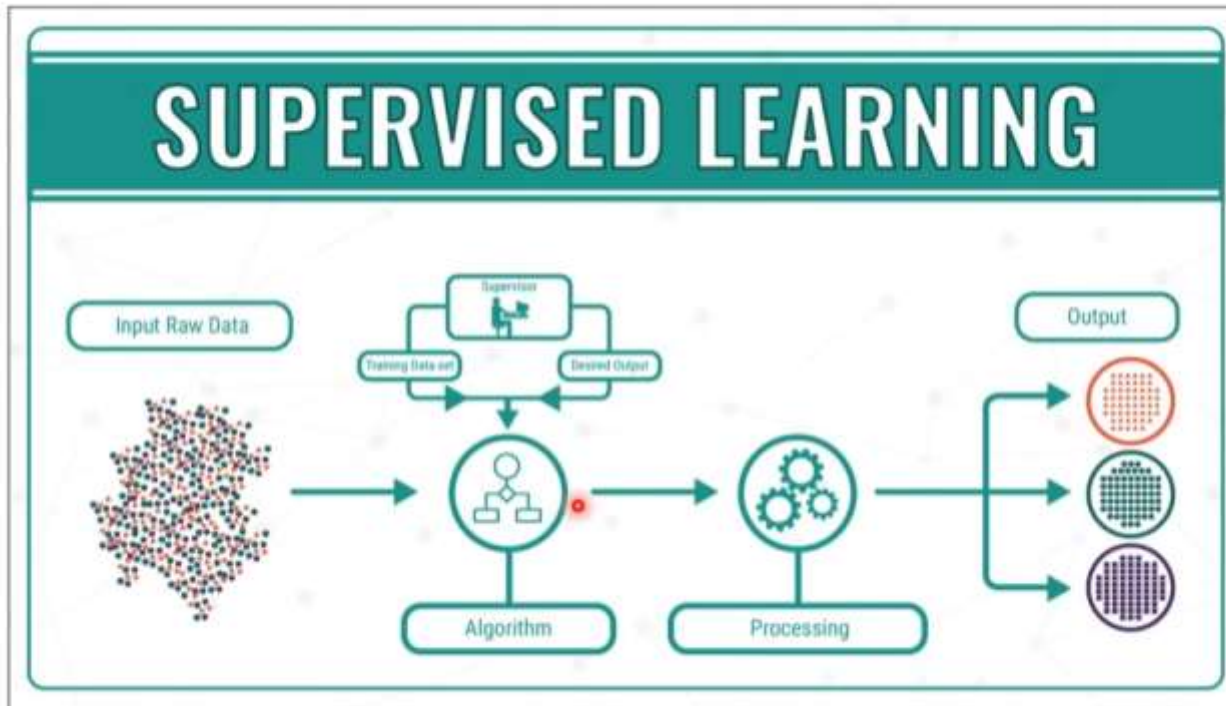


- Learning Agents' components can be learned from appropriate feedback.
- An agent training to become a **taxi driver**.
- Every time the instructor gives a command "Brake!", the agent can learn a **condition-action rule**, when we apply brake (component 1).
- By seeing many **camera images**, it can learn to recognize the objects on road (2).
- By trying **actions and observing the results**, for example, braking hard on a wet road, it can learn the effects of its actions (3).
- If there is **no tip from passengers**, but they shaken up during the trip, then it can learn a **useful component of its overall utility function** (4).
- The **type of feedback** available for learning is usually the most important factor in determining the nature of the learning problem that the agent faces.

# Popular Machine Learning Algorithms

- The field of machine learning usually distinguishes three cases:
  - **Supervised Learning**
  - **Unsupervised Learning**
  - **Reinforcement learning**

# SUPERVISED LEARNING

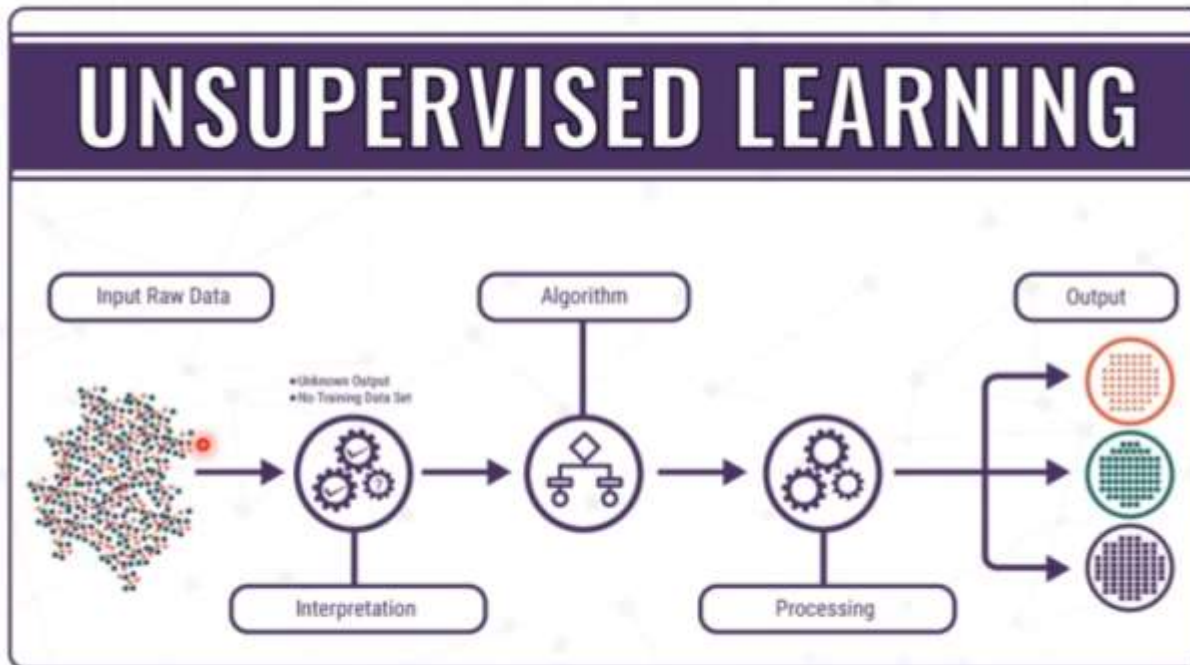


# Unsupervised Learning

- **Unsupervised Learning** - provides **unlabeled data**, the algorithm tries to **make sense** of by **extracting features and patterns** on its own.



# UNSUPERVISED LEARNING



# Reinforcement learning

- **Reinforcement learning** - is a type of dynamic programming that trains algorithms using a system of reward and punishment.

