Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2025-26

Class:	**TE**	**Semester:**	**V**
Course Code:	**CSL502**	**Course Name:**	**Artificial Intelligence Lab**

Name of Student:	**Shravani Sandeep Raut**
Roll No. :	**51**
Experiment No.:	**2**
Title of the Experiment:	**Identify suitable Agent Architecture and type for the problem.**
Date of Performance:	**15/07/2025**
Date of Submission:	**22/07/2025**

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty : Mrs. Rujuta Vartak

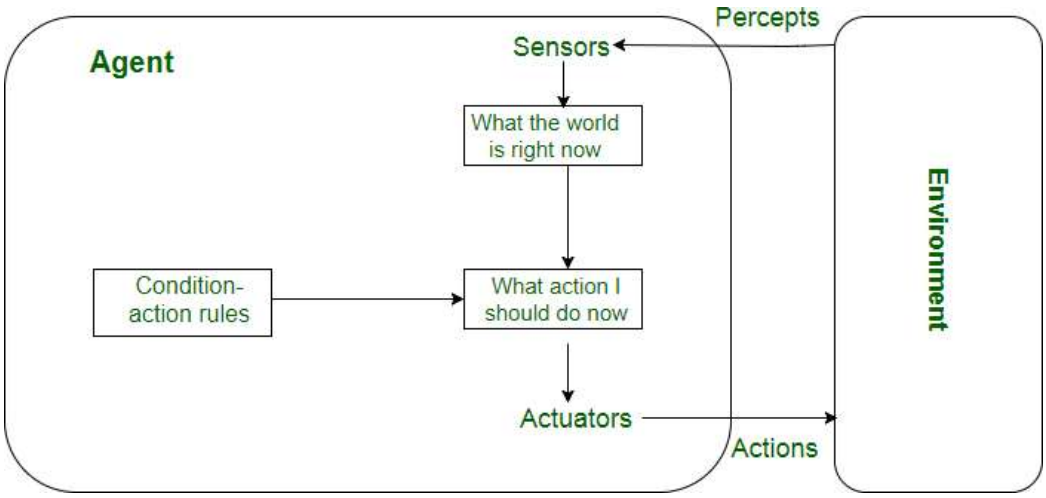
Signature :

Date:

Aim: Identify suitable Agent Architecture and type for the problem.

Objective: To study the structure , characteristics of intelligent agent and identify the type of any rational agent.

Theory:



Simple Reflex agent:

- The Simple reflex agents are the simplest agents. These agents take decisions on the basis of the current percepts and ignore the rest of the percept history.
- These agents only succeed in the fully observable environment.
- The Simple reflex agent does not consider any part of percepts history during their decision and action process.
- The Simple reflex agent works on Condition-action rule, which means it maps the current state to action. Such as a Room Cleaner agent, it works only if there is dirt in the room

Model-based reflex agent

- The Model-based agent can work in a partially observable environment, and track the situation.
- A model-based agent has two important factors:
  - **Model:** It is knowledge about "how things happen in the world," so it is called a Model-based agent.
  - **Internal State:** It is a representation of the current state based on percept history.
- These agents have the model, "which is knowledge of the world" and based on the model

they perform actions.

- Updating the agent state requires information about:

. How the world evolves

a. How the agent's action affects the world.

Goal-based agents

- The knowledge of the current state environment is not always sufficient to decide for an agent to what to do.
- The agent needs to know its goal which describes desirable situations.
- Goal-based agents expand the capabilities of the model-based agent by having the "goal" information.
- They choose an action, so that they can achieve the goal.
- These agents may have to consider a long sequence of possible actions before deciding whether the goal is achieved or not. Such considerations of different scenario are called searching and planning, which makes an agent proactive.

Utility-based agents

- These agents are similar to the goal-based agent but provide an extra component of utility measurement which makes them different by providing a measure of success at a given state.
- Utility-based agent act based not only goals but also the best way to achieve the goal.
- The Utility-based agent is useful when there are multiple possible alternatives, and an agent has to choose in order to perform the best action.
- The utility function maps each state to a real number to check how efficiently each action achieves the goals.

Learning Agents

- A learning agent in AI is the type of agent which can learn from its past experiences, or it has learning capabilities.
- It starts to act with basic knowledge and then able to act and adapt automatically through learning.
- A learning agent has mainly four conceptual components, which are:

. **Learning element:** It is responsible for making improvements by learning from environment

a. **Critic:** Learning element takes feedback from critic which describes that how well the agent is doing with respect to a fixed performance standard.

b. **Performance element:** It is responsible for selecting external action

c. **Problem generator:** This component is responsible for suggesting actions that will lead to new and informative experiences.

- Hence, learning agents are able to learn, analyze performance, and look for new ways to improve the performance.

Conclusion:

Identify the type of an agent with suitable component diagram and comment on it.

Imagine a company uses drowns to deliver packages in city, each drone in equipped with sensors to detect a obstacles, GPS for navigation, cameras for visual input and an onboard AI system to decide a best route, avoid collisions and adjust a weather conditions, it can recharge itself when low on battery and notify the control center if it faces a failure. Identify type of agent used in the above scenario, draw a suitable agent component diagram and comment on the agent type and it's suitability.

The drone described:

- Uses sensors (obstacle detection, GPS, cameras) for input.
- Has an onboard AI system to decide the best route, avoid collisions, and adjust for weather.
- Can recharge itself when battery is low.
- Can notify a control center if it faces failure.

This agent:

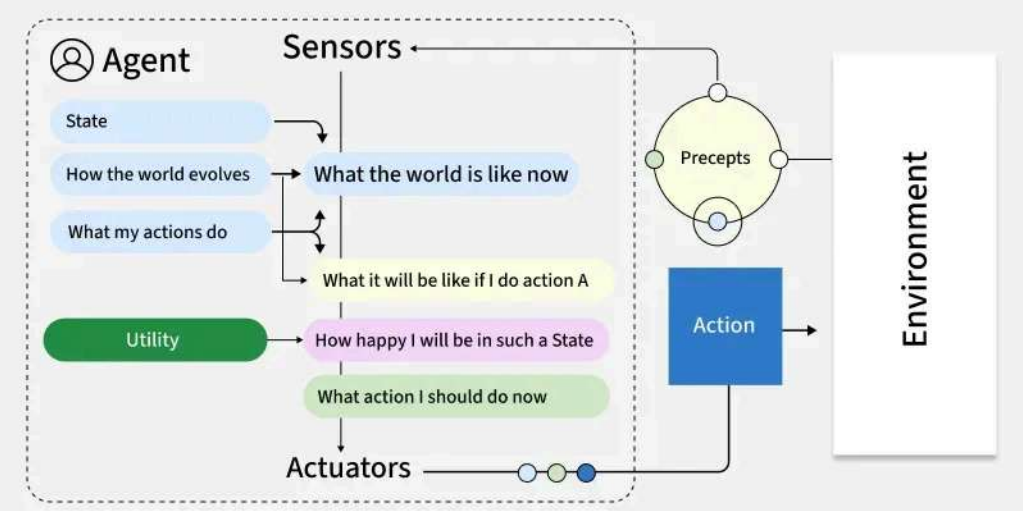
- Keeps track of the environment (obstacle detection, GPS, weather).
- Plans and adjusts routes (goal-based).
- Optimizes decisions (like route, weather adjustment).
- Performs self-maintenance (recharging).
- Reports problems (communication with control center).

Agent Type:
Utility-Based Agent combined with Model-Based Reflex and Goal-Based features.

- Utility-Based: It optimizes routes and collision avoidance, balancing factors like time, battery, and safety.
- Model-Based: Keeps internal state about the environment (location, obstacles).
- Goal-Based: Has clear goals like delivery completion and safety.

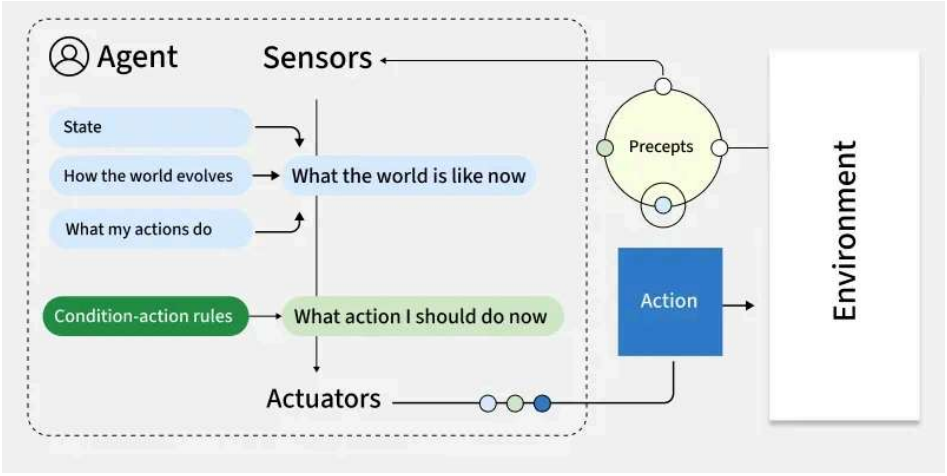
Comment on Agent Type & Suitability

- **Why Utility-Based?**
  The drone balances multiple factors (speed, safety, battery life), choosing actions that maximize overall utility (efficient and safe delivery).



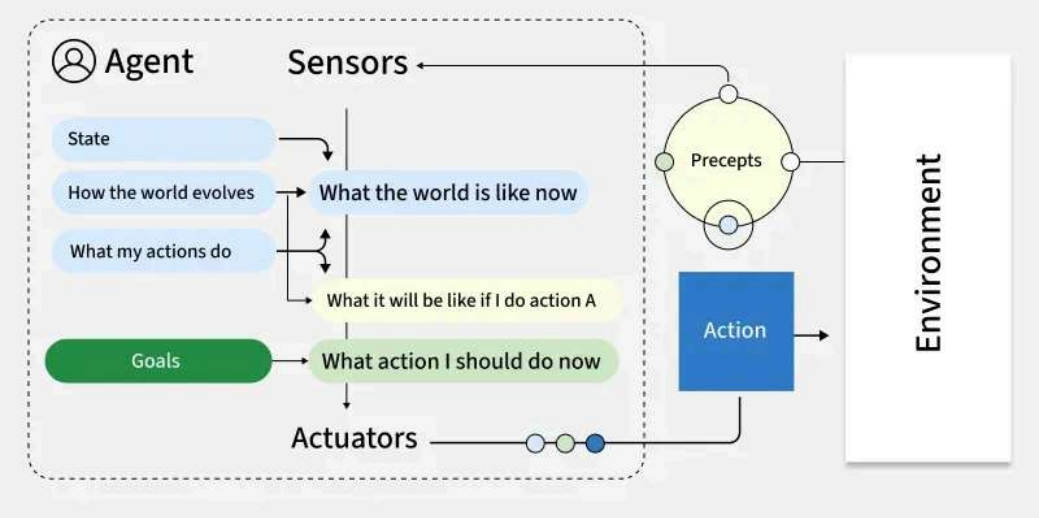
Agent Component Diagram

- **Why Model-Based?**
  It keeps an internal model of the environment (obstacles, weather, GPS location) to make informed decisions.



Agent Component Diagram

- **Why Goal-Based?**
  It has explicit goals: deliver packages, avoid collisions, recharge battery when needed.



Agent Component Diagram

- Suitability:
  This hybrid agent design is very suitable because it:
- Adapts to dynamic and uncertain city environments.
- Handles multiple goals and trade-offs.
- Improves reliability by self-maintenance and reporting failures.
- Provides autonomous operation with effective real-time decision making.