EXPERIMENT NO. 06

Aim: Identify suitable agent architecture for the problem.

An agent is a computer program or system that is designed to perceive its environment, make decisions and take actions to achieve a specific goal or set of goals.

Types of agent architecture

➢ **Simple Reflex Agents**- Simple reflex agents ignore the rest of the percept history and act only on the basis of the current percept. Percept history is the history of all that an agent has perceived to date. The agent function is based on the condition-action rule. A condition-action rule is a rule that maps a state i.e., a condition to an action. If the condition is true, then the action is taken, else not.

➢ **Model-Based Reflex Agents**-It works by finding a rule whose condition matches the current situation. A model-based agent can handle partially observable environments by the use of a model about the world. The agent has to keep track of the internal state which is adjustedby each percept and that depends on the percept history.

➢ **Goal-Based Agents**- These kinds of agents take decisions based on how far they are currently from their goal(description of desirable situations). Their every action is intended to reduce their distance from the goal. This allows the agent a way to choose among multiple possibilities, selecting the one which reaches a goal state.

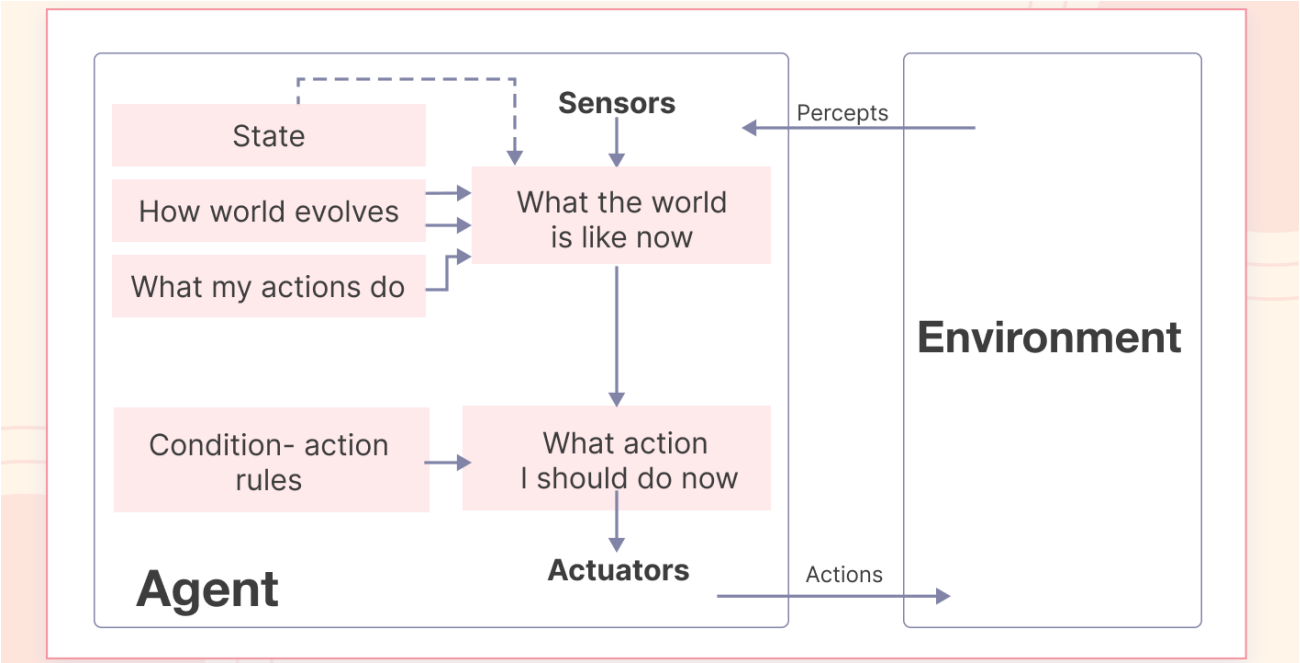
➢ **Utility-Based Agents**- These kinds of agents take decisions based on how far they are currently from their goal(description of desirable situations). Their every action is intended
to reduce their distance from the goal. This allows the agent a way to choose among multiple possibilities, selecting the one which reaches a goal state.

➢ **Learning Agent**-A learning agent in AI is the type of agent that can learn from its past experiences or it has learning capabilities. It starts to act with basic knowledge and then is able to act and adapt automatically through learning.

➢ **Multi-agent systems**-These agents interact with other agents to achieve a common goal. They may have to coordinate their actions and communicate with each other to achieve their objective. A multi-agent system (MAS) is a system composed of multiple interacting agents that are designed to work together to achieve a common goal. These agents may be autonomous or semi-autonomous and are capable of perceiving their environment, making decisions, and taking action to achieve the common objective.

➢ **Hierarchical agents**-These agents are organized into a hierarchy, with high-level agents overseeing the behavior of lower-level agents. The high-level agents provide goals and constraints, while the low-level agents carry out specific tasks. Hierarchical agents are useful in complex environments with many tasks and sub-tasks.

Problem Statement- Identify agent architecture for Robotic Vacuum Cleaners.



Pseudo Code:

Model-Based Reflex Agent

```
Initialize:
    Set current_position to starting location
    Set current_state to CLEANING
    Create internal map of environment

While true:
    Perceive environment:
        Get sensor readings for obstacles, dirt, and current position
        Update internal map based on sensor data

    If current_state is CLEANING:
        If current_position is dirty:
            Perform suck action to clean dirt[1][2]
        Else:
            Choose next action based on internal map and cleaning strategy:
                If nearest dirty location is to the right:
                    Perform action_right() to move right[4]
                Else if nearest dirty location is down:
                    Perform action_down() to move down[4]
                Else if nearest dirty location is to the left:
                    Perform action_left() to move left[4]
                Else:
                    Perform action_up() to move up[4]

    Else if current_state is RETURNING_TO_BASE:
        If current_position is home base:
            Set current_state to CHARGING
        Else:
            Choose action to return to home base using internal map
```

```
Else if current_state is CHARGING:
    If battery is full:
        Set current_state to CLEANING
    Else:
        Perform charging action

Update current_position based on action taken

Sleep for short time to simulate real-time operation
```

Conclusion- Thus, we have successfully studied and identified suitable agent architecture for Robotic Vacuum Cleaners.