**Artificial Intelligent (Lab)**

**Task # 03**

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**Temperature Analysis using (Model Based Reflex agents)**

**Introduction:**

The Model-Based Reflex Agent for Smart Homes is designed to intelligently manage heating systems in multiple rooms. Unlike a simple reflex agent that only reacts to current temperature, this agent also remembers the previous state of the heater. By doing so, it avoids unnecessary repetitive actions, such as repeatedly turning the heater on or off when the condition has not changed. This makes the system smarter, more efficient, and closer to real-world applications.

This model working on PEAS phenomena.

**Why I made this:**

The primary goal of this project was to learn and practice how to implement memory in agents. While the Simple Reflex Agent demonstrates basic decision-making based on conditions, the Model-Based Agent introduces the idea of state-tracking, which is crucial in artificial intelligence. By making this program, I wanted to:

* Understand how agents use memory to avoid redundant actions.
* Strengthen my knowledge of conditional logic and object-oriented programming (OOP).
* Explore how AI concepts can be applied in practical scenarios like smart homes.
* Learn how to design programs that adapt dynamically to changing inputs.

**How it works:**

1. **Starting with Rooms**  
   The program begins with a predefined list of rooms and their current temperatures. Each room represents a part of the smart home that needs heating control.
2. **Sensing (Sensor)**  
   The agent senses the temperature of a room through its sensor function. This ensures that decisions are always based on the most recent data.
3. **Decision Making (Performance)**

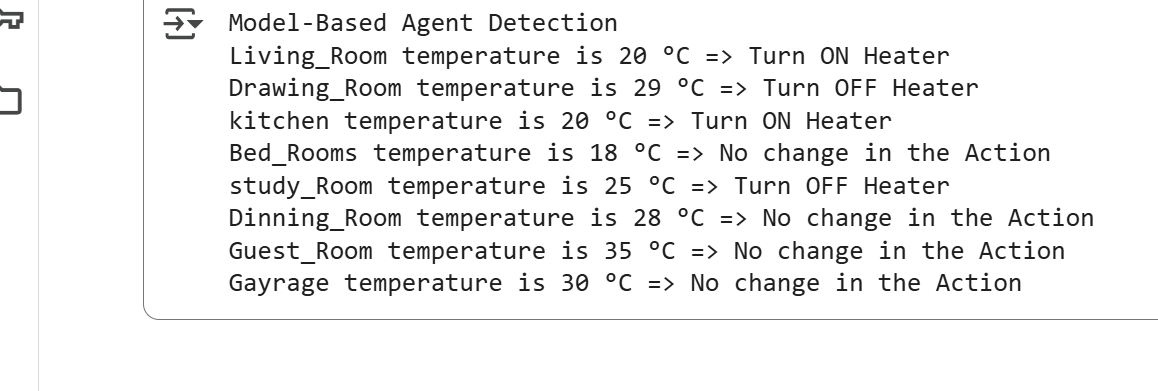
* If the room’s temperature is below 22°C, the agent decides to turn ON the heater.
* If the temperature is 22°C or above, the agent decides to turn OFF the heater.
* If the new decision is the same as the previous one for that room, the agent outputs “No change in the Action”, preventing redundant switching.

1. **Actuator**  
   The agent then performs the selected action and prints the room’s name, temperature, and the corresponding decision.
2. **Memory Usage**  
   Unlike the simple agent, this one uses a memory structure to store the last action performed in each room. This memory helps the agent avoid repeating the same command unnecessarily.

**Summary:**

1. The Model-Based Reflex Agent is a Python program that simulates a smart home heating system. It senses temperatures, makes decisions about heater control, and remembers the last action for each room.
2. By using memory, the agent avoids repeating unnecessary ON/OFF commands, making it smarter and more realistic compared to a simple reflex agent.
3. This project demonstrates the importance of internal state in artificial intelligence and helps in understanding how AI agents can be applied in practical, everyday environments.

**Output:**

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