

Experiment No: 1

Aim: -Prepare PEAS properties. Implement PEAS property for any one AI agent.

Objective: -To understand PEAS property of AI agent.

Theory:-An AI agent is a software system or autonomous entity that perceives its surroundings, makes decisions using reasoning or rules, and takes actions to independently achieve a specific goal without requiring constant human intervention

Types of AI Agents

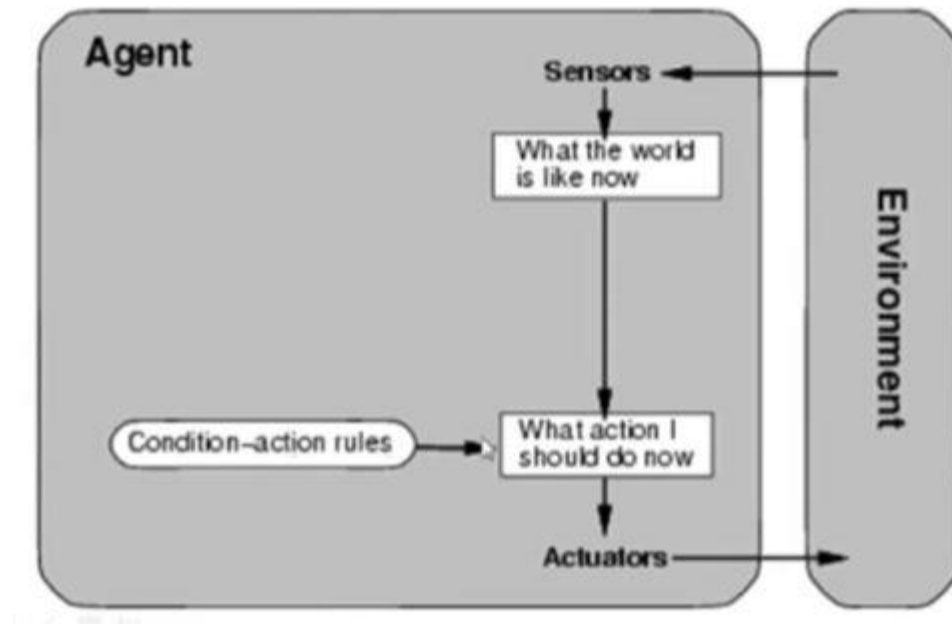
Agents are categorized by how they process context, memory, and objectives:

- **Simple Reflex Agents:** Follow strict, immediate condition-action rules (if-then); they rely entirely on the current input and have no memory.
- **Model-Based Reflex Agents:** Track an internal state to handle situations where some environment information is hidden or partially observable.
- **Goal-Based Agents:** Look ahead by planning multiple steps to reach a specific target or objective.
- **Utility-Based Agents:** Optimize decisions by calculating which possible action yields the highest "utility" or value (e.g., balancing speed vs. safety).
- **Learning Agents:** Capable of adapting, learning from past experiences, and improving their performance over time using feedback.
- **Modern Agentic AI (Multi-Agent/LLM-based):** Utilize large language models to use tools (APIs, code interpreters) and collaborate with other independent agents to accomplish complex workflows.

Types of Environments

The setting in which an agent operates dictates how it must behave and what level of complexity is required to function effectively:

- **Fully vs. Partially Observable:** Whether the agent's sensors can see the complete state of the world at all times (e.g., Chess is fully observable, Poker is partially).
- **Deterministic vs. Stochastic:** In a deterministic environment, the next state is 100% predictable based on the current action; stochastic environments introduce randomness (like the stock market).
- **Static vs. Dynamic:** Static environments do not change while the AI is deliberating, while dynamic environments (like driving a car in traffic) continuously evolve.
- **Single-Agent vs. Multi-Agent:** Whether the agent operates entirely alone or interacts/competes with other independent agents.
- **Discrete vs. Continuous:** Environments with a finite, countable number of actions/states (discrete, like a crossword) versus those with infinite changing variables (continuous, like driving speed).



PEAS Representation:

PEAS stand for Performance Measures, Environment, Actuators, and Sensors.

Performance Measure: If the objectives function to judge the performance of the agent. For example, in case of pick and place robot, no of correct parts in a bin can be the performance measure.

Environment: It the real environment where the agent need to deliberate actions.

Actuators: These are the tools, equipment or organs using which agent perform actions in the environment. This works as output of the agent.

Sensors: These are tools, organs using which agent captures the state of the environment. This works as input to the agent.

PEAS descriptor for Automated Car Driver:

Performance Measure: Safety: Automated system should be able to drive the car safely without dashing anywhere. Optimum speed: Automated systems should be able to maintain the optimal speed depending upon the surroundings. Comfortable journey: Automated systems should be able to give a comfortable journey to the end user.

Environment: Roads: Automated car drivers should be able to drive on any kind of road ranging from city roads to highways. Traffic conditions: You will find different sort of traffic conditions for different types of roads, signals.

Actuators: Steering wheel: used to direct the car in desired directions. Accelerator gear: To increase or decrease speed of the car.

Sensors: To take i/p from the environment in car driving example cameras, GPS radar system etc.

In this way, an AI problem can be identified and its PEAS description is to be stated.

CONCLUSION: Thus, a case study PEAS properties. Implement PEAS property for any one AI agent is studied.

VIVA QUESTIONS

1. What does PEAS stand for in Artificial Intelligence?

2. Why is the PEAS framework important when designing an AI agent?

3. What is the role of the Performance Measure in a PEAS description?

4. Differentiate between Sensors and Actuators with an example.

5. Can two AI agents performing different tasks have the same PEAS description?

Why or why not?

Experiment No. 1

Title: PEAS Properties of an AI-Based Smart Security Camera

Aim: To prepare the PEAS properties and implement the PEAS representation for an AI-based Smart Security Camera.

Theory

An AI agent is a system that observes its surroundings, makes decisions using artificial intelligence, and performs actions to achieve a specific goal.

A Smart Security Camera is an AI-based system that monitors an area, detects suspicious activities, identifies possible intruders, and sends alerts to the owner.

PEAS stands for Performance Measure, Environment, Actuators, and Sensors. It is used to describe the working of an AI agent.

PEAS Representation

PEAS Component	Description
P – Performance Measure	Detect intruders accurately, reduce false alarms, provide quick alerts, and improve security.
E – Environment	Homes, offices, shops, buildings, parking areas, and other monitored places.
A – Actuators	Alarm or siren, mobile notification system, camera movement controls, and warning lights.
S – Sensors	Camera, motion sensor, microphone, and infrared sensor for night vision.

Working of an AI-Based Smart Security Camera

1. **Capture:** The camera captures images and videos of the surrounding area.
2. **Detection:** AI analyzes the video to detect people, movement, or suspicious activities.
3. **Decision:** The system determines whether the activity requires an alert.
4. **Action:** It activates an alarm or sends a notification to the owner's mobile phone.
5. **Monitoring:** The camera continues monitoring the area for further activities.

Conclusion: Thus, the PEAS properties of an AI-based Smart Security Camera were studied. The system uses sensors to monitor its environment, AI to detect suspicious activities, and actuators to provide alerts and improve security.