Class and Branch: TE AI-DS A DOP: 12-07-24
Student Roll no.: A07 (A1 Batch)
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EXPERIMENT NO.: 01

AIM: Description of PEAS for various task environments.

OBJECTIVES: From this experiment, it will be able to:

- Identify PEAS description for different task environment.

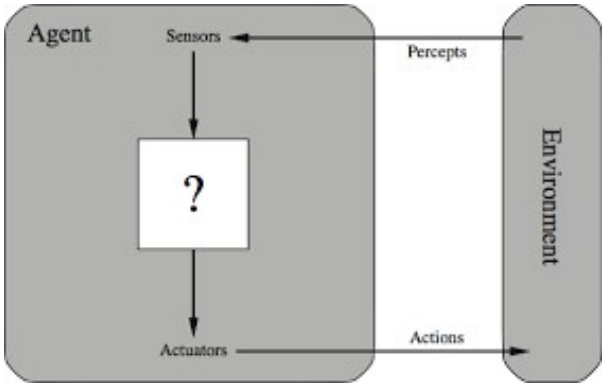
OUTCOMES: The learner will be able to:

- Ability to develop a basic understanding of AI PEAS Environment

SOFTWARE REQUIRED: Given problem definition.

THEORY:

An agent is something that perceives and acts in an environment. The agent function for an agent specifies the action taken by the agent in response to any percept sequence. An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuator.



A performance measure embodies the criterion for success of an agent's behavior. When an agent is plunked down in an environment, it generates a sequence of actions according to the percepts it receives. This sequence of actions causes the environment to go through a sequence of states. If the sequence is desirable, then the agent has performed well. A rational agent acts so as to maximize the expected value of the performance measure, given the percept sequence it has seen so far. A task environment specification includes the performance measure, the external environment, the actuators, and the sensors. In designing an agent, the first step must always be to specify the task environment as fully as possible. Task environments vary along several significant dimensions.
They can be fully or partially observable, deterministic or stochastic, episodic or sequential, static or dynamic, discrete or continuous, and single-agent or multiagent. The task environment for an agent is comprised of PEAS (Performance measure, Environment, Actuators, Sensors) PEAS specify the setting of an intelligent agent:

- P: The performance measure defines degree of success.
- E: What does the agent know about the environment?
- A: The actions that the agent can perform.
- S: Everything that an agent as perceived so far through its sensors

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PROCEDURE/PROGRAM:

Steps to follow for each task environment:

1. Define the Task: Briefly explain the task the agent is expected to perform.
2. Analyse the Performance Measure: Specify how you will determine the success of the agent's actions.
3. Characterize the Environment: Describe the properties of the environment and any constraints or special conditions.
4. List Actuators: Identify the actions available to the agent and how they can be implemented or simulated.
5. Identify Sensors: Explain the types of sensors or inputs the agent will use and how they contribute to the agent's decision-making process.

RESULTS:

EXAMPLES OF AI AGENTS

Example 1: Medical Diagnosis System
a) Performance Measure: Accuracy of diagnoses, speed of diagnosis, reduction in misdiagnoses.
b) Environment: Hospitals and clinics with patient data, medical records, lab results
c) Actuators: User interface for doctors/nurses, report generation.
d) Sensors: Electronic health records, lab test results, medical imaging data

Example 2: Autonomous Vacuum Cleaner
a) Performance Measure: Cleanliness of the floor, coverage area, battery usage efficiency, time taken to clean.
b) Environment: Home with various floor types, furniture and obstacles like toys or pets.
c) Actuators: Wheels for movement, brushes and suction for cleaning, speakers for alerts.
d) Sensors: Bump sensors, cliff sensors, dirt sensors, cameras or LIDAR for mapping.

Example 3: Smart Home Thermostat
a) Performance Measure: Energy efficiency, maintaining desired temperature, ease of use
b) Environment: Home with various rooms, different heating/cooling zones
c) Actuators: HVAC system controls, user interface.
d) Sensors: Temperature sensors, humidity sensors, occupancy sensors, weather data

CONCLUSION:

In conclusion, the PEAS proved to be an effective method for analyzing and designing intelligent agents for various task environments. By clearly defining the PEAS for each task, it was easy to systematically evaluate the suitability and efficiency of different agent designs.

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