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Subject	Artificial Intelligence (lab)

Experiment No. 1

1. Aim: Description of PEAS for various task environment

2. Objectives: From this experiment, it will be able to

- Understand different types of agent.
- Identify PEAS description for different task environment.

3. Outcomes: The learner will be able to

- Ability to develop a basic understanding of AI building blocks presented in intelligent agents.

4. Software Required: Given problem definition.

5. 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.

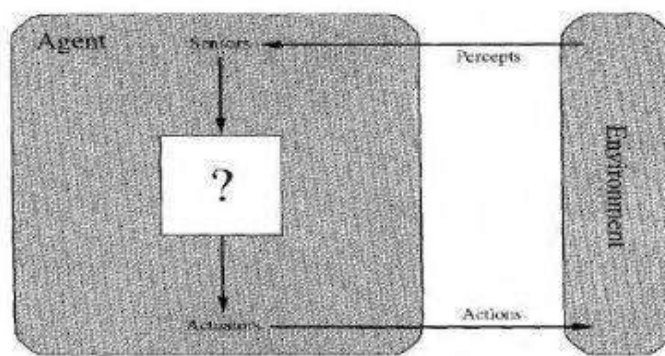


Figure: Agents interact with environments through sensors and actuators.

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 has perceived so far through its sensors.

6. Procedure/ Program:

Example of Agent types and their PEAS (performance, environment, actuators, sensor) Descriptions.

PEAS Agent: Interactive English tutor

Performance measure: Maximize student's score on test

Environment: Set of students

Actuators: Screen display (exercises, suggestions, corrections)

Sensors: Keyboard

7. Result:

Example 1:

PEAS Agent: a robot designed to perform household cleaning tasks.

Performance measure: Time efficiency, Cleaning effectiveness, Energy consumption.

Environment: interior of the house, specific rooms, furniture, obstacles.

Actuators: Wheels or legs, Brushes and suction mechanisms, Arms or extensions

Sensors: Vision sensors, Tactile sensors.

Example 2:

PEAS Agent: virtual assistant AI agent designed to provide personalized health and fitness recommendations

Performance measure: Accuracy of recommendations, User satisfaction, Responsiveness.

Environment: personal health data, fitness goals.

Actuators: Customized workout plans, Personalized diet recommendations.

Sensors: User profile data, Activity tracking data.

Example 3:

PEAS Agent: AI vacuum agent.

Performance measure: Cleaning efficiency, Navigation effectiveness, Battery life optimization.

Environment: types of flooring, furniture.

Actuators: Wheels or tracks, Brushes and rollers, Charging mechanism.

Sensors: Obstacle detection sensors, Floor type sensors

8. Conclusion: For any given problem for a particular agent the required performance measure to measure the accuracy of an agent, the environment behaviour of an agent, the sensors required to receive the input from environment and the actuators required to perform the task is carefully observed and analysed.

10. References:

1. Elaine Rich and Kevin Knight "Artificial Intelligence "Third Edition
2. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
3. Han Kamber, "Data Mining Concepts and Techniques", Morgan Kaufmann Publishers