**Experiment No : 3**

**Aim :**

**Thoery :**

* **PEAS :**

In AI, PEAS stands for Performance measure, Environment, Actuators, and Sensors. It's a framework used to describe the key components of an intelligent agent and help define how it interacts with the world.

1. **Performance Measure :**

The criteria used to evaluate the success or performance of the agent in achieving its goals.

**Example:** In the case of an autonomous car, the performance measure could be safe travel, efficiency, fuel consumption, comfort, and time to destination.

1. **Environment :**

The external context or surroundings in which the agent operates. This is the "world" the agent interacts with, and it can include physical factors, other agents, or even virtual settings depending on the system

**Example:** For an autonomous car, the environment could include roads, traffic, pedestrians, other vehicles, and weather conditions.

1. **Actuators :**

The mechanisms through which the agent acts or interacts with its environment. These are the components that carry out the agent's actions based on its decisions.

**Example:** In an autonomous car, actuators include steering wheel, brakes, gas pedal, indicators, and lights.

1. **Sensors :**

The components that allow the agent to perceive or sense the environment. Sensors gather data that the agent uses to make decisions or perform actions

**Example:** For an autonomous car, sensors could include cameras, radar, lidar, GPS, and speedometer.

* **Examples :**

1. **Autonomous Farming Tractor :**

A tractor that automatically plows, plants, and irrigates crops, optimizing field operations based on soil conditions and crop health.

* + **Performance Measure**: Crop yield, fuel efficiency, soil quality, speed of operation, precision in planting.
  + **Environment**: Farmlands, soil types, crop rows, weather conditions.
  + **Actuators**: Steering system, engine, plowing mechanism, seeding mechanism, irrigation controls.
  + **Sensors**: GPS, soil moisture sensors, infrared cameras, crop health sensors, proximity sensors.

1. **Autonomous Underwater ROV (Remotely Operated Vehicle) :**

An underwater robotic vehicle used for deep-sea exploration or maintenance, capable of navigating underwater terrain and collecting data.

* **Performance Measure**: Depth accuracy, image clarity, battery life, mission completion time.
* **Environment**: Underwater, ocean currents, submerged objects, underwater terrain.
* **Actuators**: Thrusters, manipulators, camera control, lights, ballast control.
* **Sensors**: Depth sensors, sonar, cameras, pressure sensors, temperature sensors.

1. **Autonomous Surgical Robot :**

A highly precise robotic system assisting surgeons in performing complex surgeries with minimal invasiveness, improving patient outcomes.

* + - **Performance Measure:** Surgical precision, speed of operation, patient safety, recovery time, error rate.
    - **Environment:** Operating room, patient body, surgical tools.
    - **Actuators:** Robotic arms, surgical tool manipulators, cameras, lasers.
    - **Sensors:** Pressure sensors, cameras, force sensors, position sensors, infrared sensors.

1. **Autonomous Train System :**

A fully automated train system that controls speed, braking, and stops, ensuring efficient and safe travel along designated rail lines.

* **Performance Measure:** On-time performance, speed control, energy efficiency, safety, comfort.
* **Environment:** Rail tracks, stations, weather conditions, signals.
* **Actuators:** Brakes, throttle, train doors, couplers.
* **Sensors:** GPS, track sensors, cameras, speed sensors, temperature sensors

1. **Autonomous Garbage Collection Truck:**

An Autonomous Garbage Collection Truck is a self-driving vehicle that automatically collects and transports waste. It uses sensors and AI to navigate and perform garbage collection without human input.

* **Performance Measure**: Collection speed, waste sorting accuracy, fuel efficiency, route optimization, safety.
* **Environment:** Urban streets, residential areas, commercial zones, waste bins.
* **Actuators:** Hydraulic lifting system for bins, wheels, compaction mechanism, Vehicle controls.
* **Sensors:** Cameras, ultrasonic sensors, weight sensors, GPS, proximity sensors.