Experiment - 02

Aim :

Select a problem statement relevant to AI. Recognize the PEAS descriptor, identify properties of task environment and type of agent for the selected problem.

Theory :

* Intelligent system and its characteristics.

An Intelligent agent is an entity that perceives and acts or one that can be viewed as perceiving and acting. Especially any object qualifies, the key point is the way the object implements an agent function.

characteristics of Intelligent System are :
* Ability to simulate and emulate in near real time.
* Automated learning and machine learning functionality.
* Digital feedback loops that influence product development.
* Action based on sensory data & algorithms.
* customised to detect and resolution of events.
* Experimenting as a learning system.
* Ability to predict stresses & failures.

* Significance of PEAS descriptor:

We know that there are different types of agents in AI. PEAS system is used to categorize similar agents together. The PEAS system delivers the performance measure with respect to the environment, actuators and sensors of the respective agent. Most of the highest performing agents are Rational agents.

PEAS stands Performance measure, Environment, Actuator, Sensor.

1) Performance Measure : It is the unit to define the success of an agent. Performance varies with agents based on their different precept.

2) Environment : Environment is the surrounding of an agent at every instant. It keeps changing with time if the agent is set in motion.

3) Actuator : Actuator is a part of the agent that delivers the output of an action to the environment.

4) Sensor : Sensors are the receptive parts of an agent which takes in the input for the agent.

* The Generic properties of task environment:

There are 5 major types of environments:

- Fully observable & partially observable
- Episodic & Sequential.
- Static & Dynamic
- Discrete & continuous.
- Deterministic & Statistic.

* Types of agents:

1] Simple Reflex Agent:

Agent		ENVIRONMENT
	Sensors ←	
	what the world is like now.	
Action rules →	what Action?	
	Actuators →	

2] Model based Reflex Agent:

Agent			ENVIRONMENT
State	Sensors ↓		
How world evolves. →	what world is like.		
what my actions do. →	what action?		
Action rules →	Actuators ↓ →		
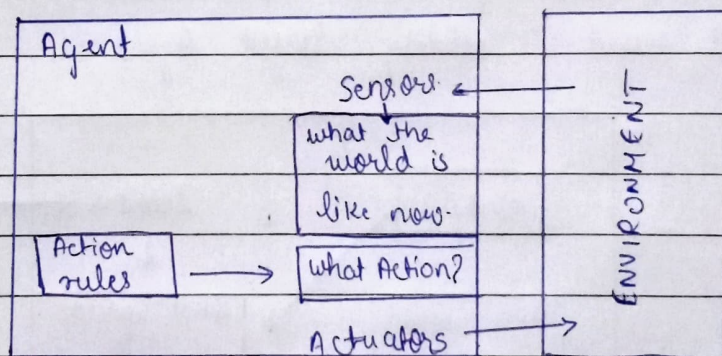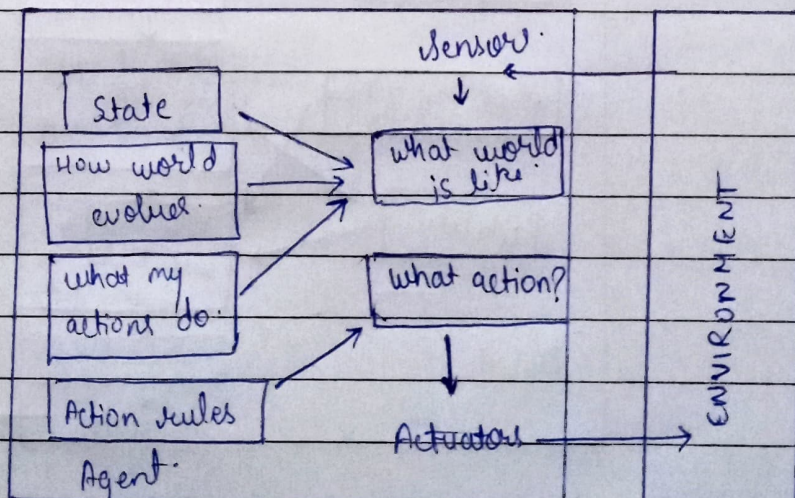
3) Model based, goal based agent:

```
+-----------------------------------------------+  +---------+
|                                               |  |         |
|   +--------+              Sensors <----------------|---------|<--
|   | State  |<--                               |  |    E    |  |
|   +--------+   \             |                |  |    N    |  |
|                 \            v                |  |    V    |  |
|   +----------+    \    +-----------+          |  |    I    |  |
|   | How world |    \-->| what world|          |  |    R    |  |
|   | evolves   |------->| is like   |          |  |    O    |  |
|   +----------+         |   now     |          |  |    N    |  |
|                        +-----------+          |  |    M    |  |
|                             |                 |  |    E    |  |
|                             v                 |  |    N    |  |
|   +-------------+     +-----------+            |  |    T    |  |
|   | what my     |---->| what will |           |  |         |  |
|   | actions do  |     | be like if|           |  |         |  |
|   +-------------+     | I do action|          |  |         |  |
|                        +-----------+          |  |         |  |
|                             |                 |  |         |  |
|                             v                 |  |         |  |
|   +--------+          +------------+          |  |         |  |
|   | Goals- |--------->|Action should|         |  |         |  |
|   +--------+          | I do?      |          |  |         |  |
|                        +------------+         |  |         |  |
|   Agent.              Actuators ------------------|---------|-->
+-----------------------------------------------+  +---------+
```
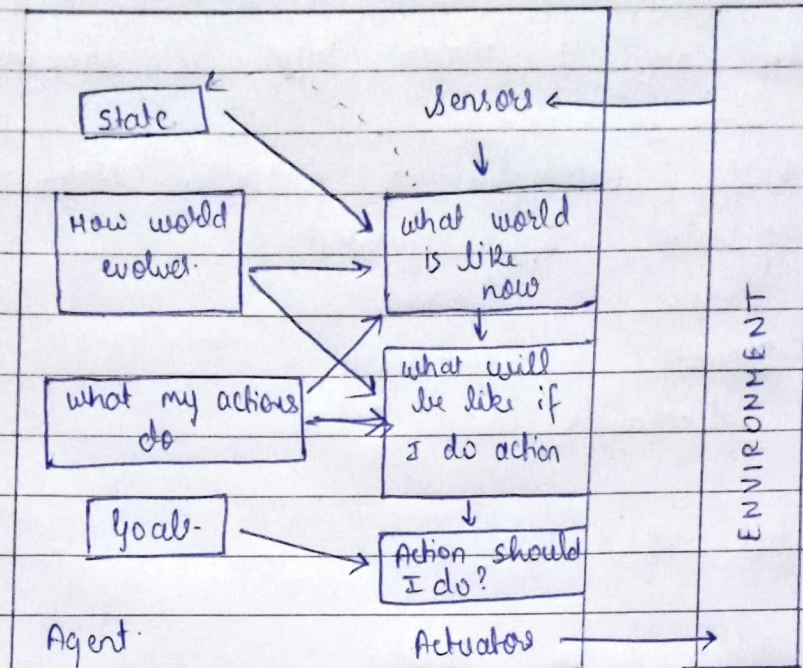
4) Model based, utility based Agent:

```
+-----------------------------------------------+  +---------+
|                                               |  |         |
|   +--------+              Sensors <----------------|---------|<--
|   | State. |<--                               |  |    E    |  |
|   +--------+   \             |                |  |    N    |  |
|                 \            v                |  |    V    |  |
|   +----------+    \    +-----------+          |  |    I    |  |
|   | How world |    -->| what world|          |  |    R    |  |
|   | evolves   |------>| is like   |          |  |    O    |  |
|   +----------+        |   now     |          |  |    N    |  |
|                        +-----------+          |  |    M    |  |
|                             |                 |  |    E    |  |
|                             v                 |  |    N    |  |
|   +-------------+     +-----------+            |  |    T    |  |
|   | what my     |---->| what il will|         |  |         |  |
|   | action do   |  X  | be like if|           |  |         |  |
|   +-------------+  X  | I do action A|        |  |         |  |
|                        +-----------+          |  |         |  |
|                             |                 |  |         |  |
|                             v                 |  |         |  |
|   +--------+          +------------+          |  |         |  |
|   | utility|--------->| How Happy  |          |  |         |  |
|   +--------+          | will I be in|         |  |         |  |
|                        | such state.|         |  |         |  |
|                        +------------+          |  |         |  |
|                             |                 |  |         |  |
|                        +------------+          |  |         |  |
|   Agent.              |Action to do?|         |  |         |  |
|                        +------------+          |  |         |  |
|                       Actuator ------------------|---------|-->
+-----------------------------------------------+  +---------+
```
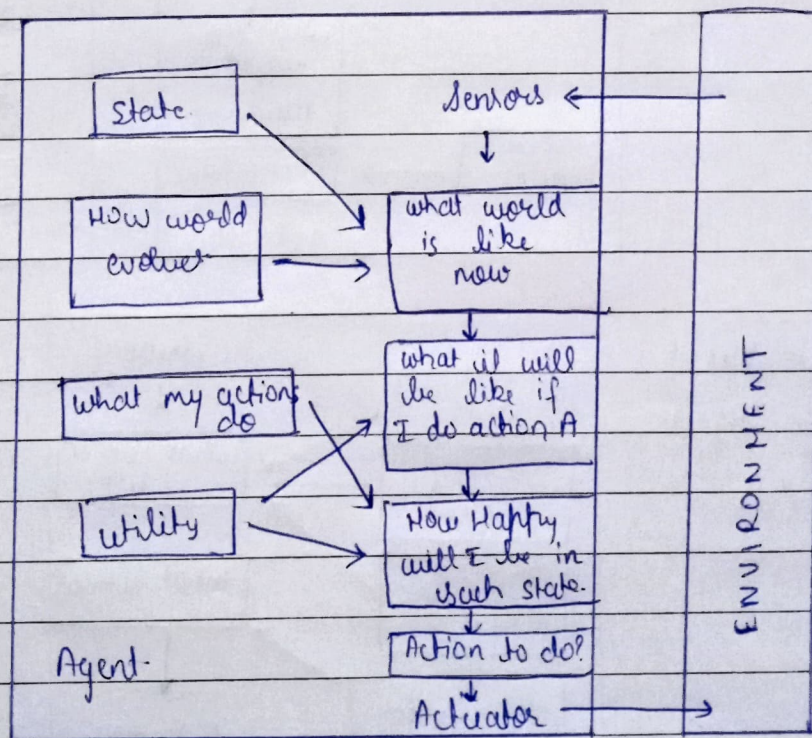
5] General learning Agent :

Performance Model.

Critic

feedback

Learning element

changer

Performance element

learning goals

Knowledge

Sensors

Problem Generator

Actuators

Agent.

ENVIRONMENT
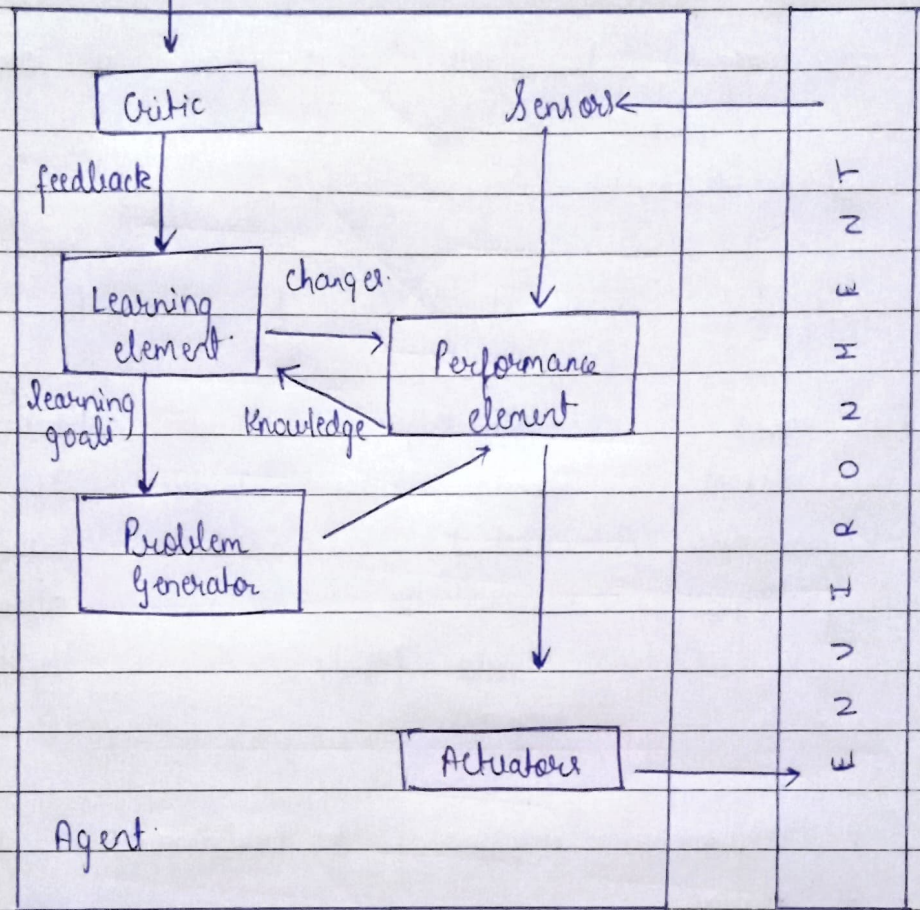
* Outcome :

- Selected problem statement :

AI agent to detect drowsiness of driver.

PEAS descriptor :

Agent	P	E	A	S
AI agent to detect drowsiness of driver	- Safe trips - Drivers attention - Instant reaction to drivers facial response.	- Roads - Traffic - Vehicles	• Brake - IOT based alarm System	- Front camera - Iot • alarm.

P - Performance measure , E - Environment , A - Actuators
S - Sensors.

* Properties of Agent : - Partially Observable
- Single agent
- Stochastic

* Type of agent : Model based Reflex Agent.

* Conclusion :
We have understood PEAS descriptor, types of agents &
different properties of environment & applied to our problem