Topic : Tutorial No. 1

Page No. :
Date. : / /

Name :- Pranay Arvind Mate

Roll No :- 36

Subject :- AI / IS Lab

Std / Branch :- B.E / I.T

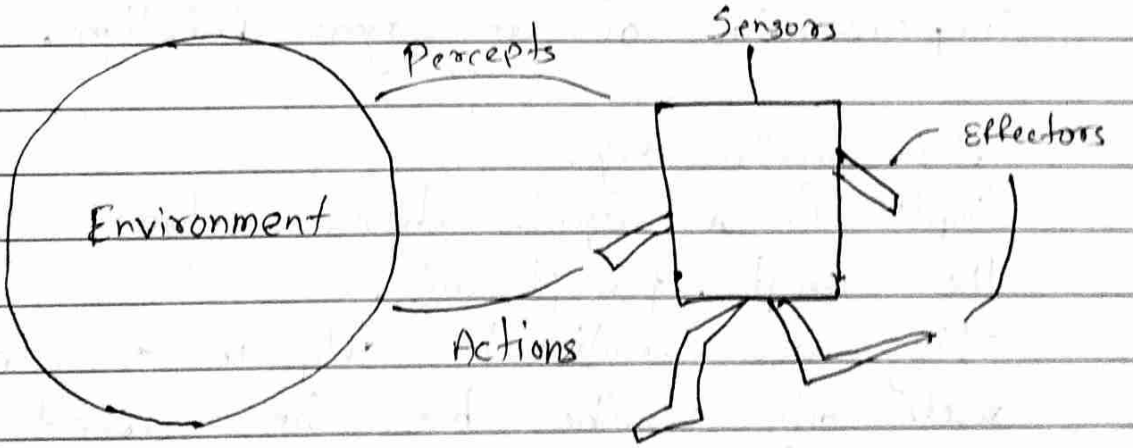
Topic : Tutorial 1. Page No. : Date. : / /

Tutorial 1 : Design of Intelligent Agent

Aim :- To understand the concept of Agent Abstraction by studying definition of Rational Agent, Agent environment, Task Environment Descriptors, environment types.

Theory :- An Artificial Intelligent (AI) system is composed of an agent and its environment.

An agent is anything that can perceive its environment through sensors & acts upon that environment through effectors.
This can be clearly seen in fig 1. An agent in particular can be :



AI Agent with Environment

Page No. :
Date. : / /

Topic :

Human agent has sensory organs such as eyes, ears, nose, tongue and skin parallel to the sensors, and other organs such as hands, legs, mouth, for effectors.

Robotic agent replaces cameras and infrared range finders for the sensors, and various motors & actuators for effectors.

Software agent has encoded bit strings as its programs and actions.

Agent structure can be viewed as a combination of Agent architecture and Agent Program.
Agent Architecture refers to the machinery that an agent executes on whereas Agent Program is an implementation of an agent function.

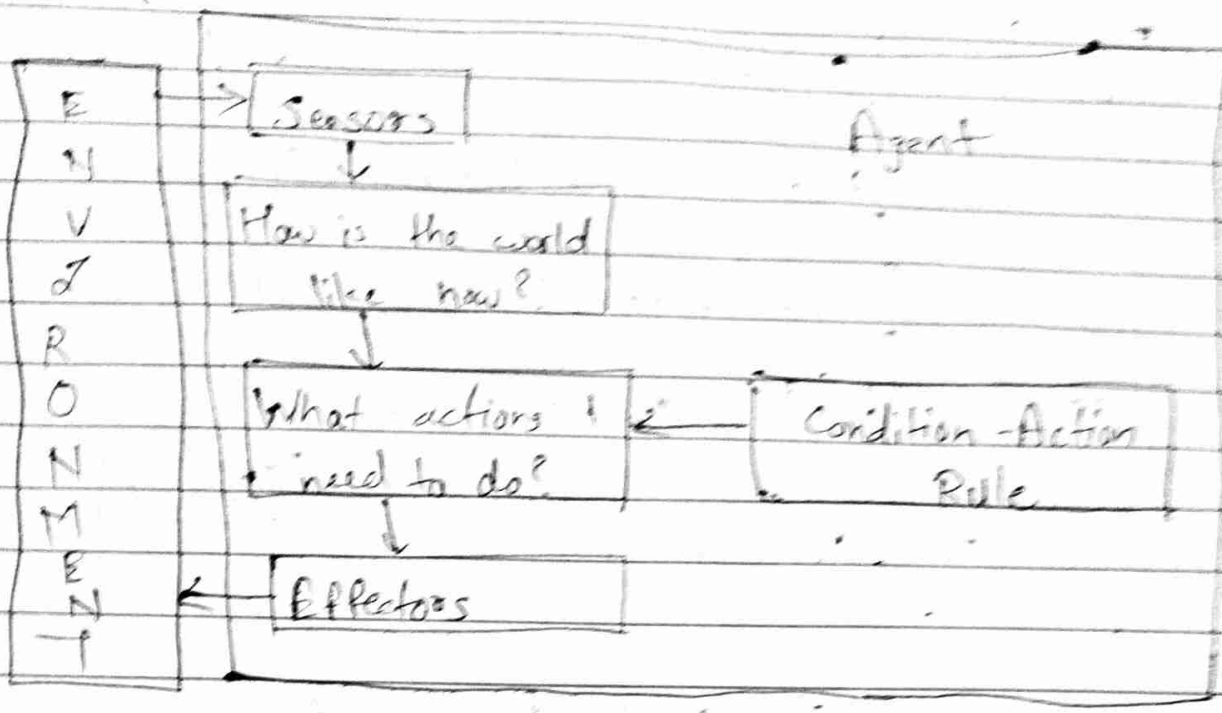
As Seen in fig.
Simple Reflex agents choose actions only based on the current percept only.
They are rational only if a correct decision is made only on the basis of current percept.

Agent environment for such agents is fully observable.

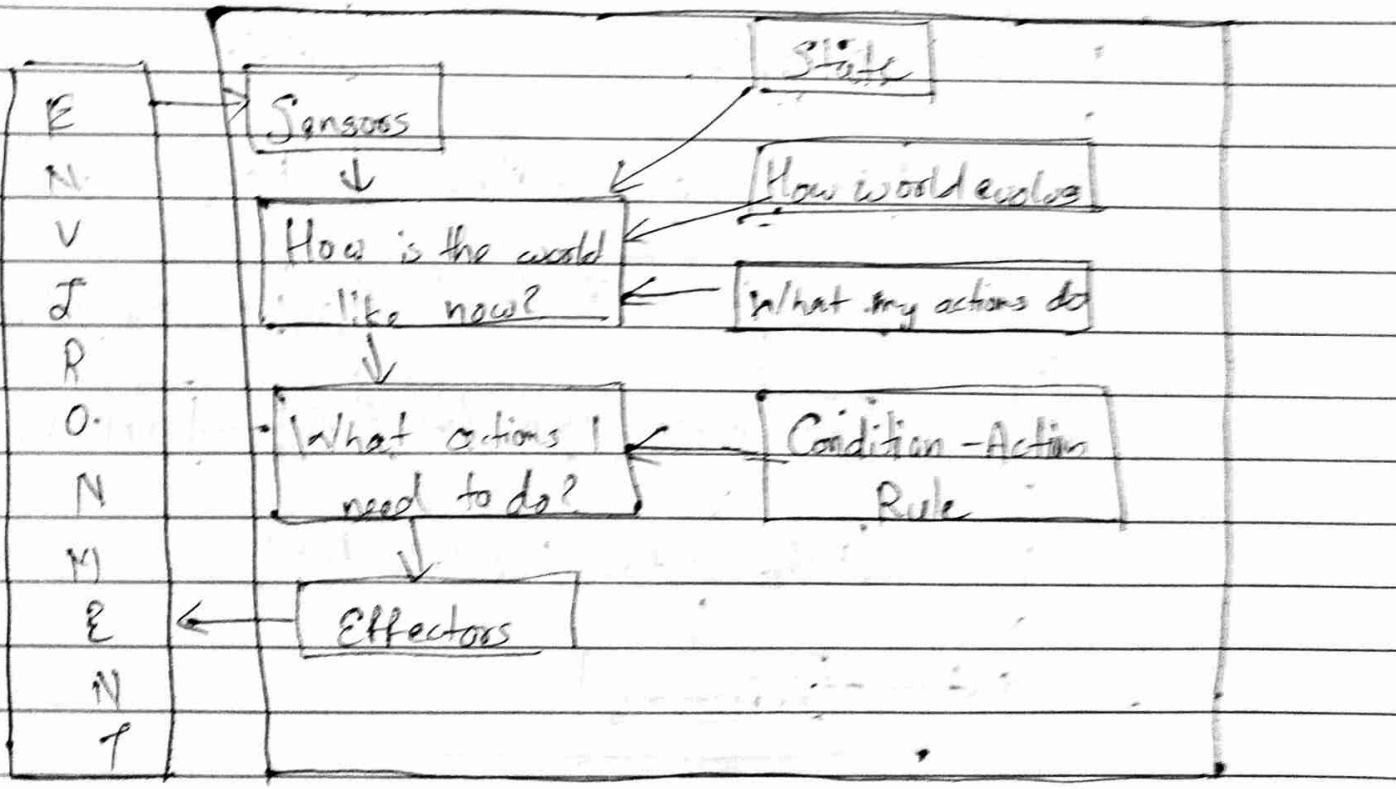
They maintain an internal state as a persistent information.

Topic :

Page No.
Date :

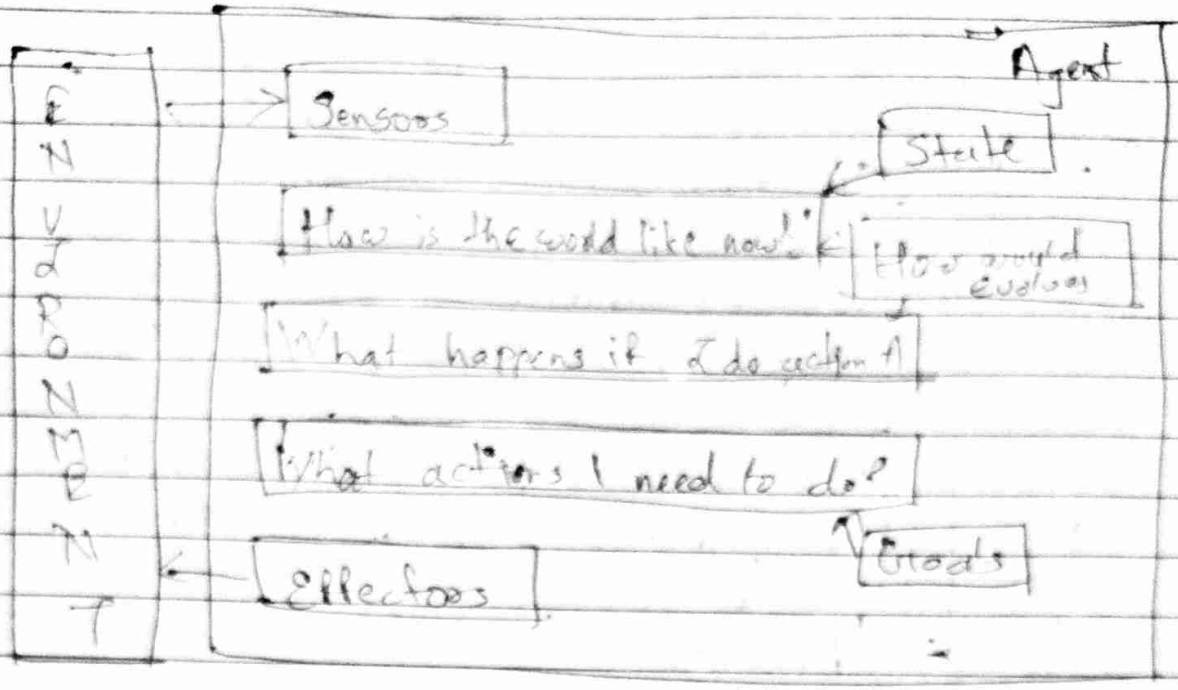


(A) Simple Reflex Agent

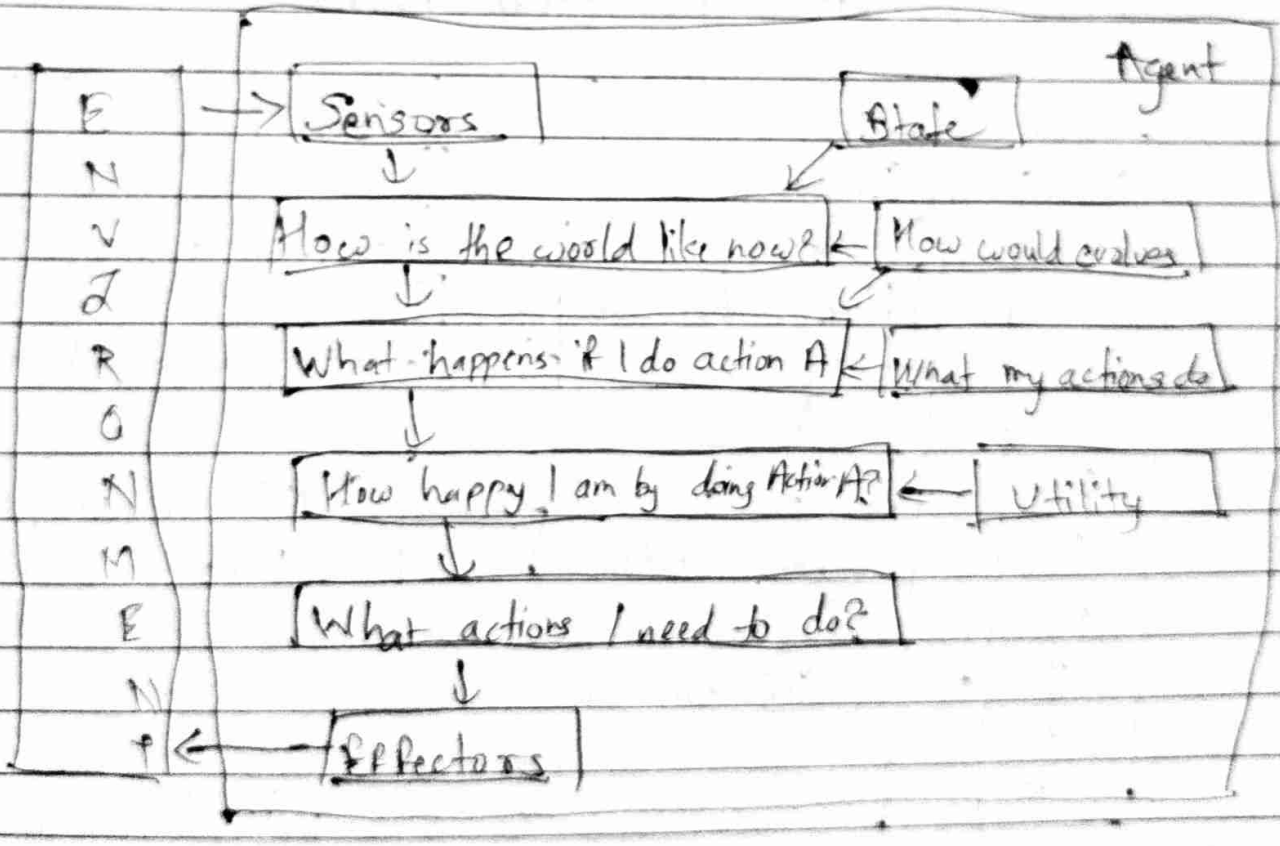


(B) Model Based Reflex Agent

Topic : Date. :



(C) Goal Based Agent



(D) Utility Based Agent

Topic :

Page No. :
Date. :

An AI agent is referred to as Rational Agent. A rational agent always performs right action, where the right action means the action that causes the agent to be most successful in the given percept sequence.

PEAS descriptors for the agent task environment it operators in.

Another important piece of information is task environment properties.
While analyzing task environment the agent archite needs to consider following properties

1. Discrete or Continuous:
If there are a limited number of distinct, clearly defined, states of the environment, the environment is discrete, otherwise it is continuous.

2. Observable or Partially Observable:
If it is possible to determine the complete state of the environment at each time point from the precepts it is observable; otherwise it is only partially observable.

3. Static or Dynamic:
If th environment does not change while an agent is acting, then it is static, otherwise it is dynamic.

Topic : Page No. : Date. : / /

4. Deterministic or Non-deterministic If the next state of the environment is completely determined by the current state and the actions of the agent, the the environment is deterministic; otherwise it is non-deterministic.

5. Episodic or Sequential In an episodic environment, each episode of events consists of the agent perceiving and then acting.

The quality of its action depends on the actions in the previous episodes.

~~7. Accessible Is~~

6. Single agent or Multiple agents:-
The environment may contain single agent or other agents which may be of the same or different kinds as that of the agent.
These agents may be co-operating or competing with each other.

7. Accessible or Inaccessible:-
If the agent's sensory apparatus can have access to the complete state of the environment, then the environment is accessible to that agent.

Topic :

Page No. :
Date. : / /

Working :-

Search internet for AI based applications in following scenarios and identify who is agent for that application.

further list out PEAS descriptors for agent environment in each of the cases.

finally try to classify task environment properties like a list of attributes from above list of task environment properties.

1. Autonomous Lunar Rover
2. Deep Blue Chess playing computer program.
3. Eliza the natural language processing computer program created from 1964 to 1966 at the MIT AI Laboratory by Joseph Weizenbaum.
4. Automatic Portfolio management.
5. Sophia is a social humanoid robot developed by Hong Kong based company Hanson Robotics.
6. AlphaGo is a computer program that plays the board game Go

7. Apples virtual assistance Siri
8. Endurance : A compony for Dementia Patients.
9. Casper: Helping Insomniacs Get Through the Night.
10. Marvel : Guarding the Galaxy with comic-book crossover
11. Automated Cross word solver.