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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. The Agents act in their environment. An agent is anything that can perceive its environment through sensor & acts upon that environment through effectors.

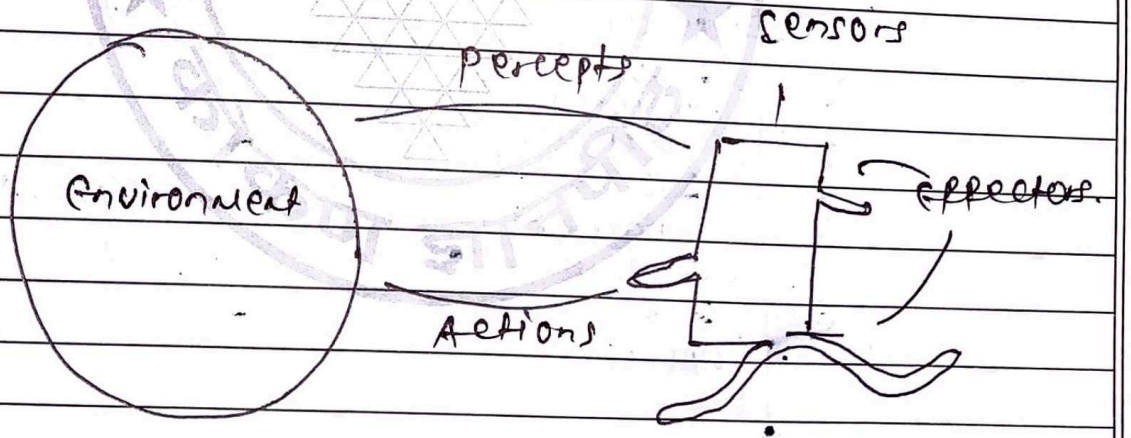


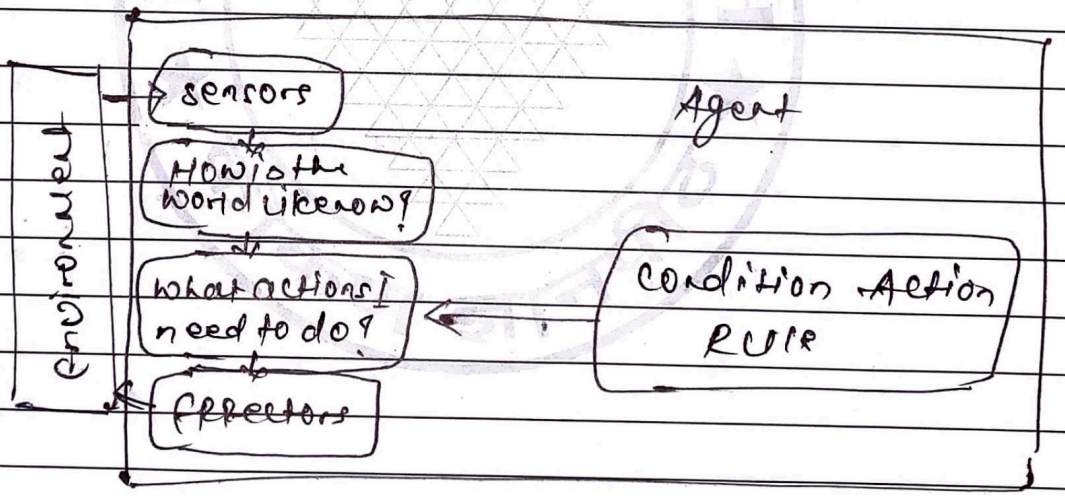
Fig 1 :- AI agent with environment

Agent in particular can be :-
Human agent has sensory organs such as eyes, ears, nose, tongue and skin parallel to the sensors, & other organs such as hands, legs, Mouth for effectors.

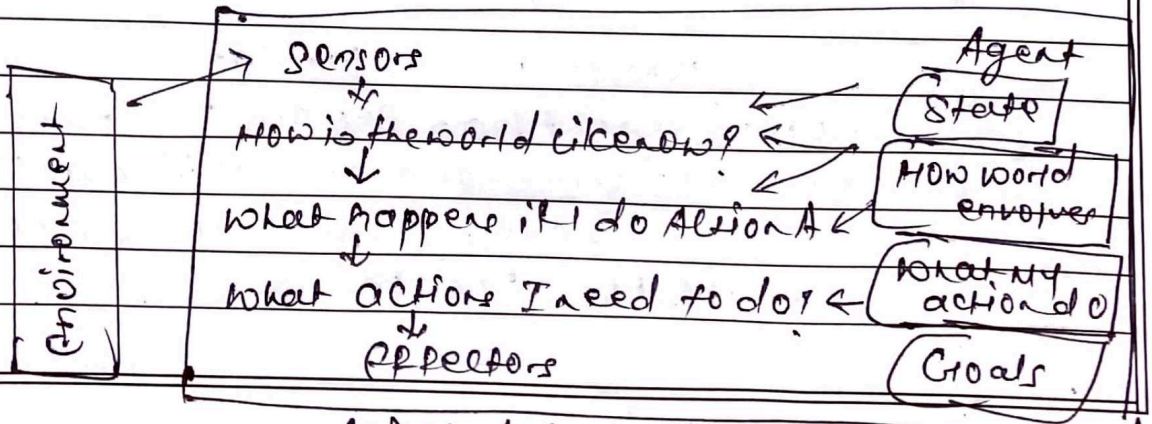
Robotic agent replaces cameras & infrared range finders for the sensors and various motors and actuators for effectors.

Software agent has encoded bit strings as its programs and actions

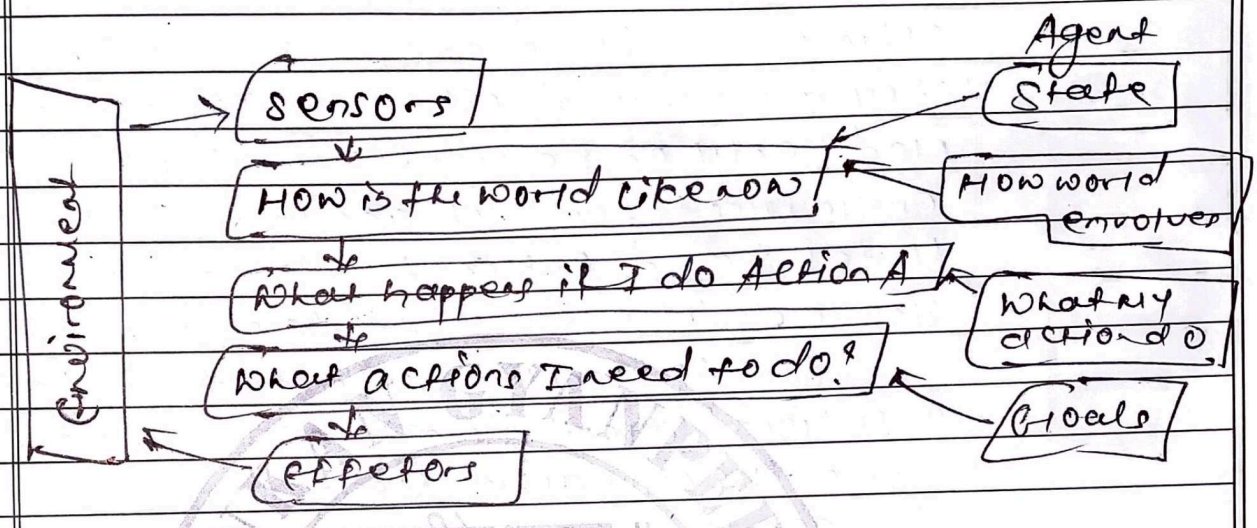
Agent structure can be viewed as a combination of Agent architecture & Agent program.
Fig 2 shows the important types of agent architecture



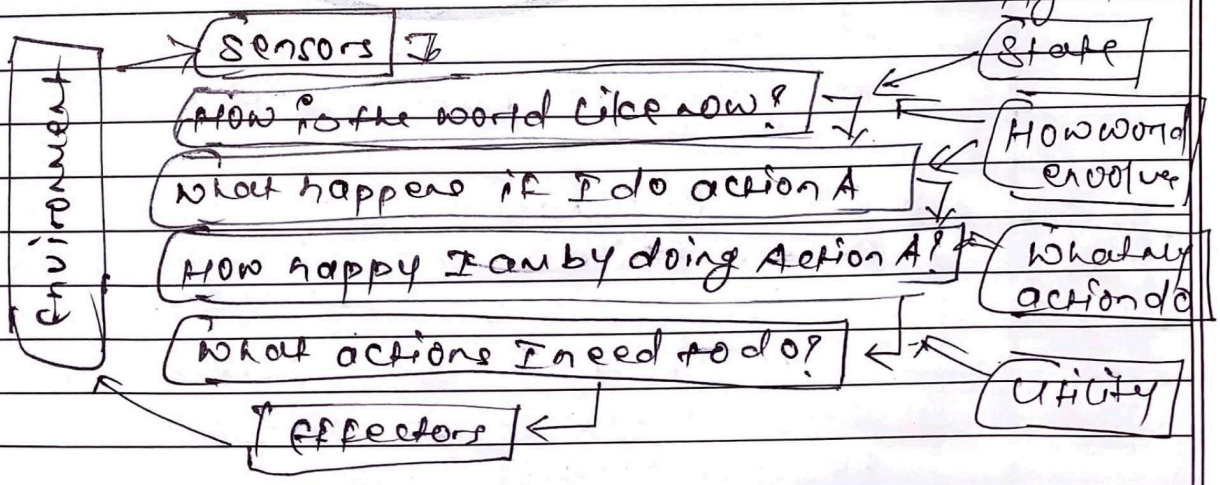
(a) Simple Reflex Agent



(b) Model Based Reflex Agent



(c) Goal Based Agent



(d) Utility Based Agent.

Fig 2:- Agent Architecture Types

As seen in Fig 2a, Simple Reflex agents choose actions only based on the current percept only. They are rational only if a correct decision is made only on basis of current percept. Agent environment for such agents is fully observable Model Based Reflex Agents as shown in Fig 2b use a model of the world to choose their actions

An AI agent is refered 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 given percept sequence

Another important piece of information is task environment properties

1) Discrete or continuous: If there are limited number of distinct clearly defined, states of environment, the environment is discrete

2) Observable or particially observable: If it is possible to determine the complete state of environment at each time point from the precepts is observable

3) Static or Dynamic: If the environment does not change while an agent is acting, then it is static

4) Deterministic or Non-deterministic: If the next state of the environment is completely determined by current state

6) Single agent or Multiple agents The environment May contain Single agent or other agents which may be of the Same or different kind as that of the agent

7) Accessible or Inaccessible If the agent's sensory appartus can have acess to the complete State of may be same.

Working search internet for AI based application in following scenarios & identify who is agent for that application. Finally try to classify 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 MIT
4) Automatic Portofollio Management
5) Sophia is a social humanoid robot developed by Hong kong based company Hanson Robotics
6) AlphoGo is a social humonoid robot developed by Hongkong based company Hanson Robotics
7) Apples virtual assistance Siri
8) Endurance : A companion for Dementia patients
9) Casper : Helping Insomanics Get through the night
10) Marvel : Guarding the Galaxy with comic-Book Crossovers
11) Automated Cross word solver.