K.G.C.E.
Karjat - Raigad

AI Tutorial 1)

Page No. :
Date :

KGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCEKGCE

Name – Rohan . K . Mudaliyar .

Roll no – 38

Class – B . E . / I . T .

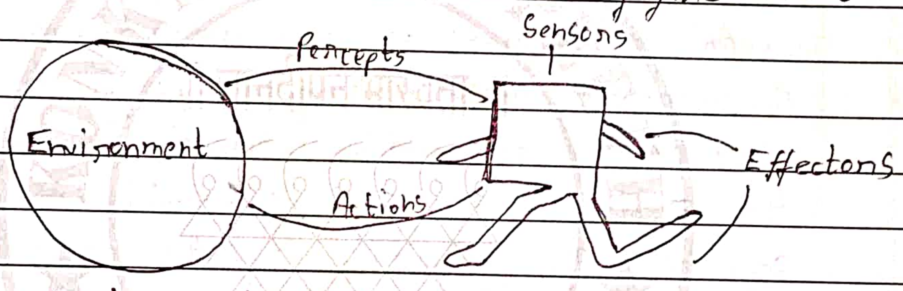
Batch – I - 2 .

D . O . P .	D . O . A .	Sign	Remark .

AI Tutorial 1)

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

Theory – An 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 sensors and acts upon that environment through effectors. This can be seen in figure below.



An agent in particular can be :
Human agent : has sensor organs such as eyes, nose, ears tongue and skin parallel to the sensors, and 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 and Agent Program. Agent architecture refers to the machinery that an agent executes on whearas Agent Program is an implementation of an agent function. Simplex Reflex agents choose actions only based on the current percept only. They maintain an internal

State as a persistent information. Agent take into account how its actions in order to achieve goals. Goal based agents shown the things happen in the world. Goal based agent approach is more flexible than reflex agent since the Knowledge supporting a decesion is explicitly modeled, thereby allowing for modifications. The Utility Agent choose actions based on a preference for each state. Utility function objectively map how much being in a particular state is desirable.

An AI agent is referred to as Rotai Rotional Agent. A rotational agent always performs right action, where the right action means the action that causes the agent to be most surcessful in the given percept seqvence. The problem is the agent solves is chat characterized by Performance Measure, Environment, Actvators, & Sengors (PEAS).

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

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

b) Observable or Partially observed: If it is possible to determine the complete state of the environment at each time point from the precepts it is observable else its only partially observable.

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

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

e) 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.

f) 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.

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

Working - Search internet for AI based applications in following scenarios & identify who is agent for that application. Further list out PEAS descriptors for agent environment in each of the case. Finally try to classify task environment properties like a list of attributes from above list of 7 task environment properties.

a) Deep Blue Chess playing computer program.

→ Performance measure: Win / Lose / draw, Safety of chess pieces, Safety of King, no. of moves, time each move.

Environment : Chess board, Chess pieces

Actuators : Desktop Screen, CPU.

Sensors : Chess board.

Task environment properties : Discrete, fully observable, static, Deterministic, Sequential, single agent, Accessible

b) Eliza the natural language Processing Computer Program.

→ Performance measure : Understanding user, maintaining conversation.
Environment : User, Program, Keyboard, user text inputs, Eliza texts, output window.
Actuators : Texts.
Sensors : User texts inputs.
Task environment : Continuous, fully observable, static, Deterministic, Sequential, Single agent, Accessible.

~~c) Sophia is a So~~

c) Sophia is a Social humanoid Robot.

→ Performance measure : Understanding User, Maintaining conversation, facial expression, response time.
Environment : Human objects.
Actuators : Arms, mouth, legs, speaker.
Sensors : Eyes (cameras) ears, mic, audio sensors.
Task environment : Continuous, fully observable, Dynamic, Deterministic, Sequential, Single agent, Accessible.

d) Apples virtual assistance Siri.

→ Performance measure : Understanding user text & speech, producing best results, summoning, response speed.
Environment : User, speech, text.
Actuators : Mobile screen, speaker.
Sensors : Mobile screen, mic, button.
Task Environment properties : Continuous, fully observable, static, Deterministic, Episodic, Single agent, Accessible.