

Tutorial-3.

1. What do you mean by task environment? For following given problems/situation, identify each task environment characteristics along with justification.

a) Auto-crane Driving-

Consider a self driving crane: the crane is supposed to drive in campus of MNC. The car is used to purpose of transferring raw materials from warehouse to Shop Floor

b) Animal detection in Image-

Consider a traffic signal having camera, Camera takes pictures of Road in specified time intervals. The objective is to detect frequent animals arrival on road.

→ ~~a) Auto-crane Driving:~~

A task environment specification defines the environment in which tasks are done. Task environment specification consists of PEAS values.

a) Auto crane driving:

(i) Partially observable as the crane ~~operator~~ ^{sensors} or cameras can perceive only area surrounding it, not the entire campus.

(ii) Agent: ~~Single~~ ^{Multi} agent as the crane is ^{not} operating on its own without any input from other agent.

(iii) Deterministic: Stochastic as ~~the crane is constantly moving~~ the next state of environment is not completely determined by the current state and action as several other ~~var~~ variables such as whether dynamic objects, etc affect its condition or future state of action

(iv) Dynamic as the current state of environment changes over time as crane is moving constantly and interacts with environment.

v) Sequential as the current action might affect the future state of action and crane follows a sequence of actions in order to achieve goals.

vi) Continuous as the crane is moving continuously & changing positions & this task requires continuous monitoring & control.

b) Animal detection in image:

i) Partially observable as the image may not contain whole animal or may contain other objects that could affect the detection process.

ii) Multiagent as the image may contain multiple animals, requiring the detection process to identify multiple objects.

iii) Deterministic: Stochastic as the detection process may not always result in same outcome even with same input due to variations in the animal's appearance, background, etc.

iv) Static as camera takes images at fixed time intervals and doesn't actively change its environment ~~as~~ but it may be dynamic if we are working with live images.

v) Episodic as the ~~result~~ from current image cannot affect the ~~result~~ of future image. But in case of live image it ~~is~~ is ~~ep~~ stochastic sequential.

v) Sequential as detection process is performed step by step in order to identify animals in image and result from current step might affect result of next step.

vi) Discrete as camera takes images at specific time interval, not continuously but in case of live image detection it is continuous.

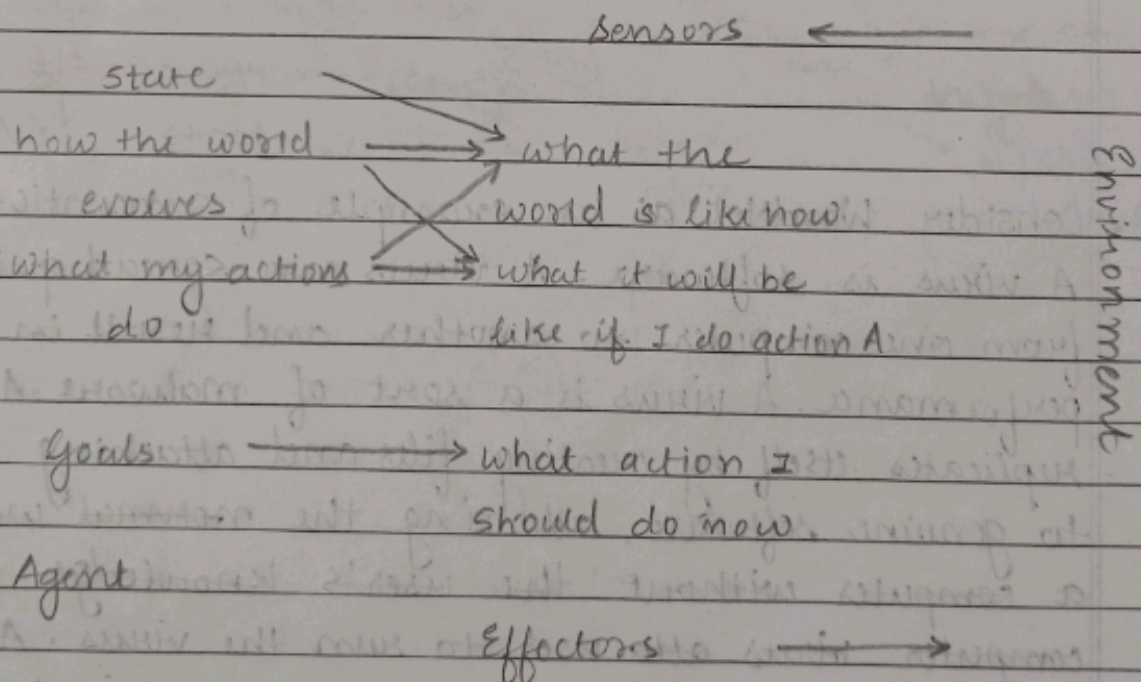
2. Compare goal based and model-based reflex agent.

→ Goal based-agent:

The goal based agents has some goal which forms a basis of its action. Such agents works as follows:

- information comes from sensors
- changes the agent's current state of the world
- based on state of the world, knowledge and goal, it chooses actions and does them through the effectors.

Goal-based agents act by ~~which~~ reasoning about which actions achieve the goal. The sequence of steps required to solve a problem is not known to agent, the agent must determine ^{steps} by a systematic exploration of alternatives.

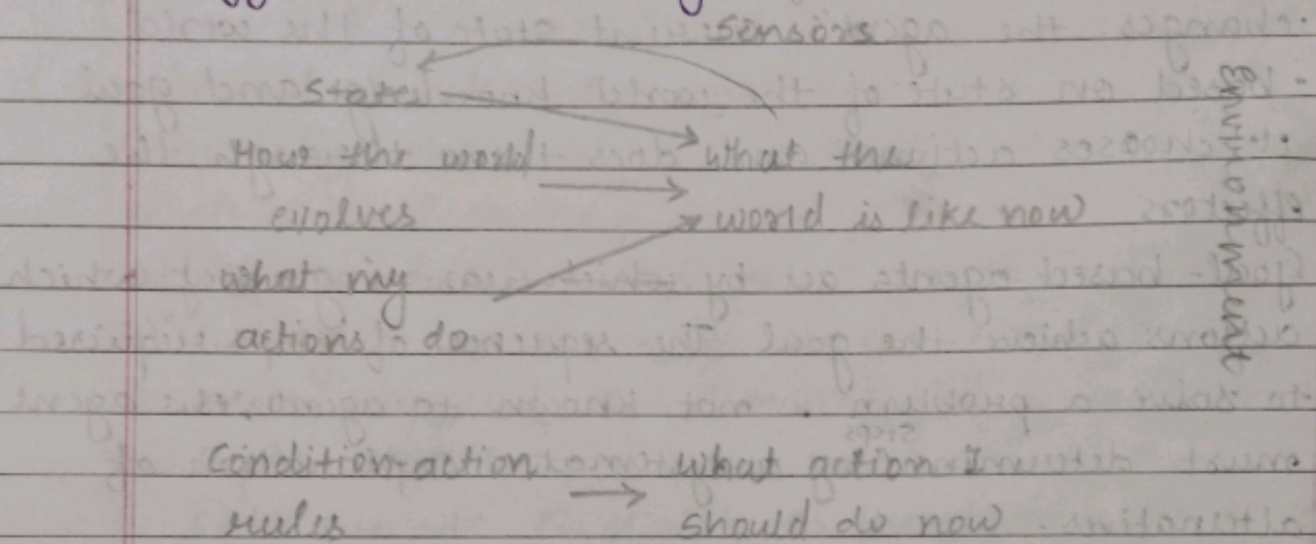


→ Model based reflex agent or state based agent:

The state based agents maintain some sort of state based on the percept sequence received. The state is updated regularly based on what the agent senses, and the agent's action.

Thus a state based agent work as follows:

- information comes from sensors
- based on this, the agent changes current state of world.
- based on state of world and knowledge, it triggers actions through the effectors.



Agent

Effectors

3. Consider WordNet as an example of semantic-nets.

A virus is software. A virus can spread quickly from one computer to another and result in abnormal performance. A virus is a sort of malware. A virus replicates itself by creating files and attaching itself to genuine software, allowing the normal working of a computer without the user's knowledge. A computer virus asks user to run the virus. A virus can only spread with human interaction. A computer virus is a program that disrupts the normal working of a computer without the user's knowledge. A computer virus attaches itself to the files stored on the computer and damages them. When the replication succeeds, the affected areas are said to be

→ A problem can be formulated using the following steps:

