1/9/21 Lecture : 02 (Onsite)

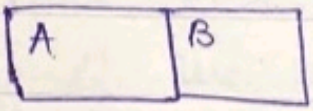
AGENTS

→ Agent can be anything (human, process, machine ....) which perceives (takes input) and acts accordingly.
input is always taken from environment (action) to perform given task.

* For eg if we are designing a chess game then the environment will be the chess itself.
* For eg if we are crossing the road our (eyes, ears) senses are the inputs we act accordingly.
* For eg if we are driving a car the road sense, driving rules, sight all are input and driver accelerating the car decelerating it, reversing it and all are actions.

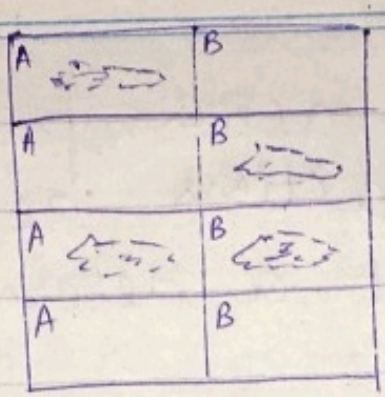
* Whenever we design an agent we discuss percepts (inputs) and actuators. Percepts are recieved from sensors.
* For eg if we have to move some bricks from one place to another our hands are actuators.
* An agent requires domain information.
* For eg If we are creating an agent as traffic man
* numbers of cars in any direction is input and it uses it's hand to tell them where they should move this is action
* In traffic lights there is no input and actuators are lights
* Environment is anything in which an agent has to act.
* We have to describe the environment and list down all its parameters before designing the agent.

* Another important thing while designing an agent is performance measures to assess it.
* For eg assessing students on the basis of performance in exams.
* An agent may have more than one performance measure and then the agent will be ~~accessed~~ assessed on the basis of all the measures.
* For example designing a Vaccum Cleaner agent :-



There are 2 adjacent rooms There are 2 possibilities whether there will be dirt in rooms or not. Since there are 2 rooms so 4 possibilities.

$2^2 = 4.$



Another possibility that in which room is VC present.

[4 possibilities in room A
4 " " room B

[4 x 8 = 32 possibilities.

For eg the input is VC is in room B with no dirt.

= (B, 7 dirt)

In room B with dirt.

= (B, dirt)

Action = clean the room

There are 3 actions basically clean, don't, clean, don't do anything.

* It is a deterministic problem where states or conditions are known. where

we can determine actions prior and we can take actions accordingly.

* Driving is not a deterministic problem.
* Problems are not always deterministic. They are uncertain.
* Possible no of states in chess = 10^{60}, but it is not practically possible our system will crash. Possibilities is also called possible words.
* Possibilities in a Tic Tac Toe Game. The eq will be parametric and we have to sum all the result through Big O notation.
* Environment can also be stochastic. For eq when we flip a coin in the morning, day or night the possibilities are only two head or tail. Possibilites

is not changing ever so it is stochastic.

* Environment can be fully observable
For eg: a chess board is fully observable but a football player can not see the back view.

* Driving a car is a partially observable environment.

* Environment can be single or multi agent.

* A VC example was a single agent example however driving a car, there are multiple agents on the road so it is a multi-agent problem.

* There are 5 types of agents.

1)
2)
3)
4)
5) Learning agent