What is AI?

Artificial Intelligence is an area of computer science where we design an intelligent machine which work, act, and react like as human. Some area are

- → Speech Recognition
- → Learning
- → Planning
- → Problem Solving

• Machine learning & Robotics are core part of AI.

Birthof AI 1956

Thought Process

Thinking Humanly	Thinking Rationally
Activities related to human thinking → decision-making Problem Solving Learning	Study of mental faculties through the use of computational model.

Human Like Performance

Ideal Performance

Acting Humanly	Acting Rationally.
The study of how to make computers do things at the moment. People are better.	AI is concerned with Intelligent behaviour in artifacts.

Acting Behaviour

Some Defination of AI which catagrized in four part

"A System is Rational if it does the 'right thing' given what it knows"

CAPTCHA→

Completly Automated Public Turing Test to tell Computer and Human Apart.

• Highest award in Computer Science → Turing Award. (IBM)

2-School of Thoughts-

→ Behave as Intelligent as human.
→ Behave in the best possible manner.

- Natural Language Processing → To communicate in English succ
- Knowledge Representation → to stor what it knows & hear.
- automated Reasoning → used stored info to answer question & dra new conclusion
- machine learning → adapt new circumstance and to detect and extrapolate patterns.

- Computer vision → to preceive objects
- Robotics to manipulate object & move about.

Cognative Science → It is a study of mind and what it does, its structure.

- Acting humanly → Turing-Test Approach.
- Thinking humanly → The cognative modeling Approach.
- Thinking rationally → The "laws of thought" approach } based on Inference
- ~~Thinking~~ Acting rationally → The "rational Agent" approach.

- Intelligence → the ability to acquire and apply knowledge.
  or
  the ability to imagine new idea's.

- what do you mean by Rational? → being Reasonable & sensible.

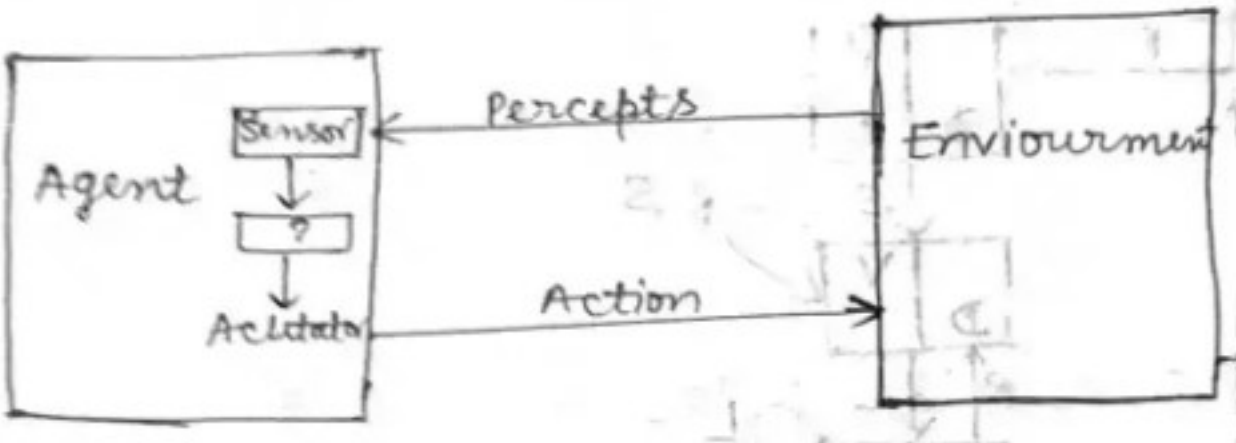
Intelligent Agent

An AI system is composed by agent & It's enviourment. Agent act in their enviourment. Enviourment may contain Other Agent.

- what are Agent & Enviourment?
  Agent is anything that can perceive its enviourment through sensors and act upon that enviourment through effectors.
  Example
  1) Human Agent
     Sensor: eye, nose, tongue, skin
     Effectors: Hand, leg, mouth.

  2) Robotic Agent:
     Sensor - cameras, Infrared range finders
     Effectors: motors, ~~Actuators~~ actuators

actuator

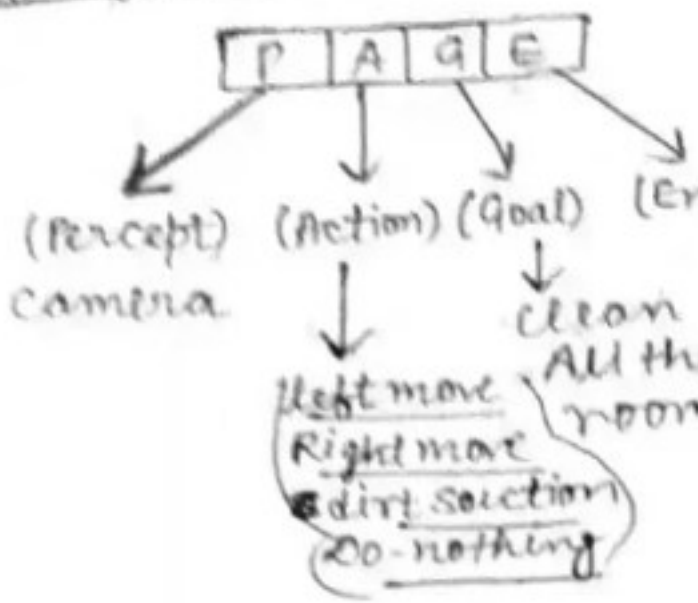


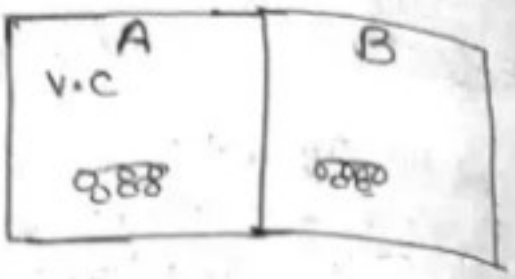
(P A G E)

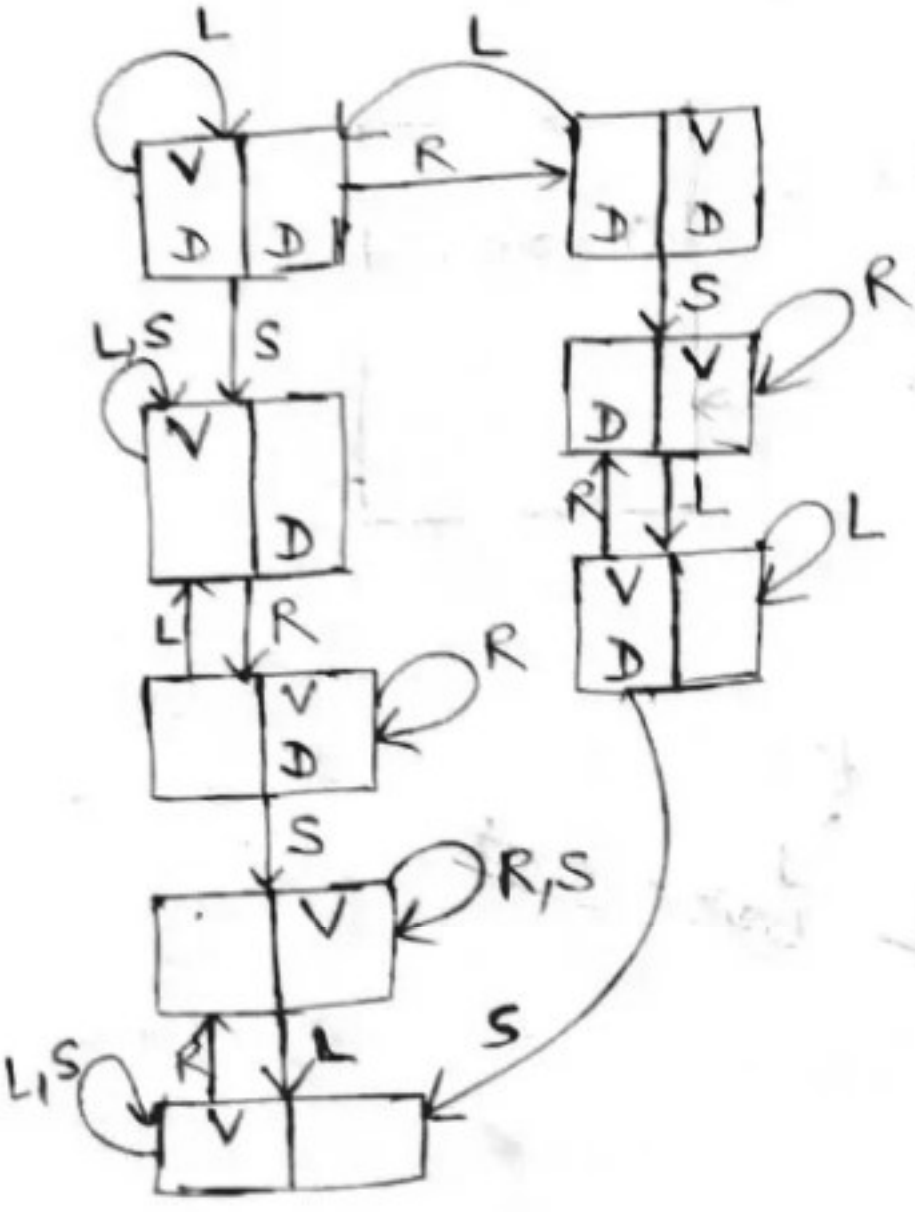
Percept → Action → Goal → Enviourment

(I) Simplex Reflex Agent
(II) Model Based Agent
(III) Goal Based Agent
(IV) Utility based Agent
(IV) Learning Agent

Vacuum cleaner →







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Automated Car →

P A G E → Road / Path, customer traffic

- Camera, Speedometer, Automatic Gear, Proximity sensor
- see left, see right, Gear, break } apply
- Reach destination safely

Enviarment →

- Fully observed – chess
- Partially observed – Card (Pack)
- Determinizm → Deterministic → vaccum cleaner
  uncertanity → Automated car

- Episodicity
  - ✓ Episodic – No Sequence
  - ✓ Sequential –
- Dynamism
  - Static – Dimension of cross Puzzle,
  - Dynamic – Automated taxi

* Problem Solving Using Search *

Search Problem →

S: Set of States
S_0: Initial State
G: Goal State
A: S → S [mapping function] or Successor function.

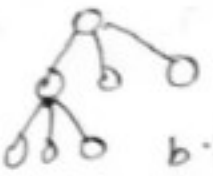
How will you search do untill a solution found or state space is exausted.

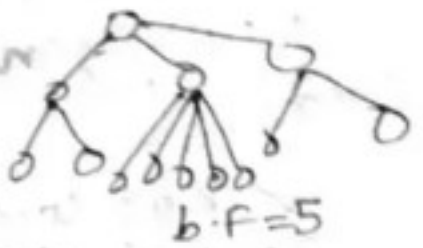
1) Check the current state.
2) execute allowable action to find successor state
3) Pick one of the new state
4) Check If the new state is a solution state
   If not new state become current state
   & Process repeated.

Problem Solving Using Searching →
(Uninformed search or blined search). L → Fringe

1) Problem of loops
   4 Parameter
   - ✓ Completness
   - ✓ optimality
   - ✓ time complexity (less)
   - ✓ space complexity. (less)

2) branching factor





3) d: depth of the sallowest node.

4) m: maximum bf of search Tree or maximum number of Successor node can have.

- **Breadth-first-Search:-**

In BFS the root node expand first, then all the successor of Root node are expanded, then there successor & so on. Shallowest node expand first. FIFO is used for that

```
1. Let fringe be a list containg the intial state
2: Loop
3   If fringe is empty
4      return failure;
5   Node = remove-first(fringe)
6    If(node == goal State)
7      return Path from Initial State to node
8    else
9      generate all succesor of the node add generated
10     node to the back of fringe.
11 end.
```