Prashant Walunj 183

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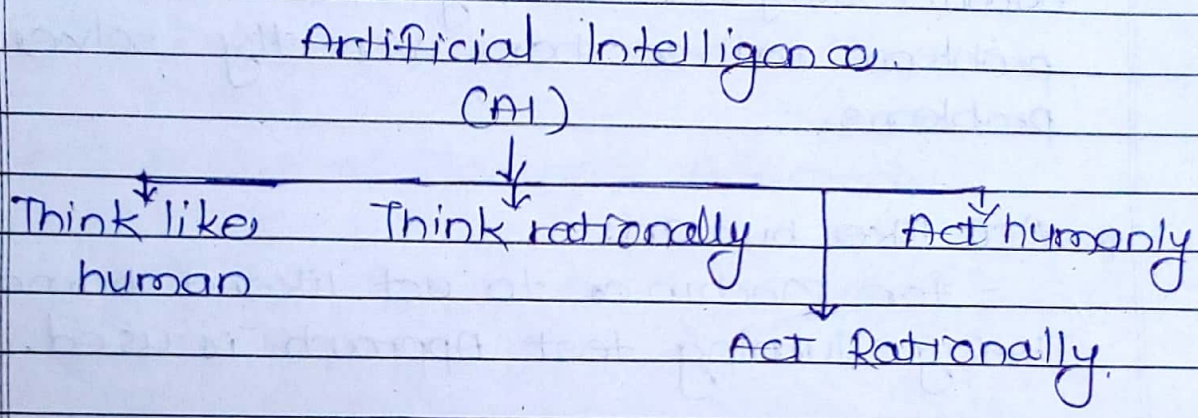
Q.1. Explain concept of AI using four Different categories.

→ AI is the study of how to make computers make things which at the moment peoples do better

* four categories of AI:



* Think like human:

→ The exciting new effort to make computer this machin with minds, in the full and listed sence.

- One of the approach to establish on AI which this category is cognitive approach.

'To develop a program that think like human, the way the human think should be known.

- knowing the precise theory of mind, one must express this theory as a computer program.

* General problem solver (GPS):
  - GPS is concerned with comparing the traces of its reasoning steps to traces of human subjects solving the same problem rather than correctly solves problems.

* Act like human:
  - for Machines to act like a human being. Turning test Approach is used.

* Turing test approach:
  - Alan Tering designed a test for intelligent behaviour.
  - This test allows machine ability to achieve human-level performance in all cognitive tesk, sufficient to feat an interrogator.
  - for this test these are the requirements
    1] Human Interrogater.
    AND two candidates:
    i] Human
    ii] Machine

→ Computer would need.

i] Natural language processing → Communicates
ii] Knowledge Representation
- store info. before and during interrogation.
iii] Automated Reasoning - answer questions and draw new conclusions.
iv] Machine learning - adapt to new circumstances.

* Think Rationally:

* The laws of Thought Approach:

- Aristotle and his syllogism (Right thinking).

"Always give correct conclusions given correct premises".

. Socrates is a man % fact
. All men are Mortal % Rule.

- These laws of thought initiated the field of logic.

- Two main obstacle:

i] Not easy to translate an informal knowledge into formal logic.
ii] It is usually the case that problem can exhaust the computational power of any computer.

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* Act rationally:

* The rational Agent Approach:
  - An agent is something that perceives and act

"law of thought → Correct inferences"

- making correct inferences part of being rational agent.

Act Rationally = reason logically to the conclusion.
↓
act on that conclusion.

- Correct inferences is not always rationality
- Two main advantages.

i] more general than the law of thoughts

ii] more amenable to scientific development than approaches based on behaviour thoughts.

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Q. Write short note on Rationality —

→

Rationality what is rational at any given time depends on four things. The performance measure that defines the criterion of success. The agent's prior knowledge can perform. The ~~agents~~ actions that the agent can perform The agent's percept sequence of ~~date~~.

This leads to a definition of a rational agent. ~~DEFINITION OF RATIONAL AGENT~~ For each possible percept sequence, a rational agent should select an action that is expected to maximize its performance measure, given the evidence provided by the percept sequence and whatever built-in knowledge the agent has.

Consider the simple vacuum-cleaner agent that cleans a square if it is dirty and moves to the other square if not; this is the agent function tabulated :

The performance measure awards one point for each clean square at each time ~~step~~, over a 'lifetime' of 1000 time steps.

The "geography" of the environment is known a priori but the dirt distribution and the initial location of the agent are not. clean ~~clean~~ squares stay clean and sucking cleans the current square. The left and right actions move the agent left and right except when this would take the agent outside the environment in which case the agent remains where it is.

The agent correctly perceives its location and location and whether that location contains dirt.

Q. Apply any particular real time example to describe working of intelligent Agent.

→

The example which is given below is the real time example of working of intelligent agent. given example is project of microsoft

With the help of ultra-low latency, the system processes requests as fast as it receives them

Real-time AI is becoming increasingly important as cloud infrastructures process live data streams, whether they be search queries, videos, sensor streams, or interactions with users," said Doug Burger, an engineer at microsoft, in a blog post late on Tuesday.

The 'project brainwave' uses the massive field-programmable gate array (FPGA) infrastructure that microsoft has been deploying over the past few years.

By attaching high-performance FPGA's directly to our datacentre nlw, we can serve DNNs as hardware microservices, where a DNN can be mapped to a pool of remote FPGAs and called by a server with no GPU in the loop," Burger sai

He added that the system architecture reduces latency, since the CPU doesn't need to process incoming requests, and allows very high throughput with the FPGA processing requests as fast as the D/W can stream execution.

Microsoft claimed that the system, designed for real time AI, can handle complex, memory-intensive models such as long short Term Memories (LSTM), without using batching to juice throughput Burger said.

Project Brainwave achieves unprecedented level of demonstrated real-time AI performance on extremely challenging models. As we tune the system over the next few quarters, we expect significant further performance improvements.

Microsoft is also planning to bring the real-time AI system to user in Azure.

"With the 'Project Brainwave' system incorporated at scale and available to our customers, Microsoft azure will have industry-leading capabilities for real-time AI," Burger said.

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Q4. Illustrate steps in problem formulation process with an suitable example.

→ - A problem formulation is about deciding what actions and states to consider, we will come to this point it shortly.
- We will describe our states as "in (CITYNAME)" where cityname is the name of city in which we are currently in.

A problem can be defined formally by 4 components:

1. Initial state:
   - It is the state from which our agents start solving the problem. (e.i: in (A)).

2. State description
   - a description of the possible actions available to the agent, it is common to describe it by means of successor function, given state x then successor-fn(x) returns a set of ordered pairs <action, successor> where action is a legal action from state x and successor is the state in which we can be by applying action.

- The initial state and the successor function together defined what is called state space which is set of all possible states readable from the initial state.

3. Goal Test:
   - we should be decided whether the current table state is a goal state.
   { e.i: is the current state is in (E) ? }.

4. Path cost:
   - a function that assigns a numeric value to each path, each step we take in solving the problem should be somehow weighted, so if we travel from A to E our agent will pass by many cities, the cost to travel between two consecutive cities should have some measure.

A solution to a problem is path from the initial state to goal state, the solution quantity is measured by the path cost, and optimal solution has the lowest path cost among all possible solutions.