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A.I Assignment

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1) what is AI ? Explain AI four definition

→ AI stands for Artificial intelligence refers to the simulation of human intelligence in machines that are programmed to think like human brain or copy their action AI can also refer to machine that exhibit traits associated with a human mind such as learning.

→ four definition of AI are
System that think like humans
System that think like rationally
System that act like human
System that act rationally

Acting like human uses the approach of turning test to provide satisfactory operational definition of intelligence. It is the ability to achieve human level performance in all task and sufficient to fool interrogater.

Thinking like human uses the approach of the cognitive modeling. We need to the computer that think like human brain activities such as decision making, problem solving, learning.

- system that thinking rationally - The study of the computation that make it possible to perceive, reason and act

- System that act rationally - The branch of computer science that is concerned with the automation of Intelligent behaviour.

2) Write a note on Turing test

→ A turing test is a method of inquiry in artificial intelligence for determining whether or not a computer is capable of thinking like a human being. Turing proposed that a computer can be said to posses artificial intelligence if it can mimic or act like a human responses or think like a human brain under certain condition. The original turing test requires three terminals each of which is physically separated from the other two. One terminal is operated by a computer, while the other two are operated by human. During

as the questioner, while the second human and the computer function as responde. The questioner interrogates the respondent with in a specific subject area using a specified format or context. After a preset length of time or number of question, the questioner is then asked to decide respondent was human and which was a computer

- The test is repeated many time. If the questioner makes the correct determination in half of the test runs or less, the computer is considered to have AI because the questioner regards it as "just as human".

3) Explain Application of AI ?

-> The State of the Art :- Robotic vehicle
A driverless robotic car named Stanley sped through the rough terrain of the mojave dessert at 22 mph. Stanley is a volkswagen outfitted with cameras radar and laser rangefinder to sense the environment and onboard software to command the steering, braking and acceleration

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- Speech Recognition - A traveler calling United Airlines to book a flight can have the entire conversation guided by an automated Speech recongnition and dialog management system.
- Autonomous plannings and scheduling Mars Remote Agent program became the first onboard autonomous planning program to control the scheduling of operation for a Spacecraft Remote Agent generated plans from high-level goals specified from the ground and monitored the execution of those plans - detecting, diagnosing and recovering.
- Game playing - IBM, Deep blue became the first computer program to defeat the world champion in a chess match when it ~~be~~ were able to loss and draw a few matches in subsequent years.
- Spam fighting - Each day learning algorithm classify over a billion message as spam saving recipient from having to waste time.

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4) What are AI agents ? list and explain types of AI agents.

→ An AI system is composed of an agent and its environment. The agents act in their environment. The environment may contain other agents. An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuators.
Every agent can perceive its own action. Example - A human agent has eyes, ears and other organs which act as sensors and hands, legs act as actuators.

Types of Agents:

- Simple Reflex Agents
- model - Based Reflex Agent
- Goal Based Agents
- Utility - Based Agents.
- learning Agents

Simple Reflex Agents. - It has very limited intelligence, No knowledge of non perceptual parts of state, usually too big to generate and store, If there occurs any change in the environment then collection of rules need to be update

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- model-based reflex agent - It works by finding a rule whose condition matches the current situation. As It can handle partially observable environments by use of model about the world. The agent has to keep track of internal state.
- Goal-based agent - These kind of agents take decision based on how far they are currently from their goal. Their every action is intended to reduce its distance from goal. This allows to select multiple possibilities
- Utility based agents - The agents which are developed having their uses as building blocks are called utility based agents. when there are multiple possible alternative then to decide which one is best. They choose action based on preference for each state
- Learning Agents - A learning agent in AI is the type of agent which can learn from its past experience or it has learning capabilities. It starts to act with basic knowledge and then able to act and adapt automatically through learning

Q.5 Explain properties of task environment

→ Fully observable vs partially observable
If an agent sensors give it access to the complete state of the environment at each point in time, then we say that the task environment is fully observable
- A task environment is ~~is~~ effectively fully observable if the sensors detect all aspects that are relevant to the choice of action relevance in turn depends on the performance measure

2) Single agent vs multiagent
- Time an agent is acting in the environment solely or engage into certain relationship with other agents distinguishing them from other object of the environment by identifying that its own performance depends on other agents performance. multiagent environment can be competitive, cooperative or partially both

3) Discreate vs Continuous
- Describes a state of the environment the way time is being handled and to the percept and action of an agent chess game is discrete

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4) Static vs Dyanmic
- If an environment is changing while an agent is deibrating then it is dynamic. Static environment does not change ore time. Semidynamic environment does not change but on agents performe.

5) Deterministic vs Stochastic
- If a next state of the environment is complcely determined by an agent and any variation are excluded then the environment is deterministic otherwise

Q6 Explain 8 puzzle ~~queen~~ problem

- In 8puzzle there are 8 tiles need to be aranged in a way showed in the goal state

7	2	4
5		6
8	3	1

	1	2
3	4	5
6	7	8

A tile adjacent to the blank space can slide into the space. The object is to reach a specified goal state such shown in goal state figure

- States : A state description specifies the location of each of the eight tiles and the blank in one of the nine squares
- Initial State :- Any state can be designated as the initial state. Note that any given goal can be reached from exactly half of the possible initial states
- Action :- The simplest formulation defines the actions as movements of the blank space left, right up or down. Different subsets of these are possible depending on where the blank is
- Transition Model :- Given a state and action, this returns the resulting state
Goal test - This checks whether the state matches the goal configuration

Q7 Explain ~~heuristic~~ heuristic function in AI ?

⇒ A ~~heuristic~~ heuristic function is an evaluation function, to which the search state is given as input and it generates the tangible representation of the state as output.

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It maps the problem state description to measure of desirability, usually represented as number weight. The value is a heuristic function at a given node in the search process giving a good estimate of that node being on the desired path to solution.

- It evaluates individual problem state and determines how much ~~promi~~ promissing the state is. Heuristic functions are the most common way of imparting additional knowledge of the problem state to the search algorithm.

State/Node → [heuristic function] → value of node n, 'e'

The representation may be the approximate cost of the path from the goal node or number of hopes required to reach to the good node or number of hopes required for a node n, h(n) = estimated cost of the cheapest path from the state at node n to a goal state.

It leads to faster and better than it will never lead in wrong direction in the search tree