Department of Computer Engineering

T.E. (Computer Sem VI) Assignment -1 Artificial Intelligence (CSC604)

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CO Addressed:—CSC604.1 -To conceptualize the basic ideas and techniques underlying the design of intelligent systems.

Assignment 1:

- 1. Explain the concept of rationality in the context of intelligent agents. How does rationality relate to the behavior of agents in their environments? Provide examples to illustrate your explanation.
- 2. Discuss the nature of environments in which intelligent agents operate. What are the key characteristics that define an environment, and how do they influence the design and behavior of agents? Provide examples of different types of environments and the challenges they present to agents.
- 3. Describe the structure of intelligent agents and the types of agents commonly used in artificial intelligence. What are the components of an agent, and how do they interact to achieve intelligent behavior? Provide examples of different types of agents and their applications in real-world scenarios.
- 4. Outline the process of problem-solving by searching, including the role of problem-solving agents and the formulation of problems. How do problem-solving agents analyze and approach problems, and what methods do they use to search for solutions? Illustrate your explanation with examples of problem-solving tasks and the strategies employed by agents to solve them.

Rubrics for the First Assignments:

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some missing points and structured (1)	Readable with improved points coverage and structured (1)	Very well written and fully structured	
Level of content(4)	All major topics are covered, the information is accurate (2)	Most major and some minor criteria are included. Information is accurate (3)	All major and minor criteria are covered and are accurate (4)	
Depth and breadth of discussion and representation(4)	Minor points/information maybe missing and representation isminimal (1)	Discussion focused on some points and covers themadequately (2)	Information is presented indepth and is accurate (4)	
Total				

Signature of the Teacher

Mame: Royce Dmello, ROLL-HO-9533 . Artificial Intelligence. Assignment gist i) In astificial Intelligence (AI) and mach scarning a rational agent is a theoretice entity that models how intelligent being think and make decisions (i) A rational agent is characterized b preterence: et considers advantageous and aims to acheive its goals. learning ability: It can adapt and lear experience. iii) A rational agent uses a set of rule, or to determine the best course of action in ix.) to a example: when you've hun ory, you decide to eat son it yours no longer hungry, you stop ca A rational agent follow similar decisi making process. v.) examples of rational agent a) selt bring cars The vehicle use sensor data to make They optimize for seafety and effices by longidering and landition, toa pedestråan movements. b.) hame playing These agent follow game outer and an the wront state of the board. They aim to maximize their chance of wi

Teacher's Sign



(1) virtual personal Assistant These agents understand national language They take appropriate action based or d.) spock trading Algorithm These agent analyze market data and predict future performance. They make byy/seu decision to option Rationality iscentral to Al because it us to create intelligent system that m human deelsion-making. 920) Discuss the nature of environment in whi agent operate. What are the key charact that define an environment and how do the influence the design and behaviour of a the nature of environment in which intelligent agent operate and how the envisonment intuence agent design and behaviour-Kry characteristic of environments incl i) observability: Whether an agent can tu perceive the environment or only partial it ofully observable environment provide information while passially observable Present challenges. Teacher's Signa 1 NA.



ing Determism: whether the environment behaviour is predictable or stochastic (
Deterministic environments dollaws tixes while stochastic ones introduce uncertain while stochastic vs bynamic: static environment remain unchanged during an agent decise making process, while dynamic environment change over time.

[vi) Discrete vs (antinuous: Discrete environment with pieces)

have distinct states and action while continuous one involve continuous variable v.) single Agent vs multi-Agent:

single-agent environments involve only one while multi-agent environment have multi-invacting agents

Examply of Different Environment

chess Game (tully observable, Determin

sequential)

They Chessboard is fully observable

The ruley are deterministic

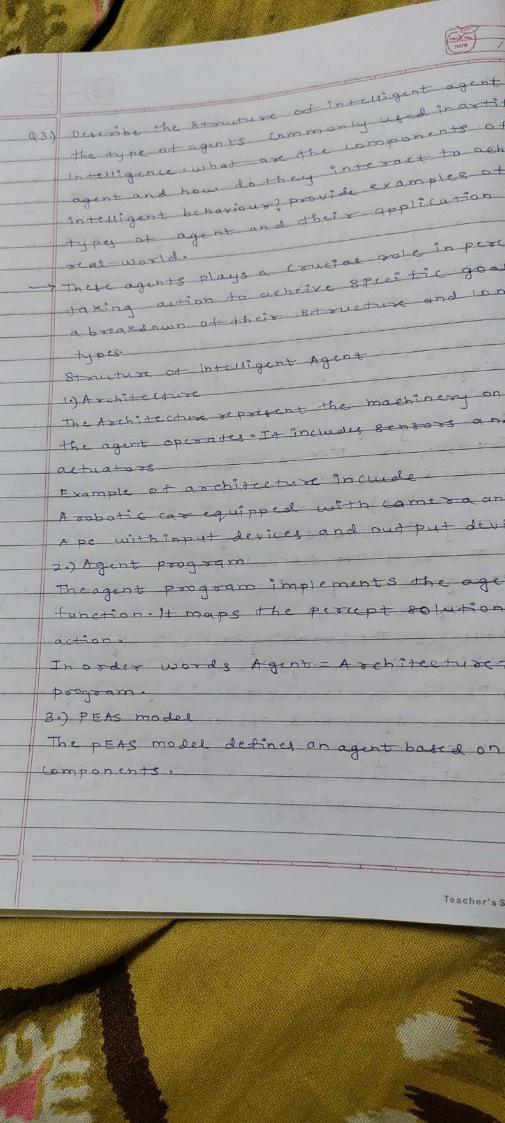
The game is sequential, with each move aff subsequent moves.

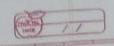
challenges. The branching factor is high , org

vii) Environment characteristic guide age sensors: Agent need appropriate sensors viii) Designing intelligent agent involves having these characteristic and tailoring the behaviour accordingly.

Teacher's Sig







performance Measure: The Criteria torrevaluation the agent opera

Environment: The contexts in which the agent opera

agent interact with the environment.

Achers : The sensors that perceive the environme

Types at Intelligent Agent.
1.) reactive Agent

There agent respond to immediate stimuli from the environment.

They don't maintain an internal state or plan

Ahead.

Example: Intelligent personal assistant like siring

and google Assistant.

proportive Agents plan ahead to acheive their goal They consider part and warent information to

Example: Diverters care

3.) Software Deacmons:

These agents monitor software environments and modity them based on changing condition

Example: The UNIX xibittprogram which alest

These agents monitor real-world envisonments

and take action to modity them.

Example: A thermostat adjusting soom temper based on sensor reading



Real - world Applications · Robots in factories , warehouses and be industrial automation to assembly 1.) Fabatics non-player characters in video games 2a) (aming Al apponents in chess, 40 and other gar 3.) intelligent system · Recommedation 8ystem · Tontoic management in smart citie (94) outline the process of problem solving Including the mie of problem-solving the formulation of problem. How do po agents analyze and approach problems methods dother use to scarch for & problem solving by searching in th of Alopablem solving agent play solcin dinding solutions to various p problem solving Agends 1.) Goal formation Agents start by defining their goa aim to acheive tor eg: Imagine being on holiday ir (Arad) and needing to reach Bucha Hight. 20) problem formation Agents represent the problem in staty and action. states: Represent various situation Action: Define legal transition, bet



to paraples in the travel scanario, eisting and a provided and daying between cities is an action and daying between cities is an action and a provided and a provided a provided a provided and a provided a pro

solution are bequire of person leading from the

Example: The agent searches for the sequence cities (hood, & biu, dagasos, Bucharet)

once the solution is found, the agent perform

Example: Traveling In Kornania
informal Description: you're on holiday in Forma
when by in Aradeyour flight leaves from Bu
tomorrows

Goal: Be in Bucherest
States: various cities

Enution: A sequence of cities leading from

A and to Buchanest
Etwategies Employed by Agents

1.) unitormed search strategies
Bread tirst search: Explore au neighbour
deeper levels.

unitorm - cost scarchi. Consider paths with

Depth-first search: Explore as far as poss algng one branch betwee backtracking.

Teacher's Signature:



