B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Make-Up Examinations

Programme: B.E.
Branch: Institutional Elective
Course Code: 20IS7OEAIM
Course: Artificial Intelligence and Machine Learning

Semester: VII
Duration: 3 hrs.
Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

				CO	PO	Marks
			UNIT - I	CO1	-	
1	a)		Outline the structure and working of a model-based reflex agent.	CO1	-	**05**
	b)		Elucidate the concept of environments in the context of intelligent agents. Provide examples.	CO1	-	**05**
	c)		With an example and algorithm, Illustrate the working of Depth-First Search (DFS) uninformed search strategy in problem-solving. Discuss its traversal order and potential pitfalls.	CO2	PO1	**10**
			UNIT - II			
2	a)		Differentiate between blind search and heuristic search strategies.	CO2	PO1	**08**
	b)		Write the algorithm for Best First Search. Illustrate with an example. Mention its advantages and disadvantages.	CO2	PO1	**12**
			OR			
3	a)		Write the A* search algorithm. Given an initial state of an 8-puzzle problem and final state to be reached, find the most cost-effective path to reach the final state from initial state using A* Algorithm. Consider $g(n)$ = Depth of node and $h(n)$ = Number of misplaced tiles.	CO2	PO1	**12**

Initial State   Final State

				CO	PO	Marks
	b)		Solve the following cryptarithmetic problem. BASE + BALL = GAMES	CO2	PO1	**08**

			UNIT - III			
4	a)		Let us consider designing a program to learn to play checkers, with the goal of entering it in the world checkers tournament. The performance measure considered is the percent of games it wins in the world tournament. Design a learning system for the same clearly indicating the various steps involved in the process.	CO3	PO1	**10**
	b)		Write the Candidate-Elimination algorithm. Will the Candidate-Elimination algorithm converge to the correct hypothesis? Justify your answer.	CO3	PO1	**10**
			UNIT - IV			
5	a)		Write the ID3 decision tree learning algorithm specialized to learning Boolean-valued functions. Illustrate its working with an example.	CO3	PO1	**10**
	b)		Define overfitting in decision tree learning. Elaborate on how to avoid overfitting in decision tree learning.	CO3	PO2	**10**
			UNIT - V			
6	a)		Write and explain the Stochastic Gradient Descent version of the Backpropagation algorithm for feedforward networks containing two layers of sigmoid units.	CO3	PO1	**10**
	b)		Outline the general steps involved in an End-to-End Machine learning project. Illustrate the steps with examples.	CO4	PO1	**10**
			OR			
7	a)		Outline the general steps involved in building classification models to make predictions in machine learning. Illustrate the steps with examples.	CO4	PO1	**10**
	b)		Build an Artificial Neural Network (ANN) learning system for ALVINN to steer an autonomous vehicle driving at normal speeds on public highways.	CO3	PO2	**10**

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