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18CB62

Sixth Semester B.Tech. Degree Examination, June/July 2023

Artificial Intelligence and Machine Learning with Python

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is uninformed search? Explain Depth First Search (DFS) strategy. (08 Marks)
- b. Solve the following cryptarithmic problem.

$$\begin{array}{r} \text{SEND} \\ + \text{MORE} \\ \hline \text{MONEY} \end{array}$$

(06 Marks)

- c. What is problem reduction? Explain with respect to AND – OR graphs. (06 Marks)

OR

- 2 a. Define Hill Climbing. Explain steepest – Ascent hill climbing and simulated Annealing. (10 Marks)
- b. Explain constraint satisfaction problem with an example. (10 Marks)

Module-2

- 3 a. Write candidate elimination algorithm. Apply the algorithm to obtain the final version space.

Sl No	Sky	Temp	Humidity	Wind	Water	Forecast	Enjoy sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cool	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Warm	Change	Yes

(10 Marks)

- b. List and explain issues in knowledge representation. (10 Marks)

OR

- 4 a. What are the desirable properties of knowledge representation system? Explain inheritable knowledge. (10 Marks)

- b. Express the following sentence in predicate logic

John likes all kinds of food

Orange is food

Fish is food

Ram eats peanuts and is still alive

Sham eats everything Ram eats

(10 Marks)

Module-3

- 5 a. What is decision tree? Explain ID3 algorithm. (10 Marks)

- b. Construct the decision tree for the following Boolean functions.

i) $A \wedge B$ ii) $(A \wedge B) \vee (C \wedge D)$ iii) $B \wedge \neg C$ iv) $A \vee B$ v) $A \text{ XOR } B$. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 a. What is Perceptron? Explain back propagation algorithm. (10 Marks)
b. Define Artificial neural network. Explain ANN representation with an example. (10 Marks)

Module-4

- 7 a. Write and explain EM algorithm. (08 Marks)
b. Illustrate Bayes theorem and maximum posterior hypothesis. (08 Marks)
c. Explain least – squared error hypothesis. (04 Marks)

OR

- 8 a. Explain Naïve Bayes classifier and Bayesian belief network. (10 Marks)
b. Describe Brute force MAP learning algorithm. (10 Marks)

Module-5

- 9 Write short note on
i) K – Nearest Neighbor (KNN)
ii) Case Based Reasoning
iii) Locally weighted regression
iv) Radial Basis Function (20 Marks)

OR

- 10 a. What is reinforcement learning? Explain the concepts of reinforcement learning and its characteristics. (10 Marks)
b. What is learning task? Illustrate the basic concepts of Q-learning. (10 Marks)

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