CBCS SCHEME

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18EC745

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
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. Define Well posed learning problem. Describe the following problems with respect to tasks, performance and experience :
i) A checkers learning problem ii) A hand writer recognition learning problem.
iii) A robot driving learning problem. **(10 Marks)**

b. Write Find – S algorithm with an example. **(10 Marks)**

OR

2 a. With the diagram, explain the final design of the Checkers Learning program. **(10 Marks)**

b. Find the version space for the following set of training examples with respect to candidate elimination algorithm.

Ex	Sky	Air 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	Cool	Change	Yes

(10 Marks)

Module-2

3 a. What is Decision tree and discuss the use of decision tree for classification problem. **(10 Marks)**

b. Discuss the issues in Decision tree learning. **(10 Marks)**

OR

4 a. Build a decision tree for the following set of training examples :

Day	Outlook	Temperature	Humidity	Wind	Play tennis
D_1	Sunny	Hot	High	Weak	No
D_2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D_4	Rain	Mild	High	Weak	Yes
D_5	Rain	Cool	Normal	Weak	Yes
D_6	Rain	Cool	Normal	Strong	No
D_7	Overcast	Cool	Normal	Strong	Yes
D_8	Sunny	Mild	High	Weak	No
D_9	Sunny	Cool	Normal	Weak	Yes
D_{10}	Rain	Mild	Normal	Weak	Yes
D_{11}	Sunny	Mild	Normal	Strong	Yes
D_{12}	Overcast	Mild	High	Strong	Yes
D_{13}	Overcast	Hot	Normal	Weak	Yes
D_{14}	Rain	Mild	High	Strong	No

(10 Marks)

b. Write a Python program for decision tree learning. **(10 Marks)**

Module-3

5 a. Explain the concept of a perception with neat diagram. **(10 Marks)**

b. How a single perception can be used to represent Boolean functions such as AND & OR? **(10 Marks)**

OR

6 a. What is Gradient descent search? Derive the equation for the same. **(10 Marks)**

b. Derive equation for Back propagation algorithm. **(10 Marks)**

Module-4

7 a. What is the Brute – force MAP algorithm? Briefly explain. **(10 Marks)**

b. Explain Maximum Likelihood hypothesis for predicting probabilities. **(10 Marks)**

OR

8 a. Explain Naïve Bayes classifier with an example. **(10 Marks)**

b. Derive necessary equations of the K means algorithm with respect to EM algorithm. **(10 Marks)**

Module-5

9 a. What is the K-nearest neighbor learning? Explain briefly. **(10 Marks)**

b. Explain briefly Locally weighted Linear regression. **(10 Marks)**

OR

10 a. Explain the following :

i) Estimating Hypothesis Accuracy ii) Binomial distribution. **(10 Marks)**

b. Discuss the Learning task and Q – learning in the context of reinforcement learning. **(10 Marks)**

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