CBCS SCHEME

USN | | | | | | | | | | 15CS73

Seventh Semester B.E. Degree Examination, July/August 2022
Machine Learning

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1   a.   What is Machine Learning? List the applications of Machine learning.   (03 Marks)
     b.   Explain with neat diagram, the choices in designing a learning system.   (10 Marks)
     c.   Describe briefly the issues in machine learning.   (03 Marks)

OR

2   a.   Describe the Find-S algorithm. Explain its working by taking enjoy sport concept and training instances given below:

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	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(08 Marks)

     b.   Describe candidate elimination algorithm with example.   (08 Marks)

Module-2

3   a.   With an example describe decision tree representation.   (04 Marks)
     b.   Discuss the characteristics of appropriate problems for decision tree learning. (04 Marks)
     c.   Write the basic decision tree learning algorithm (ID3)   (04 Marks)
     d.   Discuss the capabilities and limitation of ID3.   (04 Marks)

OR

4   a.   Give entropy and information gain measure and calculate the information gain of all 4 attributes for the following training example.   (10 Marks)

Day	Outlook	Temperature	Humidity	Wind	Play Tennis
D_1	Sunny	Hot	High	Weak	No
D_2	Sunny	Hot	High	Strong	No
D_3	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	Strong	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

Table Q4 (a)

     b.   Explain the issues in decision tree learning.   (06 Marks)

1 of 2

Module-3

5 a. Describe the appropriate problems for Neural Network Learning. (06 Marks)
   b. Explain perception, gradient descent and delta rule. (06 Marks)
   c. Write the gradient descent algorithm. (04 Marks)

OR

6 a. Explain the Back propagation algorithm for multilayer feed forward network. (10 Marks)
   b. Discuss the remarks on the back propagation algorithm. (06 Marks)

Module-4

7 a. Explain Brute Force MAP learning algorithm. (08 Marks)
   b. Discuss the features of Bayesian learning method. (04 Marks)
   c. Derive the expression for maximum likelihood hypothesis for predicting probabilities. (04 Marks)

OR

8 a. Explain Naïve Bayes classifier algorithm for example given in Table 4(a). (08 Marks)
   b. Explain in detail EM algorithm. (08 Marks)

Module-5

9 a. Explain K-Nearest Neighbour learning algorithm. (08 Marks)
   b. Explain Q-learning algorithm with an example. (08 Marks)

OR

10 a. Define the following with respect to Binomial distribution:
   (i)   Mean and Variance
   (ii) Estimation Bias.
   (iii) Confidence interval. (06 Marks)
   b. Write a note on:
   (i)   Two sided and one sided bound. (03 Marks)
   (ii) Hypothesis testing. (03 Marks)
   (iii) Comparing learning algorithm. (04 Marks)

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