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Seventh Semester B.E. Degree Examination, June/July 2023
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. Specify the learning task for 'A checkers learning problem. **(03 Marks)**
   b. Discuss the following with respect to the above,
      i) Choosing the training experience.
      ii) Choosing the target function and
      iii) Choosing a function approximation algorithm. **(09 Marks)**
   c. Comment on the issues in machine learning. **(04 Marks)**

OR

2. a. Write candidate elimination algorithm. Apply the algorithm to obtain the final version space for the training example. **(10 Marks)**

Sl. No	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

   b. Discuss about an unbiased Learner. **(06 Marks)**

Module-2

3. Construct decision tree for the following data using ID3 algorithm.

Day	A1	A2	A3	Classification
1	True	Hot	High	No
2	True	Hot	High	No
3	False	Hot	High	Yes
4	False	Cool	Normal	Yes
5	False	Cool	Normal	Yes
6	True	Cool	High	No
7	True	Hot	High	No
8	True	Hot	Normal	Yes
9	False	Cool	Normal	Yes
10	False	Cool	High	No

(16 Marks)

OR

4. a. Explain the concept of decision tree learning. Discuss the necessary measure required to select the attributes for building a decision tree using ID3 algorithm. **(08 Marks)**
   b. Discuss the issues of avoiding over fitting the data, handling continuous data and missing values in decision trees. **(08 Marks)**

Module-3

5 a. Define Perceptron. Explain the concept of single perceptron with neat diagram. **(06 Marks)**
   b. Explain the back propagation algorithm. Why is it not likely to be trapped in local minima? **(10 Marks)**

OR

6 a. List the appropriate problems for neural network learning. **(04 Marks)**
   b. Discuss the Perceptron Training rule and Delta rule that solves the learning problem of perceptron. **(08 Marks)**
   c. Write a remark on representation of feed forward networks. **(04 Marks)**

Module-4

7 a. What is Bayes theorem and maximum posterior hypothesis? **(04 Marks)**
   b. Derive an equation for MAP hypothesis using Bayes theorem. **(04 Marks)**
   c. Consider a football game between two rival teams: Team 0 and Team 1. Suppose Team 0 wins 95% of the time and Team 1 wins the remaining matches. Among the games won by team 0, only 30% of them come from playing on teams 1's football field. On the otherhand, 75% of the victories for team 1 are obtained while playing at home. If team 1 is to host the next match between the two teams, which team will most likely emerge as the winner? **(08 Marks)**

OR

8 a. Describe Brute – Force MAP learning algorithm. **(04 Marks)**
   b. Discuss the Naïve Bayees classifier. **(04 Marks)**
   c. The following table gives data set about stolen vehicles. Using Naïve bayes classifier classify the new data (Red, SUV, Domestic).

Color	Type	Origin	Stolen
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	SUV	Imported	No
Yellow	SUV	Imported	Yes
Yellow	SUV	Domestic	No
Red	SUV	Imported	No
Red	Sports	Imported	Yes

(08 Marks)

Module-5

9 a. Explain locally weighted linear regression. **(08 Marks)**
   b. What do you mean by reinforcement learning? How reinforcement learning problem differs from other function approximation tasks? **(05 Marks)**
   c. Write down Q-learning algorithm. **(03 Marks)**

OR

10 a. What is instance based learning? Explain K-Nearest neighbour algorithm. **(08 Marks)**
    b. Explain sample error, true error, confidence intervals and Q-learning function. **(08 Marks)**

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