17CS73

USN | | | | | | | | | | |

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Machine Learning

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. Find the maximally general hypothesis and minimally specific hypothesis for the training examples given in the table below, using candidate elimination algorithm.

Day	Sky	Air Temperature	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

(10 Marks)

   b. Explain List-then-eliminate algorithm.   **(05 Marks)**
   c. List areas/disciplines that have influenced machine learning.   **(05 Marks)**

OR

2 a. Define machine learning. Explain the various stages involved in designing a learning system in brief.   **(10 Marks)**
   b. Explain in detail, the perspectives and issues in machine learning. **(05 Marks)**
   c. Explain Find_S algorithm.   **(05 Marks)**

Module-2

3 a. Discuss the issues of avoiding over fitting data, missing values and handling continuous data in decision trees.   **(09 Marks)**
   b. Derive the decision tree for the following transactions:

Txn Id	Refund	Marital status	Taxable Income	Cheat
1	Yes	Single	125 K	No
2	No	Married	100 K	No
3	No	Single	70 K	No
4	Yes	Married	120 K	No
5	No	Divorced	95 K	Yes
6	No	Married	60 K	No
7	Yes	Divorced	220 K	No
8	No	Single	85 K	Yes
9	No	Married	75 K	No
10	No	Single	90 K	Yes

(11 Marks)

OR

4 a. Construct the decision trees for the following expressions:
       (i) A XOR B   (ii) $A \vee (B \wedge C)$ **(06 Marks)**
   b. Explain the issues of decision tree learning.   **(06 Marks)**
   c. Explain briefly on reduced error pruning and rule post pruning.   **(08 Marks)**

Module-3

5 a. Discuss the perceptron training rule and delta rule that solves the learning problem of perceptron. **(10 Marks)**

    b. List down the properties of neural networks. Under what circumstances artificial neural network will be considered for learning the system. **(10 Marks)**

OR

6 a. Explain back propagation algorithm. **(10 Marks)**

    b. What set of functions can be represented by feed-forward networks? **(05 Marks)**

    c. What is squashing function? Why it is needed? **(05 Marks)**

Module-4

7 a. Explain and derive Brute Force MAP algorithm. **(10 Marks)**

    b. Explain Bayesian belief networks and conditional independence with examples. **(10 Marks)**

OR

8 a. Derive the expression for Maximum Likelihood hypothesis. **(10 Marks)**

    b. Explain Naïve Bayes classifier. **(05 Marks)**

    c. Discuss on Maximum Description Length Principle. **(05 Marks)**

Module-5

9 a. Explain briefly on estimating hypothesis accuracy. **(10 Marks)**

    b. Explain central limit theorem. **(04 Marks)**

    c. Explain reinforcement learning with examples. **(06 Marks)**

OR

10 a. Explain K-Nearest neighbor learning algorithm and distance weighted nearest neighbor algorithm. **(10 Marks)**

    b. Discuss on locally weighted regression. **(05 Marks)**

    c. Write down the Q-Learning algorithm. **(05 Marks)**

* * * * *