15CS73

USN

Seventh Semester B.E. Degree Examination, Jan./Feb. 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. What do you mean by a well posed learning problem? Explain the important features that are required to well-define a learning problem. **(08 Marks)**
   b. Explain Find-S algorithm with given example. Give its application.

Table 1.

Example	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

(08 Marks)

OR

2 a. What are the basic design issues and approaches to machine learning? **(08 Marks)**
   b. Explain the various stages involved in designing a learning system (Checkers learning system). **(08 Marks)**

Module-2

3 a. Greedy learn a decision tree using ID$_3$ algorithm and draw the tree. **(08 Marks)**
   b. Compare Entropy and Information gain in ID$_3$ with an example. **(08 Marks)**

OR

4 a. Describe hypothesis space search in ID$_3$ and contrast it with candidate elimination algorithm. **(08 Marks)**
   b. List the issues in Decision Tree learning. Interpret the algorithm with respect to overfitting the data. **(08 Marks)**

Module-3

5 a. Define ANN. Explain the concept of a perceptron with a neat diagram. **(08 Marks)**
   b. What do you mean by Gradient Descent? Derive the Gradient Descent Rule. **(08 Marks)**

OR

6 a. Derive the Back propagation rule considering the training rule for output unit weights and training rule for hidden unit weights. **(08 Marks)**
   b. Explain how to learn multilayer networks using Gradient Descent Algorithm. **(08 Marks)**

Module-4

7 a. Explain the concept of Baye's theorem with an example. **(08 Marks)**
   b. Explain the K-means algorithm with an example. **(08 Marks)**

OR

8 a. Explain Naïve Baye's classifier with an example. **(08 Marks)**

b. Explain Bayesian belief networks and conditional independence with example. **(08 Marks)**

Module-5

9 a. What is Reinforcement Learning? Explain the Q function and Q Learning algorithm.
(08 Marks)

b. Describe K-nearest Neighbour learning algorithm for continuous valued target function.
(08 Marks)

OR

10 a. Explain locally weighted linear regression. **(08 Marks)**

b. Explain Binomial Distribution with an example. **(08 Marks)**

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