CBCS SCHEME

USN | | | | | | | | | | **15EC834**

Eighth Semester B.E. Degree Examination, Dec.2023/Jan.2024

Machine Learning

Time: 3 hrs. Max. Marks : 80

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Sketch important blocks of final design of a learning system and explain the same with respect to checkers learning program. **(08 Marks)**

b. Write the formal definition of specific boundary set 'S' and general boundary set 'G' considered in Candidate-Elimination algorithm. **(04 Marks)**

c. Mention the common issues that arise in machine learning. **(04 Marks)**

OR

2 a. Table Q2 (a) represents the training dataset which is to be used to learn Enjoy sport concept. Enjoy sport will take the value 'yes', if a given day is suitable to enjoy watersport. Otherwise, it takes the value 'no'. Use Find-S algorithm to come up with hypothesis that remains consistent with the data :

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	Enjoysport
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

Table Q2 (a) **(08 Marks)**

b. In the following learning problems, mention the task involved, the measure of performance and the experience obtained.

i) A robot driving learning problem

ii) Hand written text recognition problem. **(04 Marks)**

c. Draw a figure which indicates the summary of design choices we have in designing the checkers learning problem. **(04 Marks)**

Module-2

3 a. What is decision tree and discuss the use of decision tree for classification problem. **(08 Marks)**

b. Describe the ID3 algorithm for decision tree learning with example. **(08 Marks)**

OR

4 a. Explain the concept of a perceptron with neat diagram. **(08 Marks)**

b. How a single perceptron can be used to represent the Boolean functions such as AND, and OR. **(08 Marks)**

Module-3

5 a. Describe Brute – force MAP learning algorithm. **(08 Marks)**

b. Explain Baye's optimal classifier with an example. **(08 Marks)**

OR

6 a. Discuss maximum likelihood and least square error hypothesis. **(10 Marks)**

b. Briefly explain Naïve Baye's classifier. **(06 Marks)**

Module-4

7 a. Discuss the K-nearest neighbor learning. (04 Marks)
b. Discuss locally weighted regression. (04 Marks)
c. Explain the CADET system using case based reasoning. (08 Marks)

OR

8 a. Define the following terms with respect to K-nearest neighbor learning.
i) regression ii) residual iii) kernel function. (03 Marks)
b. Explain radial basis functions. (05 Marks)
c. Explain the FOIL algorithm. (08 Marks)

Module-5

9 a. Explain the Prolog-EBG algorithm. (10 Marks)
b. What is reinforcement learning? Explain the reinforcement problem with a neat diagram. (06 Marks)

OR

10 a. Explain the difference between analytical and inductive learning methods based on formulation of the learning problem. (06 Marks)
b. Discuss the FOCL algorithm by considering an example of learning a concept. (10 Marks)

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