CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

18SCS31

Third Semester M.Tech. Degree Examination, Dec.2019/Jan.2020
Machine Learning Techniques

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1 a. What is Machine learning? Mention any three issues in Machine learning. **(04 Marks)**
   b. List the different steps to design a learning system. Explain any two in brief. **(06 Marks)**
   c. Write the candidate Elimination algorithm. Find specific and generic hypotheses for the concept enjoy sport given below. **(10 Marks)**

Example	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

OR

2 a. Explain ID3 algorithm for decision tree learning. **(10 Marks)**
   b. Consider the following set of training examples:

Instance	Classification	a_1	a_2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

   i) What is the Entropy of these examples with respect to the target function classification?
   ii) What is the information gain of a_2 and a_1?
   iii) Which will be selected as the root node a_2 or a_1? **(10 Marks)**

Module-2

3 a. Explain gradient descent algorithm for training a linear unit. Also derive gradient descent rule. **(10 Marks)**
   b. Derive Back propagation rule considering output unit weights and hidden unit weights. **(10 Marks)**

OR

4 a. Explain a prototypical Genetic Algorithm. **(10 Marks)**
   b. Discuss about common operators for Genetic Algorithm with example. **(10 Marks)**

Module-3

5 a. Explain Naïve Bayes algorithm for learning and classifying text. **(10 Marks)**
   b. What is Bayesian Learning? Discuss the features of Bayesian learning method. **(06 Marks)**
   c. Determine h_{MAP} from Bayes theorem. **(04 Marks)**

<div align="center">OR</div>

6 a. Explain EM algorithm in detail. **(10 Marks)**

b. Describe Bayesian Belief Networks by taking suitable example. **(10 Marks)**

Module-4

7 a. Explain K-Nearest Neighbor algorithm for approximating a discrete-valued function $f: R^n \rightarrow v$. **(10 Marks)**

b. Explain case based reasoning by taking suitable example. **(10 Marks)**

<div align="center">OR</div>

8 a. Describe basic FOIL algorithm in detail. **(10 Marks)**

b. Write a note on Locally Weighted Linear Regression. **(10 Marks)**

Module-5

9 a. Define Q function. Explain algorithm for Q learning by taking suitable example. **(10 Marks)**

b. What is reinforcement learning? How reinforcement learning problem differs from other function approximation tasks. **(10 Marks)**

<div align="center">OR</div>

10 a. Compare Inductive learning and Analytical learning by giving suitable illustration. **(10 Marks)**

b. Explain the explanation based learning algorithm PROLOG-EBG. **(10 Marks)**

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