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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)**

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OR

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 $f:R^n \to v$. (10 Marks)
  b. Explain case based reasoning by taking suitable example. (10 Marks)

OR

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)

OR

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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