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

18MCA53

Fifth Semester MCA Degree Examination, June/July 2024
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. Why machine learning is important? Define a well posed learning problem. **(10 Marks)**
   b. Write and explain Find - S algorithm. **(10 Marks)**

OR

2 a. With the help of an example, write and explain candidate elimination algorithm. **(12 Marks)**
   b. Discuss about an unbiased learner. **(08 Marks)**

Module-2

3 a. What is a decision tree? Discuss the use of decision tree for classification purpose with an example. **(10 Marks)**
   b. Discuss any two issues in decision tree learning. **(10 Marks)**

OR

4 a. Write the algorithm for ID3. **(10 Marks)**
   b.

Day	Outlook	Temp	Humidity	Wind	Decision
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rainfall	Mild	High	Weak	Yes
5	Rainfall	Cool	Normal	Weak	Yes
6	Rainfall	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rainfall	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rainfall	Mild	High	Strong	No

Solve the above using ID3 algorithm for information gain on "Sunny" outlook factor.

(10 Marks)

Module-3

5 a. Define perceptron. Explain the working of perceptron with a diagram. **(10 Marks)**
   b. Explain the importance of the terms :
   (i) Hidden layer   (ii) Generalization
   (iii) Over fitting   (iv) Stopping criterion **(10 Marks)**

OR

6 a. What is gradient descent and delta rule with derivation of gradient descent rule? **(10 Marks)**
   b. Explain back propagation algorithm. **(10 Marks)**

Module-4

7 a. Explain Naïve Bayes classifier. **(10 Marks)**
   b. Explain Brute force MAP learning algorithm. **(10 Marks)**

OR

8 a. Discuss Minimum Description Length principle in brief. **(10 Marks)**
   b. Explain Bayesian belief network and conditional independence with example. **(10 Marks)**

Module-5

9 a. Define: (i) Sample error   (ii) True error   (iii) Reinforcement learning **(10 Marks)**
   b. Explain K-nearest neighbor learning algorithm. **(10 Marks)**

OR

10 a. Explain locally weighted linear regression. **(10 Marks)**
   b. Write short notes on:
      (i)   Estimating Hypothesis accuracy
      (ii) Binomial Distribution **(10 Marks)**

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