CBCS SCHEME

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18EC745

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Machine Learning With Python

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. Discuss the four distinct program modules that represent the central in many learning system. **(10 Marks)**

b. Discuss the basic issue and approaches to ML are illustrated by designing a program to learn to play checkers, with the goal of entering it in the world checkers tourment. **(10 Marks)**

OR

2 a. Discuss the unbiased learner. **(10 Marks)**

b. Write a Find-S algorithm and to illustrate this algorithm, the learner is given the sequence of training examples from the Enjoy sport task.

Ex	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	Cold	Change	Yes

(10 Marks)

Module-2

3 a. Write basic ID3 algorithm which learns decision tree by constructing them top – down. **(10 Marks)**

b. Give decision tree to represent the following Boolean function

i) $A \wedge \neg B$

ii) $A \vee (B \wedge C)$

iii) A XOR B

iv) $(A \wedge B) \vee (C \wedge D)$. **(10 Marks)**

OR

4 a. Discuss the appropriate problems for decision tree learning. **(10 Marks)**

b. For the transaction shown in the table compute the following :

i) Entropy of the collection of transaction records of the table with respect to classification

ii) What are the information gain of a_1 and a_2 relative to the transaction of the table?

Instance	1	2	3	4	5	6	7	8	9
a_1	T	T	T	F	F	F	F	T	F
a_2	T	T	F	F	T	T	F	F	T
Target class	+	+	–	+	–	–	–	+	–

(10 Marks)

Module-3

5 a. How to calculate the gradient at each step using training rule for gradient descent. **(10 Marks)**

b. Explain the stochastic approximation to gradient descent. **(10 Marks)**

OR

6 a. Write the Back propagation algorithm. **(10 Marks)**

b. Derive the training rule for hidden unit weights. **(10 Marks)**

Module-4

7 a. Discuss the features of Bayesian learning methods. **(10 Marks)**

b. Explain the terms :

i) Maximum a posterior (MAD) Hypothesis

ii) Maximum a likelihood (ML) Hypothesis **(10 Marks)**

OR

8 a. What criterion should be optimized in order to find maximum likelihood hypothesis **(10 Marks)**

b. The following table gives data set, at using naïve bayes classifier classify the new data (Sunny, Cool, high, Strong)

Day	Outlook	Temperature	Humidity	Wind	Play tennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

(10 Marks)

Module-5

9 a. Write the K-Nearest Neighbor algorithm for approximation a discrete valued target function and also real values target function. **(10 Marks)**

b. Explain the ANN learning with radial basis functions. **(10 Marks)**

OR

10 a. Write the algorithm for Q-learning algorithm. **(07 Marks)**

b. The dates sample S contains n = 40 examples and that hypothesis h commits r = 12 errors over this data, with the 68% confidence interval estimate for $error_D(h)$ with $Z_N = 1$. **(07 Marks)**

c. Write the comparing learning algorithm. **(06 Marks)**

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