Reg. No. :

Question Paper Code: 99320

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Elective

Electrical and Electronics Engineering

19UEE920- MACHINE LEARNING

(Regulations 2019)

Duration: Three hours   Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. Application of machine learning methods to large databases is called   CO1 -R

    (a) data mining   (b) artificial intelligence

    (c) big data computing   (d) internet of things

2. In what type of learning labeled training data is used   CO1 -R

    (a) unsupervised learning   (b) supervised learning

    (c) reinforcement learning   (d) active learning

3. Regression trees are often used to be   CO2- R

    (a) Linear   (b) Non-linear   (c) Categorical   (d) Symmetrical

4   How do you choose the root node while constructing a Decision Tree?   CO2- R

    (a) attribute with high entropy   (b) high entropy and information gain

    (c) largest information gain   (d) None of the above

5   ID3 stands for   CO3- R

    (a) Induction Decision Tree   (b) Iterative Data base

    (c) Iterative Dichotomiser   (d) Iterative Decision Tree

6   The output of training process in machine learning is   CO3- R

    (a) machine learning model   (b) machine learning algorithm

    (c) null   (d) accuracy

99320

7   You are given reviews of few netflix series marked as positive, negative   CO4- App
    and neutral. Classifying reviews of a new netflix series is an example of

    (a) supervised learning   (b) unsupervised learning

    (c) semisupervised learning   (d) reinforcement learning

8   _____finds the most specific hypothesis consistent with the training   CO4- R
    example

    (a) Find-S   (b) Rote-Learn   (c) Candidate Elimination   (d) All of the above

9   Back propagation is a learning technique that adjusts weights in the neural   CO5- R
    network by propagating weight changes

    (a) Forward from source to sink

    (b) Backward from sink to source

    (c) Forward from source to hidden nodes

    (d) Backward from sink to hidden nodes

10 The Bayes rule can be used in   CO5- R

    (a) Solving queries   (b) Increasing complexity

    (c) Decreasing complexity   (d) Answering probabilistic query

                          PART – B (5 x 2= 10Marks)

11. Explain the steps in designing learning systems in detail   CO1-U

12. Differentiate between Gradient Descent and Perceptron training rule.   CO2-U

13. Explain Brute force Bayes Concept Learning.   CO3 -U

14. Consider a medical diagnosis problem in which there are two alternative   CO4 -App
    hypotheses:

    (i) That the patient has a particular form of cancer (+) and

    (ii) That the patient does not (-). A patient takes a lab test and the result
    comes back positive. The test returns a correct positive result in only 98% of
    the cases in which the disease is actually present, and a correct negative
    result in only 97% of the cases in which the disease is not present.
    Furthermore, .008 of the entire population have this cancer. Determine
    whether the patient has Cancer or not using MAP hypothesis.

15. Explain the methods involved in learning disjunctive sets of rules.   CO5 -U

PART – C (5 x 16 = 80Marks)

16. (a) Explain the steps in designing learning systems in detail CO1 -U (16)

Or

(b) Describe the procedure of building Decision tree using ID3 with Gain and Entropy. Illustrate with example. CO1-U (16)

17. (a) Write the final version space for the below-mentioned training example using the candidate elimination algorithm. CO2 -App (16)

Origin	Manufacturer	Color	Decade	Type	Example Type
Japan	Honda	Blue	1980	Economy	Positive
Japan	Toyota	Green	1970	Sports	Negative
Japan	Toyota	Blue	1990	Economy	Positive
USA	Chryster	Red	1980	Economy	Negative
Japan	Honda	White	1980	Economy	Positive
Japan	Toyota	Green	1980	Economy	Positive
Japan	Honda	Red	1980	Economy	Negative

Or

(b) With the given data set, find B_0 and B_1 by using logistic Regression. CO2 -App (16)

When $X = 6$, find the value of Y.

X	1	2	4	3	5
Y	1	3	3	2	5

18. (a) Classify a set of 10 students in to two clusters based on the obtained marks and rank using appropriate method. (Analyze) CO3 -Ana (16)

Marks	99	59	97	87	86	77	67	57	47	40
Rank	1	7	2	3	4	5	6	8	9	10

Or

(b) By using the fitness function as $f(x) = 2x$ with the interval [0, 15], find the optimal solution using appropriate algorithm. CO3-Ana (16)

19. (a) Derive an equation for MAP hypothesis using Bayes theorem and explain Maximum Likelihood Hypothesis for predicting probabilities. CO4- Ana (16)

Or

(b) Consider the sample dataset mentioned below and calculate $\frac{\partial L}{\partial W1}$ by using back propagation algorithm. Assume 1. Your network has only one hidden layer. 2. All the weights are equal to 1 and all the bias are equal to 0.   CO4-Ana   (16)

Name	Weight (lb)	Height (in)	Gender
Alice	133	65	F
Bob	160	72	M
Charlie	152	70	M
Diana	120	60	F

20. (a) Draw the perceptron network with the notation. Derive an equation of gradient descent rule to minimize the error.   CO5-U   (16)

Or

(b) Explain Radial Basis Function and Case Based Reasoning   CO5- U   (16)