

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - V Computer Science & Engineering AI & ML : WINTER : 2024
SUBJECT: MACHINE LEARNING

Day : Tuesday
Date : 10/12/2024

W-23958-2024

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Assume suitable data **WHEREVER** necessary.
- 4) Draw neat labeled diagrams **WHEREVER** necessary.

- Q.1 a) How you will design a learning system? Explain with example. (05)
b) List and explain perspectives and issues in Machine Learning. (05)

OR

- Q.1 What is machine learning? Discuss about learning and machine learning. Choose various types of machine learning. (10)

- Q.2 Explain what are the various metrics used to evaluate the machine learning model performance. (10)

OR

- Q.2 Consider following table for binary classification. Calculate the root of the decision tree using Gini index. (10)

| Sr. No. | Customer Income | Gender | Car Type | Class |
|---------|-----------------|--------|----------|-------|
| 1 | High | M | Family | C1 |
| 2 | High | M | Sports | C1 |
| 3 | High | M | Family | C2 |
| 4 | Low | M | Family | C2 |
| 5 | Low | F | Family | C2 |
| 6 | Low | F | Sports | C1 |
| 7 | Low | F | Sports | C2 |
| 8 | High | M | Family | C1 |
| 9 | High | F | Family | C2 |
| 10 | High | F | Family | C2 |
| 11 | High | F | Sports | C2 |
| 12 | Low | M | Sports | C2 |
| 13 | Low | F | Family | C2 |
| 14 | Low | M | Sports | C1 |

- Q.3 What is Bagging and Boosting? Explain in details with example (10)

OR

- Q.3 Explain in details about Random Forest Technique. (10)

- Q.4 Explain the k-Nearest Neighbour Classification. Compare k-Nearest Neighbour Classification and Naive Bayes classifiers with suitable example. (10)

OR

- Q.4 Explain maximum margin concept behind SVM, Using diagram. (10)

PTO

Q.5 With a diagram, explain how you can use minimum spanning tree for clustering. (10)

OR

Q.5 Two clusters have the following data points. Calculate their intra cluster distance (10)
also calculate total inertia of the data point assignment.

| Height | Weight | Assigned Cluster |
|--------|--------|------------------|
| 185 | 72 | 2 |
| 170 | 56 | 1 |
| 168 | 60 | 1 |
| 179 | 68 | 2 |
| 182 | 72 | 2 |
| 188 | 77 | 2 |
| 180 | 71 | 2 |
| 180 | 70 | 2 |
| 183 | 84 | 2 |
| 180 | 88 | 2 |
| 180 | 67 | 2 |
| 177 | 76 | 2 |

Q.6 Describe the Linear Discriminant Analysis with suitable example. (10)

OR

Q.6 Define SVD. Explain the procedure for decomposition matrix with suitable example. (10)

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