R20

III B. TECH I SEMESTER REGULAR EXAMINATIONS, NOVEMBER - 2022
MACHINE LEARNING
(Common to CSM and AIM)

Time: 3 Hours   **Max. Marks: 70**

Note : Answer **ONE** question from each unit **(5 × 14 = 70 Marks)**
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UNIT-I

1. a) Define prediction and inference with suitable examples? [7M]

   b) Explain the parametric methods for estimating f with suitable example? [7M]

(OR)

2. a) Explain the following with suitable examples. [7M]
       i) Accuracy
       ii) MSE
       iii) Overfitting

   b) Explain any two unsupervised and two supervised machine learning applications? [7M]

UNIT-II

3. a) Explain the procedure of estimating the coefficients in multiple liner regression? [7M]

   b) Suppose we have a data set with five predictors, X1 =GPA, X2 = IQ, X3 = Gender (1 for Female and 0 for Male), X4 = Interaction between GPA and IQ, and X5 = Interaction between GPA and Gender. The response is starting salary after graduation (in thousands of dollars). [7M]
   Suppose we use least squares to fit the model, and get $\hat{\beta}0$ = 50, $\hat{\beta}1$ =20, $\hat{\beta}2$ = 0.07, $\hat{\beta}3$ = 35, $\hat{\beta}4$ = 0.01, $\hat{\beta}5$ = −10.
       a) Predict the salary of a female with IQ of 110 and a GPA of 4.0.
       b) Predict the salary of a male with IQ of 100 and a GPA of 5.0.

(OR)

4. a) Discuss about working process of linear regression and compute the salary of an employee with 8 Years of experience? [7M]

Years of Experience	2	3	5	6	9	11
Salary in Lakhs	4	5	6	8	10	12

   b) Explain the differences between KNN classifier and KNN regression? List any two applications of each? [7M]

UNIT-III

5. a) Explain Leave-One-Out Cross-Validation? Draw the schematic [7M]
        display of 4-fold Cross validation?

    b) Explain the Bias-Variance Trade-Off for k-Fold Cross- [7M]
        Validation?

(OR)

6. a) Explain different Shrinkage Methods?   [7M]

    b) Explain the PCA for dimensionality reduction?   [7M]

UNIT-IV

7. a) Write an algorithm to build a regression tree?   [7M]

    b) Explain the advantages and disadvantages of classification [7M]
        trees?

(OR)

8. a) Define Random Forest? Explain how the random forest used to [7M]
        perform classification?

    b) Explain the Bayesian Additive Regression Trees?   [7M]

UNIT-V

9. a)   Explain Support Vector Classifiers?   [7M]

    b) Explain the usage of SVM with multiple classes? Explain the [7M]
        one-versus-all classification of SVM?

(OR)

10. a) Explain K means clustering algorithm?   [7M]

    b) Explain Hierarchical Clustering algorithm?   [7M]

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