BACHELOR OF TECHNOLOGY (CBCS) (2020 COURSE)

B.Tech.Sem - V Information Technology : WINTER : 2023

SUBJECT : ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Day : Monday

Date : 04-12-2023

W-24731-2023

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) Draw neat labelled diagrams **WHEREVER** necessary.
4) Use of **Non-programmable** calculator is allowed.

Q.1 How do you find the variance of a random variable with a given probability density function? Explain with suitable example. **(10)**

OR

Find the standard deviation of following data points: **(10)**
4, 9, 11, 12, 17, 5, 8, 12, 14.

Q.2 How do you select the most appropriate clustering algorithm for a given dataset or problem and what factors should be considered in making that decision? **(10)**

OR

How do clustering algorithms handle noise and outliers in a dataset and what are some standard techniques for dealing with these issues? **(10)**

Q.3 What are the advantages and disadvantages of KNN algorithm? Explain with suitable example. **(10)**

OR

Cluster the following eight points (with x, y) representing locations into three clusters using K-means algorithms. **(10)**
A1 (2, 10), A2 (2, 5), A3(8, 4), A4 (5, 8),
A5 (7, 5), A6 (6, 4), A7 (1, 2), A8 (4, 9)

Q.4 Perform the result validation to calculate the precision, recall and F-measure for following data: **(10)**
TP = 0.5, TN = 0.4, FP = 0.4, FN= 0.3

OR

How can non-linear data be classified? Provide examples of algorithms that can be used for this purpose. **(10)**

Q.5 Evaluate the effectiveness of different regularization techniques in reducing over-fitting in regression models? **(10)**

OR

Analyze the feature importance of a Random Regression model and interpret the results taking suitable example. **(10)**

Q.6 What are the limitations of using bagging to reduce variance? Select appropriate example to justify your answer. **(10)**

OR

How would you determine whether bagging or boosting is more appropriate for a particular use case? Explain with suitable example. **(10)**

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