

BACHELOR OF TECHNOLOGY (CBCS) (2020 COURSE)
B.Tech.Sem - V INFORMATION TECHNOLOGY : WINTER : 2024
SUBJECT: ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Day : Wednesday
Date : 04/12/2024

W-24731-2024

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 if necessary.

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- Q.1 Discuss the role of Regression Coefficients in AI/ML models. How are they calculate and what do they signify about the relationship between variables? (10)
- OR
- Q.1 How is hypothesis testing applied in AI/ML? Discuss the steps involved in hypothesis testing and how it helps validate models and algorithms. (10)
- Q.2 What is the K-Nearest Neighbour (KNN) algorithm and how does it work for classification tasks? Analyse its advantages and disadvantages. (10)
- OR
- Q.2 How can Principal Component Analysis (PCA) be used for data compression and feature selection? Explain the concept of principal components and discuss how PCA can reduce dimensionality while preserving significant information in the dataset. (10)
- Q.3 How do Naïve Bayes, Logistic Regression, Support Vector Machine (SVM) and Decision tree algorithms differ in their approach to classification? Examine the underlying principles of each and discuss scenarios where one might be more effective than the other. (10)
- OR
- Q.3 What are the key advantages and limitations of Naïve Bayes as a classification algorithm? How does its assumption of feature independence affect its accuracy and in what context does it perform best? (10)
- Q.4 What are the key differences between Linear Regression and Random Forest Regression? Explore how Random Forests ensemble approach might lead to improved predictive performance. (10)
- OR
- Q.4 What are the key assumptions underlying Linear Regression model, and how can the assumptions limit its use? (10)
- Q.5 Analyse how Regularization techniques like Lasso and Ridge regression affect model complexity and feature selection. (10)
- OR
- Q.5 Discuss various features selection methods, such as filter-based, wrapper-based and embedded approaches. (10)
- Q.6 What distinguishes the Random Forest algorithm from other ensemble methods? Discuss how the combination of multiple decision trees and random feature selection contributes to a reduction in model correlation. (10)
- OR
- Q.6 What is the bias-variance trade-off in the context of supervised learning algorithms? Discuss how bagging, boosting and stacking attempt to address this trade-off (10)
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