Exam. Code: 0924
Sub. Code: 33562

2055

B.E. (Information Technology)-6th Semester

PCIT-602: Machine Learning

Time allowed: 3 Hours | Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

1. Attempt the following:-
   a) What is the difference between supervised and unsupervised learning?
   b) Name any two popular machine learning software tools.
   c) What is the purpose of the normal equation in regression models?
   d) Define maximum likelihood estimation (MLE) in the context of generative learning.
   e) How does gradient descent help in logistic regression?
   f) What is the role of activation functions in neural networks?
   g) Explain the concept of hierarchical clustering in unsupervised learning.
   h) What is principal component analysis (PCA), and why is it used?
   i) What does the confusion matrix represent in model evaluation?
   j) Explain the elbow method and its application in clustering. (10x1)

UNIT - I

II. Compare parametric regression models with non-parametric regression models. Explain the advantages and limitations of both approaches with examples. (10)

III. Discuss the bias-variance tradeoff in machine learning. How does it impact model performance? Suggest methods to reduce bias and control variance. (10)

IV. Describe the backpropagation algorithm used in training neural networks. Explain the role of gradients in weight updates with an example. (10)

UNIT - II

V. Explain the K-means clustering algorithm. Discuss the impact of initial centroid selection and strategies to improve its performance. (10)

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VI. Discuss Principal Component Analysis (PCA) in detail. How does PCA help in reducing dimensionality while preserving variance? Provide a step-by-step explanation. (10)

VII. What are the different classification evaluation metrics? Explain precision, recall, F1-score, and ROC-AUC curve with their mathematical formulations. (10)

x-x-x