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**PRESIDENCY UNIVERSITY
BENGALURU**

Department of Research & Development

Mid - Term Examinations - AUGUST 2024

Odd Semester: Ph.D. Course Work

Course Code: EEE819

Course Name: Predictive Analytics Algorithms for Electrical Engineering

Department: EEE

Date: 13-08-2024

Time: 09.30am to 11.00am

Max Marks: 50

Weightage: 25%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
 - (ii) Do not write any matter on the question paper other than roll number.
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PART A (THOUGHT PROVOKING)

Answer all the Questions. Each question carries 5marks.(4Qx 5M=20M)

1. Identify the scenario in which linear regression is used as a machine-learning algorithm. Explain the types of linear regression. (CO:01 BL: Comprehension)
2. Probability distributions play a crucial role in modeling different types of data in machine learning. For an application having continuous data, summarize the different type of probability distributions that can be applied.(CO:01 BL: Comprehension)
3. In what scenarios might a linear classifier be preferred over non-linear classifiers, despite the potential for lower accuracy(CO:02 BL: Comprehension)
4. What is a Bayesian Network, and how does it represent conditional dependencies among variables? (CO:02 BL: Comprehension)

PART B (PROBLEM SOLVING)

Answer all the Questions. Each question carries 10 marks. (3Qx 10M= 30M)

5. Find the eigenvalues and eigenvectors of the matrix $D = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$. How do eigenvalues and eigenvectors facilitate dimensionality reduction in Principal Component Analysis. (CO:01BL: Application)

6. Given a dataset with two classes, explain how logistic regression can be used to classify the data. What is the decision boundary in logistic regression?
What performance metrics would you use to evaluate a linear classifier (CO:02 BL: Application)

7. Given a dataset with two classes, Class A and Class B, and two features X1 and X2, describe the steps to perform Linear Discriminant Analysis and obtain the decision boundary.
(CO:02BL: Application)