CBCS SCHEME

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21EC744

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Machine Learning with Python

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Write a note on Supervised learning with a suitable example. **(05 Marks)**

b. Write a neat diagram, explain the roadmap for building machine learning systems. **(07 Marks)**

c. Write a Python code snippet to implement the perceptron object. **(08 Marks)**

OR

2 a. Write a note on classification and regression problems. **(05 Marks)**

b. State the perceptron learning rule and show that it reduces error in a binary classification problem. **(08 Marks)**

c. Starting from the cost function of the ADALINE unit obtain the expression for weight update. **(07 Marks)**

Module-2

3 a. Define the following terms with relevant expressions:
i) Gini impurity ii) Entropy iii) Classification error **(06 Marks)**

b. With relevant expressions and diagram, explain the concept of maximizing margins using support vector machines. **(08 Marks)**

c. Enlist and explain the strategies that can be employed to select meaningful features. **(06 Marks)**

OR

4 a. Write a python code to implement the sigmoid function. Compute the values from –7 to +7 in step of 1 and sketch the function. **(06 Marks)**

b. Discuss the strategies employed to handle missing data along with the relevant python functions. **(07 Marks)**

c. Explain the KNN algorithm with the steps involved. Indicate the values that the test sample ⓣ as in Fig.Q4(c), k = 8, k = 10.

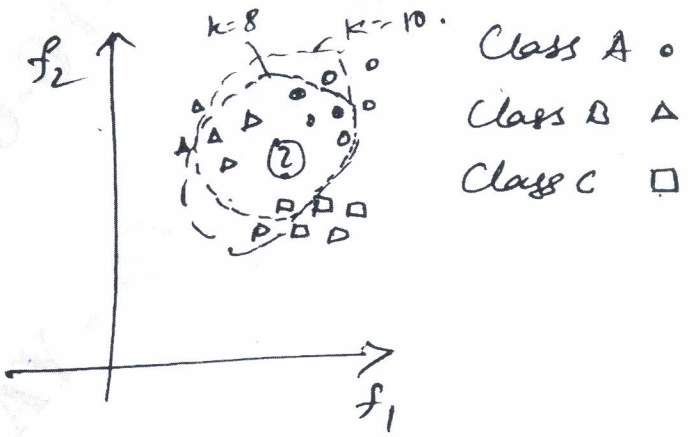

Fig.Q4(c) **(07 Marks)**

Module-3

5 a. How does the diagnosis of the bias variance problem be carried out with the help of learning curves? Explain. **(06 Marks)**

b. List the steps involved in linear discriminant analysis with relevant expressions. **(08 Marks)**

c. Write the python code to import IMdB movie review database and transform words to feature vectors (assume the movie data is stored in a CSV file). **(06 Marks)**

OR

6 a. Explain K-fold cross validation with suitable diagrams and expressions. **(06 Marks)**

b. Write a python pseudocode to classify data that is distributed as concentric circles. **(08 Marks)**

c. Explain latent Dirichlet allocation considering the example of IMdB movie review dataset. **(06 Marks)**

Module-4

7 a. Write a code snippet to serialize the fitted scikit learn estimators. **(07 Marks)**

b. Enlist the steps involved in setting up of SQLite database for data storage. **(07 Marks)**

c. Write a note on correlation matrix considering Housing dataset. **(06 Marks)**

OR

8 a. Explain how a robust regression model can be built using RANSAC. **(07 Marks)**

b. With relevant expression contrast the differences between ridge regression, LASSO and Elasticnet. **(08 Marks)**

c. List the steps involved in setting up a web application using Flask. **(05 Marks)**

Module-5

9 a. With neat diagram and expression explain the k-means clustering. **(10 Marks)**

b. Write a helper function pseudocode that loads MNIST database and returns labels and images. **(10 Marks)**

OR

10 a. Summarize the back propagation method with the help of a neat diagram. **(10 Marks)**

b. Explain the process of quantification of quality of clustering using Silhouette plots. **(10 Marks)**

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