LAB ASSIGNMENT-9

Title: Write a program to demonstrate the working of decision tree based CART algorithm. Build the decision tree and classify a new sample using suitable dataset. Compare the performance with that of ID, C4.5, and CART in terms of accuracy, recall, precision and sensitivity.

Objective: The objective of this lab assignment is to implement the decision tree-based Classification and Regression Trees (CART) algorithm and compare its performance with other decision tree algorithms, namely ID3 and C4.5, in terms of accuracy, recall, precision, and sensitivity. The assignment includes building decision trees, classifying new samples, and evaluating the models using a suitable dataset.

Dataset: Load a dataset of your choice or generate a synthetic dataset.

Tasks:

1) Implement the CART algorithm from scratch.
2) Build decision trees using the implemented CART, as well as the scikit-learn library's implementations for ID3 and C4.5.
3) Evaluate the performance of each decision tree model on the testing dataset.
4) Compare the performance of the CART, ID3, and C4.5 decision tree algorithms based on the evaluation metrics

Submission:
Prepare a PDF file that covers all the tasks mentioned above. Include code snippets, visualizations, and tables to support your analysis. Clearly explain the steps you took, the results you obtained, and your interpretation of the findings.

Additional Notes:
You can choose a dataset that aligns with your interests.