MLT LAB

Q1. Pre-Pruning and Post-Pruning Techniques in Decision Trees

1. Load the Iris dataset using sklearn.datasets.load_iris.
2. Split the dataset into training (70%) and testing (30%) sets.
3. Build a Decision Tree Classifier using sklearn.tree.DecisionTreeClassifier.

(a) Implement Pre-Pruning:
- Use parameters such as max_depth, min_samples_split, and min_samples_leaf to limit tree growth.
- Train and evaluate the model accuracy on both training and testing sets.

(b) Implement Post-Pruning :
- Use the parameter ccp_alpha to prune the tree.
- Re-train and evaluate the model.

(c) Display and Compare:
- Tree depth and number of nodes before and after pruning.
- Accuracy and confusion matrix for both models.

Q2. Naive Bayes on Iris Dataset

1. Load the Iris dataset using sklearn.datasets.load_iris.
2. Split the dataset into training (70%) and testing (30%) sets.

(a) Train a Gaussian Naive Bayes classifier (sklearn.naive_bayes.GaussianNB).
Evaluate accuracy and display the confusion matrix.

(b) Compare with Another Naive Bayes Variant:
- Train a Multinomial Naive Bayes model on the same dataset.
- Compare the performance of both models using accuracy and F1-score.