Evaluation Report

Decision Tree – Bank Marketing Subscription Prediction

Objective:
The objective of this task is to predict whether a customer will subscribe to a bank term deposit using a Decision Tree Classifier. The model aims to learn interpretable decision rules based on customer demographic and campaign-related features.

Dataset Description:
The Bank Marketing Dataset (Kaggle) was used for this task. It contains customer-related information such as age, job, marital status, education, balance, housing loan, personal loan, contact details, campaign information, and previous marketing outcomes.

Data Preprocessing:
Missing values represented as "unknown" were replaced using mode values. Categorical features were encoded using Label Encoding. The dataset was split into training and testing sets in an 80:20 ratio.

Model Used:
Algorithm**:** Decision Tree Classifier
Criterion**:** Gini
Impurity Max Depth**:** 4

Results:
The model achieved balanced training and testing accuracy, indicating good generalization without overfitting.

Decision Rules:
Customers with longer call durations and successful previous outcomes are more likely to subscribe. Short call durations and failed outcomes indicate low subscription probability.

Conclusion:
The Decision Tree model performed effectively and provided interpretable rules useful for business decision-making.