Evaluation Report – Decision Tree Model

Dataset Used

The model was trained and evaluated using the **Kaggle Bank Marketing Dataset**, which contains customer-related attributes to predict whether a client will subscribe to a term deposit.

Model Performance

The Decision Tree Classifier was evaluated using **training accuracy** and **testing accuracy** to assess both learning capability and generalization performance.

Training Accuracy: 0.7900

Testing Accuracy: 0.7721

Analysis of Results

The training and testing accuracies are **very close**, with a difference of approximately **2%**, indicating that the model generalizes well to unseen data.

There is **no significant overfitting**, as the model does not show a large performance drop on the test dataset.

The slightly lower accuracy is expected because:

- The dataset is **imbalanced**, with more "no" subscription cases.
- The decision tree depth was intentionally limited to avoid overfitting and maintain interpretability.

Overfitting Check

Since the testing accuracy closely follows the training accuracy, the model demonstrates **stable and balanced performance**. This confirms that controlling the max_depth parameter effectively reduced overfitting.

Conclusion

The Decision Tree model achieved **reasonable and reliable accuracy** on both training and testing data. The results indicate that the model is suitable for understanding customer subscription behavior and provides interpretable decision rules, fulfilling the objectives of the task.