Decision Tree Classifier

1. Implement a Decision Tree and compute its accuracy

Two Decision Tree classifiers were trained using the 'entropy' and 'gini' splitting criteria on data from 2020 to 2022, and tested on 2023–2024.

• Accuracy (entropy): 78.10%

• Accuracy (gini): 80.00%

2. Compute the confusion matrix

• Entropy Confusion Matrix: [[52, 7], [10, 36]]

• Gini Confusion Matrix: [[53, 6], [9, 37]]

3. What is your true positive rate (sensitivity or recall)?

• TPR (entropy): 78.26%

• TPR (gini): 80.43%

4. What is your true negative rate (specificity)?

• TNR (entropy): 88.14%

• TNR (gini): 89.83%

5. Implement a trading strategy and compare with Buy-and-Hold

• Decision Tree Strategy (entropy): $986.30

• Decision Tree Strategy (gini): $1012.67

• Buy-and-Hold Strategy: $925.86

6. Do the same if you use 'gini' criteria

The gini-based tree produced slightly better performance in all metrics and trading value.

7. Which criteria is better (accuracy, TPR, TNR)?

The Decision Tree using "gini" criterion performed slightly better than "entropy" in terms of accuracy, true positive rate, and trading return. Therefore, "gini" is the better choice for this dataset.

- Higher Accuracy (80.00%)
- Higher TPR (80.43%)
- Higher TNR (89.83%)