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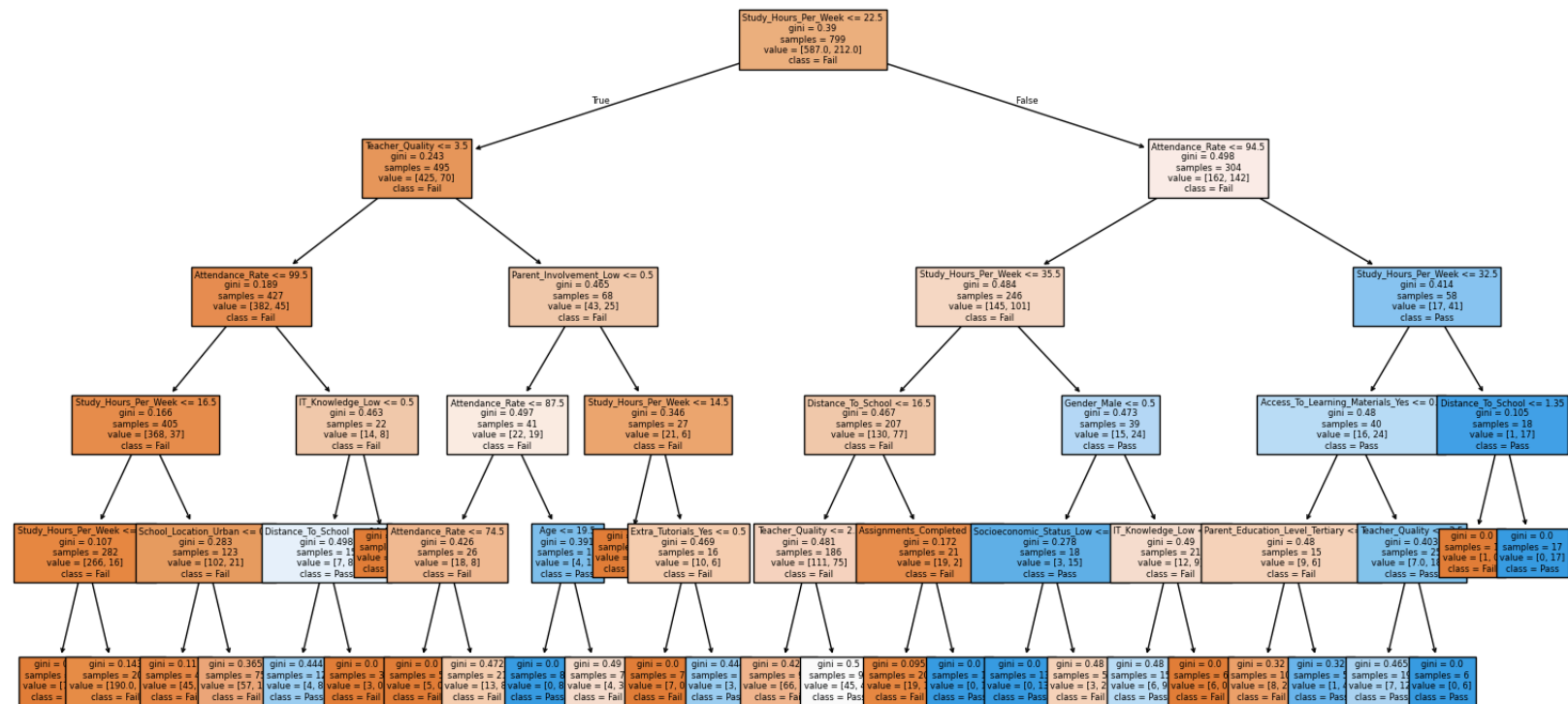
Sec:1

Machine Learning Lab Assignment-9

1)

Decision tree(Scikit Learn)

My Decision Tree

```
PS D:\class\SEM 5\ML\lab9> python -u "d:\class\SEM 5\ML\LA09\S20220010170_A9.py"
Custom Decision Tree Structure:
Split: [X0 < 23]
| Split: [X2 < 4]
| | Split: [X1 < 100]
| | | Split: [X0 < 17]
| | | | Split: [X0 < 7]
| | | | | Predict: 0
| | | | | Predict: 0
| | | | Split: [X7 < True]
| | | | | Predict: 0
| | | | | Predict: 0
| | | Split: [X12 < True]
| | | | Split: [X3 < 14.9]
| | | | | Predict: 1
| | | | | Predict: 0
| | | | Predict: 0
| | Split: [X10 < True]
| | | Split: [X1 < 88]
| | | | Split: [X1 < 76]
| | | | | Predict: 0
| | | | | Predict: 0
| | | | Split: [X4 < 20]
| | | | | Predict: 1
| | | | | Predict: 0
| | | Split: [X0 < 15]
| | | | Split: [X0 < 13]
| | | | | Predict: 0
| | | | | Predict: 0
| | | | Split: [X8 < True]
| | | | | Predict: 0
| | | | | Predict: 1
| Split: [X1 < 95]
| | Split: [X0 < 36]
| | | Split: [X3 < 16.6]
| | | | Split: [X2 < 3]
| | | | | Predict: 0
| | | | | Predict: 1
| | | | Split: [X5 < 5]
| | | | | Predict: 0
| | | | | Predict: 1
| | | Split: [X14 < True]
| | | | Split: [X15 < True]
| | | | | Predict: 1
| | | | | Predict: 0
| | | | Split: [X12 < True]
| | | | | Predict: 1
| | | | | Predict: 0
| | Split: [X0 < 33]
| | | Split: [X9 < True]
| | | | Split: [X18 < True]
| | | | | Predict: 0
| | | | | Predict: 1
| | | | Split: [X2 < 4]
| | | | | Predict: 1
| | | | | Predict: 1
| | | Split: [X3 < 2.1]
| | | | Predict: 0
| | | | Split: [X0 < 40]
| | | | | Predict: 1
| | | | | Predict: 1
Custom Decision Tree -> Accuracy: 0.690, Precision: 0.492, Recall: 0.492, F1-Score: 0.492
Scikit-learn Decision Tree -> Accuracy: 0.690, Precision: 0.492, Recall: 0.492, F1-Score: 0.492
```

The Accuracy Precision Recall and F1-Scores comparison between my decision tree and Scikit Learn

```
| | | | | Predict: 1
Custom Decision Tree -> Accuracy: 0.690, Precision: 0.492, Recall: 0.492, F1-Score: 0.492
Scikit-learn Decision Tree -> Accuracy: 0.690, Precision: 0.492, Recall: 0.492, F1-Score: 0.492
```

2)Random Forest Accuracy,Precision,Recall, F1-Score and Confusiopn matrix

```
Random Forest -> Accuracy: 0.725, Precision: 0.875, Recall: 0.115, F1-Score: 0.203
Confusion Matrix:
 [[138    1]
 [ 54    7]]
Single Decision Tree -> Accuracy: 0.690, Precision: 0.492, Recall: 0.492, F1-Score: 0.492
```

Visualization:

Random Forest Accuracy vs Number of Trees