lab-13-hajira-imran-44594

April 29, 2025

```python
[1]: #import libraries
     import pandas as pd
     from sklearn import tree
     import matplotlib.pyplot as plt
```

```python
[2]: #Upload the CSV
     from google.colab import files
     uploaded = files.upload()
```

    <IPython.core.display.HTML object>

    Saving study_dataset.csv to study_dataset.csv

```python
[3]: #read file
     data = pd.read_csv("study_dataset.csv")
```

```python
[4]: data.columns
```

```python
[4]: Index(['Hours_Studied', 'Sleep_Hours', 'Tuition_Attended', 'Pass'],
           dtype='object')
```

```python
[5]: #separate features and labels
     X = data.drop("Pass", axis=1)   # Features: Hours_Studied, Sleep_Hours,␣
      ↪Tuition_Attended
     Y = data["Pass"]                # Labels: Pass (0/1)
```

```python
[6]: #create and train the decision tree model
     clf = tree.DecisionTreeClassifier()
     clf = clf.fit(X, Y)
```

```python
[7]: #make a prediction
     sample = [[3, 7, 1]]   # Studied 3 hours, Slept 7 hours, Attended tuition
     prediction = clf.predict(sample)
```

    /usr/local/lib/python3.11/dist-packages/sklearn/utils/validation.py:2739:
    UserWarning: X does not have valid feature names, but DecisionTreeClassifier was
    fitted with feature names
      warnings.warn(

```
[8]: print("Will the student pass? (1 = Yes, 0 = No):", prediction[0])
```

Will the student pass? (1 = Yes, 0 = No): 1

```
[9]: # visualize the Decision Tree
     plt.figure(figsize=(12, 8))
     tree.plot_tree(clf,
                    feature_names=["Hours_Studied", "Sleep_Hours",⏎
       ↪"Tuition_Attended"],
                    class_names=["Fail", "Pass"],
                    filled=True)
     plt.title("Decision Tree - Student Pass Prediction")
     plt.show()
```

Decision Tree - Student Pass Prediction

Tuition_Attended <= 0.5
gini = 0.5
samples = 8
value = [4, 4]
class = Fail

True   False

gini = 0.0   gini = 0.0
samples = 4   samples = 4
value = [4, 0]   value = [0, 4]
class = Fail   class = Pass