Decision tree classification methodologies

Using iris dataset

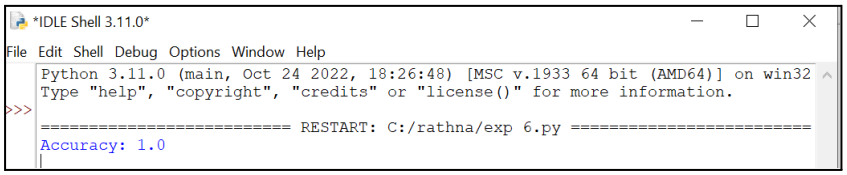
Prog - 6

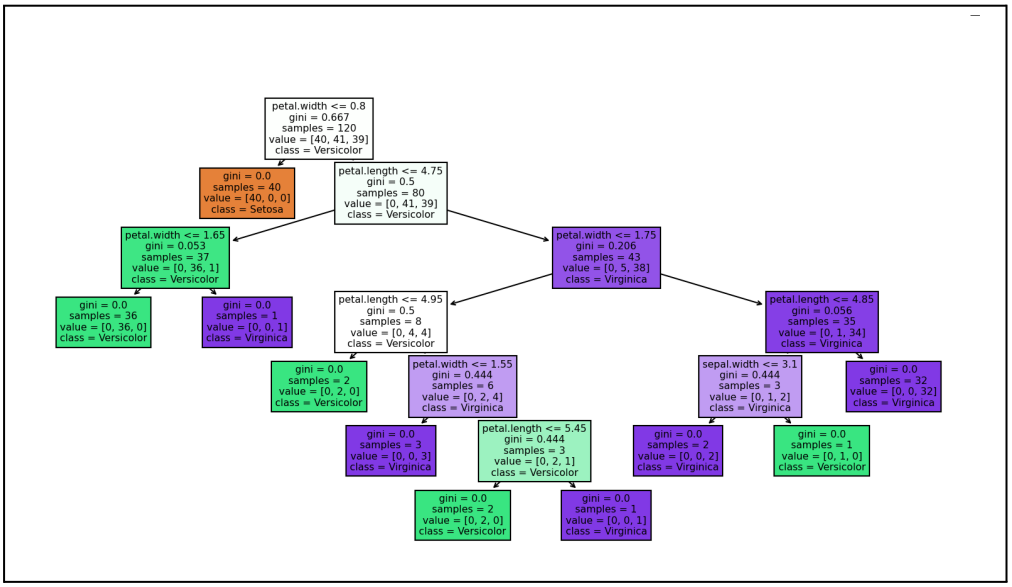
Aim: Employing Decision tree Classification methodologies to the iris dataset and plotting the result.

Source code:

```
import pandas as pd
import numpy as np
from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn import tree
import matplotlib.pyplot as plt

df = pd.read_csv('C:/iris.csv')

x = df.drop('variety', axis=1)
y = df['variety']

x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.2, random_state=42)
dt = DecisionTreeClassifier()
dt.fit(x_train, y_train)
y_pred = dt.predict(x_test)
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:",accuracy)

fig, ax = plt.subplots(figsize=(10,10))

tree.plot_tree(dt,feature_names=x.columns,class_names = np.unique(y),filled =
True, ax = ax)

plt.show()
```

Output:


IDLE Shell 3.11.0
File Edit Shell Debug Options Window Help
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/rathna/exp 6.py ==========
Accuracy: 1.0


petal.width <= 0.8
gini = 0.667
samples = 120
value = [40, 41, 39]
class = Versicolor
gini = 0.0
samples = 40
value = [40, 0, 0]
class = Setosa
petal.length <= 4.75
gini = 0.5
samples = 80
value = [0, 41, 39]
class = Versicolor
petal.width <= 1.65
gini = 0.053
samples = 37
value = [0, 36, 1]
class = Versicolor
petal.width <= 1.75
gini = 0.206
samples = 43
value = [0, 5, 38]
class = Virginica
gini = 0.0
samples = 36
value = [0, 36, 0]
class = Versicolor
gini = 0.0
samples = 1
value = [0, 0, 1]
class = Virginica
petal.length <= 4.95
gini = 0.5
samples = 8
value = [0, 4, 4]
class = Versicolor
petal.length <= 4.85
gini = 0.056
samples = 35
value = [0, 1, 34]
class = Virginica
gini = 0.0
samples = 2
value = [0, 2, 0]
class = Versicolor
petal.width <= 1.55
gini = 0.444
samples = 6
value = [0, 2, 4]
class = Virginica
sepal.width <= 3.1
gini = 0.444
samples = 3
value = [0, 1, 2]
class = Virginica
gini = 0.0
samples = 32
value = [0, 0, 32]
class = Virginica
gini = 0.0
samples = 3
value = [0, 0, 3]
class = Virginica
petal.length <= 5.45
gini = 0.444
samples = 3
value = [0, 2, 1]
class = Versicolor
gini = 0.0
samples = 2
value = [0, 0, 2]
class = Virginica
gini = 0.0
samples = 1
value = [0, 1, 0]
class = Versicolor
gini = 0.0
samples = 2
value = [0, 2, 0]
class = Versicolor
gini = 0.0
samples = 1
value = [0, 0, 1]
class = Virginica