EX.NO : 09 **DATE :**

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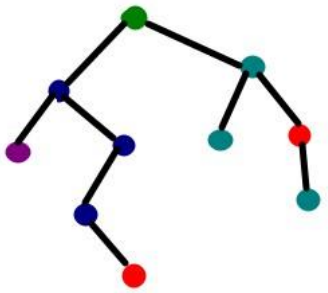
IMPLEMENTATION OF DECISION TREE CLASSIFICATION TECHNIQUES

Decision Tree is one of the most powerful and popular algorithm. Decision-tree algorithm falls under the category of supervised learning algorithms. It works for both continuous as well as categorical output variables.



AIM:

To implement a decision tree classification technique for gender classification using python.

EXPLANATION:

- Import tree from sklearn.
- Call the function DecisionTreeClassifier() from tree
- Assign values for X and Y.
- Call the function predict for Predicting on the basis of given random values for each given feature.
- Display the output.

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CODE:

```
import numpy as np
from sklearn.datasets import load_iris
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
import matplotlib.pyplot as plt
from sklearn import tree

data = load_iris()
X = data.data
y = data.target

X = X[y != 2]
y = y[y != 2]

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

model = DecisionTreeClassifier(criterion='gini', max_depth=3, random_state=42)
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
print(f"Accuracy: {accuracy:.2f}")

print("\nClassification Report:")
print(classification_report(y_test, y_pred, target_names=['Setosa', 'Versicolor']))

print("\nConfusion Matrix:")
print(confusion_matrix(y_test, y_pred))

plt.figure(figsize=(10,8))
tree.plot_tree(model, filled=True, feature_names=data.feature_names, class_names=['Setosa', 'Versicolor'], rounded=True)
plt.show()
```

OUTPUT:

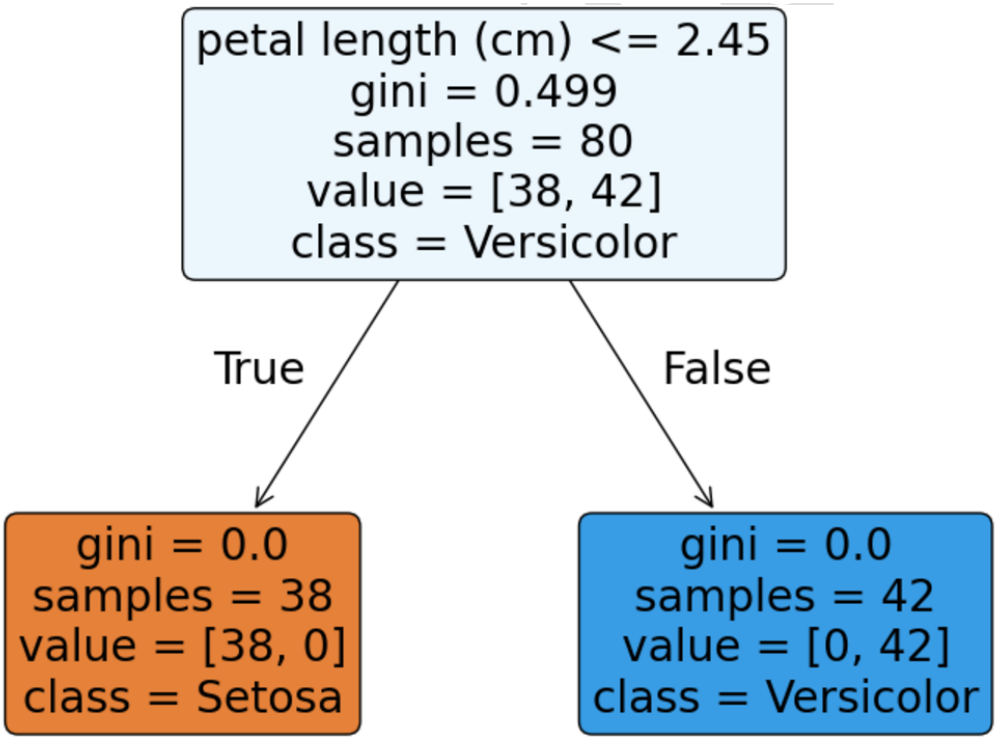
```
Accuracy: 1.00

Classification Report:
              precision    recall  f1-score   support

      Setosa       1.00      1.00      1.00        12
  Versicolor       1.00      1.00      1.00         8

    accuracy                           1.00        20
   macro avg       1.00      1.00      1.00        20
weighted avg       1.00      1.00      1.00        20


Confusion Matrix:
[[12  0]
 [ 0  8]]
```



RESULT:

Thus, the Decision Tree Classification program has been implemented successfully.