

EXPERIMENT-7

A python program to implement decision tree

AIM:

To code a python program to implement decision tree.

CODE:

```
# Import required libraries from sklearn.datasets import load_iris
from sklearn.tree import DecisionTreeClassifier, plot_tree
import numpy as np import matplotlib.pyplot as plt

# Load the Iris dataset iris = load_iris()

# Parameters n_classes = 3 plot_colors = "ryb" plot_step = 0.02

# Create a figure for decision boundaries plt.figure(figsize=(12, 8))

# Loop through all pairs of features for pairidx, pair in enumerate([[0,
1], [0, 2], [0, 3], [1, 2], [1, 3], [2, 3]]):
    X = iris.data[:, pair]
    y = iris.target

    # Train Decision Tree on the selected features    clf =
    DecisionTreeClassifier().fit(X, y)

    # Define plot limits    x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
    y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
```

```

# Create meshgrid    xx, yy = np.meshgrid(np.arange(x_min,
x_max, plot_step), np.arange(y_min, y_max, plot_step))

)

# Predict over the grid

Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])

Z = Z.reshape(xx.shape)

# Create subplot    plt.subplot(2, 3, pairidx + 1)
plt.tight_layout(h_pad=0.5, w_pad=0.5, pad=2.5)

# Plot decision boundary    cs = plt.contourf(xx, yy, Z,
cmap=plt.cm.RdYlBu)

# Plot the training points    for i, color in zip(range(n_classes),
plot_colors):

    idx = np.where(y == i)

    plt.scatter(X[idx, 0],
X[idx, 1], c=color,
label=iris.target_names[i],
edgecolor="black",
s=15

)

# Label axes    plt.xlabel(iris.feature_names[pair[0]])
plt.ylabel(iris.feature_names[pair[1]])

# Add a common title plt.suptitle("Decision Surface of Decision Trees
(Iris Dataset)") plt.legend(loc="lower right", borderpad=0,
handletextpad=0) plt.show()

```

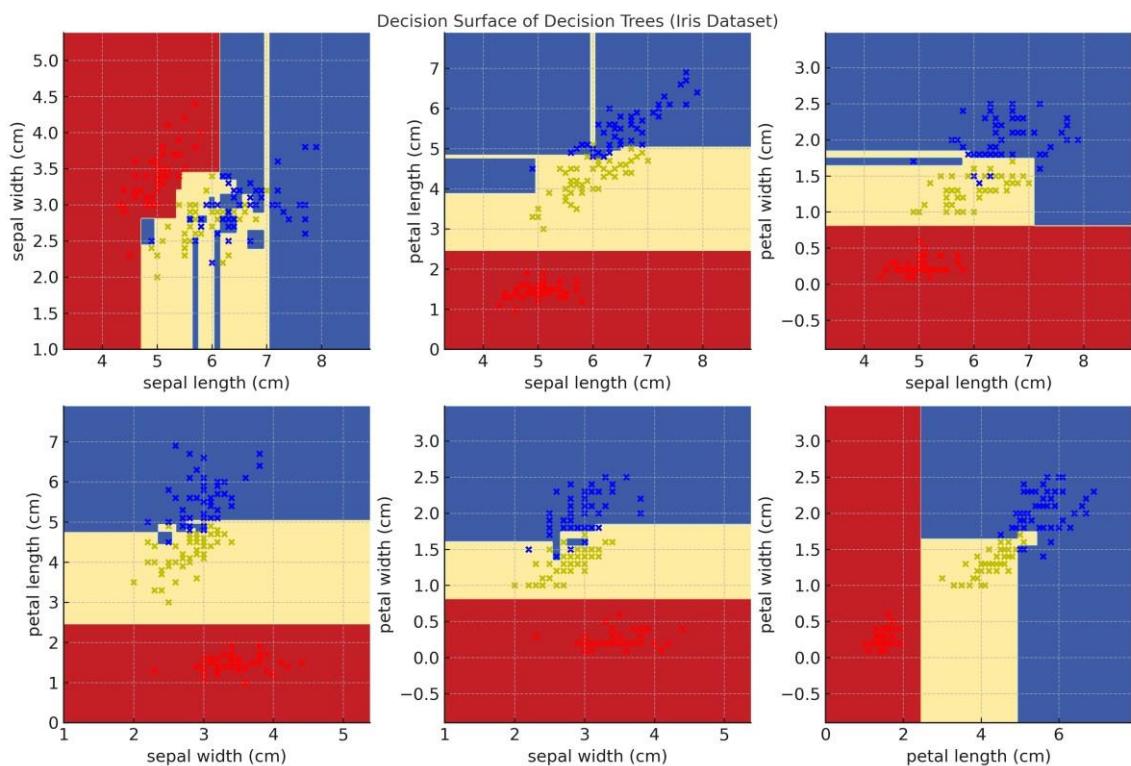
```

# Plot the Decision Tree trained on all features

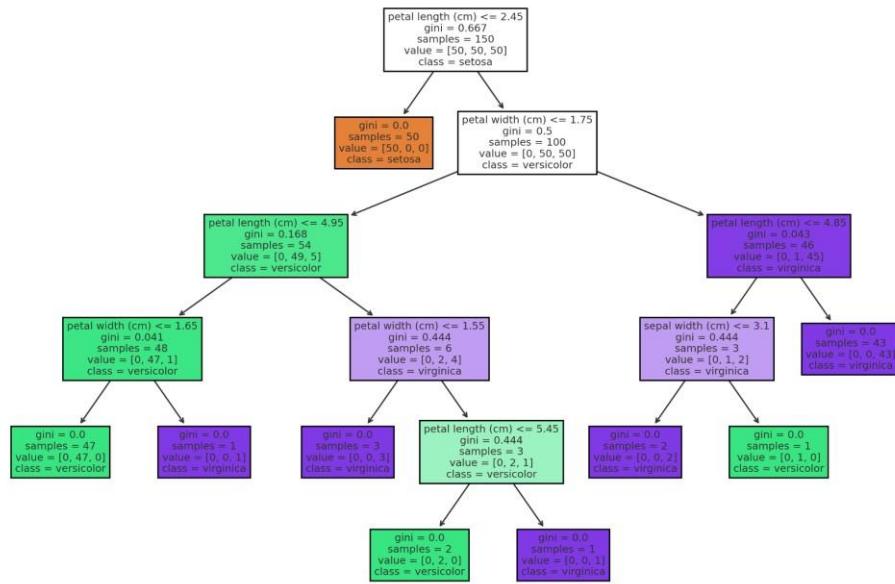
plt.figure(figsize=(12, 8)) clf_full =
DecisionTreeClassifier().fit(iris.data, iris.target)
plot_tree(clf_full, filled=True,
feature_names=iris.feature_names,
class_names=iris.target_names) plt.title("Decision Tree
Trained on All Iris Features") plt.show()

```

OUTPUT:



Decision Tree Trained on All Iris Features



RESULT:

Thus python program to implement decision tree is written and the output is verified successfully.