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# Practical 5: Random forest model

#First, start with importing necessary Python packages −
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

#Next, download the iris dataset from its weblink as follows −
path = "https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data"


#Next, we need to assign column names to the dataset as follows −
headernames = ['sepal-length', 'sepal-width', 'petal-length', 'petal-width', 'Class']


#Now, we need to read dataset to pandas dataframe as follows −
dataset = pd.read_csv(path, names = headernames)
dataset.head()

#Data Preprocessing will be done with the help of following script lines.
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, 4].values



#Next, we will divide the data into train and test split. The followingcode will split the dataset into 70% tra
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.30)


#Next, train the model with the help of RandomForestClassifier class of sklearn as follows −
from sklearn.ensemble import RandomForestClassifier
classifier = RandomForestClassifier(n_estimators = 50)
classifier.fit(X_train, y_train)
RandomForestClassifier(n_estimators=50)
#At last, we need to make prediction. It can be done with the help of following script −
y_pred = classifier.predict(X_test)


#Next, print the results as follows −
from sklearn.metrics import classification_report, confusion_matrix, accuracy_score
result = confusion_matrix(y_test, y_pred)
print("Confusion Matrix:")
print(result)
result1 = classification_report(y_test, y_pred)
print("Classification Report:",)
print (result1)
result2 = accuracy_score(y_test,y_pred)
print("Accuracy:",result2)
```

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Confusion Matrix:
[[16  0  0]
 [ 0 14  1]
 [ 0  2 12]]
Classification Report:
                 precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        16
Iris-versicolor       0.88      0.93      0.90        15
 Iris-virginica       0.92      0.86      0.89        14

       accuracy                           0.93        45
      macro avg       0.93      0.93      0.93        45
   weighted avg       0.93      0.93      0.93        45

Accuracy: 0.9333333333333333
```