codealpha-task-1

September 17, 2024

CODEALPHA TASK-01

Iris flower has three species; setosa, versicolor, and virginica, which differs according to their measurements. Now assume that you have the measurements of the iris flowers according to their species, and here your task is to train a machine learning model that can learn from the measurements of the iris species and classify them Although the Scikit-learn library provides a dataset for iris flower classification, you can also download the same dataset from here for the task of iris flower classification with Machine Learning.

[6]:

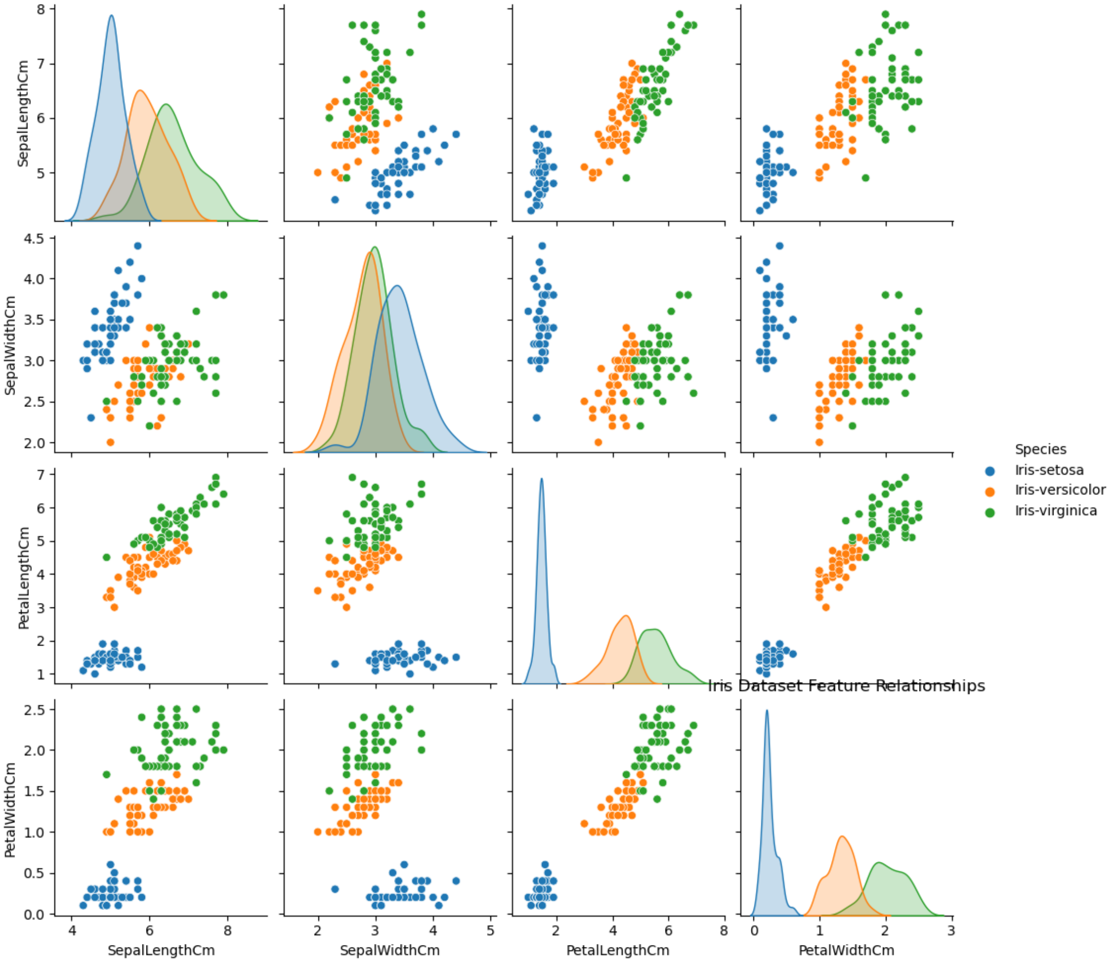
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report,␣
 ↪confusion_matrix

# Load the dataset
data_path ="C:\\Users\\Harshika k\\Downloads\\Iris.csv"
df = pd.read_csv(data_path)

# Inspect the first few rows of the dataset
print(df.head())

# Prepare the data
X = df[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']]
y = df['Species']

# Visualize the data using a pairplot
sns.pairplot(df, hue='Species', vars=['SepalLengthCm', 'SepalWidthCm',␣
 ↪'PetalLengthCm', 'PetalWidthCm'])
plt.title('Iris Dataset Feature Relationships')
plt.show()

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3,␣
 ↪random_state=42)
```

```python

# Standardize the features
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)

# Train a RandomForestClassifier
model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

# Make predictions on the test set
y_pred = model.predict(X_test)

# Evaluate the model
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy:.2f}')

# Print classification report
print('Classification Report:')
print(classification_report(y_test, y_pred))

# Confusion Matrix
conf_matrix = confusion_matrix(y_test, y_pred)
print('Confusion Matrix:')
print(conf_matrix)

# Visualize the confusion matrix
plt.figure(figsize=(7, 5))
sns.heatmap(conf_matrix, annot=True, fmt='d', cmap='Blues', xticklabels=df['Species'].unique(), yticklabels=df['Species'].unique())
plt.title('Confusion Matrix')
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.show()

# Feature Importance Plot
feature_importances = model.feature_importances_
features = ['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']

plt.figure(figsize=(8, 6))
plt.barh(features, feature_importances, color='skyblue')
plt.title('Feature Importance in RandomForestClassifier')
plt.xlabel('Importance Score')
plt.ylabel('Features')
plt.show()
```

```
   Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm      Species
```

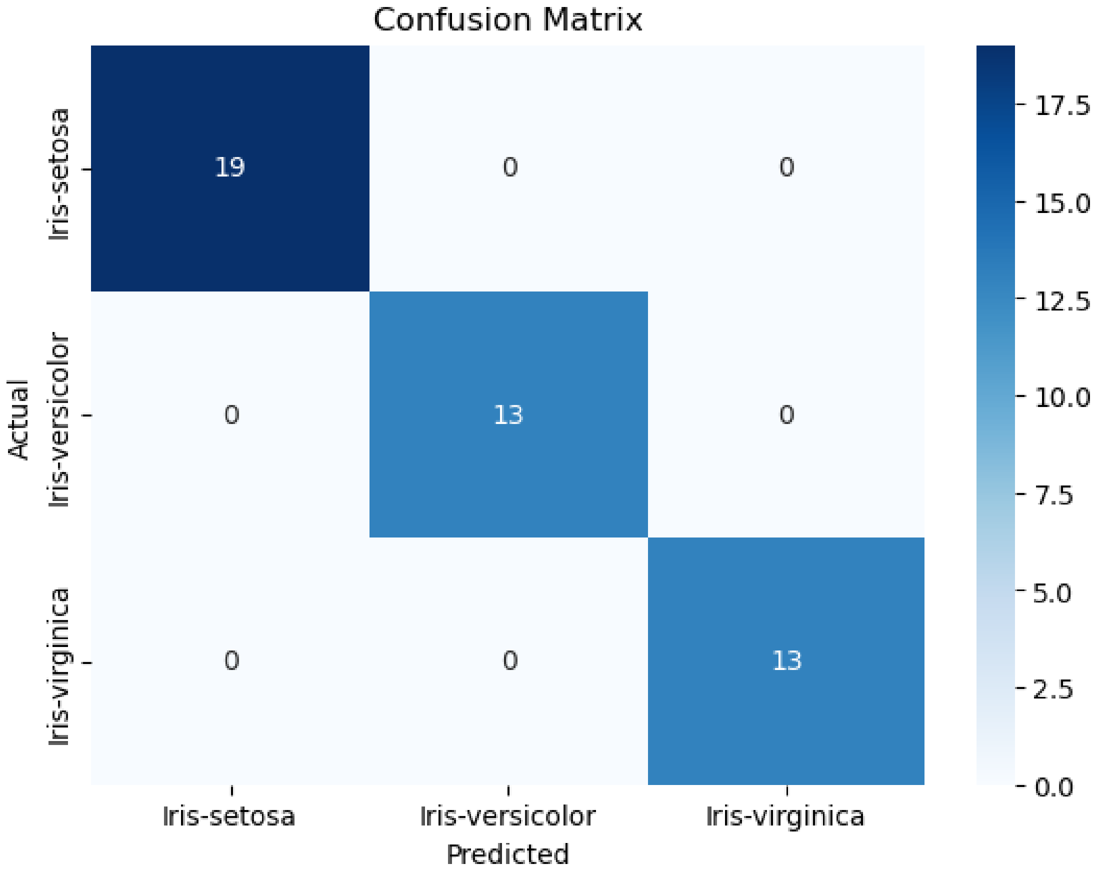
```
0   1           5.1          3.5           1.4           0.2  Iris-setosa
1   2           4.9          3.0           1.4           0.2  Iris-setosa
2   3           4.7          3.2           1.3           0.2  Iris-setosa
3   4           4.6          3.1           1.5           0.2  Iris-setosa
4   5           5.0          3.6           1.4           0.2  Iris-setosa
```

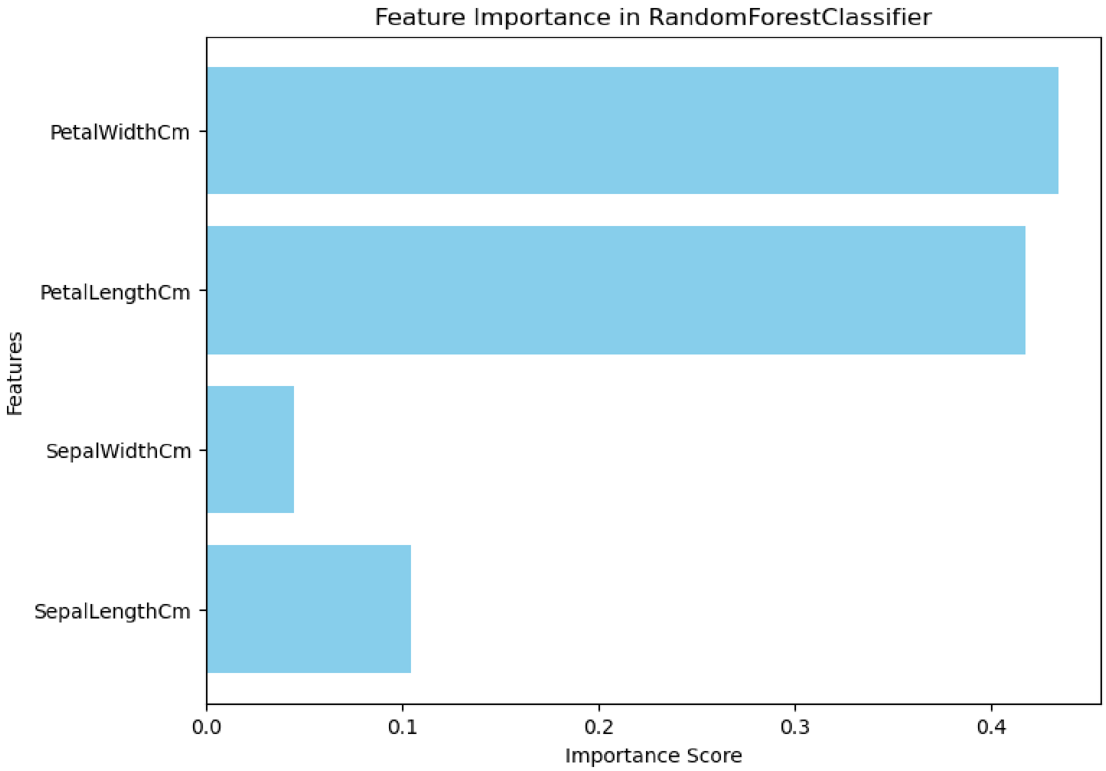
```
C:\Users\Harshika k\anaconda3\Lib\site-packages\seaborn\axisgrid.py:118:
UserWarning: The figure layout has changed to tight
  self._figure.tight_layout(*args, **kwargs)
```



```
Accuracy: 1.00
Classification Report:
                 precision    recall  f1-score   support

    Iris-setosa       1.00      1.00      1.00        19
Iris-versicolor       1.00      1.00      1.00        13
 Iris-virginica       1.00      1.00      1.00        13
```

```
    accuracy                           1.00        45
   macro avg       1.00      1.00      1.00        45
weighted avg       1.00      1.00      1.00        45

Confusion Matrix:
[[19  0  0]
 [ 0 13  0]
 [ 0  0 13]]
```




Feature Importance in RandomForestClassifier
PetalWidthCm
PetalLengthCm
SepalWidthCm
SepalLengthCm
Features
0.0
0.1
0.2
0.3
0.4
Importance Score

[ ]: