datascience-task3

January 9, 2024

1 Importing necessary libraries

[1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, classification_report,␣
 ↪confusion_matrix
```

2 Load the Iris dataset

[2]:
```
df=pd.read_excel("E:\\codsoft Data science\\IRIS.xlsx")
```

[3]:
```
# Display the first few rows of the dataset

df.head()
```

[3]:

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

[4]:
```
df.describe()
```

[4]:

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

[5]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 5 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   sepal_length  150 non-null    float64
 1   sepal_width   150 non-null    float64
 2   petal_length  150 non-null    float64
 3   petal_width   150 non-null    float64
 4   species       150 non-null    object
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

[6]:
```
df.shape
```

[6]:
```
(150, 5)
```

[10]:
```
df.isnull().sum()
```

[10]:
```
sepal_length    0
sepal_width     0
petal_length    0
petal_width     0
species         0
dtype: int64
```

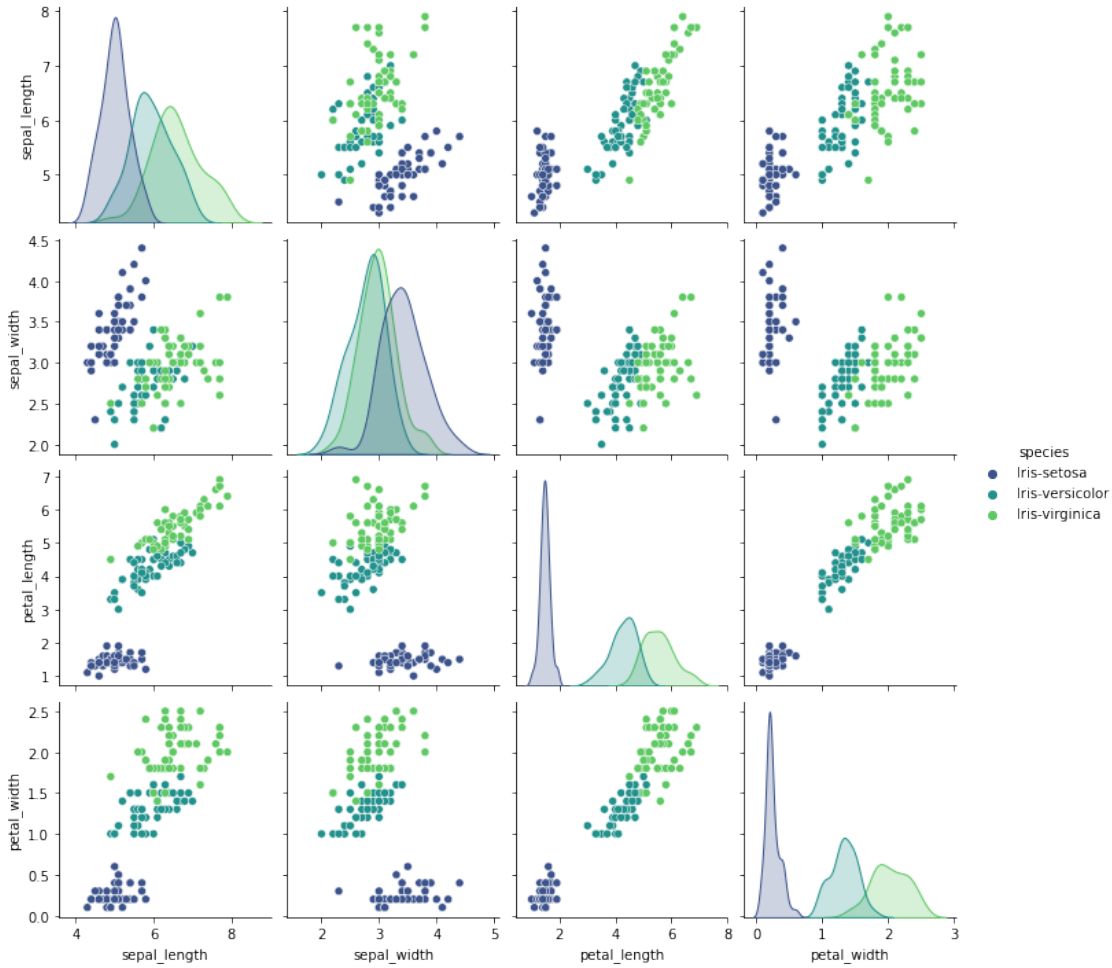
[12]:
```
df.describe(include="all")
```

[12]:

	sepal_length	sepal_width	petal_length	petal_width	species
count	150.000000	150.000000	150.000000	150.000000	150
unique	NaN	NaN	NaN	NaN	3
top	NaN	NaN	NaN	NaN	Iris-setosa
freq	NaN	NaN	NaN	NaN	50
mean	5.843333	3.054000	3.758667	1.198667	NaN
std	0.828066	0.433594	1.764420	0.763161	NaN
min	4.300000	2.000000	1.000000	0.100000	NaN
25%	5.100000	2.800000	1.600000	0.300000	NaN
50%	5.800000	3.000000	4.350000	1.300000	NaN
75%	6.400000	3.300000	5.100000	1.800000	NaN
max	7.900000	4.400000	6.900000	2.500000	NaN

3 Visualization

[13]:
```
sns.pairplot(df, hue='species', palette='viridis')
plt.show()
```



[14]:
```
# Define features (X) and target variable (y)
X = df.drop('species', axis=1)
y = df['species']
```

[15]:
```
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
↪random_state=42)
```

[16]:
```
# Initialize and train the K-Nearest Neighbors classifier
model = KNeighborsClassifier(n_neighbors=3)
model.fit(X_train, y_train)
```

[16]:
```
KNeighborsClassifier(n_neighbors=3)
```

[17]:
```
# Make predictions on the test set
predictions = model.predict(X_test)
```

[18]:
```
# Evaluate the model
accuracy = accuracy_score(y_test, predictions)
report = classification_report(y_test, predictions)
conf_matrix = confusion_matrix(y_test, predictions)

print(f"Accuracy: {accuracy:.2f}")
print("Classification Report:\n", report)
print("Confusion Matrix:\n", conf_matrix)
```

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

    Iris-setosa       1.00      1.00      1.00        10
Iris-versicolor       1.00      1.00      1.00         9
 Iris-virginica       1.00      1.00      1.00        11

       accuracy                           1.00        30
      macro avg       1.00      1.00      1.00        30
   weighted avg       1.00      1.00      1.00        30

Confusion Matrix:
 [[10  0  0]
 [ 0  9  0]
 [ 0  0 11]]
```

[ ]:
```

```