EXPERIMENT NO: 9

KNN

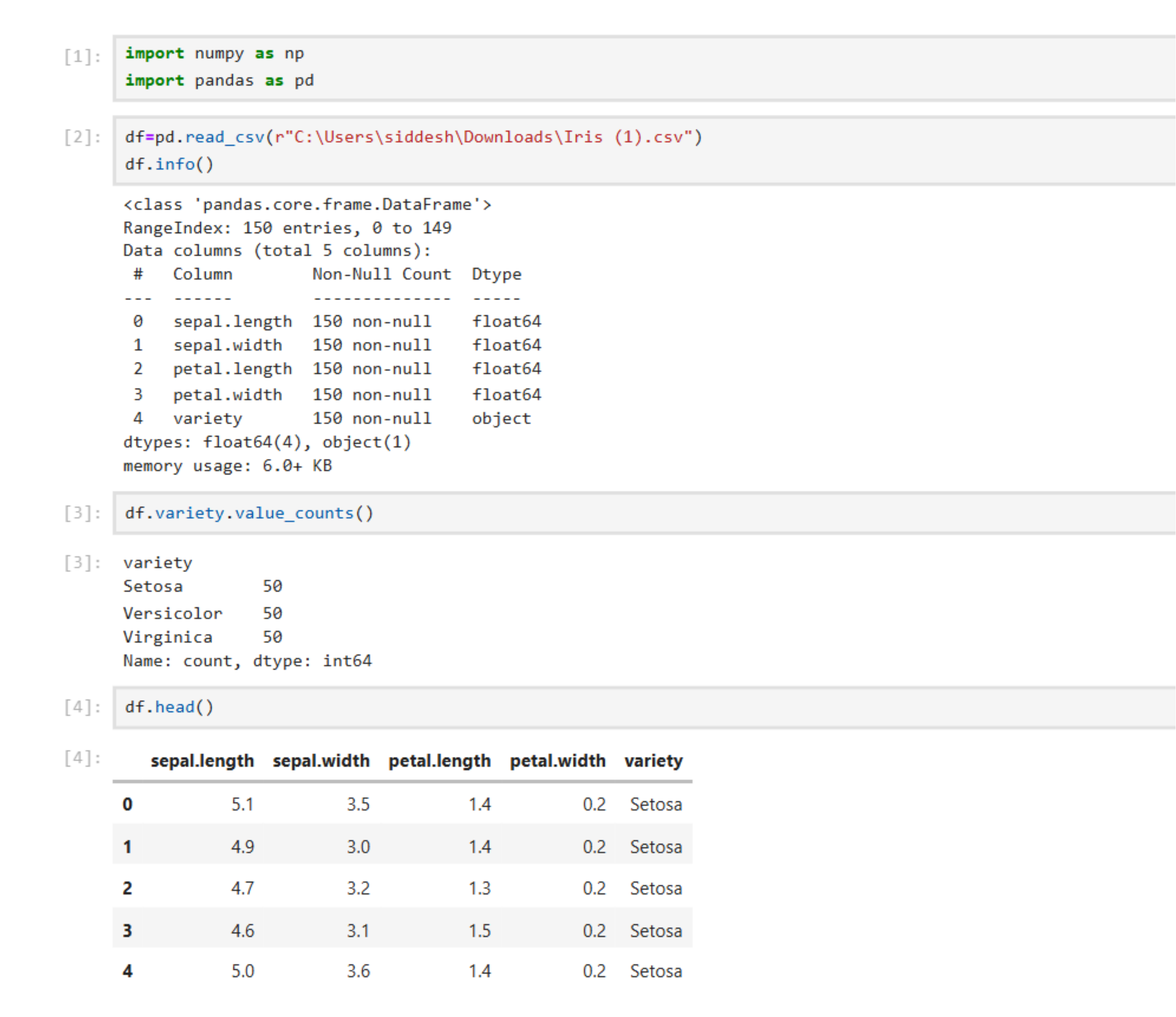
Aim:

To write the Python program to understand and perform classification using the K-Nearest Neighbors (KNN) algorithm on the given dataset..

Algorithm:

1. Load the dataset and examine its structure and contents.
2. Identify the feature columns and the target label.
3. Split the dataset into training and testing sets.
4. Initialize the KNN classifier with a chosen number of neighbors.
5. Train the classifier using the training data.
6. Evaluate the model's performance using accuracy and confusion matrix.

Program:



[1]:
```
import numpy as np
import pandas as pd
```

[2]:
```
df=pd.read_csv(r"C:\Users\siddesh\Downloads\Iris (1).csv")
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   variety       150 non-null    object 
dtypes: float64(4), object(1)
memory usage: 6.0+ KB
```

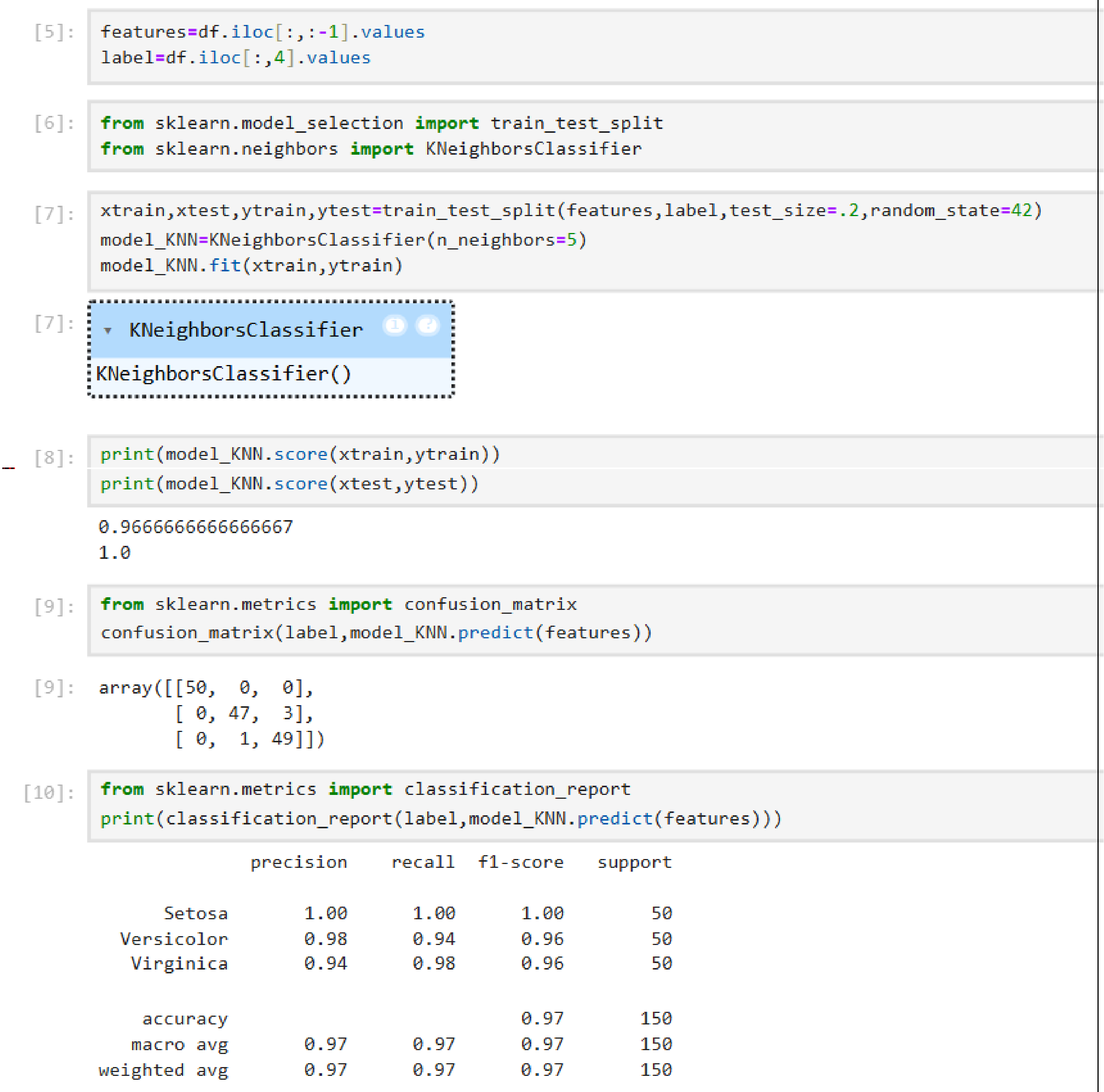
[3]:
```
df.variety.value_counts()
```

[3]:
```
variety
Setosa        50
Versicolor    50
Virginica     50
Name: count, dtype: int64
```

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

[4]:

	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa



```
[5]:  features=df.iloc[:,:-1].values
      label=df.iloc[:,4].values
```

```
[6]:  from sklearn.model_selection import train_test_split
      from sklearn.neighbors import KNeighborsClassifier
```

```
[7]:  xtrain,xtest,ytrain,ytest=train_test_split(features,label,test_size=.2,random_state=42)
      model_KNN=KNeighborsClassifier(n_neighbors=5)
      model_KNN.fit(xtrain,ytrain)
```

```
[7]:  ▾ KNeighborsClassifier
      KNeighborsClassifier()
```

```
[8]:  print(model_KNN.score(xtrain,ytrain))
      print(model_KNN.score(xtest,ytest))

      0.9666666666666667
      1.0
```

```
[9]:  from sklearn.metrics import confusion_matrix
      confusion_matrix(label,model_KNN.predict(features))
```

```
[9]:  array([[50,  0,  0],
             [ 0, 47,  3],
             [ 0,  1, 49]])
```

```
[10]: from sklearn.metrics import classification_report
      print(classification_report(label,model_KNN.predict(features)))

                    precision    recall  f1-score   support

          Setosa       1.00      1.00      1.00        50
      Versicolor       0.98      0.94      0.96        50
       Virginica       0.94      0.98      0.96        50

        accuracy                           0.97       150
       macro avg       0.97      0.97      0.97       150
    weighted avg       0.97      0.97      0.97       150
```

Result:

Thus, the Python program is executed successfully for classifying the given dataset using the KNN algorithm.