CS23334-FUNDAMENTALS OF DATA SCIENCE

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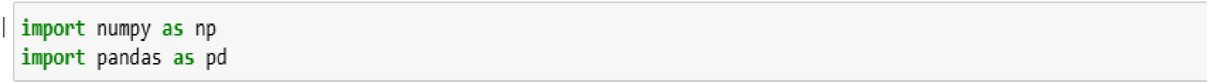
9.) K-Nearest Neighbors (KNN)

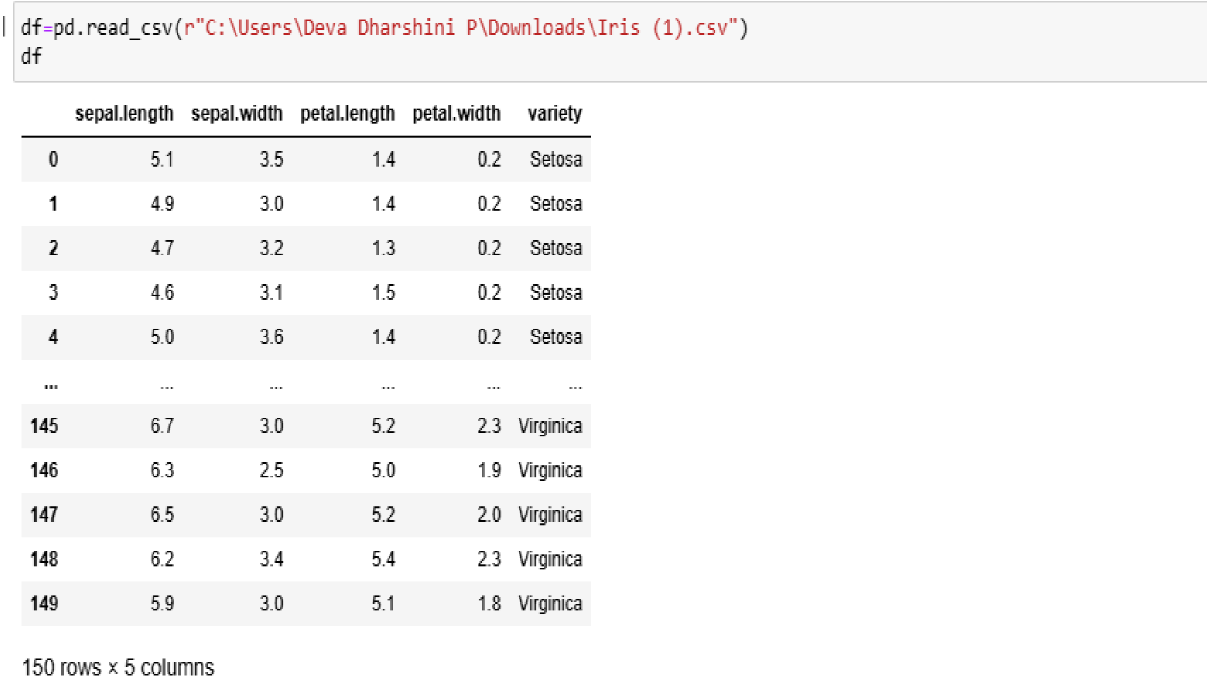
Aim:

To implement the K-Nearest Neighbors (KNN) algorithm to classify data points based on the majority class of their nearest neighbors.

Code:



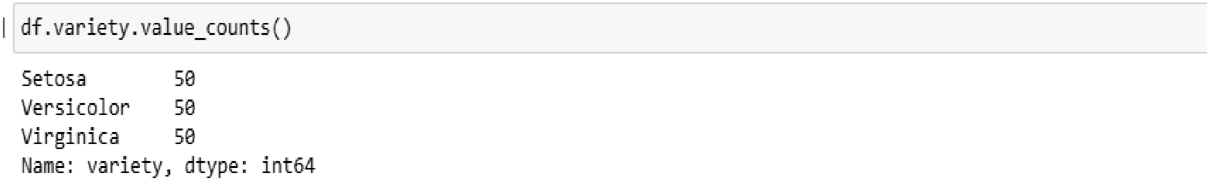
```
import numpy as np
import pandas as pd
```



```
df=pd.read_csv(r"C:\Users\Deva Dharshini P\Downloads\Iris (1).csv")
df
```

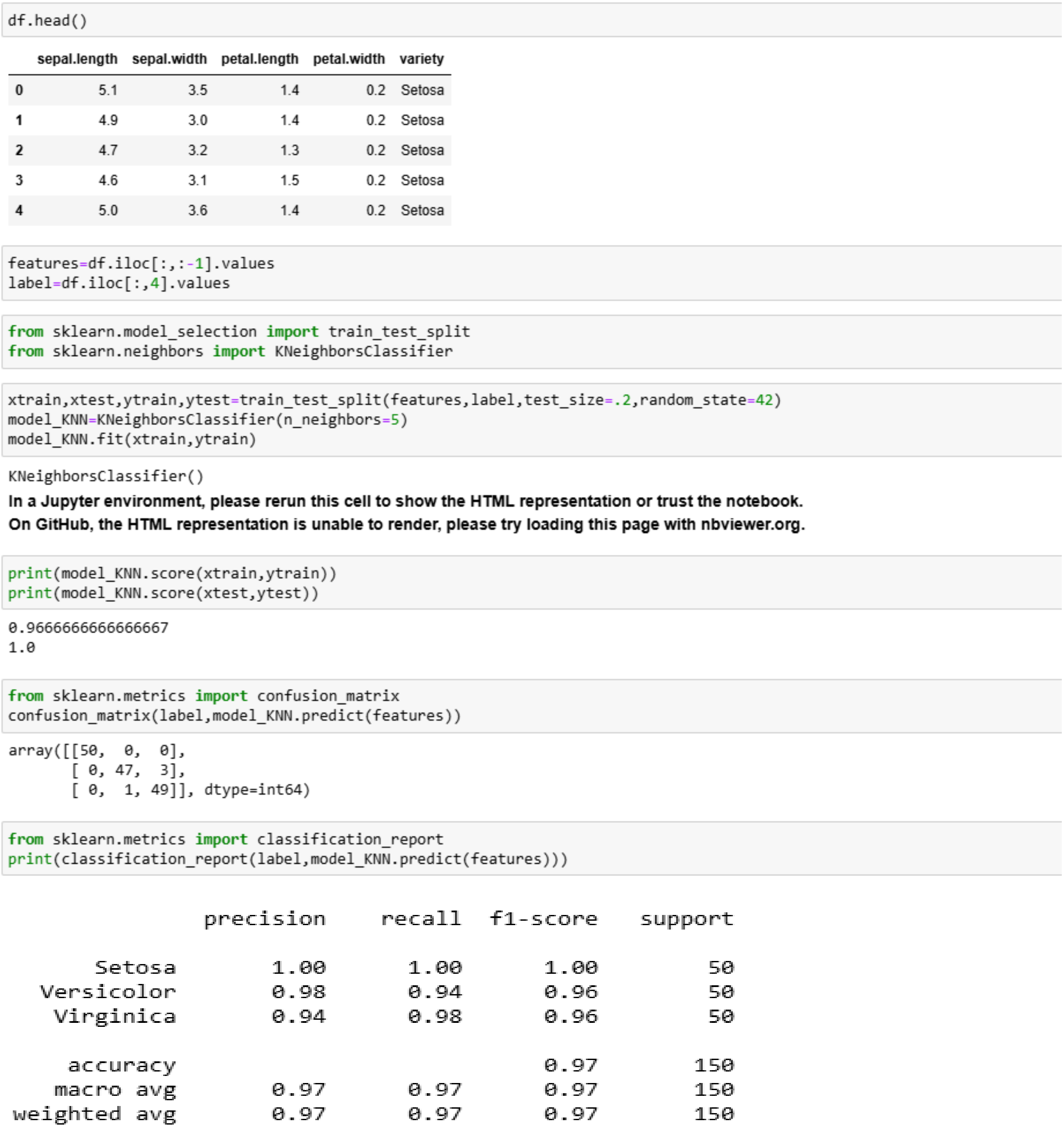
	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Virginica
146	6.3	2.5	5.0	1.9	Virginica
147	6.5	3.0	5.2	2.0	Virginica
148	6.2	3.4	5.4	2.3	Virginica
149	5.9	3.0	5.1	1.8	Virginica

150 rows × 5 columns



```
df.variety.value_counts()
```

```
Setosa        50
Versicolor    50
Virginica     50
Name: variety, dtype: int64
```



```
df.head()
```

	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

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

```
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
```

```
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)
```

```
KNeighborsClassifier()
```

**In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.**

```
print(model_KNN.score(xtrain,ytrain))
print(model_KNN.score(xtest,ytest))
```

```
0.9666666666666667
1.0
```

```
from sklearn.metrics import confusion_matrix
confusion_matrix(label,model_KNN.predict(features))
```

```
array([[50,  0,  0],
       [ 0, 47,  3],
       [ 0,  1, 49]], dtype=int64)
```

```
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:
The KNN model was successfully applied, and the data points were accurately classified according to their nearest neighbors.