

```
In [1]: #practicle no 6)
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

```
In [2]: dataset = pd.read_csv('https://raw.githubusercontent.com/mk-gurucharan/Classification/')
```

```
In [3]: dataset
```

```
Out[3]:
```

| | sepal_length | sepal_width | petal_length | petal_width | species |
|-----|--------------|-------------|--------------|-------------|-----------|
| 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

```
In [4]: X=dataset.iloc[:, :4].values
y=dataset['species'].values
```

```
In [7]: from sklearn.model_selection import train_test_split X_train, X_test, y_train, y_test
```

```
File "C:\Users\avcoe\AppData\Local\Temp\ipykernel_11532\2729918603.py", line 1
    from sklearn.model_selection import train_test_split X_train, X_test, y_train, y_
test =train_test_split(X, y, test_size = 0.2)
```

SyntaxError: invalid syntax

```
In [9]: from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.2)
```

```
In [11]: from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

```
In [12]: from sklearn.naive_bayes import GaussianNB
classifier = GaussianNB()
classifier.fit(X_train, y_train)
```

Out[12]: GaussianNB()

```
In [13]: y_pred = classifier.predict(X_test)
         #classifier.predict() to predict the values for the Test set and the values predicted
```

In [14]: y_pred

Out[14]: array(['setosa', 'versicolor', 'setosa', 'setosa', 'virginica',
 'virginica', 'versicolor', 'setosa', 'versicolor', 'setosa',
 'versicolor', 'setosa', 'setosa', 'virginica', 'versicolor',
 'virginica', 'virginica', 'virginica', 'virginica', 'setosa',
 'virginica', 'versicolor', 'versicolor', 'virginica', 'virginica',
 'setosa', 'versicolor', 'virginica', 'virginica', 'virginica'],
 dtype='<U10')

```
In [15]: from sklearn.metrics import confusion_matrix
         cm = confusion_matrix(y_test, y_pred)
         from sklearn.metrics import accuracy_score
         print("Accuracy : ", accuracy_score(y_test, y_pred))
         print(cm)
```

Accuracy : 0.9666666666666667
[[9 0 0]
 [0 8 1]
 [0 0 12]]

```
In [16]: df = pd.DataFrame({'Real Values':y_test, 'Predicted Values':y_pred})
         print(df)
```

| | Real Values | Predicted Values |
|----|-------------|------------------|
| 0 | setosa | setosa |
| 1 | versicolor | versicolor |
| 2 | setosa | setosa |
| 3 | setosa | setosa |
| 4 | virginica | virginica |
| 5 | virginica | virginica |
| 6 | versicolor | versicolor |
| 7 | setosa | setosa |
| 8 | versicolor | versicolor |
| 9 | setosa | setosa |
| 10 | versicolor | versicolor |
| 11 | setosa | setosa |
| 12 | setosa | setosa |
| 13 | virginica | virginica |
| 14 | versicolor | versicolor |
| 15 | virginica | virginica |
| 16 | virginica | virginica |
| 17 | virginica | virginica |
| 18 | virginica | virginica |
| 19 | setosa | setosa |
| 20 | virginica | virginica |
| 21 | versicolor | versicolor |
| 22 | versicolor | versicolor |
| 23 | versicolor | virginica |
| 24 | virginica | virginica |
| 25 | setosa | setosa |
| 26 | versicolor | versicolor |
| 27 | virginica | virginica |
| 28 | virginica | virginica |
| 29 | virginica | virginica |

```
In [17]: from sklearn.metrics import precision_score, recall_score, accuracy_score
```

```
In [18]: m=accuracy_score(y_test, y_pred)
print("error rate:-",1-m)
```

error rate:- 0.033333333333333326

```
In [19]: print('Precision:',precision_score(y_test,y_pred,average='micro'))
```

Precision: 0.9666666666666667

```
In [20]: print("Recall Score:",recall_score(y_test,y_pred,average='micro'))
```

Recall Score: 0.9666666666666667

```
In [ ]:
```