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Assignment 6 Group A

Data Analytics III

1. Implement Simple Naïve Bayes classification algorithm using Python/R on iris.csv dataset.

2. Compute Confusion to find TP, FP, TN, FN, accuracy, Precision Recall on the given dataset

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
df=sns.load_dataset('iris')
```

```
df.head(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
```

```
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```

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   sepal_length  sepal_width  petal_length  petal_width species
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2           4.7          3.2           1.3          0.2  setosa
```

```
df.species.value_counts()
```

```
species
setosa        50
versicolor    50
virginica     50
Name: count, dtype: int64
```

```
df.isnull().sum()
```

```
sepal_length    0
sepal_width     0
petal_length    0
petal_width     0
species         0
dtype: int64
```

```
df.duplicated().sum()
```

```
1
```

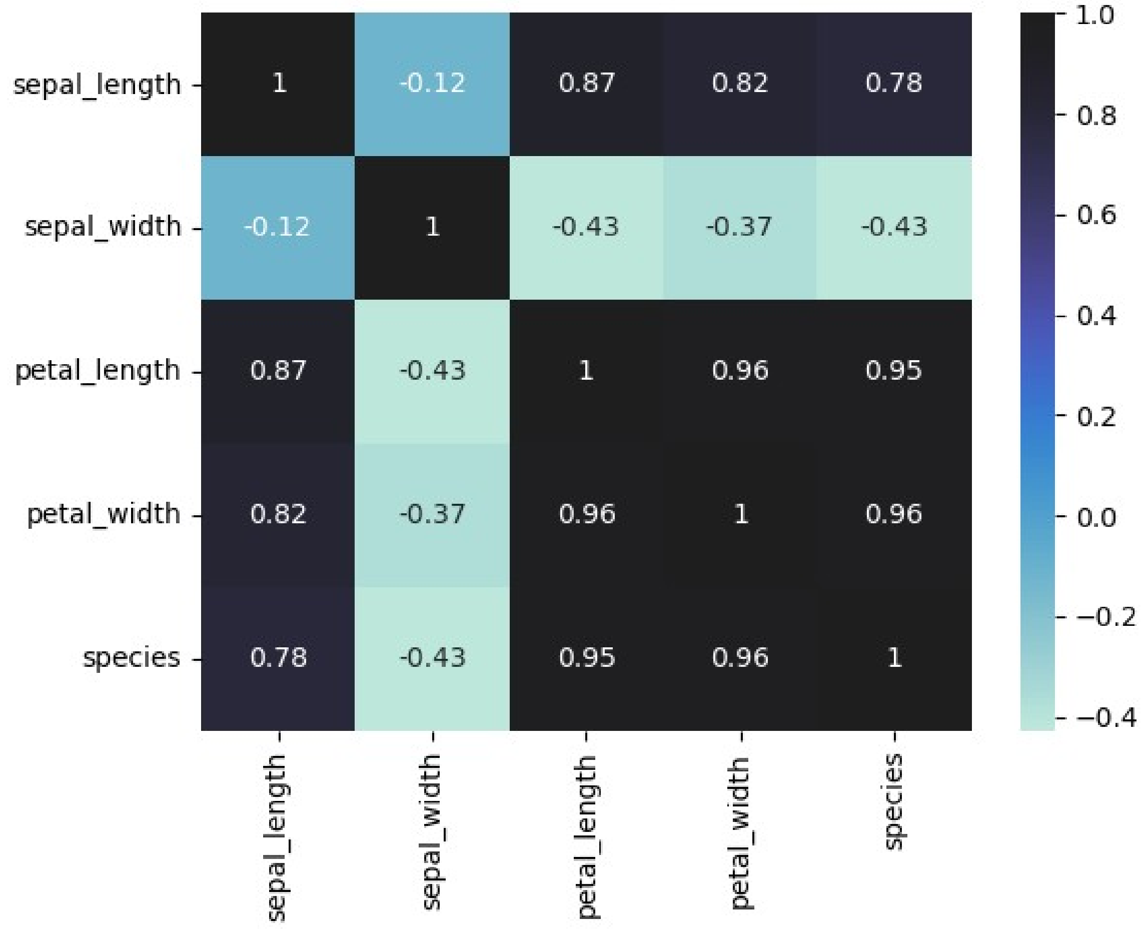
```
df['species']=df.species.map({'setosa':0,'versicolor':1,"virginica":2}
)
```

```
df['species'].value_counts()
```

```
species
0    50
1    50
2    50
Name: count, dtype: int64
```

```
sns.heatmap(df.corr(),annot=True,center=1)
```

```
<Axes: >
```



```
X=df.drop('species',axis=True)
Y=df['species']

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import
accuracy_score,confusion_matrix,classification_report

df.describe()

       sepal_length  sepal_width  petal_length  petal_width
species
count    150.000000   150.000000    150.000000   150.000000
150.000000
mean       5.843333     3.057333      3.758000     1.199333
1.000000
std        0.828066     0.435866      1.765298     0.762238
0.819232
min        4.300000     2.000000      1.000000     0.100000
0.000000
```

```
25%          5.100000     2.800000      1.600000     0.300000
0.000000
50%          5.800000     3.000000      4.350000     1.300000
1.000000
75%          6.400000     3.300000      5.100000     1.800000
2.000000
max          7.900000     4.400000      6.900000     2.500000
2.000000
```

```
X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.3,rando
m_state=42)
Y=df['species']
```

```
gb=GaussianNB()
gb.fit(X_train,Y_train)
```

```
GaussianNB()
```

```
y_pred=gb.predict(X_test)
```

```
accuracy_score(Y_test,y_pred)
```

```
0.9777777777777777
```

```
print(classification_report(Y_test,y_pred))
```

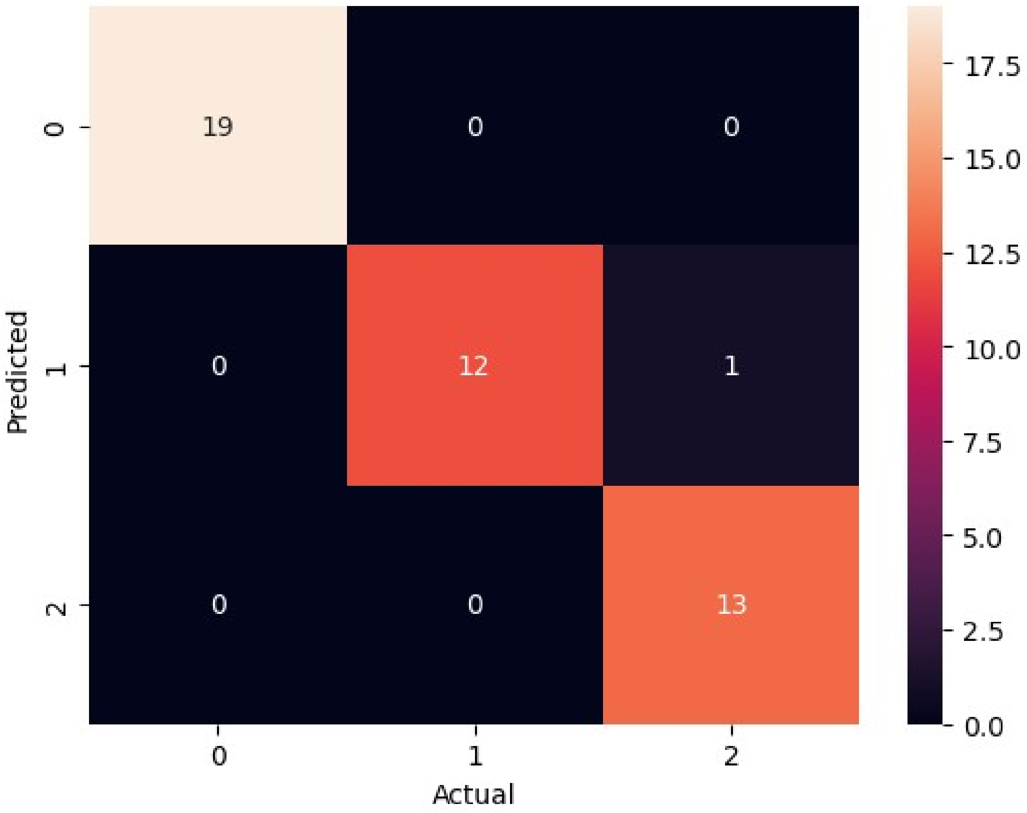
```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        19
           1       1.00      0.92      0.96        13
           2       0.93      1.00      0.96        13

    accuracy                           0.98        45
   macro avg       0.98      0.97      0.97        45
weighted avg       0.98      0.98      0.98        45
```

```
sns.heatmap(confusion_matrix(Y_test,y_pred),annot=True)
plt.xlabel('Actual')
plt.ylabel('Predicted')
```

```
Text(50.722222222222214, 0.5, 'Predicted')
```



```
sns=pd.DataFrame({'Actual':Y_test,'Predicted':y_pred})

sns['Actual']=sns.Actual.map({0:'setosa',1:'versicolor',2:'virginic'})
sns['Predicted']=sns.Predicted.map({0:'setosa',1:'versicolor',2:'virgi
nic'})

sns.head(5)
```

```
         Actual   Predicted
73   versicolor  versicolor
18       setosa      setosa
118    virginic    virginic
78   versicolor  versicolor
76   versicolor  versicolor
```