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ASSIGNMNET 3.2

Importing the Dependencies

In [136…

```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
from sklearn import datasets
from sklearn.metrics import f1_score, mean_squared_error
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
import seaborn as sns
from sklearn import metrics
from sklearn.metrics import confusion_matrix, classification_report
```

Loading the Dataset

In [137…

```
wine = datasets.load_wine()
```

In [142…

```
x = wine.data[:, -2:]
y = wine.target
```

Splitting the data into test and train set

In [143…

```
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.3)
x_train.shape,y_train.shape
```

Out[143]:

```
((124, 2), (124,))
```

In [144…

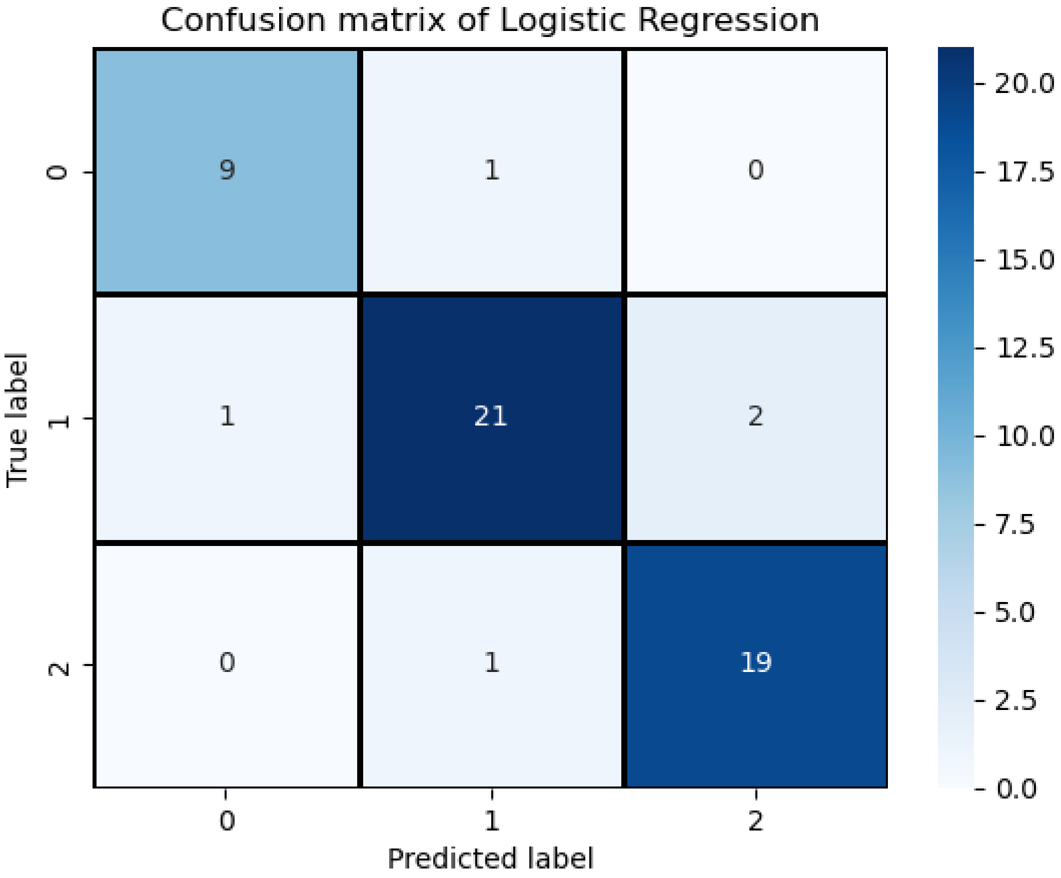
```
sx=StandardScaler()
x_train=sx.fit_transform(x_train)
x_test=sx.transform(x_test)
```

Logistic Regression

In [145…

```
lgr = LogisticRegression(max_iter=1000)
lgr.fit(x_train, y_train)
print("The Logistic Regression score is: ", lgr.score(x_test, y_test)*100)
y_pred = lgr.predict(x_test)
mt = confusion_matrix(y_test, y_pred)
print("False positive rate : %f %%" % ((mt[0][1] / float(sum(mt[0])))*100))
print('False negative rate : %f %%' % ((mt[1][0] / float(sum(mt[1]))*100)))
g = pd.DataFrame(mt)
g
plt.title('Confusion matrix of Logistic Regression')
print(mt)
sns.heatmap(mt ,annot=True,linewidths=1 ,cmap = "Blues", linewidth = 1 ,linecolor='k')
plt.xlabel('Predicted label')
plt.ylabel('True label')
plt.show()
print(classification_report(y_test, y_pred))
print("Mean Squared Error :", mean_squared_error(y_test, y_pred))
```

```
The Logistic Regression score is:  90.74074074074075
False positive rate : 10.000000 %
False negative rate : 4.166667 %
[[ 9  1  0]
 [ 1 21  2]
 [ 0  1 19]]
```



```
              precision    recall  f1-score   support

           0       0.90      0.90      0.90        10
           1       0.91      0.88      0.89        24
           2       0.90      0.95      0.93        20

    accuracy                           0.91        54
   macro avg       0.91      0.91      0.91        54
weighted avg       0.91      0.91      0.91        54

Mean Squared Error : 0.09259259259259259
```

```
In [ ]:
```

```
In [ ]:
```