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

df =
pd.read_csv(r"C:\Users\GLAU\Desktop\K-NEarest-Neighbor-master/Classifi
ed Data",index_col=0)
df.head()
```

```
        WTT       PTI       EQW       SBI       LQE       QWG
FDJ  \
0  0.913917  1.162073  0.567946  0.755464  0.780862  0.352608
0.759697
1  0.635632  1.003722  0.535342  0.825645  0.924109  0.648450
0.675334
2  0.721360  1.201493  0.921990  0.855595  1.526629  0.720781
1.626351
3  1.234204  1.386726  0.653046  0.825624  1.142504  0.875128
1.409708
4  1.279491  0.949750  0.627280  0.668976  1.232537  0.703727
1.115596

        PJF       HQE       NXJ  TARGET CLASS
0  0.643798  0.879422  1.231409             1
1  1.013546  0.621552  1.492702             0
2  1.154483  0.957877  1.285597             0
3  1.380003  1.522692  1.153093             1
4  0.646691  1.463812  1.419167             1
```

```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
scaler.fit(df.drop('TARGET CLASS',axis=1))
```

```
StandardScaler()
```

```
scaled_features = scaler.transform(df.drop('TARGET CLASS',axis=1))
```

```
df_feat = pd.DataFrame(scaled_features,columns=df.columns[:-1])
df_feat.head()
```

```
        WTT       PTI       EQW       SBI       LQE       QWG
FDJ  \
0 -0.123542  0.185907 -0.913431  0.319629 -1.033637 -2.308375 -
0.798951
1 -1.084836 -0.430348 -1.025313  0.625388 -0.444847 -1.152706 -
1.129797
2 -0.788702  0.339318  0.301511  0.755873  2.031693 -0.870156
2.599818
3  0.982841  1.060193 -0.621399  0.625299  0.452820 -0.267220
1.750208
```

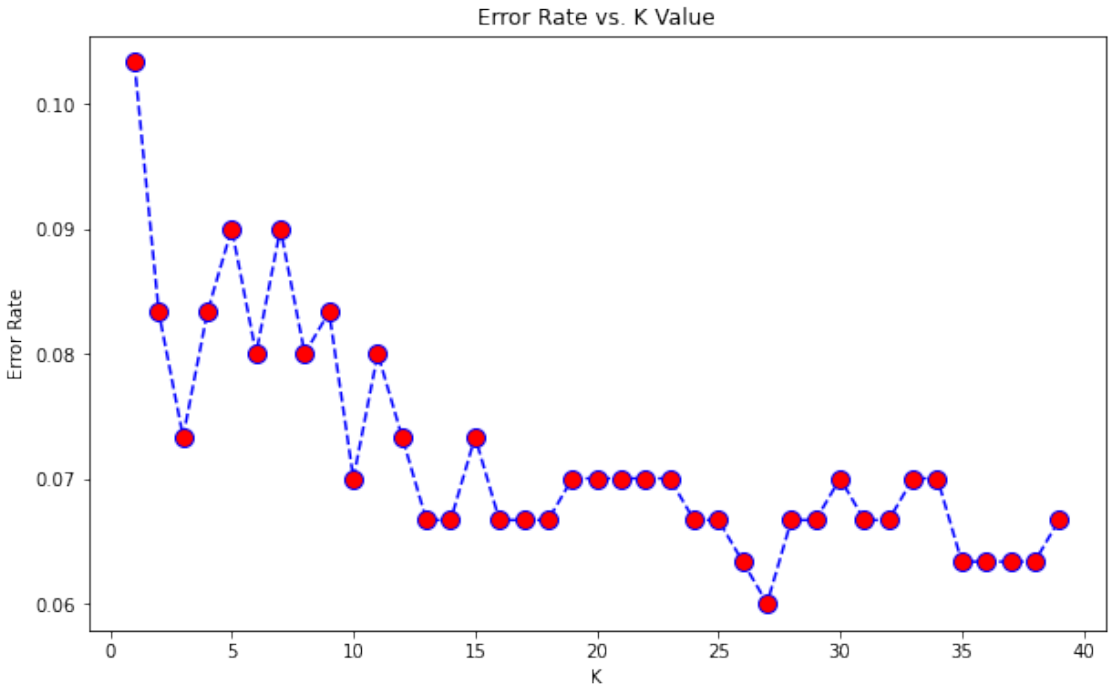
```
4  1.139275 -0.640392 -0.709819 -0.057175  0.822886 -0.936773
0.596782
```

```
        PJF       HQE       NXJ
0 -1.482368 -0.949719 -0.643314
1 -0.202240 -1.828051  0.636759
2  0.285707 -0.682494 -0.377850
3  1.066491  1.241325 -1.026987
4 -1.472352  1.040772  0.276510
```

```
## Train Test split
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test =
train_test_split(scaled_features,df['TARGET CLASS'],
                                                    test_size=0.30)

## USING KNN
## Remember that we are trying to come up with a model to predict
whether someone will TARGET CLASS or not. We'll start with k=1.
from sklearn.neighbors import KNeighborsClassifier

knn = KNeighborsClassifier(n_neighbors=1)

knn.fit(X_train,y_train)

KNeighborsClassifier(n_neighbors=1)

pred = knn.predict(X_test)

## Prediction and Evaluation
from sklearn.metrics import classification_report,confusion_matrix

print(confusion_matrix(y_test,pred))

[[139  17]
 [ 14 130]]

print(classification_report(y_test,pred))

              precision    recall  f1-score   support

           0       0.91      0.89      0.90       156
           1       0.88      0.90      0.89       144

    accuracy                           0.90       300
   macro avg       0.90      0.90      0.90       300
weighted avg       0.90      0.90      0.90       300


## choosing a K value
error_rate = []
```

```
# Will take some time
for i in range(1,40):

    knn = KNeighborsClassifier(n_neighbors=i)
    knn.fit(X_train,y_train)
    pred_i = knn.predict(X_test)
    error_rate.append(np.mean(pred_i != y_test))

plt.figure(figsize=(10,6))
plt.plot(range(1,40),error_rate,color='blue', linestyle='dashed',
marker='o',
         markerfacecolor='red', markersize=10)
plt.title('Error Rate vs. K Value')
plt.xlabel('K')
plt.ylabel('Error Rate')
```

```
Text(0, 0.5, 'Error Rate')
```




```
# FIRST A QUICK COMPARISON TO OUR ORIGINAL K=1
knn = KNeighborsClassifier(n_neighbors=1)

knn.fit(X_train,y_train)
pred = knn.predict(X_test)

print('WITH K=1')
print('\n')
print(confusion_matrix(y_test,pred))
```

```
print('\n')
print(classification_report(y_test,pred))
```

WITH K=1

```
[[139  17]
 [ 14 130]]
```

```
              precision    recall  f1-score   support

           0       0.91      0.89      0.90       156
           1       0.88      0.90      0.89       144

    accuracy                           0.90       300
   macro avg       0.90      0.90      0.90       300
weighted avg       0.90      0.90      0.90       300
```

```
# NOW WITH K=23
knn = KNeighborsClassifier(n_neighbors=23)

knn.fit(X_train,y_train)
pred = knn.predict(X_test)

print('WITH K=23')
print('\n')
print(confusion_matrix(y_test,pred))
print('\n')
print(classification_report(y_test,pred))
```

WITH K=23

```
[[143  13]
 [  8 136]]
```

```
              precision    recall  f1-score   support

           0       0.95      0.92      0.93       156
           1       0.91      0.94      0.93       144

    accuracy                           0.93       300
   macro avg       0.93      0.93      0.93       300
weighted avg       0.93      0.93      0.93       300
```