knn

April 30, 2022

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

[ ]:
```
df = pd.read_csv('Classified Data.csv', index_col=0)
df.head()
```

[ ]:

	WTT	PTI	EQW	SBI	LQE	QWG	FDJ	PJF	HQE	NXJ	TARGET CLASS
0	0.913917	1.162073	0.567946	0.755464	0.780862	0.352608	0.759697	0.643798	0.879422	1.231409	1
1	0.635632	1.003722	0.535342	0.825645	0.924109	0.648450	0.675334	1.013546	0.621552	1.492702	0
2	0.721360	1.201493	0.921990	0.855595	1.526629	0.720781	1.626351	1.154483	0.957877	1.285597	0
3	1.234204	1.386726	0.653046	0.825624	1.142504	0.875128	1.409708	1.380003	1.522692	1.153093	1
4	1.279491	0.949750	0.627280	0.668976	1.232537	0.703727	1.115596	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))
```

[ ]:
```
scaled_features
```

[ ]:
```
array([[-0.12354188,  0.18590747, -0.91343069, …, -1.48236813,
        -0.9497194 , -0.64331425],
```

```
       [-1.08483602, -0.43034845, -1.02531333, …, -0.20224031,
        -1.82805088,  0.63675862],
       [-0.78870217,  0.33931821,  0.30151137, …,  0.28570652,
        -0.68249379, -0.37784986],
       …,
       [ 0.64177714, -0.51308341, -0.17920486, …, -2.36249443,
        -0.81426092,  0.11159651],
       [ 0.46707241, -0.98278576, -1.46519359, …, -0.03677699,
         0.40602453, -0.85567   ],
       [-0.38765353, -0.59589427, -1.4313981 , …, -0.56778932,
         0.3369971 ,  0.01034996]])
```

[ ]:
```
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
```

[ ]:
```
from sklearn.model_selection import train_test_split
```

[ ]:
```
X = df_feat
y = df['TARGET CLASS']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3,␣
 ↪random_state=101)
```

[ ]:
```
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)
```

[ ]:
```
pred
```

[ ]:
```
array([0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1, 0, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1,
       0, 1, 1, 0, 0, 0, 1, 0, 0, 1, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 0, 1,
       1, 0, 1, 1, 0, 1, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 0, 1,
       0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0,
       1, 0, 0, 1, 0, 1, 0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 0, 0, 0, 1, 1, 0,
       0, 0, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 1,
       1, 0, 1, 0, 1, 1, 1, 0, 0, 1, 1, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0,
       1, 0, 0, 1, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 0, 0,
       1, 1, 0, 0, 1, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1,
       0, 1, 0, 0, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0,
       0, 1, 0, 0, 1, 1, 0, 1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 0, 1, 0, 0, 1,
       0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 0, 1, 0, 1, 1,
       1, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0,
       0, 1, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0])
```

[ ]:
```
from sklearn.metrics import classification_report, confusion_matrix
```

[ ]:
```
print(confusion_matrix(y_test, pred))
print(classification_report(y_test, pred))
```

```
[[151   8]
 [ 15 126]]
              precision    recall  f1-score   support

           0       0.91      0.95      0.93       159
           1       0.94      0.89      0.92       141

    accuracy                           0.92       300
   macro avg       0.92      0.92      0.92       300
weighted avg       0.92      0.92      0.92       300
```

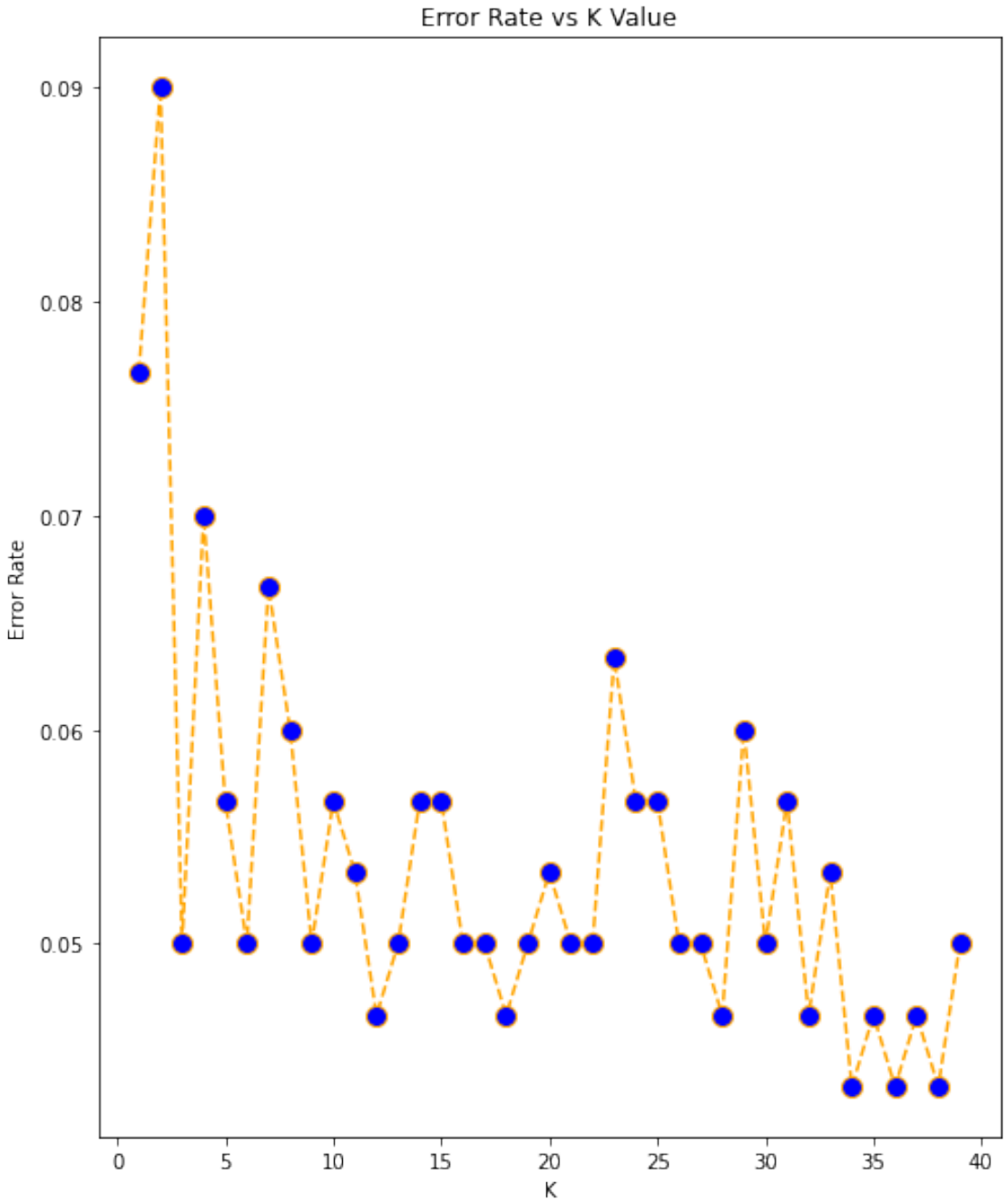
[ ]:
```
error_rate = []

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=(8,10))
plt.plot(range(1,40), error_rate, color='orange', linestyle='dashed',␣
 ↪marker='o', markerfacecolor='blue', markersize = 10)
```

```
plt.title('Error Rate vs K Value')
plt.xlabel('K')
plt.ylabel('Error Rate')
```

[ ]: Text(0, 0.5, 'Error Rate')



[ ]: