knn-classifier-1

April 5, 2024

0.1 To predict whether a person will purchase from Social Network Ads

[1]:
```
## Importing Necessary Libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score, classification_report,␣
 ↪confusion_matrix
from sklearn.preprocessing import StandardScaler
from sklearn.preprocessing import LabelEncoder
import matplotlib.pyplot as plt
```

[2]:
```
## Loading dataset
data = pd.read_csv(r'C:\Users\ntpc\Desktop\Social_Network_Ads.csv')
data.head()
```

[2]:

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

[3]:
```
data.dtypes
```

[3]:
```
User ID             int64
Gender             object
Age                 int64
EstimatedSalary     int64
Purchased           int64
dtype: object
```

[4]:
```
#checking each value counts
data['Purchased'].value_counts()
```

[4]:
```
Purchased
0    257
1    143
```

```
Name: count, dtype: int64
```

[5]:
```
#dropping User ID column
data = data.drop('User ID',axis = 1)
data.head()
```

[5]:

	Gender	Age	EstimatedSalary	Purchased
0	Male	19	19000	0
1	Male	35	20000	0
2	Female	26	43000	0
3	Female	27	57000	0
4	Male	19	76000	0

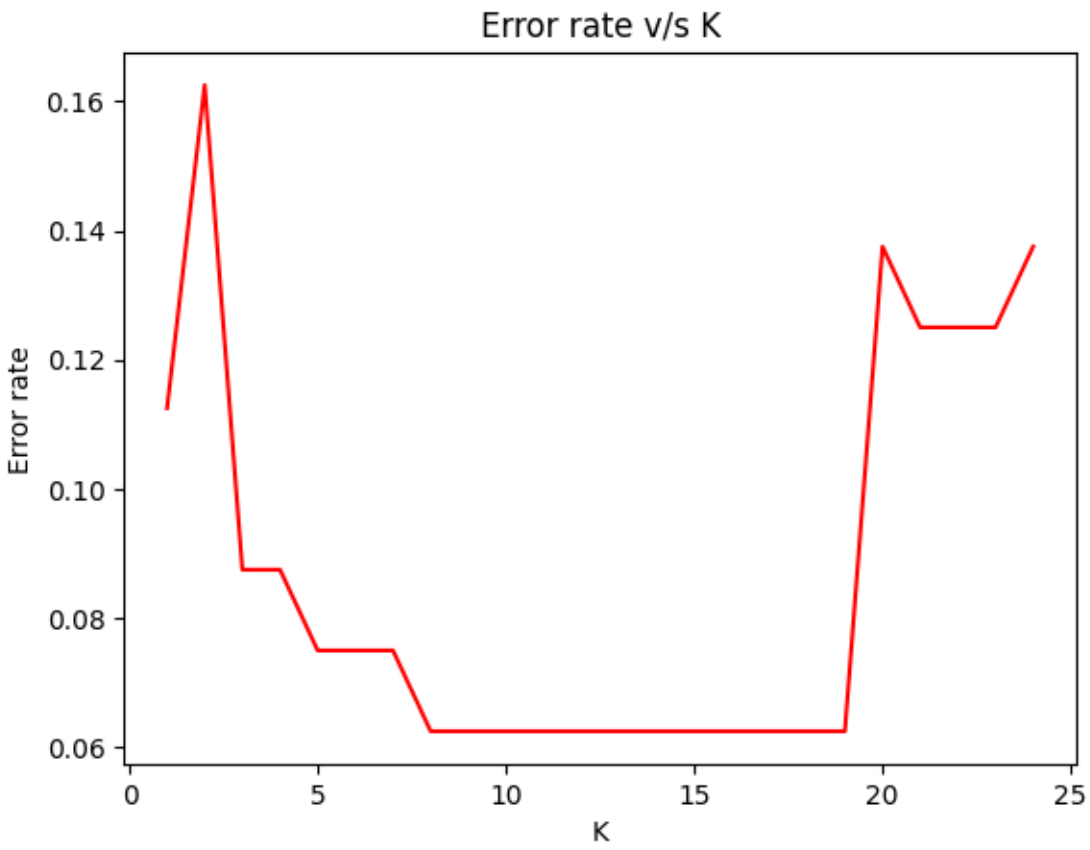
[6]:
```
# Encoding categorical variables
le = LabelEncoder()
data['Gender'] = le.fit_transform(data['Gender'])
```

[7]:
```
# Splitting the data into training and testing sets
X = data.drop('Purchased', axis=1)
y = data['Purchased']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=42)
```

[8]:
```
## Doing Feature Scaling for better accuracy
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

[9]:
```
## Selecting the k value
acc_list = []
err_list = []
for i in range(1,25):
    model = KNeighborsClassifier(n_neighbors=i)
    model.fit(X_train,y_train)
    y_pred = model.predict(X_test)
    acc = accuracy_score(y_test,y_pred)
    acc_list.append(acc)
    err_list.append(1-acc)
```

[10]:
```
plt.plot(list(range(1,25)),err_list,c= 'r')
plt.title('Error rate v/s K')
plt.xlabel('K')
plt.ylabel('Error rate')
plt.show()
```



[11]:
```
model = KNeighborsClassifier(n_neighbors=5)
model.fit(X_train,y_train)
y_pred = model.predict(X_test)
```

[12]:
```
# Evaluating the model
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy}')
```

```
Accuracy: 0.925
```

[13]:
```
# Printing classification report and confusion matrix
print('Classification Report:')
print(classification_report(y_test, y_pred))
```

```
Classification Report:
              precision    recall  f1-score   support

           0       0.96      0.92      0.94        52
           1       0.87      0.93      0.90        28
```

```
    accuracy                           0.93        80
   macro avg       0.91      0.93      0.92        80
weighted avg       0.93      0.93      0.93        80
```

[14]:
```
print('Confusion Matrix:')
print(confusion_matrix(y_test, y_pred))
```

```
Confusion Matrix:
[[48  4]
 [ 2 26]]
```

[ ]:
```

```