2.KMeans (SKLean) Exercise

November 19, 2021

K-Means - Exercise

1. Use iris flower dataset from sklearn library and try to form clusters of flowers using petal width and length features. Drop other two features for simplicity.
2. Figure out if any preprocessing such as scaling would help here
3. Draw elbow plot and from that figure out optimal value of k

[1]:
```
from sklearn.cluster import KMeans
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
from matplotlib import pyplot as plt
from sklearn.datasets import load_iris
%matplotlib inline
```

[2]:
```
iris = load_iris()
```

[3]:
```
df = pd.DataFrame(iris.data,columns=iris.feature_names)
df.head()
```

[3]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2

[4]:
```
df['flower'] = iris.target
df.head()
```

[4]:

	sepal length (cm)	sepal width (cm)	petal length (cm)	petal width (cm)	\
0	5.1	3.5	1.4	0.2	
1	4.9	3.0	1.4	0.2	
2	4.7	3.2	1.3	0.2	
3	4.6	3.1	1.5	0.2	
4	5.0	3.6	1.4	0.2	

	flower
0	0

```
1       0
2       0
3       0
4       0
```

[5]:
```
df.drop(['sepal length (cm)', 'sepal width (cm)',␣
↪'flower'],axis='columns',inplace=True)
```

[6]:
```
df.head(3)
```

[6]:
```
   petal length (cm)  petal width (cm)
0                1.4               0.2
1                1.4               0.2
2                1.3               0.2
```

[7]:
```
km = KMeans(n_clusters=3)
yp = km.fit_predict(df)
yp
```

[7]:
```
array([1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 0, 2, 2, 2, 2, 2, 0, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0])
```

[8]:
```
df['cluster'] = yp
df.head(2)
```

[8]:
```
   petal length (cm)  petal width (cm)  cluster
0                1.4               0.2        1
1                1.4               0.2        1
```

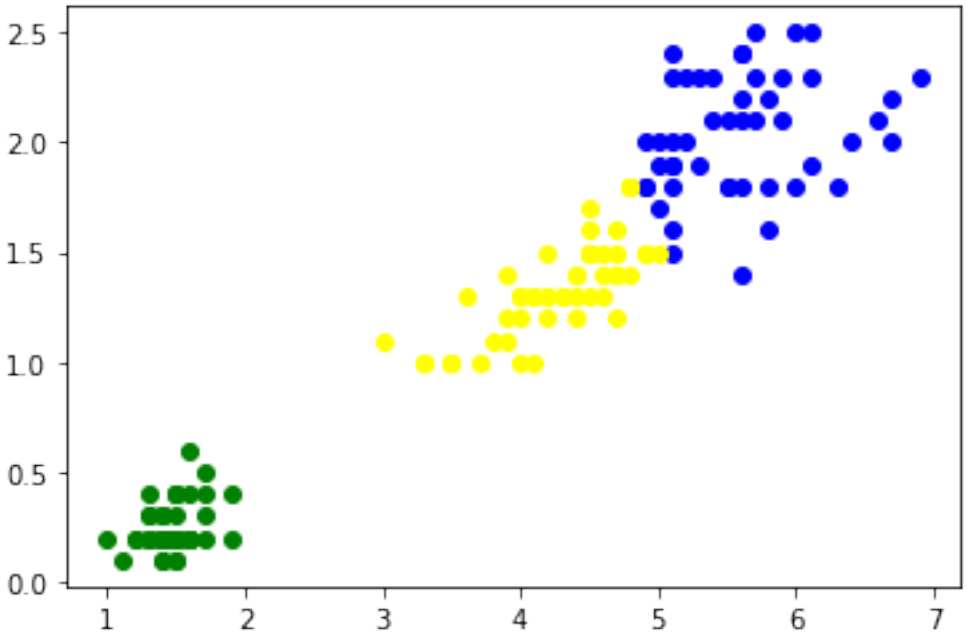
[9]:
```
df.cluster.unique()
```

[9]:
```
array([1, 2, 0])
```

[10]:
```
df1 = df[df.cluster==0]
df2 = df[df.cluster==1]
df3 = df[df.cluster==2]
```

[11]:
```
plt.scatter(df1['petal length (cm)'],df1['petal width (cm)'],color='blue')
plt.scatter(df2['petal length (cm)'],df2['petal width (cm)'],color='green')
plt.scatter(df3['petal length (cm)'],df3['petal width (cm)'],color='yellow')
```

[11]:
```
<matplotlib.collections.PathCollection at 0x207ea355400>
```

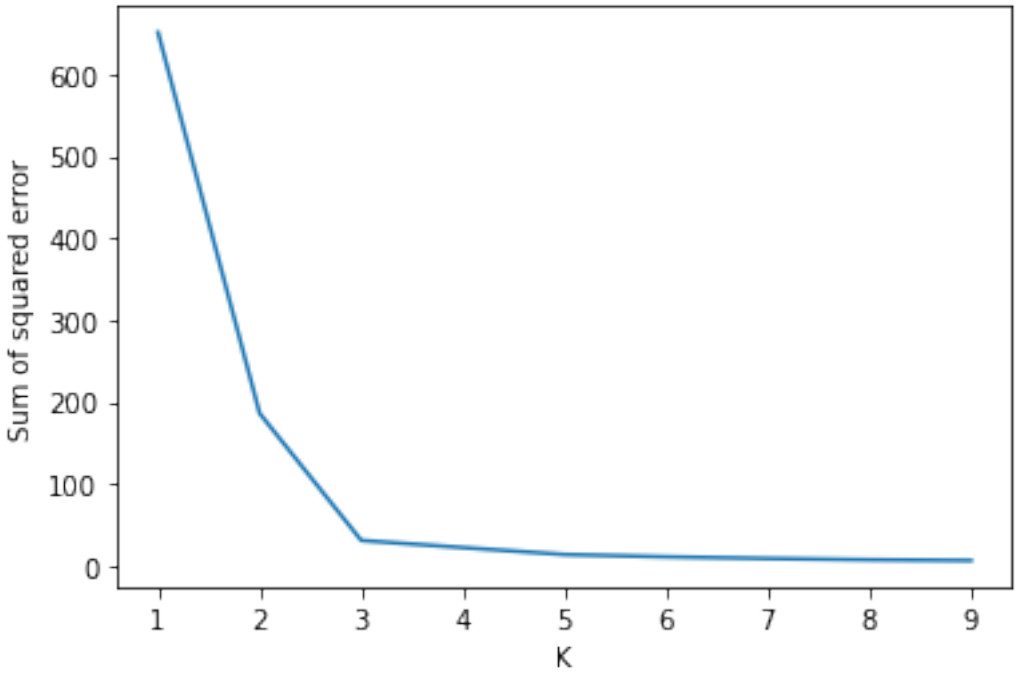


Elbow Plot

[12]:
```
sse = []
k_rng = range(1,10)
for k in k_rng:
    km = KMeans(n_clusters=k)
    km.fit(df)
    sse.append(km.inertia_)
```

[13]:
```
plt.xlabel('K')
plt.ylabel('Sum of squared error')
plt.plot(k_rng,sse)
```

[13]: [<matplotlib.lines.Line2D at 0x207ea895760>]


Sum of squared error
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
9
K