KMeansOnIrisData

March 13, 2023

From the given 'Iris' dataset, predict the optimum number of clusters and represent it visually

1 Importing Libraries

[1]:

```
# importng libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from matplotlib.patches import ConnectionPatch
from matplotlib.patches import Circle
```

2 Loading the Data

[2]:

```
# loading data
raw_url = 'https://raw.githubusercontent.com/ukantjadia/TSF-GRIP-Tasks/Main/
 ↪Task-02/Iris.csv'
df = pd.read_csv(raw_url)
df.head()
```

[2]:

```
   Id  SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm      Species
0   1            5.1           3.5            1.4           0.2  Iris-setosa
1   2            4.9           3.0            1.4           0.2  Iris-setosa
2   3            4.7           3.2            1.3           0.2  Iris-setosa
3   4            4.6           3.1            1.5           0.2  Iris-setosa
4   5            5.0           3.6            1.4           0.2  Iris-setosa
```

3 Model

The given task is to find the best value for k. So, we are using the **Elbow Curve Method** for finding the best value. read my blog better understanding. NOTE: For blog link refre to my GitHubhttps://github.com/ukantjadia/ or LinkedInwww.linkedin.com/in/ukantjadia

[3]:

```
x = df.iloc[:,[0,1,2,3]].values

wcss = []
```

```
for i in range(1,11): # we are taking 1,10 values as initial centroids.
  kmeans = KMeans(n_clusters = i, init = 'k-means++',max_iter = 300, n_init =␣
 ↪10, random_state = 0)
  kmeans.fit(x)
  wcss.append(kmeans.inertia_) # appending the within cluster sum of squares
```

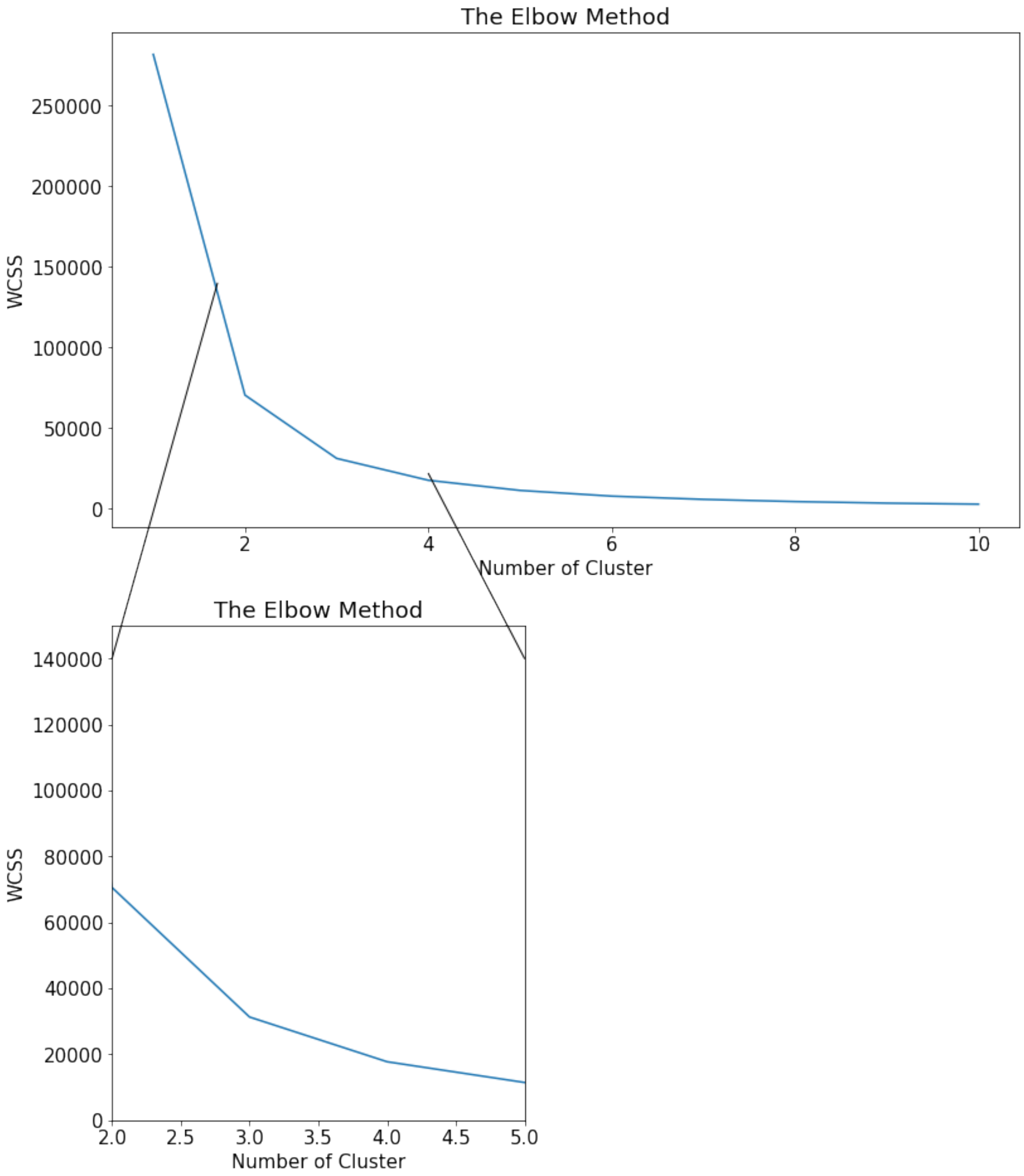
[4]:

```
fig = plt.figure(figsize=(10,12))
plt.rc('font', size=15)
plt.subplots_adjust(bottom = 0, left = 0, top = 1, right = 1)
sub1 = fig.add_subplot(2,2,(1,2)) # two rows, two columns, first cell
sub1.plot(range(1,11),wcss)
sub1.set_title('The Elbow Method')
sub1.set_xlabel('Number of Cluster')
sub1.set_ylabel('WCSS')

sub2 = fig.add_subplot(2,2,3) # two rows, two colums, combined third and forth␣
 ↪cell
sub2.set_xlim(2,5)
sub2.set_ylim(0,150000)
sub2.plot(range(1,11),wcss)
sub2.set_title('The Elbow Method')
sub2.set_xlabel('Number of Cluster')
sub2.set_ylabel('WCSS')
con1 = ConnectionPatch(xyA=(1.
 ↪7,140000),xyB=(2,140000),axesA=sub1,axesB=sub2,coordsA="data",coordsB="data")
con2 =␣
 ↪ConnectionPatch(xyA=(4,22000),xyB=(5,140000),axesA=sub1,axesB=sub2,coordsA="data",coordsB="

sub2.add_artist(con1)
sub2.add_artist(con2)

plt.show()
```



[5]:
```
# Modeling
kmeans = KMeans(n_clusters = 3, init = 'k-means++',max_iter = 300, n_init = 10,␣
 ↪random_state = 0)
y_kmeans = kmeans.fit_predict(x)
```

[6]:
```
plt.figure(figsize=(10,10))
plt.scatter(x[y_kmeans == 0, 0], x[y_kmeans == 0, 1],s = 100, c = 'red', label␣
 ↪= 'Iris-setosa')
```

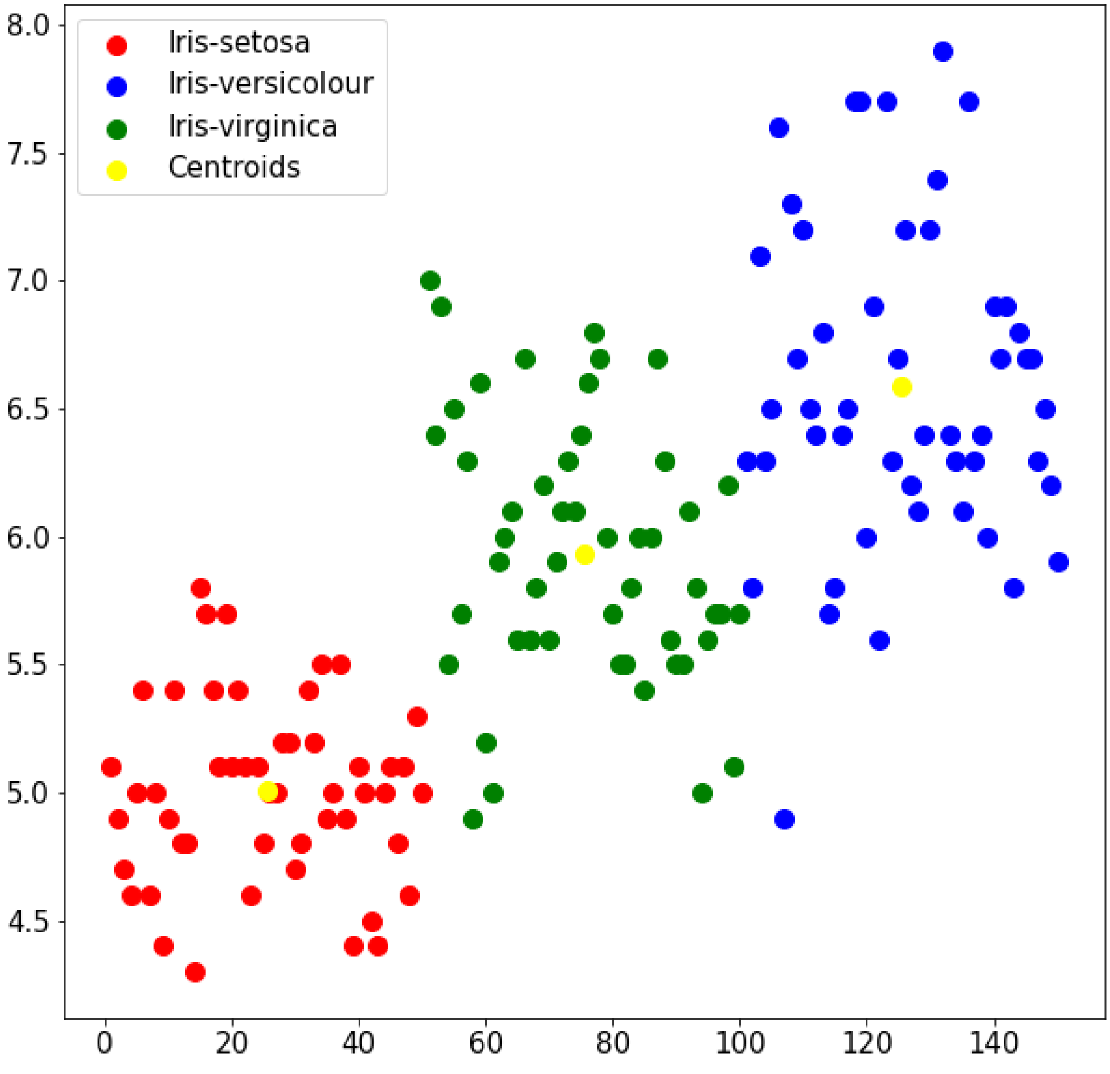
```
plt.scatter(x[y_kmeans == 1, 0], x[y_kmeans == 1, 1],s = 100, c = 'blue', label␣
 ↪= 'Iris-versicolour')
plt.scatter(x[y_kmeans == 2, 0], x[y_kmeans == 2, 1],s = 100, c = 'green',␣
 ↪label = 'Iris-virginica')

# Plotting the centroids of the clusters
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:,1],s =␣
 ↪100, c = 'yellow', label = 'Centroids')

plt.legend()
```

[6]:

```
<matplotlib.legend.Legend at 0x7fc58e2f06a0>
```



So, we have 3 centroids finally.