# Spark Intern - Task 2

March 14, 2022

[8]:
```
import numpy as n
import pandas as pd
import matplotlib.pyplot as plt
```

[9]:
```
data = pd.read_csv('Iris.csv')
data.head()
```

[9]:
```
   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
```

[10]:
```
data.drop(['Species','Id'],axis=1)
```

[10]:
```
     SepalLengthCm  SepalWidthCm  PetalLengthCm  PetalWidthCm
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
..             …             …              …             …
145            6.7           3.0            5.2           2.3
146            6.3           2.5            5.0           1.9
147            6.5           3.0            5.2           2.0
148            6.2           3.4            5.4           2.3
149            5.9           3.0            5.1           1.8

[150 rows x 4 columns]
```

[11]:
```
x = data.iloc[:, [0, 1, 2, 3]].values
```

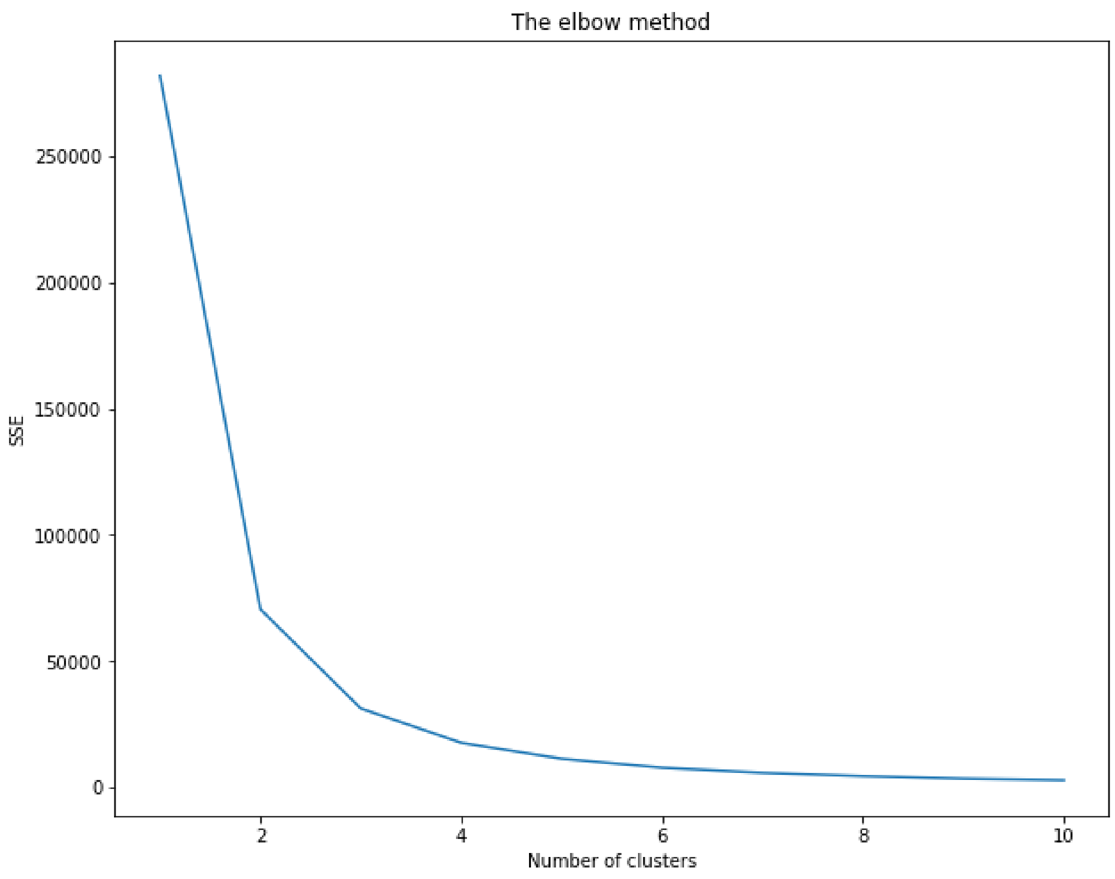
[18]:
```
from sklearn.cluster import KMeans
```

[19]:
```
sse = []

for k in range(1,11):
    km = KMeans(n_clusters=k,max_iter=300,n_init=10,init = 'k-means++')
    km.fit(x)
    sse.append(km.inertia_)

plt.plot(range(1,11),sse)
plt.title('The elbow method')
plt.xlabel('Number of clusters')
plt.ylabel('SSE')
plt.show()
```

```
C:\Users\sandy\anaconda3\lib\site-packages\sklearn\cluster\_kmeans.py:881:
UserWarning: KMeans is known to have a memory leak on Windows with MKL, when
there are less chunks than available threads. You can avoid it by setting the
environment variable OMP_NUM_THREADS=1.
  warnings.warn(
```



[20]:
```
km = KMeans(n_clusters=3,max_iter=300,n_init=10)
y_kmeans = km.fit_predict(x)
```

[21]:
```
y_kmeans
```

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

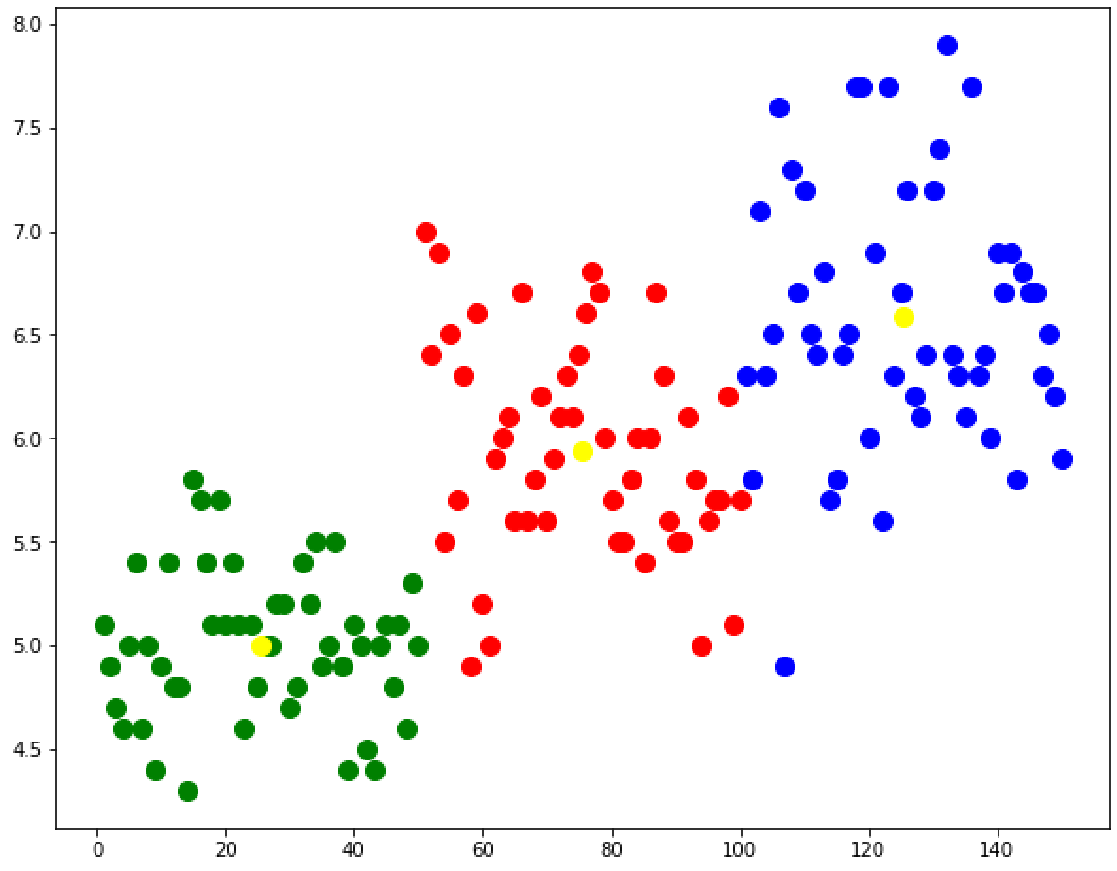
```
[22]: plt.scatter(x[y_kmeans == 0,0], x[y_kmeans == 0,1],s=100,c = 'red',label =␣
       ↪'Iris-setosa')

      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')

      plt.scatter(km.cluster_centers_[:,0],km.cluster_centers_[:,1],␣
       ↪s=100,c='yellow',label='Centroids')

      plt.rcParams["figure.figsize"]=10,8
```



[ ]:

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[ ]:

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```