The Sparks Foundation - Data Science & Business Analytics Internship

TASK 2 - Prediction using Unsupervised Machine Learning

In this task it is required to predict the optimum number of cluster for the iris data set .iris data set consists of 3 types of flower namely Iris-setosa Iris-versicolour and Iris-virginica

Author : Chaitanya Chaudhari

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
data=pd.read_csv('Iris.csv')
```

In [3]:
```
data.head()
```

Out[3]:

	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

In [4]:
```
# Drop 'Species' column as it is the result of Clustering
data.drop('Species',axis=1,inplace=True)
```

In [5]:
```
# Drop 'Id' column as it has no role in Clustering
data.drop('Id',axis=1,inplace=True)
```

In [6]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 4 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   SepalLengthCm  150 non-null    float64
 1   SepalWidthCm   150 non-null    float64
 2   PetalLengthCm  150 non-null    float64
 3   PetalWidthCm   150 non-null    float64
dtypes: float64(4)
memory usage: 4.8 KB
```

In [7]:
```
data.describe()
```

Out[7]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [8]:
```
data.shape
```

Out[8]:
```
(150, 4)
```

In [9]:
```
# Handling NULL values
data.isnull().sum()
```

Out[9]:
```
SepalLengthCm    0
SepalWidthCm     0
PetalLengthCm    0
PetalWidthCm     0
dtype: int64
```

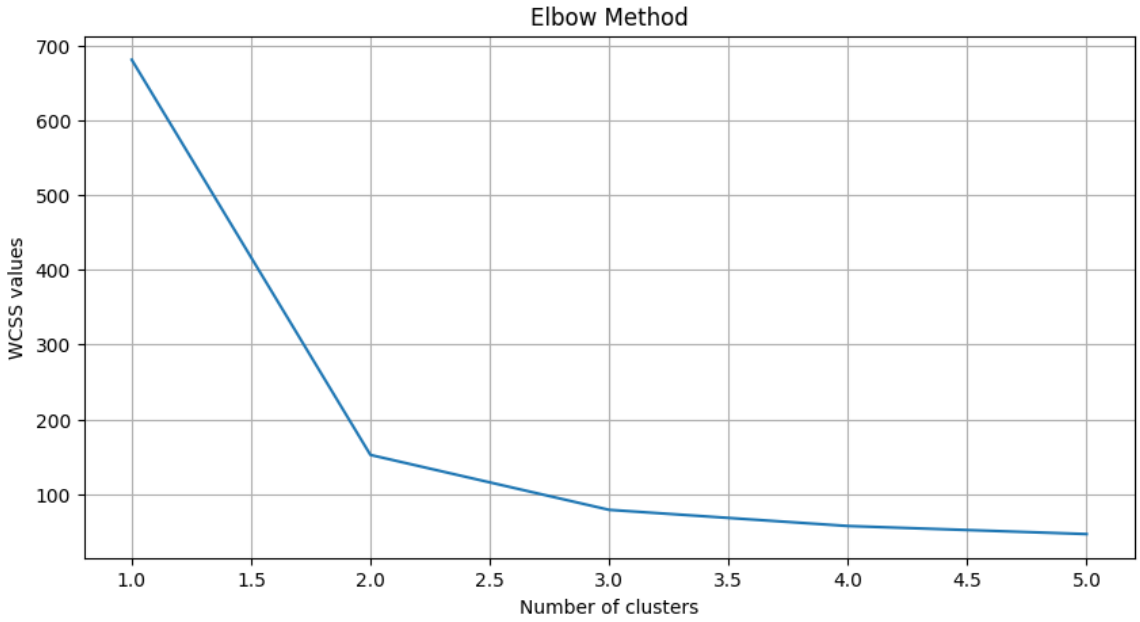
In [10]:
```
# All values are in the same scale i.e. cm hence scaling is not required
```

In [11]:
```
from sklearn.cluster import KMeans
```

In [12]:
```
list = []

for i in range(1,6):
    model=KMeans(n_clusters=i,n_init=10,max_iter=500)
    model.fit(data)
    list.append(model.inertia_)
```

In [13]:
```
# Plotting WCSS values
plt.figure(figsize=(10,5))
plt.plot(range(1,6),list)
plt.title('Elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS values')
plt.grid()
plt.show()
```



In [14]:
```
k_model = KMeans(n_clusters=3,n_init=10,max_iter=500)
k_model.fit(data)
```

Out[14]:
```
KMeans(max_iter=500, n_clusters=3, n_init=10)
```

In [15]:
```
# Cluster centroids
centroids=k_model.cluster_centers_
centroids
```

Out[15]:
```
array([[5.9016129 , 2.7483871 , 4.39354839, 1.43387097],
       [5.006     , 3.418     , 1.464     , 0.244     ],
       [6.85      , 3.07368421, 5.74210526, 2.07105263]])
```

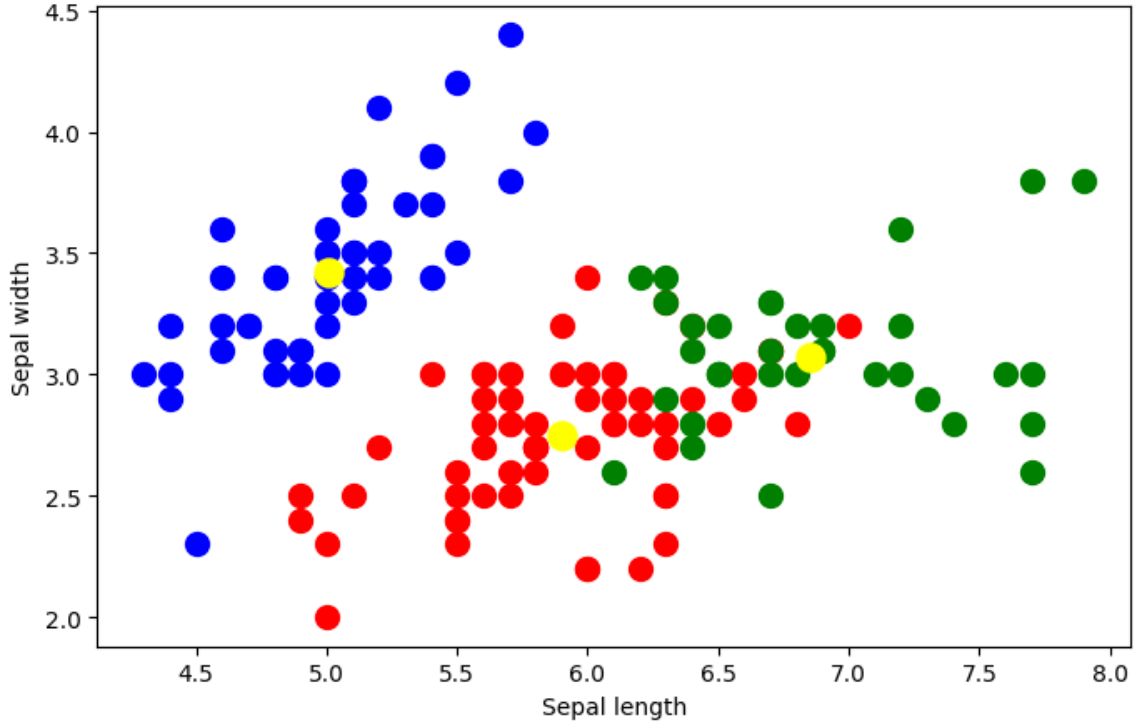
In [18]:
```
.# Make a new column in data representing the cluster number
prediction=k_model.predict(data)
data['Clusters']=prediction
```

In [19]:
```
plt.figure(figsize=(8,5))
plt.scatter(data[data.Clusters==0].SepalLengthCm,data[data.Clusters==0].SepalWid
plt.scatter(data[data.Clusters==1].SepalLengthCm,data[data.Clusters==1].SepalWid
plt.scatter(data[data.Clusters==2].SepalLengthCm,data[data.Clusters==2].SepalWid

plt.scatter(centroids[:, 0], centroids[:, 1],c='yellow',s=150)

plt.xlabel('Sepal length')
plt.ylabel('Sepal width')
```

Out[19]:
```
Text(0, 0.5, 'Sepal width')
```



In [ ]: