Prediction using Unsupervised ML

- From the given 'Iris' dataset, predict the optimum number of clusters and represent it visually.
- Dataset : https://bit.ly/3kXTdox (https://bit.ly/3kXTdox)

In [1]:

```
#Load the necessary python libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn import datasets

# Load the iris dataset
iris = datasets.load_iris()
iris_df = pd.DataFrame(iris.data, columns = iris.feature_names)
iris_df.head() # See the first 5 rows
```

Out[1]:

	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

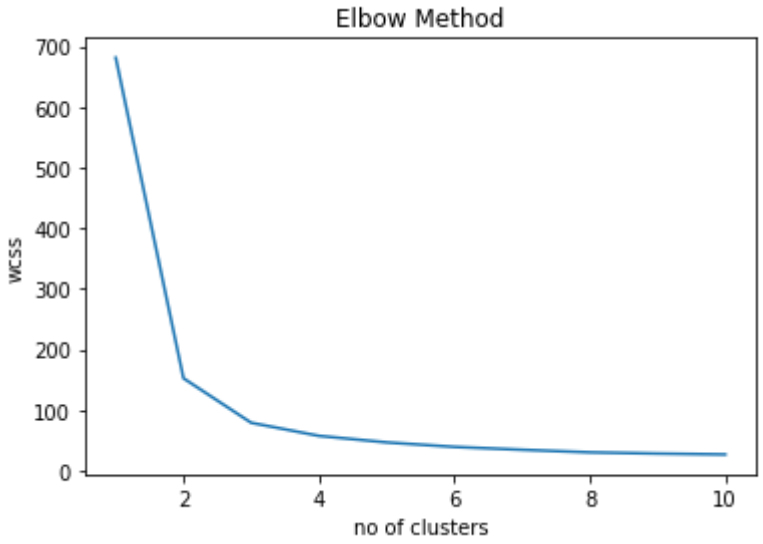
In [2]:

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

from sklearn.cluster import KMeans
wcss=[]

for i in range(1,11):
  kmeans=KMeans(n_clusters=i,init="k-means++",max_iter=300,n_init=10,random_state=0)
  kmeans.fit(x)
  wcss.append(kmeans.inertia_)
wcss

#Elbow Method- to find value of k
plt.plot(range(1,11),wcss)
plt.title('Elbow Method')
plt.xlabel('no of clusters')
plt.ylabel('wcss')  # Within cluster sum of squares   #wcss is low for higher no. of cl
usters
plt.show()
```



In [3]:

```
#Clustering
kmeans=KMeans(3)
kmeans.fit(x) #shows the parameters
```

Out[3]:

```
KMeans(algorithm='auto', copy_x=True, init='k-means++', max_iter=300,
       n_clusters=3, n_init=10, n_jobs=None, precompute_distances='auto',
       random_state=None, tol=0.0001, verbose=0)
```

In [4]:

```
#results
identified_clusters=kmeans.fit_predict(x)
identified_clusters #gives array containing predicted clusters
```

Out[4]:

```
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, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 2, 0, 2, 2, 2, 2, 0, 2, 2,
       2, 2, 2, 0, 0, 2, 2, 2, 2, 0, 2, 0, 2, 0, 2, 2, 0, 0, 2, 2, 2,
       2, 0, 2, 2, 2, 2, 0, 2, 2, 2, 0, 2, 2, 2, 0, 2, 2, 0])
```

In [5]:

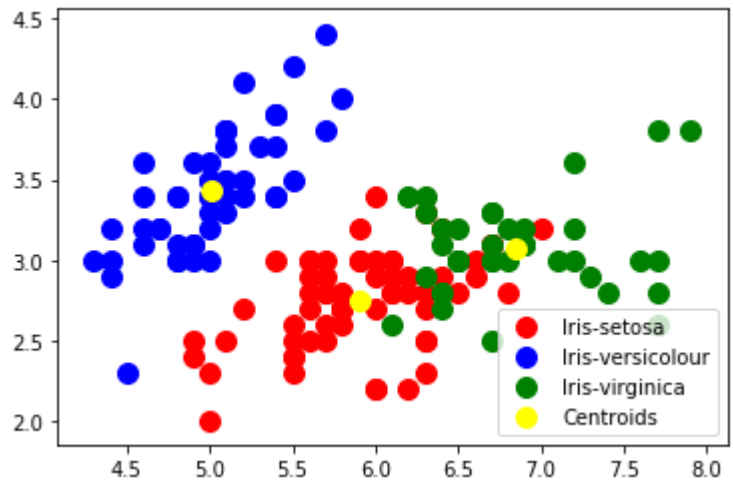
```
# Visualising the clusters - On the first two columns
plt.scatter(x[identified_clusters  == 0, 0], x[identified_clusters  == 0, 1],
            s = 100, c = 'red', label = 'Iris-setosa')
plt.scatter(x[identified_clusters  == 1, 0], x[identified_clusters  == 1, 1],
            s = 100, c = 'blue', label = 'Iris-versicolour')
plt.scatter(x[identified_clusters  == 2, 0], x[identified_clusters  == 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()
```

Out[5]:

```
<matplotlib.legend.Legend at 0x227e874de88>
```



In [ ]: