https://www.kaggle.com/datasets/vjchoudhary7/customer-segmentation-tutorial-in-python

Implemention of Clustering Algoritm in Python : KMeans

In [3]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.metrics import silhouette_score
```

In [4]:

```
customer_data = pd.read_csv ("C:/Users/Acer/Downloads/archive/Mall_Customers.csv", delimiter = ",")
```

In [7]:

```
customer_data
```

Out[7]:

	CustomerID	Gender	Age	Annual Income (k$)	Spending Score (1-100)
0	1	Male	19	15	39
1	2	Male	21	15	81
2	3	Female	20	16	6
3	4	Female	23	16	77
4	5	Female	31	17	40
...	...	...	...	...	...
195	196	Female	35	120	79
196	197	Female	45	126	28
197	198	Male	32	126	74
198	199	Male	32	137	18
199	200	Male	30	137	83

200 rows × 5 columns

In [9]:

```
customer_data.shape
```

Out[9]:

```
(200, 5)
```

In [19]:

```
#chossing the relevent feature
X = customer_data [['Annual Income (k$)', 'Spending Score (1-100)']]
```

In [21]:

```
X
```

Out[21]:

	Annual Income (k$)	Spending Score (1-100)
0	15	39
1	15	81
2	16	6
3	16	77
4	17	40
...	...	...
195	120	79
196	126	28
197	126	74
198	137	18
199	137	83

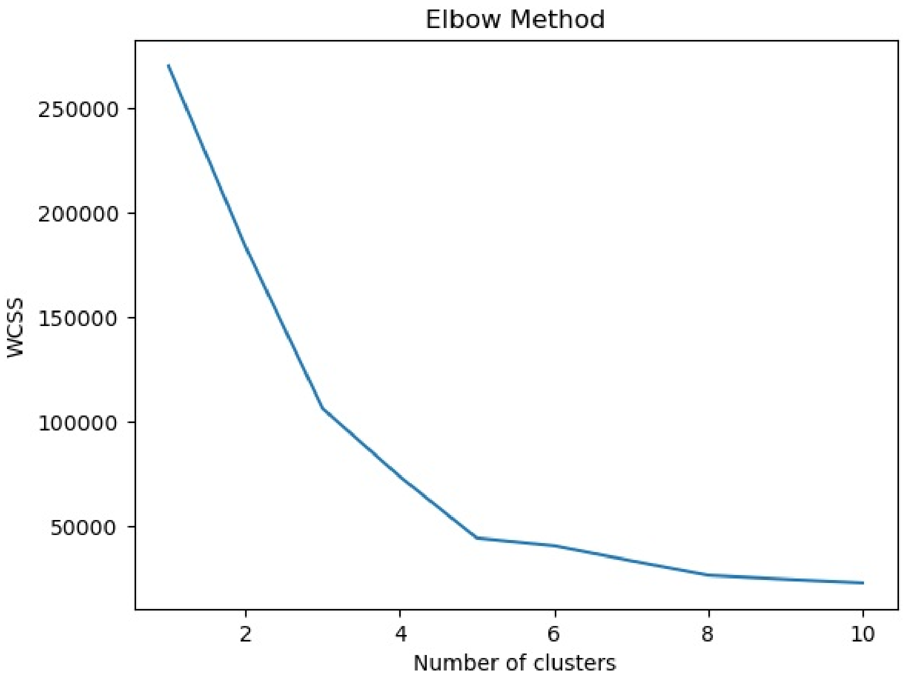
200 rows × 2 columns

In [ ]:

```
#Determine optimal number of cluster using the elbow method
wcss = []# Within-cluster sum of square(WCSS)
for i in range (1,11 ):
    kmeans = KMeans(n_clusters=i, init='k-means++', random_state = 42)
    kmeans.fit(X)
    wcss.append(kmeans.inertia_)
```

In [43]:

```
plt.plot(range(1,11),wcss)
plt.title('Elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```

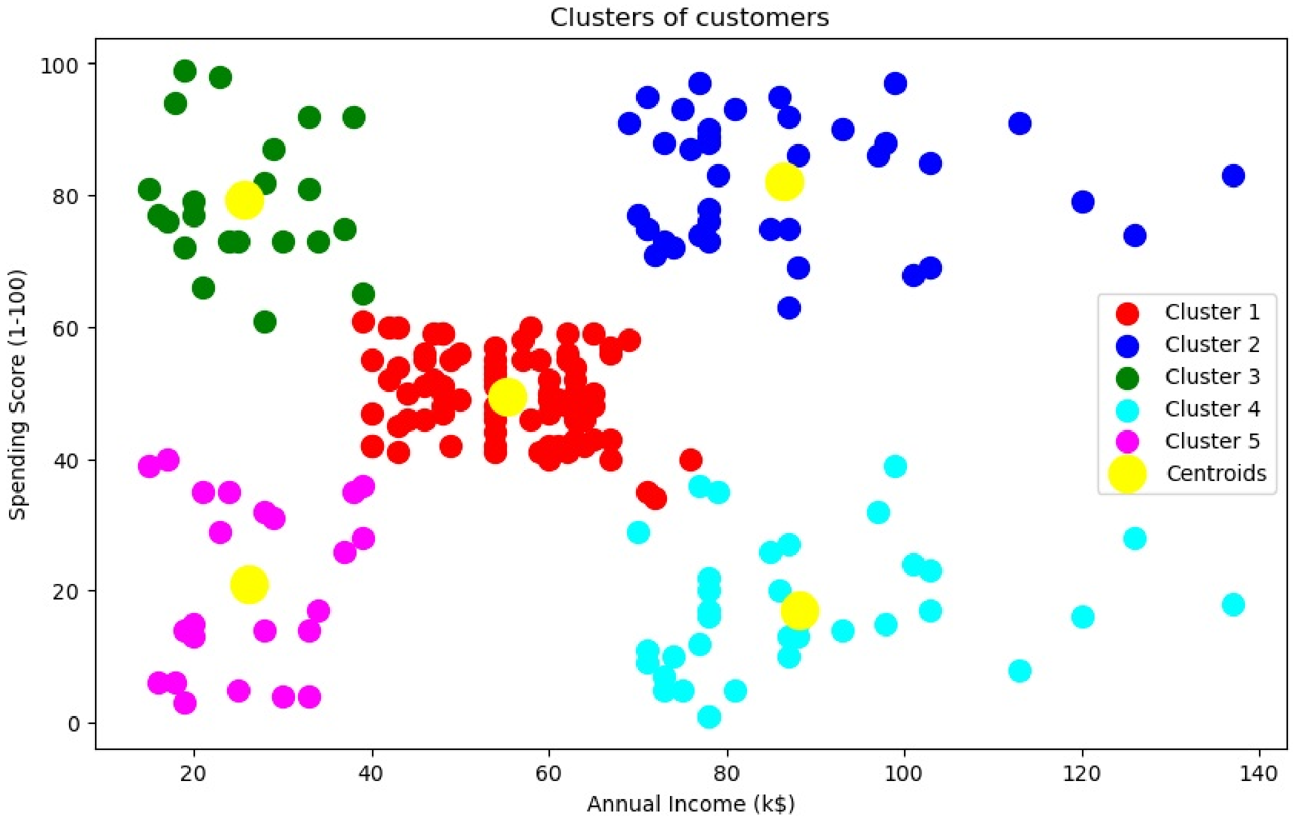


```
In [ ]: #Apply K-Means CLustering
        kmeans= KMeans(n_clusters=5, init='k-means++' , random_state= 42)
        y_kmeans = kmeans.fit_predict(X)
```

```
In [51]: y_kmeans
```

```
Out[51]: array([4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2,
                4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 2, 4, 0,
                4, 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, 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, 3, 1, 0, 1, 3, 1, 3, 1,
                0, 1, 3, 1, 3, 1, 3, 1, 3, 1, 0, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1,
                3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1,
                3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1, 3, 1,
                3, 1])
```

```
In [55]: #Visualize the Clusters
         plt.figure(figsize=(10,6))
         plt.scatter(X.iloc[y_kmeans == 0, 0], X.iloc[y_kmeans == 0, 1], s = 100, c = 'red', label = 'Cluster 1')
         plt.scatter(X.iloc[y_kmeans == 1, 0], X.iloc[y_kmeans == 1, 1], s = 100, c = 'blue', label = 'Cluster 2')
         plt.scatter(X.iloc[y_kmeans == 2, 0], X.iloc[y_kmeans == 2, 1], s = 100, c = 'green', label = 'Cluster 3')
         plt.scatter(X.iloc[y_kmeans == 3, 0], X.iloc[y_kmeans == 3, 1], s = 100, c = 'cyan', label = 'Cluster 4')
         plt.scatter(X.iloc[y_kmeans == 4, 0], X.iloc[y_kmeans == 4, 1], s = 100, c = 'magenta', label = 'Cluster 5')
         plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s = 300, c = 'yellow', label = 'Centr
         plt.title('Clusters of customers')
         plt.xlabel('Annual Income (k$)')
         plt.ylabel('Spending Score (1-100)')
         plt.legend()
         plt.show()
```



In [57]:

```
sil_score = silhouette_score(X, kmeans.labels_)
print('Silhouette Score: %.3f' % sil_score)
```

```
Silhouette Score: 0.554
```

In [ ]:

Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js