IE 345 - K “Introduction to Deep Learning: Fundamentals Concepts”

Prof. Yuzo

Clustering

K-Means Clustering

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In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

In [2]:
```
dataset = pd.read_csv('Mall_Customers.csv')
dataset.head(10)
```

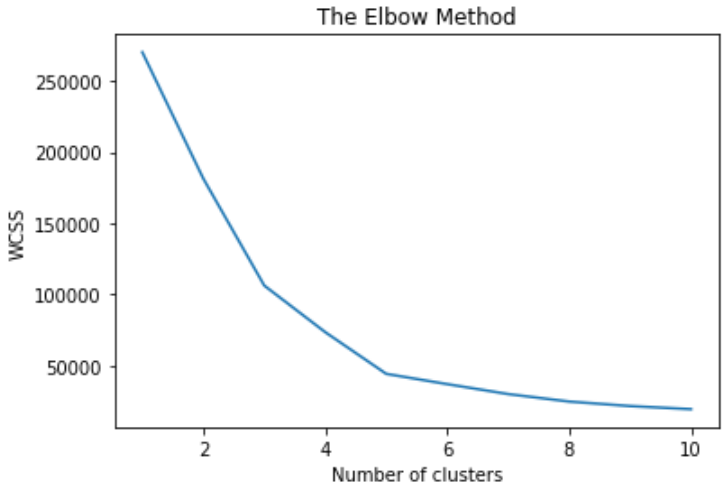
Out[2]:

	CustomerID	Genre	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
5	6	Female	22	17	76
6	7	Female	35	18	6
7	8	Female	23	18	94
8	9	Male	64	19	3
9	10	Female	30	19	72

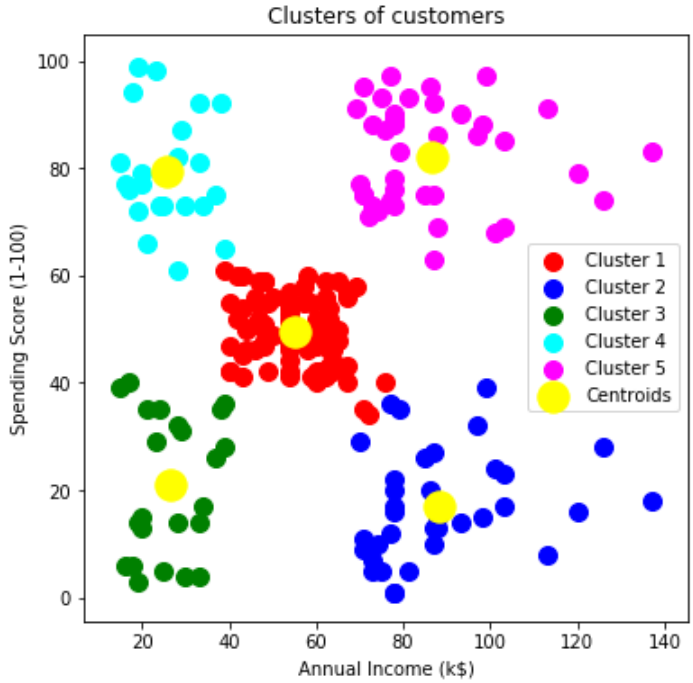
In [3]:
```
x = dataset.iloc[:, [3, 4]].values
```

In [4]:
```
from sklearn.cluster import KMeans
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_)

print(wcss)

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

```
[269981.28, 181363.59595959596, 106348.37306211118, 73679.78903948834, 44448.4554479337
1, 37233.81451071001, 30259.65720728547, 25011.83934915659, 21850.165282585633, 19672.07
284901432]
```



In [5]:
```
kmeans = KMeans(n_clusters = 5, init = 'k-means++', random_state = 42)
y_kmeans = kmeans.fit_predict(x)

plt.figure(1, figsize=(6, 6))
plt.scatter(x[y_kmeans == 0, 0], x[y_kmeans == 0, 1], s=100, c='red', label='Cluster 1')
plt.scatter(x[y_kmeans == 1, 0], x[y_kmeans == 1, 1], s=100, c='blue', label='Cluster 2')
plt.scatter(x[y_kmeans == 2, 0], x[y_kmeans == 2, 1], s=100, c='green', label='Cluster 3'
)
plt.scatter(x[y_kmeans == 3, 0], x[y_kmeans == 3, 1], s=100, c='cyan', label='Cluster 4')
plt.scatter(x[y_kmeans == 4, 0], x[y_kmeans == 4, 1], s=100, c='magenta', label='Cluster
 5')
plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:, 1], s=300, c='yello
w', label='Centroids')
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```



Pablo David Minango Negrete

pablodavid218@gmail.com

Lisber Arana Hinostroza

lisberarana@gmail.com