day59-k-means-clustering

December 7, 2023

Day59 K Means Clustering By: Loga Aswin

[1]:
```
# import libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans
```

[2]:
```
# load datasets
df = pd.read_csv('/content/Mall_Customers.csv')
```

Exploratory Data Analysis(EDA):

[3]:
```
df.head()
```

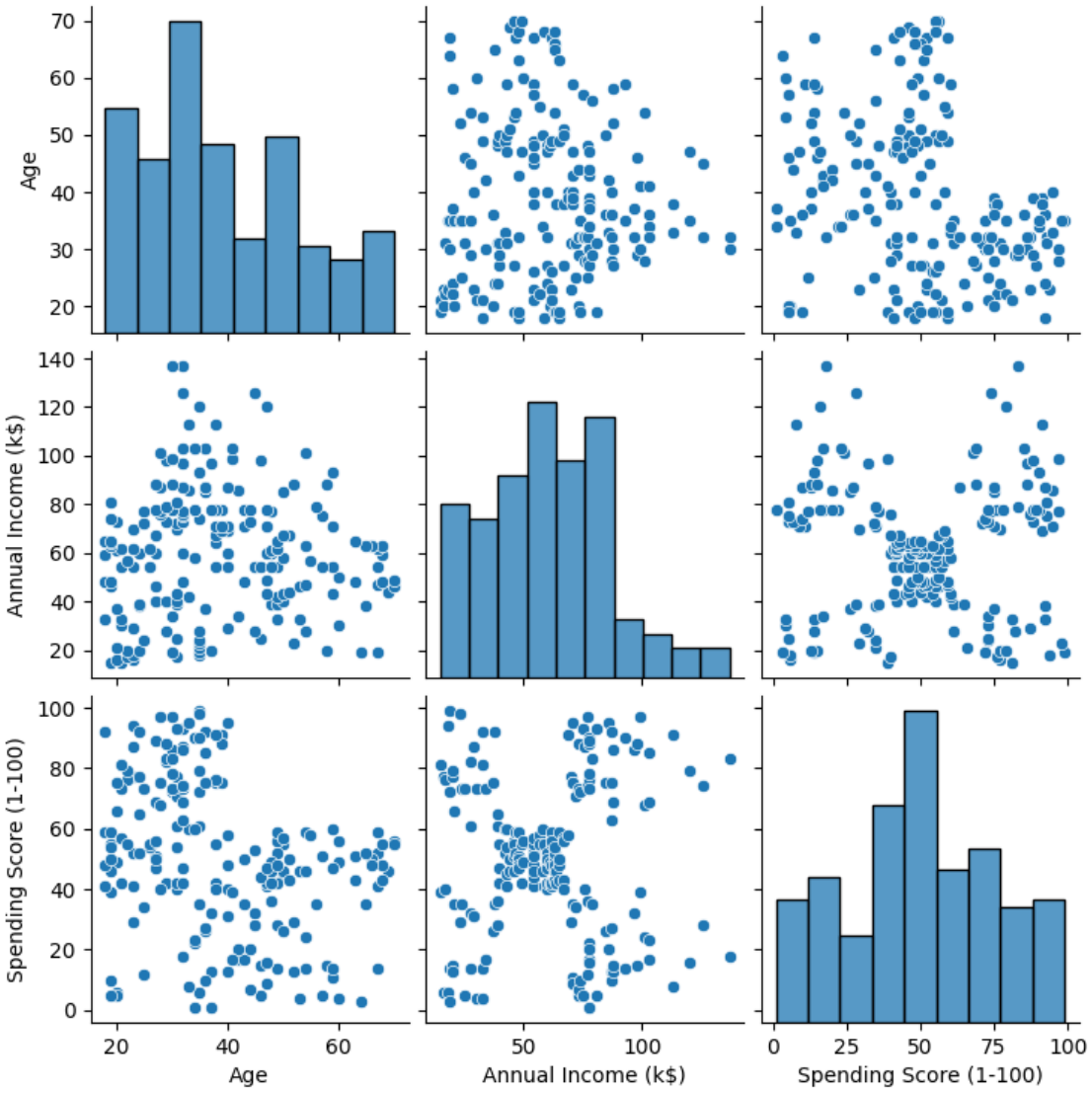
[3]:

	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

[19]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 6 columns):
 #   Column                  Non-Null Count  Dtype
---  ------                  --------------  -----
 0   CustomerID              200 non-null    int64
 1   Genre                   200 non-null    object
 2   Age                     200 non-null    int64
 3   Annual Income (k$)      200 non-null    int64
 4   Spending Score (1-100)  200 non-null    int64
 5   Cluster                 200 non-null    int32
dtypes: int32(1), int64(4), object(1)
memory usage: 8.7+ KB
```

[4]:
```
sns.pairplot(df[['Age', 'Annual Income (k$)', 'Spending Score (1-100)']])
plt.show()
```



[5]:
```
# Feature Selection
X = df[['Annual Income (k$)', 'Spending Score (1-100)']]
```

Choosing Number of Clusters (Elbow Method)

Using the Elbow Method, we'll plot the Within-Cluster Sum of Squares (WCSS) against different numbers of clusters.

After calculating WCSS for different numbers of clusters, we'll plot the number of clusters against their respective WCSS values.

[6]:
```python
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_)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870:
FutureWarning: The default value of `n_init` will change from 10 to 'auto' in
1.4. Set the value of `n_init` explicitly to suppress the warning
  warnings.warn(
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870:
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  warnings.warn(
```
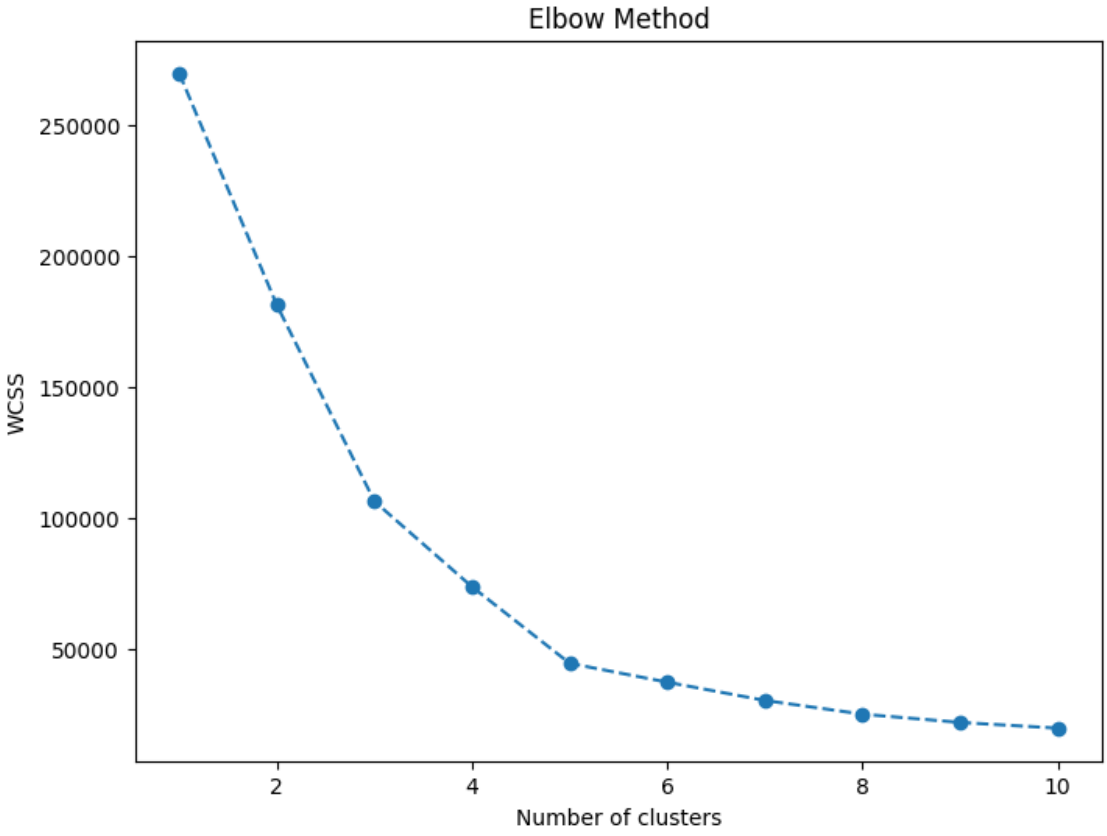

[7]:
```
plt.figure(figsize=(8, 6))
plt.plot(range(1, 11), wcss, marker='o', linestyle='--')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.title('Elbow Method')
plt.show()
```



Applying KMeans Clustering:

[8]:
```
kmeans = KMeans(n_clusters=5, init='k-means++', random_state=42)
kmeans.fit(X)
```

```
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FutureWarning: The default value of `n_init` will change from 10 to 'auto' in
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  warnings.warn(
```
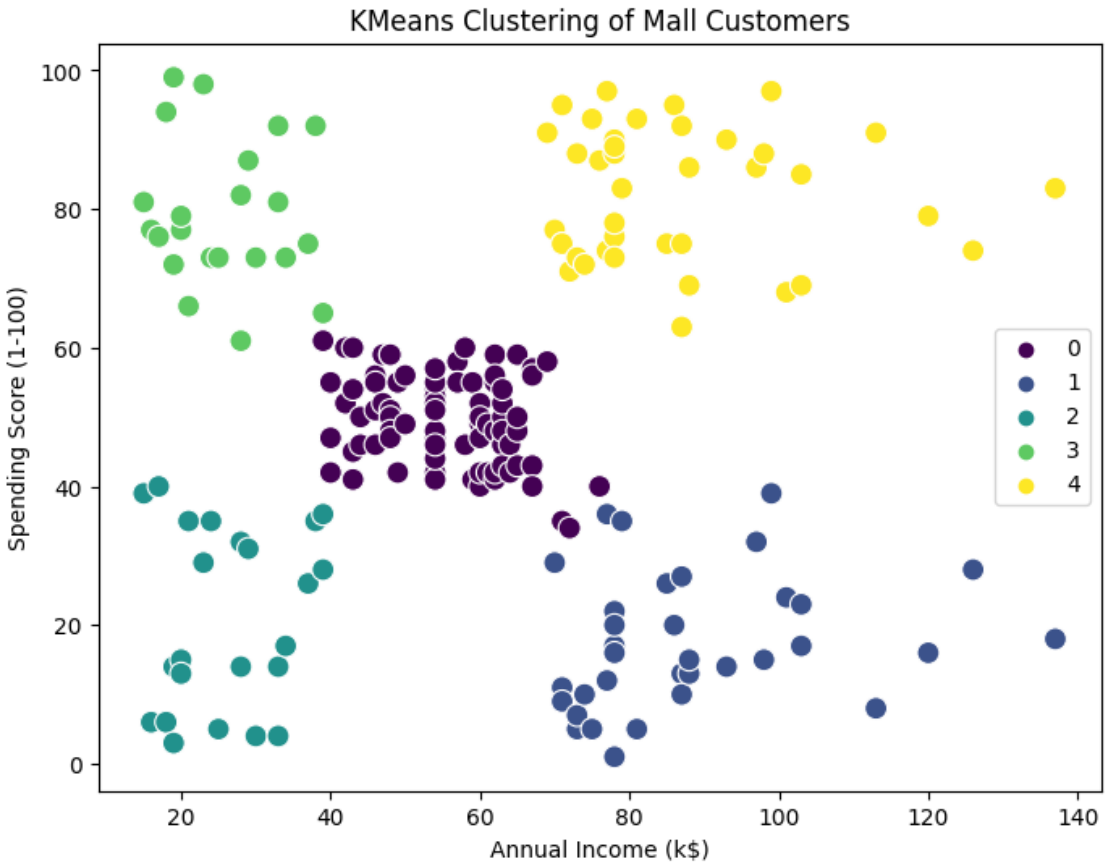

[8]:
```
KMeans(n_clusters=5, random_state=42)
```

[9]:
```
df['Cluster'] = kmeans.labels_
```

Visualization of Clusters:

[16]:
```
plt.figure(figsize=(8, 6))
sns.scatterplot(x='Annual Income (k$)', y='Spending Score (1-100)', data=df,␣
↪hue='Cluster', palette='viridis', s=100)
plt.title('KMeans Clustering of Mall Customers')
plt.legend()
plt.show()
```



Model Evaluation Metrics:

[15]:
```
from sklearn.metrics import silhouette_score

y = kmeans.labels_
silhouette = silhouette_score(X, y)
print(f"Silhouette Score: {silhouette}")
```

```
Silhouette Score: 0.553931997444648
```