day63-dbscan

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Day63 DBSCAN   By: Loga Aswin

[15]:

```
#import libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import DBSCAN
from sklearn.preprocessing import StandardScaler
from sklearn.decomposition import PCA
```

[16]:

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

[28]:

```
df.head()
```

[28]:

```
   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

   Cluster
0       -1
1        0
2       -1
3        0
4       -1
```

[30]:

```
# checking null vallues
df.isnull().sum()
```

[30]:

```
CustomerID                0
Genre                     0
Age                       0
Annual Income (k$)        0
Spending Score (1-100)    0
Cluster                   0
```

```
dtype: int64
```

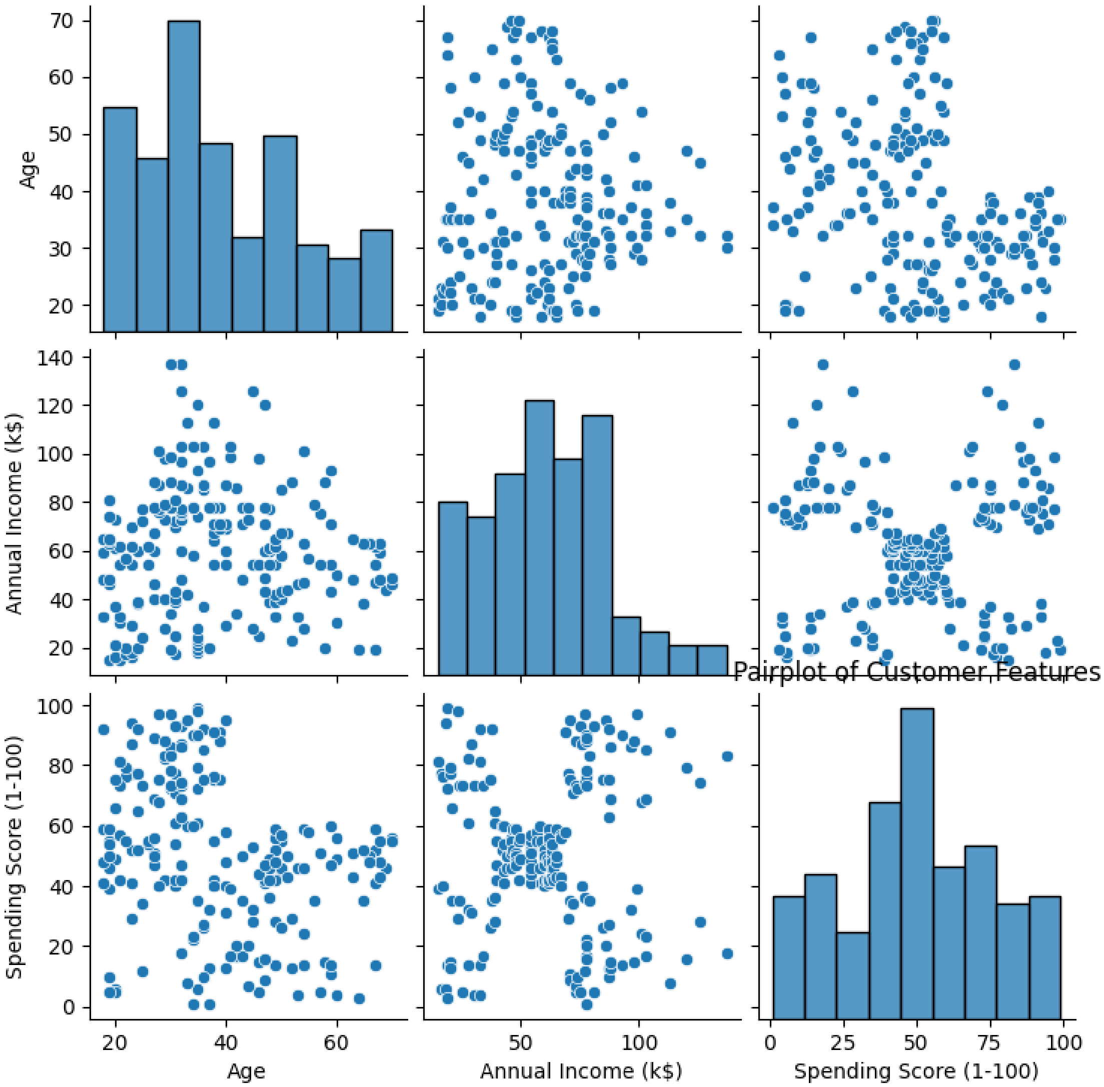
[31]:
```
# Statistical summary
df.describe()
```

[31]:
```
       CustomerID         Age  Annual Income (k$)  Spending Score (1-100)  \
count  200.000000  200.000000          200.000000              200.000000   
mean   100.500000   38.850000           60.560000               50.200000   
std     57.879185   13.969007           26.264721               25.823522   
min      1.000000   18.000000           15.000000                1.000000   
25%     50.750000   28.750000           41.500000               34.750000   
50%    100.500000   36.000000           61.500000               50.000000   
75%    150.250000   49.000000           78.000000               73.000000   
max    200.000000   70.000000          137.000000               99.000000   

          Cluster  
count  200.000000  
mean     1.470000  
std      1.974485  
min     -1.000000  
25%     -1.000000  
50%      2.000000  
75%      3.000000  
max      5.000000  
```

EDA - Pairplot of features

[17]:
```
sns.pairplot(df[['Age', 'Annual Income (k$)', 'Spending Score (1-100)']])
plt.title('Pairplot of Customer Features')
plt.show()
```



Selecting features for clustering and scaling:

```
[18]: X = df[['Age', 'Annual Income (k$)', 'Spending Score (1-100)']]
      scaler = StandardScaler()
      X_scaled = scaler.fit_transform(X)
```

Applying PCA for visualization purposes

```
[19]: pca = PCA(n_components=2)
      X_pca = pca.fit_transform(X_scaled)
```

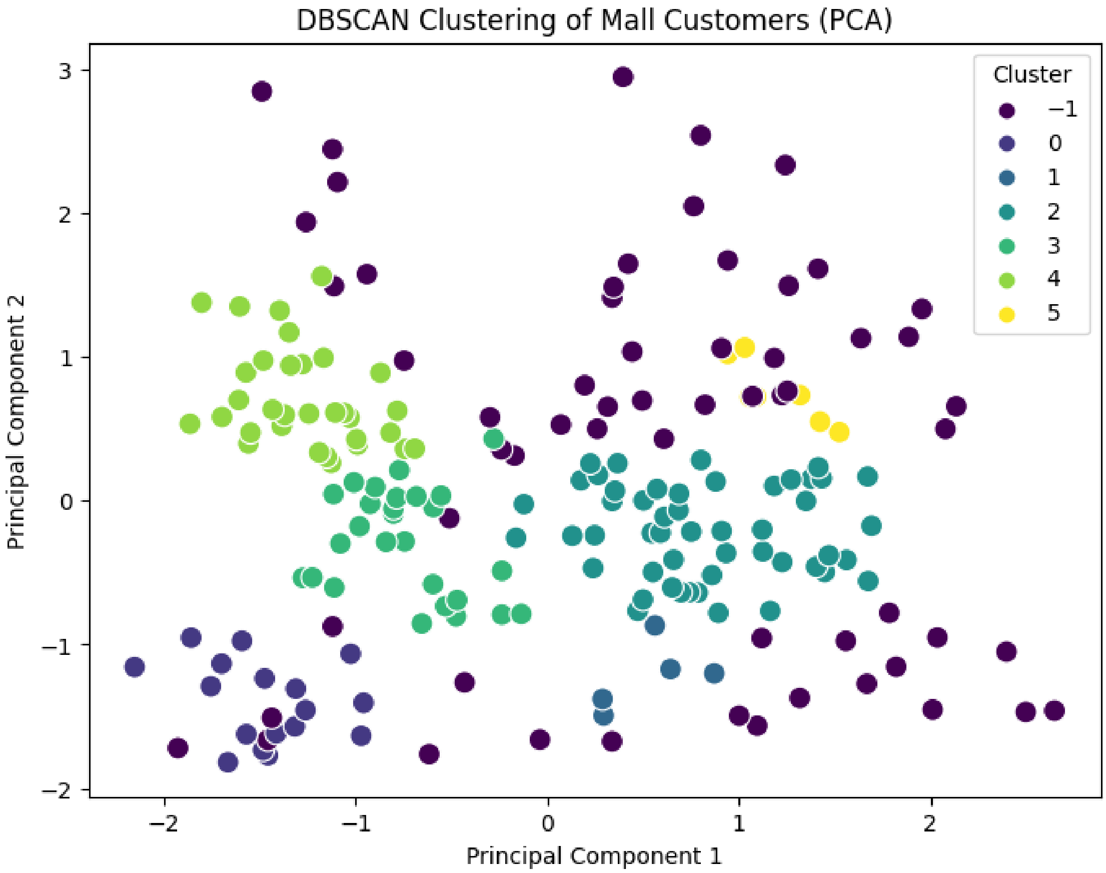
Applying DBSCAN with custom min_samples and eps values

[24]:
```
dbscan = DBSCAN(eps=0.5, min_samples=5)
y_pred = dbscan.fit_predict(X_scaled)
```

[25]:
```
df['Cluster'] = y_pred
```

Visualizing clusters using PCA

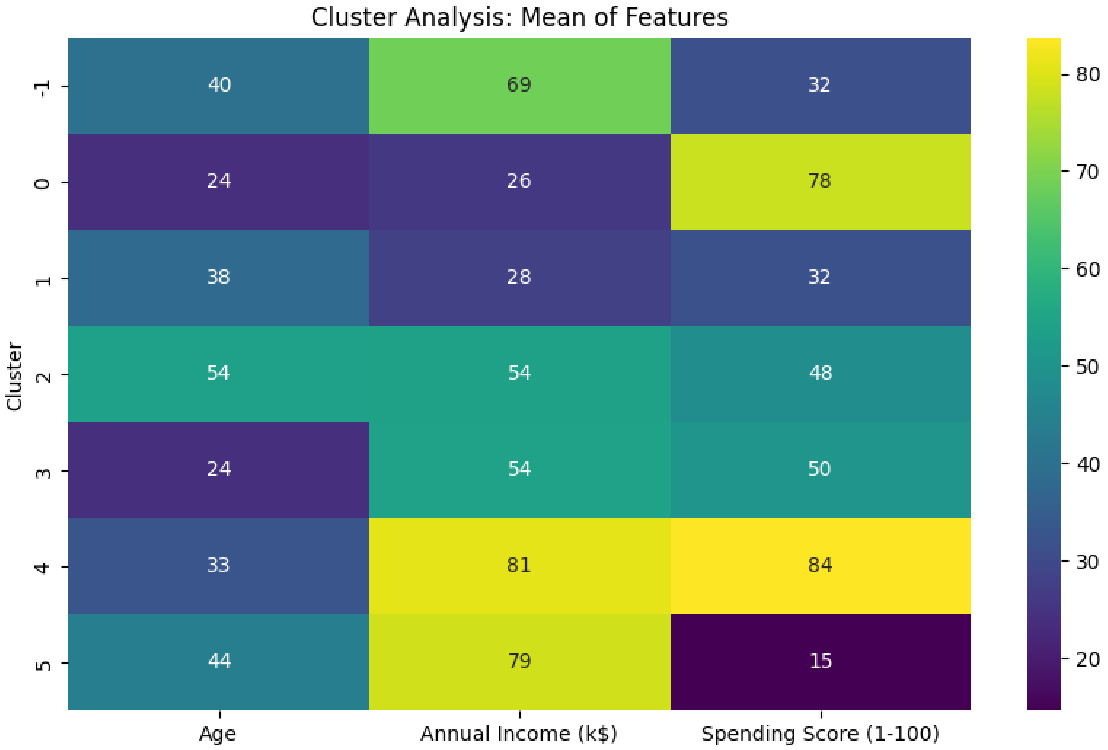
[26]:
```
plt.figure(figsize=(8, 6))
sns.scatterplot(x=X_pca[:, 0], y=X_pca[:, 1], hue=df['Cluster'],␣
 ↪palette='viridis', s=100)
plt.title('DBSCAN Clustering of Mall Customers (PCA)')
plt.xlabel('Principal Component 1')
plt.ylabel('Principal Component 2')
plt.legend(title='Cluster', loc='upper right')
plt.show()
```



Creating a heatmap for comparison of features within clusters

[27]:
```
plt.figure(figsize=(10, 6))
```

```
sns.heatmap(df.groupby('Cluster')[['Age', 'Annual Income (k$)', 'Spending Score (1-100)']].mean(), annot=True, cmap='viridis')
plt.title('Cluster Analysis: Mean of Features')
plt.show()
```



Using DBSCAN on our mall_customer information, we grouped them based on how much they earn, spend, and their age. So,this Customer Segmentation helps us discover better ways to sell services/products and grow our business.