Clustering Results

Clustering Models Evaluated

The following clustering models were applied to the dataset:

1. **K-Means Clustering**
2. **DBSCAN (Density-Based Spatial Clustering of Applications with Noise)**
3. **Agglomerative Clustering**

Key Results and Metrics

Clustering Results Table

Algorithm Name	Number of Clusters	DB Index	Silhouette Score
K-Means	3	0.83	0.65
DBSCAN	4	2.73	-0.11
Agglomerative Clustering	4	1.06	0.30

K-Means Clustering gave good results. As for the Davies-Bouldin Index the algorithm provided compact and well-separated clusters, thus the Silhouette Score appears to be moderate.

In K means using elbow method we found “3” clusters are optimal One.

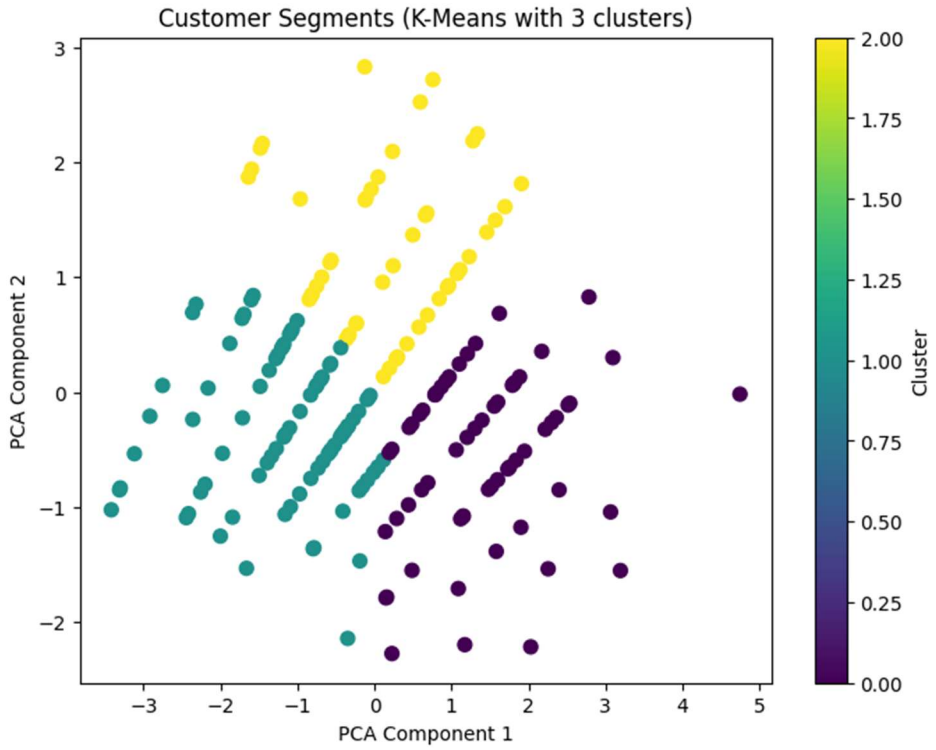
K-Means Clustering

- **Number of Clusters Formed**: 3 (Optimal number determined via the Elbow Method and Silhouette Score).
- **Davies-Bouldin Index**: 0.83
- **Silhouette Score**: 0.65
- **Cluster Visualization**: PCA was used for 2D and 3D visualizations, showing distinct groupings of customer segments.

Clustering Visualization:

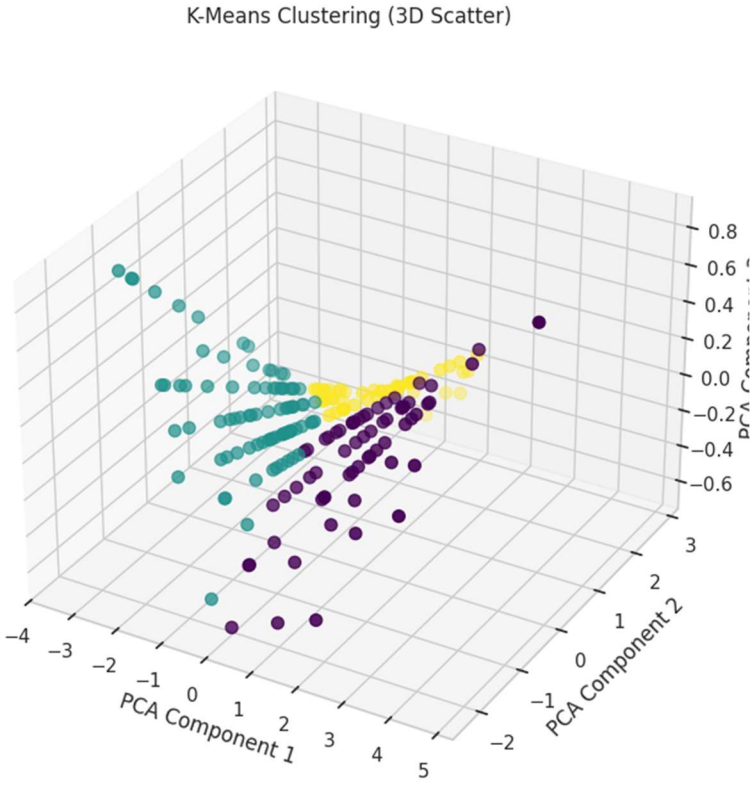
1. PCA 2D Visualization:

This 2D visualization provides a clearer representation of cluster separations.



2. 3D Visualization:

A 3D plot was also generated by reducing the dataset to 3 principal components, offering a more dynamic view of cluster interactions.



3. Pair Plot:

A pair plot was generated to visualize the pairwise relationships between features across the identified clusters