

CUSTOMER SEGMENTATION / CLUSTERING REPORT

1. Introduction

The purpose of this analysis is to segment customers into distinct clusters based on their transactional behavior, enabling better-targeted marketing strategies and improved customer understanding. The analysis utilized clustering techniques and key metrics such as the Davies-Bouldin Index to evaluate the quality of the clusters.

2. Clustering Overview

- Number of Clusters Formed:

Two clusters were identified through the analysis, as visualized using Principal Component Analysis (PCA).

- Davies-Bouldin Index (DB Index):

The DB Index value for the clustering is 0.6884, indicating well-separated and compact clusters. A lower DB Index suggests a high-quality clustering result.

3. Cluster Characteristics

The key characteristics of each cluster, based on the head values of the dataset, are summarized below:

- Cluster 0:

This cluster represents high-value customers who exhibit larger purchase quantities and more frequent transactions.

Example (based on head values): Customer C0004 has the highest TotalValue (5354.88) and the largest number of transactions (8).

- Cluster 1:

This cluster includes lower-value customers with smaller purchase quantities and fewer transactions.

Example (based on head values): Customer C0005 has a TotalValue of 2034.24 with only 3 transactions.

Cluster	Avg. Total Value	Avg. Quantity	Avg. Transactions
0	High	High	High
1	Low	Low	Low

4. Evaluation Metrics

1. Davies-Bouldin Index:

A DB Index of 0.6884 confirms good separation and compactness of clusters.

2. Visualization:

A scatterplot of PCA components with cluster assignments shows clear differentiation between the two clusters, further validating the clustering results.

5. Insights and Recommendations

- **Cluster 0 (High-Value Customers):**
Customers in this cluster represent significant revenue and should be targeted with retention programs, loyalty benefits, and personalized offers.
- **Cluster 1 (Low-Value Customers):**
These customers have lower transactional engagement and may benefit from reactivation strategies, discounts, or tailored marketing campaigns to improve engagement.

6. Conclusion

The clustering analysis successfully segmented the customers into two distinct groups with clear behavioral patterns. The identified clusters can guide targeted strategies for increasing customer retention, engagement, and profitability. Future steps could include tracking customer behavior over

time and refining the segmentation with additional features or larger datasets.