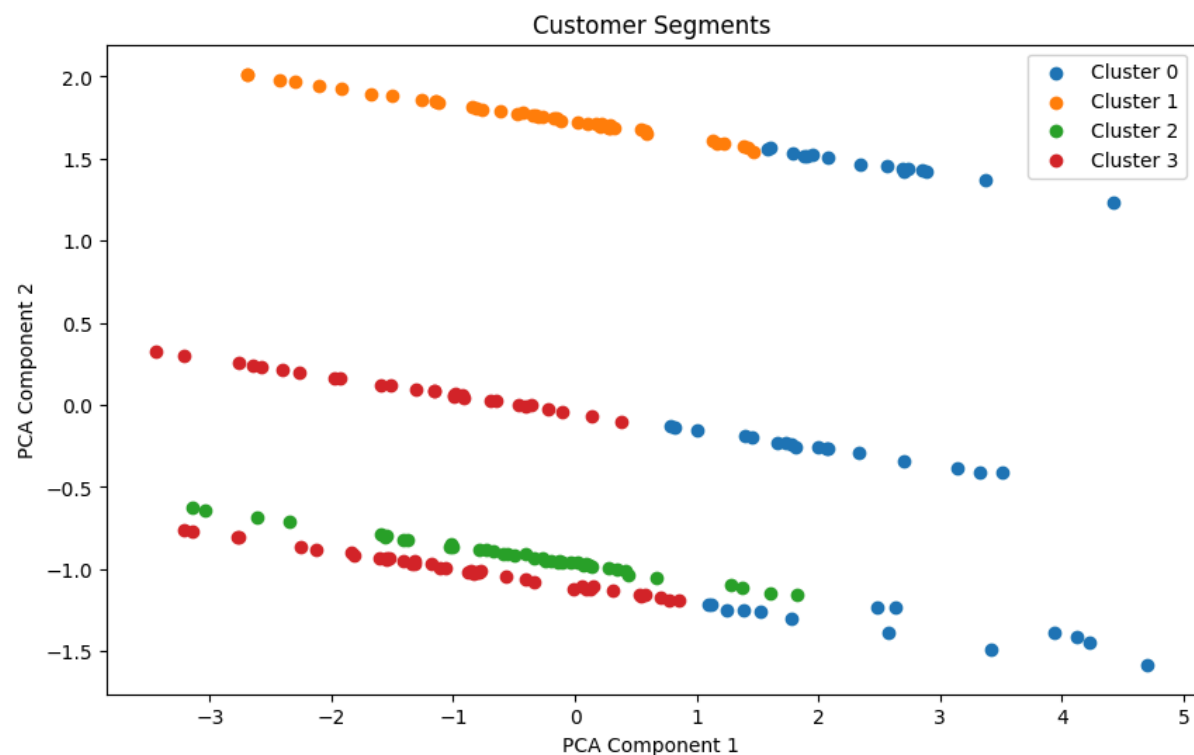# Clustering Results Report

Overview

This report summarizes the clustering results obtained using K-Means clustering. Key metrics such as the number of clusters formed, the Davies-Bouldin Index (DBI), and other relevant clustering metrics are presented to assess the quality of the clustering.

Clustering Results

1. Number of Clusters

The dataset was clustered into 4 clusters using the K-Means algorithm. This value was pre-determined based on domain knowledge and validated using clustering evaluation metrics.

2. Davies-Bouldin Index (DBI)

The Davies-Bouldin Index for this clustering solution is 0.944. This value indicates the quality of the clustering:

- A lower DBI value signifies better clustering, as it reflects compact and well-separated clusters.
- The obtained DBI score suggests that the clusters are reasonably compact and distinct.

3. Cluster Summary

The following table summarizes key statistics for each cluster:

Cluster	Mean Total Value	Sum Total Value	Mean Quantity	Sum Quantity
0	5893.69	277003.32	21.00	987
1	2867.74	123312.88	10.65	458
2	2890.35	118504.30	11.29	463
3	2480.80	171175.06	9.12	629

These metrics provide insights into the distribution of data within each cluster:

- Cluster 0 has the highest mean and total values, indicating it contains high-value customers.

- Clusters 1, 2, and 3 represent progressively smaller mean values and quantities.

Conclusion

The clustering results demonstrate a meaningful segmentation of data into four clusters with a Davies-Bouldin Index of 0.944, indicating good cluster quality. Further analysis using complementary metrics like the Silhouette Score or Calinski-Harabasz Index could provide additional validation for these results.

For visualization, refer to the PCA-based scatter plot of clusters included in this analysis to observe their spatial separation in reduced dimensions.