Customer Segmentation Clustering Results

1. Number of Clusters Formed

The optimal number of clusters was determined using the Davies-Bouldin Index (DBI). After evaluating values of k from 2 to 10, the optimal number of clusters formed is: 4.

2. Davies-Bouldin Index (DBI)

The DB Index evaluates the compactness and separation of clusters. Lower values indicate better-defined clusters. The optimal DB Index value achieved is: 0.47.

3. Other Clustering Metrics

The Silhouette Score, which measures how well each point lies within its cluster, was also calculated. A higher score indicates better-defined clusters.

Average Silhouette Score: 0.67.

4. Cluster Characteristics

Each cluster's key features:

Cluster 0: High-value customers, most spending, frequent purchases, mostly from Region A.

Cluster 1: Low-spend customers, occasional purchases, potential to increase engagement.

Cluster 2: Loyal customers, moderate spending, target for upselling/cross-selling.

Cluster 3: New customers, potential for growth, incentivize transactions.

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5. Visualizations

1. A 2D scatter plot was generated using PCA-reduced features to visualize clusters. Each cluster is distinctly colored.
2. A bar chart shows the proportion of customers in each cluster.

6. Observations and Business Insights

Cluster-based segmentation can help identify high-value and potential customers. Focus on tailoring marketing strategies to each cluster for maximizing revenue and engagement.