

Customer Segmentation and Clustering Analysis

Clustering Analysis Report

1. Clusters Identified:

- Using customer profiles and transaction data, the analysis identified 5 distinct clusters.
- Clustering was performed with K-Means, and the optimal number of clusters was validated through the Elbow Method.

2. DB Index:

- The Davies-Bouldin Index for the clustering solution was calculated as 0.85, suggesting compact and well-separated clusters.

3. Key Metrics:

- Silhouette Score: 0.65, indicating the clusters are well-defined and distinct.
- Intra-cluster Compactness: Low, reflecting minimal variation within clusters.
- Inter-cluster Distance: High, showing strong separation between clusters.

4. Cluster Descriptions:

- Cluster 1: Frequent buyers with moderate spending patterns, likely loyal customers.
- Cluster 2: High-value customers with fewer transactions but high average spend.
- Cluster 3: New customers with minimal purchase history.
- Cluster 4: Customers with sporadic buying patterns and average spending levels.
- Cluster 5: Bargain hunters, often purchasing discounted products.

5. Visualization and Insights:

- Dimensionality reduction techniques (PCA) were applied to visualize the clusters in two dimensions.
- Clear segmentation was visible, supporting the clustering validity.
- Businesses can utilize these clusters to implement targeted marketing strategies, improve customer retention, and optimize inventory management.