

Customer Segmentation Report

Overview

This report details the customer segmentation performed using clustering techniques on customer profile and transaction data. The goal was to identify distinct customer segments to inform strategic business decisions.

Clustering Algorithm

- **Algorithm Used:** KMeans Clustering
- **Number of Clusters:** 5

Clustering Metrics

- **Davies-Bouldin (DB) Index:** 0.865
 - The DB Index is a measure of clustering quality. A lower value indicates better-defined clusters. In this case, a DB Index of 0.865 suggests reasonably well-defined clusters.
- **Inertia:** 349.17
 - Inertia represents the within-cluster sum of squares. Lower values indicate tighter clusters, with the calculated inertia being 349.17.

Cluster Analysis and Visual Representation

The clusters were visualized using a 2D scatter plot with PCA components, showing clear separation between different customer segments.

Cluster Descriptions

Based on the clustering results, we identified 5 distinct customer segments with the following characteristics:

1. **Cluster 0:** High-Value Buyers
 - **Characteristics:** Customers in this cluster tend to have high total transaction values and purchase large quantities of products.

- **Strategy:** Focus on personalized marketing and loyalty programs to retain these high-value customers.

2. **Cluster 1:** Moderate Buyers

- **Characteristics:** Customers with moderate transaction values and quantities. They have consistent purchasing behavior.
- **Strategy:** Encourage upselling and cross-selling to increase their transaction values.

3. **Cluster 2:** Low-Frequency Buyers

- **Characteristics:** Customers who make few purchases with low total transaction values.
- **Strategy:** Implement engagement strategies to convert them into repeat buyers.

4. **Cluster 3:** Occasional High Spenders

- **Characteristics:** Customers who make occasional high-value purchases.
- **Strategy:** Analyze their preferences and target them with special offers during peak purchasing periods.

5. **Cluster 4:** New Customers

- **Characteristics:** Recently acquired customers with limited transaction history.
- **Strategy:** Focus on onboarding and nurturing these customers to build long-term relationships.

Visual Representation of Clusters

The clusters were visualized using a 2D scatter plot with PCA components, showing clear separation between different customer segments.

Conclusion

The clustering analysis successfully identified 5 distinct customer segments, each with unique characteristics and behaviors. These insights can guide targeted

marketing strategies, customer retention efforts, and product recommendations to optimize business performance.