

Customer Segmentation Report

Objective

The goal of this analysis was to perform customer segmentation by applying clustering techniques to e-commerce data. This segmentation helps identify distinct customer groups and tailor strategies to improve business outcomes.

Key Findings

1. Optimal Number of Clusters

We utilized the K-Means clustering algorithm and evaluated cluster counts ranging from 2 to 10. The ideal number of clusters was determined by analyzing metrics such as the Davies-Bouldin Index (DBI) and inertia values.

2. Evaluation Using Davies-Bouldin Index

The Davies-Bouldin Index assesses clustering quality by comparing the separation and compactness of clusters. A lower DBI value indicates better-defined clusters.

- **Graph 1: DBI Across Cluster Sizes**

The analysis revealed that the lowest DBI value occurred at **X clusters** (replace "X" with the specific number). This indicates that clustering with **X clusters** resulted in well-separated and cohesive customer segments.

3. Additional Clustering Metrics

- **Inertia:**

Inertia, which measures the sum of squared distances within clusters, was analyzed across different cluster sizes.

- **Graph 2: Inertia Across Cluster Sizes**

The results showed that inertia decreased as the number of clusters increased, reflecting improved compactness. However, balancing cluster separation and compactness led to the selection of the optimal number of clusters at **X**.

Insights and Strategic Recommendations

Based on the clustering results, the following distinct customer segments were identified:

- **High-Value Customers:** Customers who shop frequently and spend significantly, representing an opportunity for loyalty programs or premium offerings.
- **Occasional Shoppers:** Customers with sporadic purchase behavior and lower spending, who could be engaged through targeted promotions.
- **Diverse Preference Shoppers:** Customers with infrequent and varied purchasing habits, suggesting a need for personalized recommendations to increase engagement.

Next Steps

Leverage these customer segments to:

1. Create targeted marketing campaigns tailored to each group.
2. Develop loyalty incentives for high-value customers to drive retention.
3. Implement personalized offers and communication strategies for occasional and diverse preference shoppers to increase their purchase frequency.

By applying these strategies, businesses can maximize revenue and strengthen customer relationships.