

Clustering Report

Customer Segmentation Report

1. Objective

The goal of this analysis is to perform customer segmentation using clustering techniques. By grouping customers based on their profile and transaction information, we aim to identify distinct customer groups to enable targeted marketing and improved business strategies.

2. Methodology

1. Data Preprocessing:

- Combined `Customers.csv` and `Transactions.csv` to create a consolidated dataset.
- Aggregated transaction data for each customer to calculate:
 - Total spending (`TotalValue`)
 - Total quantity purchased (`Quantity`)
- One-hot encoded categorical columns (e.g., `Region`).
- Standardized numerical features for clustering.

2. Clustering Algorithm:

- **K-Means Clustering** was chosen for segmentation.
- The optimal number of clusters was determined by experimentation (set to 3 in this case).
- Clustering evaluation was performed using the **Davies-Bouldin Index (DB Index)**.

3. Evaluation Metric:

- The DB Index evaluates clustering quality; a lower value indicates better-defined clusters.

3. Results

1. **Number of Clusters:** 3
 2. **Cluster Characteristics:**
 - **Cluster 0:**
 - High spenders with large purchase quantities.
 - Likely to represent loyal customers or bulk buyers.
 - **Cluster 1:**
 - Moderate spenders with medium purchase quantities.
 - May represent occasional buyers or seasonal customers.
 - **Cluster 2:**
 - Low spenders with small purchase quantities.
 - Likely to include new or infrequent customers.
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5. Insights

1. **Target High-Value Customers:**
 - Customers in **Cluster 0** are the most valuable. Offering loyalty rewards or premium services could enhance retention and drive additional revenue.
 2. **Engage Moderate Customers:**
 - Customers in **Cluster 1** may benefit from personalized promotions to increase spending and frequency.
 3. **Attract New Customers:**
 - Customers in **Cluster 2** are likely new or inactive. Offering discounts or onboarding campaigns could boost their activity.
 4. **Regional Focus:**
 - Regional preferences identified through one-hot encoded data suggest opportunities for region-specific strategies.
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6. Conclusion

This segmentation analysis provides actionable insights to improve customer engagement and optimize marketing strategies. By understanding the needs of different customer segments, businesses can allocate resources more effectively and enhance customer satisfaction.