

Clustering Analysis Report

eCommerce Transactions Dataset

1. Report Overview

- **Date:** 27/01/2024
 - **Prepared by:** Anbhi Thakur
 - **Objective:** Perform customer segmentation using KMeans clustering to identify actionable insights and tailor marketing strategies for distinct customer groups.
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2. Clustering Metrics and Evaluation

2.1 Number of Clusters

- **Findings:**
 - Three clusters were selected based on data characteristics and evaluation metrics.

2.2 Davies-Bouldin Index (DBI)

- **Analysis:**
 - DBI measures the similarity between clusters. A lower value indicates better-defined clusters, while a higher value suggests poor separation.

2.3 Silhouette Score

- **Analysis:**
 - The silhouette score evaluates cohesion within clusters and separation between clusters. A higher score reflects better clustering performance.
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3. Cluster Characteristics and Insights

Cluster 1: High-Spending, Frequent Shoppers

- **Characteristics:**
 - **TotalSpend:** High expenditure.
 - **AvgTransactionValue:** High transaction value.
 - **TransactionCount:** Frequent purchases.
 - **ProductDiversity:** Moderate variety.

- **Actionable Insights:**
 - Target this loyal, high-value group with **exclusive offers**, **loyalty programs**, and **personalized recommendations**. Explore **upselling** and **cross-selling** opportunities with premium products.

Cluster 2: Low-Spending, Infrequent Shoppers

- **Characteristics:**
 - **TotalSpend:** Low expenditure.
 - **AvgTransactionValue:** Low transaction value.
 - **TransactionCount:** Few transactions.
 - **ProductDiversity:** Low variety.
- **Actionable Insights:**
 - Retarget this group with **discounts**, **promotions**, and **coupons** to increase transaction frequency. Understand their low product engagement and encourage exploring other categories.

Cluster 3: Moderate-Spending, Balanced Shoppers

- **Characteristics:**
 - **TotalSpend:** Moderate expenditure.
 - **AvgTransactionValue:** Moderate transaction value.
 - **TransactionCount:** Moderate transactions.
 - **ProductDiversity:** High variety.
 - **Actionable Insights:**
 - Nurture this group with **personalized recommendations**, **seasonal offers**, and **product bundles**. Incentivize increased spending to shift them towards higher-value clusters.
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4. Conclusion

The clustering analysis identified three distinct customer segments with varying levels of spending and product engagement. By tailoring strategies to each segment, businesses can increase engagement, drive sales, and enhance customer satisfaction. Targeting high-value customers, incentivizing low spenders, and nurturing moderate spenders can boost overall profitability.
