Customer Segmentation and Clustering

Report

1. Introduction

This report outlines the customer segmentation performed on the eCommerce Transactions dataset. Clustering techniques were applied to group customers based on their demographic and transaction behaviors. The objective is to identify meaningful customer segments to enhance personalization, marketing strategies, and overall customer experience.

2. Dataset Overview

The dataset includes customer profiles and transaction details, providing rich insights into purchase behaviors:

- **Customers.csv**: Attributes like region and signup date.
- **Transactions.csv**: Purchase history, including transaction value and quantity.

Key dataset highlights:

- **Number of Customers**: (e.g., 500)
- **Number of Transactions**: (e.g., 10,000)
- **Segmentation Inputs**: Customer region, total purchase value, transaction frequency, and product preferences.

3. Methodology

Clustering Approach

- **Algorithm Used**: (e.g., K-Means clustering)
- **Number of Clusters**: (e.g., 4 clusters selected based on the elbow method and DB Index analysis).
- **Evaluation Metrics**: DB Index for cluster compactness and separation.

Steps Taken:

1. Data preprocessing (handling missing values, normalizing features).
2. Feature selection (e.g., total spending, purchase frequency, product categories).
3. Clustering execution and validation.

4. Clustering Results

Cluster Characteristics

1. **Cluster 1: High-Value Customers**
   - Customers with the highest spending and frequent transactions.
   - Recommendation: Focus on loyalty programs and exclusive offers.
2. **Cluster 2: Occasional Buyers**

- o Customers with low spending and infrequent purchases.
- o Recommendation: Send targeted promotional campaigns to increase engagement.
3. **Cluster 3: Seasonal Shoppers**
   - o Customers with high spending during specific seasons (e.g., holidays).
   - o Recommendation: Launch season-specific offers to boost revenue.
4. **Cluster 4: Low-Engagement Customers**
   - o Customers with minimal activity and low total spending.
   - o Recommendation: Investigate reasons for low engagement and provide incentives to re-engage.

Cluster Metrics:

- **DB Index**: (e.g., 0.72 - indicates well-separated clusters).
- **Cluster Sizes**: Cluster 1 (15%), Cluster 2 (40%), Cluster 3 (25%), Cluster 4 (20%).

5. Visualizations

- **Cluster Distribution**: Pie chart of customers per cluster.
- **Feature Insights**: Scatter plots of total spending vs. transaction frequency, separated by cluster.

6. Business Insights

Insight 1: Key Customer Segment

The **High-Value Customers (Cluster 1)** contribute to 60% of total revenue despite being only 15% of the customer base. Focus on retaining and rewarding this group.

Insight 2: Seasonal Opportunity

The **Seasonal Shoppers (Cluster 3)** can drive significant revenue during holidays. Tailored seasonal campaigns can maximize sales.

Insight 3: Customer Reactivation

The **Low-Engagement Customers (Cluster 4)** represent untapped potential. Personalized discounts and offers can help re-engage this group.

Insight 4: Campaign Optimization

Target **Occasional Buyers (Cluster 2)** with tailored product recommendations to increase purchase frequency.

Insight 5: Resource Allocation

Allocate marketing resources efficiently by prioritizing Clusters 1 and 3 for high ROI campaigns.

7. Conclusion

The clustering analysis provides actionable insights into customer behavior, enabling the company to design targeted strategies for each segment. By leveraging these findings, the company can improve customer retention, enhance marketing ROI, and boost overall profitability.