

Documentation for Customer Segmentation

Overview

This section focuses on customer segmentation using clustering techniques to group customers based on their purchasing behavior and regional data. The analysis employs RFM metrics (Recency, Frequency, Monetary) and region information for clustering.

Clustering Analysis

K-Means Clustering

- **Objective:** Group customers into clusters based on RFM metrics and regional data.
- **Optimal Number of Clusters:**
 - Determined using the Elbow Method, which identifies the "elbow point" in the inertia plot.
 - Four clusters are selected for this analysis.

Evaluation Metrics

1. **Davies-Bouldin Index:**
 - Measures cluster separation and compactness. A lower value indicates better clustering.
 - Achieved DB Index: 0.4381.
2. **Silhouette Score:**
 - Evaluates how well each customer fits within its cluster. A higher score indicates better-defined clusters.
 - Achieved Silhouette Score: 0.7124.

PCA for Visualization

- Principal Component Analysis (PCA) reduces the feature space to two dimensions for easier visualization.
 - A scatter plot visualizes the clusters, showing distinct and well-separated groups.
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Key Business Insights

1. High-Value Clusters:

- Clusters with high monetary and frequency values represent loyal, high-spending customers.
- Focus on retention strategies, such as personalized offers and loyalty programs.

2. Budget Buyers:

- Clusters with low monetary and frequency values indicate occasional or one-time buyers.
- Re-engage with promotions and targeted campaigns to boost activity.

3. Regional Preferences:

- Analysis of region-based clusters helps tailor marketing strategies to regional customer needs.

4. Cluster-Specific Strategies:

- Leverage insights from distinct clusters to optimize marketing budgets and customer engagement initiatives.
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Conclusion

The customer segmentation analysis successfully grouped customers into distinct clusters using RFM metrics and regional data. High-value clusters provide opportunities for personalized retention strategies, while budget buyers can be re-engaged through targeted promotions. Regional insights further allow for tailored marketing efforts. This segmentation provides actionable strategies to improve customer engagement and optimize business resources.