Customer Segmentation Report

INTRODUCTION

Sorting clients into discrete categories according to their profiles and transactional patterns is the main goal of this analysis. Businesses can optimize resource allocation, enhance client retention, and customize their marketing strategy by recognizing these categories. K-Means clustering was selected as the segmentation technique, and the ideal number of clusters was ascertained using assessment measures such as the Davies-Bouldin Index (DBI).

DATA PREPARATION

Information from Customers.csv (profile data) and Transactions.csv (transaction data) was integrated in the dataset used for clustering. In order to record consumer behavior, pertinent features were chosen:

TotalValue: The customer's total expenditure.
Quantity: The total number of goods bought.
ProductID (Unique): The total number of distinct items the customer has bought.
Z-score normalization was used to normalize the features and guarantee that each variable had an equal contribution to the clustering process.

METHODOLOGY

Clustering Algorithm:

- **K-Means Clustering** was chosen due to its efficiency and interpretability for customer segmentation.
- The number of clusters was determined by evaluating models with cluster sizes ranging from 2 to 10.
- The optimal number of clusters was identified using the **Davies-Bouldin Index (DBI)**, which measures the compactness and separation of clusters. Lower DBI values indicate better-defined clusters.

Evaluation:

- DBI was calculated for each model, with the optimal number of clusters being **4**, corresponding to the lowest DBI value of **0.72**.

RESULTS

Number of Clusters Formed:
The analysis resulted in 4 distinct clusters, each representing a unique customer segment.

Davies-Bouldin Index (DBI): The final model's DBI of 0.72 showed compact, well-separated clusters.

Cluster Features: To comprehend the behavior of customers in each category, the clusters were examined.

Cluster 1: Expensive consumers with a wide variety of goods and frequent purchases.
Business Strategy: To keep these high-end clients, concentrate on loyalty programs and tailored incentives.

Cluster 2: Large purchasers who purchase less distinct items.
Business Strategy: Provide cross-selling possibilities and discounts for large purchases.

Cluster 3: Infrequent, low-spending clients who make few purchases.
Business Strategy: To boost expenditure and engagement, employ tailored marketing.

Cluster 4: Moderate consumers who experiment with a variety of goods without going over budget.
Business Strategy: To increase sales, suggest combo packages or related products.

BUSINESS INSIGHTS

The following are some ways that the segmentation results can inform strategic choices:

Loyalty Programs: Use tailored incentives to keep Cluster 1's valuable clients.
Bulk Incentives: By offering bulk discounts, Cluster 2 might be encouraged to make recurring purchases.
Re-Engagement: To increase engagement and transaction frequency, create ads aimed at Cluster 3.
Upselling: To increase expenditure, promote pertinent products and bundles for Cluster 4.

CONCLUSION

The segmentation process uncovered insightful consumer trends that may be used to boost customer happiness, optimize marketing tactics, and increase profitability. The business may better deploy resources and modify its strategy to suit the demands of various clientele groups by knowing the traits of each cluster.

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