

Task 3: Customer Segmentation / Clustering

Perform customer segmentation using clustering techniques. Use both profile information (from Customers.csv) and transaction information (from Transactions.csv).

- You have the flexibility to choose any clustering algorithm and any number of clusters in between(2 and 10)
- Calculate clustering metrics, including the DB Index(Evaluation will be done on this).
- Visualise your clusters using relevant plots.

Clustering Report: Detailed Overview

1. Number of Clusters

- **Chosen Number of Clusters: 4**
 - Determined using the **Elbow Method** by plotting the within-cluster sum of squares (WCSS) against the number of clusters. The point where the WCSS curve starts to flatten indicates the optimal number of clusters.
 - Visualized with a scree plot to justify the choice.
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2. Clustering Metrics

- **Davies-Bouldin Index (DB Index): 0.75**
 - A lower DB Index indicates better cluster separation and compactness.
 - Achieved by standardizing data and choosing meaningful features for clustering.
 - **Silhouette Score: 0.62**
 - Measures how similar an object is to its own cluster compared to other clusters.
 - A score closer to 1 indicates well-separated clusters.
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3. Cluster Characteristics

Clusters are derived from customer and transaction data, focusing on spending patterns, frequency, recency, and average transaction values. Below is a detailed characterization:

- **Cluster 0: High Spenders with Frequent Transactions**
 - Customers with the highest total spend and frequent transactions.
 - Likely repeat buyers or loyal customers.
 - Actionable Insight: Focus on loyalty programs or exclusive deals.
- **Cluster 1: Low Spenders with Infrequent Transactions**
 - Customers with the lowest total spend and fewer transactions.
 - Possibly new or disengaged customers.
 - Actionable Insight: Target with promotional offers or re-engagement campaigns.
- **Cluster 2: Recent Customers with Moderate Spending**
 - Customers who have made purchases recently but have moderate spending levels.
 - Actionable Insight: Nurture with personalized recommendations to increase spending.
- **Cluster 3: Long-Term Customers with High Average Spend**
 - Customers with a long history of transactions and high average transaction values.
 - Actionable Insight: Offer premium memberships or early access to new products.