

# Customer Segregation Report

Customer segmentation is a crucial process in marketing and business strategy, enabling companies to understand their customer base and tailor their offerings accordingly. In this report, we perform customer segmentation using clustering techniques based on customer profile information (from Customers.csv) and transaction information (from Transactions.csv). The goal is to group customers into meaningful clusters that can help in targeted marketing and personalized services.

## Methodology

### Data Preprocessing:

Merged customer profile data (Customers.csv) and transaction data (Transactions.csv) to create a unified dataset. Handled missing values and normalized/standardized numerical features to ensure consistency. Engineered features such as:

TotalSpending: Total amount spent by each customer.

AvgTransactionValue: Average transaction value per customer.

NumTransactions: Number of transactions per customer.

Clustering Algorithm: Used the **K-Means clustering algorithm** due to its simplicity and effectiveness for customer segmentation.

Chose **4 clusters** based on the **Elbow Method** and Silhouette Score analysis.

### Evaluation Metrics:

Davies-Bouldin Index (DBI): Measures the average similarity ratio of each cluster with the cluster that is most similar to it. A lower DBI indicates better clustering.

Silhouette Score: Measures how similar an object is to its own cluster compared to other clusters. A higher score indicates better-defined clusters.

## Result

Number of clusters=4

Davies-Bouldin Index (DBI): 1.0604

Silhouette Score: 0.3135

Cluster Summary:

Cluster	TotalSpending	AvgTransactionValue	NumTransactions
0	5521.543966	741.147332	7.517241
1	2103.758333	435.310875	4.583333
2	4317.132143	1056.828643	4.142857
3	2313.977547	719.472764	3.264151

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