

TASK – 3

Customer Segmentation Clustering Report

Overview

This report summarizes the results of the customer segmentation analysis performed using clustering techniques. The analysis utilized customer profile information from **Customers.csv** and transaction data from **Transactions.csv**.

Number of Clusters Formed

- **Optimal Number of Clusters:** The analysis identified **4 clusters** as the optimal grouping for customer segmentation based on the **elbow method** and **silhouette scores**.

Clustering Metrics

1. Davies-Bouldin Index (DB Index):

- The calculated DB Index value is **0.8001**. This metric indicates the average similarity ratio of each cluster with its most similar cluster, where lower values suggest **better separation** between clusters.

2. Average Silhouette Score:

- The average silhouette score obtained is **0.3991**. This score reflects how similar an object is to its own cluster compared to other clusters. A score close to **0.4** generally indicates **reasonable clustering quality**, though further refinement may improve segmentation.

Additional Insights

✔ Cluster Characteristics:

- Each cluster represents different segments of customers based on their **spending behavior** and **transaction frequency**.
- For example, one cluster may consist of **high-value customers** who frequently purchase, while another may include **occasional buyers**.

✔ Visual Representation:

- A **scatter plot** visualizing the clusters based on **total value spent** and **number of transactions** shows distinct groupings.
- This allows for **targeted marketing strategies** tailored to each segment.

Conclusion

The clustering analysis successfully identified **4 customer segments** based on **purchase behavior**. The insights gained from this segmentation can help businesses in:

- Personalizing marketing campaigns 🎯
- Improving customer retention 💡
- Enhancing product recommendations 🛒

Further analysis could explore **alternative clustering methods** (such as DBSCAN or hierarchical clustering) to improve segmentation accuracy.