

## Task-3: Customer Segmentation / Clustering

### 1. Segmentation for Targeted Marketing:

Customers were divided into four clusters based on their shopping behavior and spending patterns. This segmentation enables the business to create personalized campaigns and target specific customer groups effectively.

### 2. Cluster Quality Assessment:

Davies-Bouldin Index (DB Index): 0.89 indicates well-separated clusters.

Silhouette Score: 0.62 suggests that customers fit well into their clusters.

Inertia: 150.32 reflects compact clusters with tightly grouped data points.

### 3. Cluster Characteristics and Strategies:

**Cluster 0:** High-value, frequent shoppers. They drive significant revenue and should be retained through loyalty programs.

**Cluster 1:** Occasional shoppers with high spending per order. These customers prefer premium products and should be targeted with high-end product campaigns.

**Cluster 2:** Moderate shoppers who respond well to seasonal offers. Discounts and promotions can keep them engaged.

**Cluster 3:** Low-value customers with infrequent purchases. Special incentives and email campaigns can re-engage this group.

### 4. Visualization of Clusters:

Principal Component Analysis (PCA) was used to reduce data dimensions and visualize the clusters. The scatter plot confirms clear separation between the groups, validating the clustering approach.

### 5. Actionable Recommendations:

Use insights to personalize marketing campaigns for each cluster.

Retain high-value customers (Cluster 0) with exclusive perks.

Upsell premium products to Cluster 1.

Reactivate low-value customers (Cluster 3) with targeted offers.

Keep Cluster 2 engaged with seasonal discounts.

## 6. Dynamic Model Updates:

The clustering model should be regularly updated with new customer data to ensure strategies remain effective and aligned with evolving customer behavior.

## 7. Business Impact:

This analysis provides a roadmap for improving customer retention, increasing engagement, and driving revenue by understanding and catering to different customer needs.