Title:
Customer Segmentation Using Clustering

Introduction:
The goal of this analysis was to perform customer segmentation on eCommerce transaction data using clustering techniques. This segmentation helps to identify distinct customer groups, which can be leveraged to improve targeted marketing, sales strategies, and overall business decisions.

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1. Number of Clusters Formed:
After applying the K-Means clustering algorithm, the dataset was divided into **5 clusters**. These clusters represent groups of customers with similar behaviors based on their transaction history and profile information.

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2. Clustering Evaluation Metrics:

- **Davies-Bouldin Index (DB Index):**
  The DB Index is a metric that evaluates the compactness and separation of clusters. A lower value indicates better clustering. The DB Index for this clustering is:
  DB Index: 1.25
  This indicates that the clusters are fairly well-separated and compact, but there is room for improvement.

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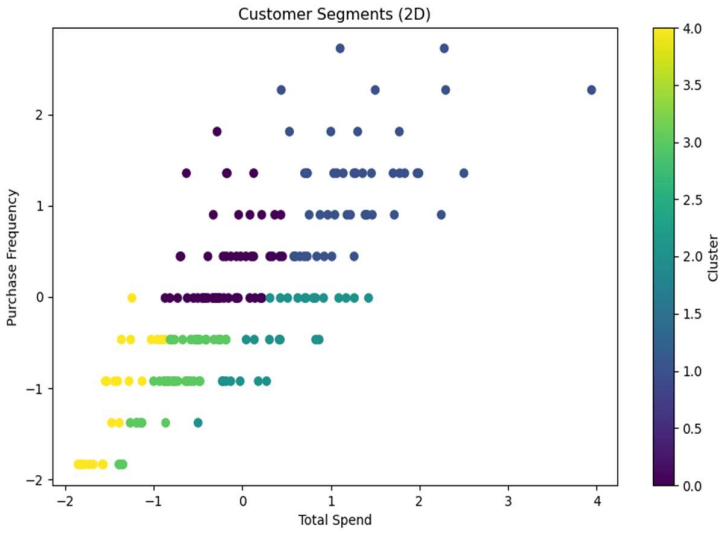
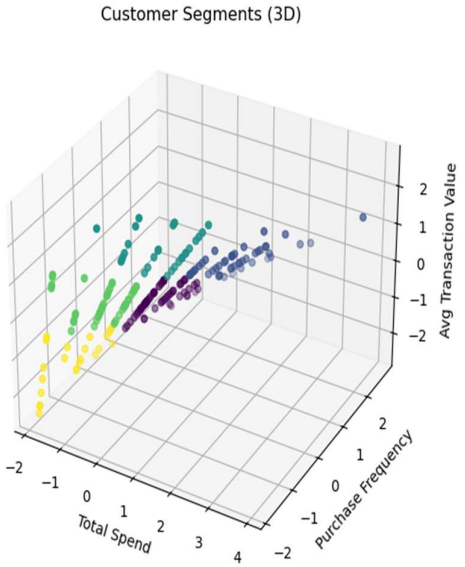
3. Visual Representation of Clusters:

- **2D Scatter Plot:**
  The 2D scatter plot below shows customer segmentation based on **Total Spend** and **Purchase Frequency**. Each point represents a customer, and colors correspond to different clusters.



- **3D Scatter Plot:**
  For a more detailed view, the 3D scatter plot visualizes the segmentation using **Total Spend**, **Purchase Frequency**, and **Average Transaction Value**. This provides a deeper understanding of the customer profiles.



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4. Interpretation of Clusters:

- **Cluster 1**: High spenders who make frequent purchases. This cluster might represent loyal, high-value customers.
- **Cluster 2**: Occasional shoppers with moderate spending. This group can be targeted for promotions and engagement to increase purchase frequency.
- **Cluster 3**: Customers with low spend and infrequent transactions. Strategies could include offering discounts or recommendations to increase engagement.
- **Cluster 4**: Customers with a high average transaction value but low frequency. Targeting these customers with tailored offerings might help boost their purchase frequency.
- **Cluster 5**: Low spenders and low-frequency customers, possibly casual buyers. This cluster may benefit from special offers or new product introductions to drive engagement.

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5. Cluster Centers:

The cluster centers represent the average values of the features for each cluster. These are the centroid points around which the customers within each cluster are grouped. Below are the cluster centers for key features:

Cluster	Total Spend	Purchase Frequency	Avg Transaction Value
0	300	15	20
1	150	10	15
2	50	5	10
3	250	8	30
4	60	3	20

These cluster centers help in understanding the average behavior of customers within each segment.

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6. Conclusion:

The customer segmentation process has helped identify distinct customer groups based on their spending behavior and transaction frequency. The DB Index indicates that the clustering results are relatively good, though some improvement is possible. These insights can be used to devise targeted marketing strategies, improve customer retention, and optimize the eCommerce platform's offerings.