Customer Segmentation Report
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1. Introduction
Objective
The goal of this analysis is to segment customers using clustering techniques based on profile and transactional data. This segmentation enables businesses to identify distinct customer groups and develop targeted marketing strategies.
Methodology
- **Datasets Used**: Customers.csv and Transactions.csv.
- **Features Used**: TotalSpending, TransactionCount, AvgProductPrice, Region, PreferredCategory.
- **Algorithm**: KMeans clustering (tested k=2 to k=10).
- **Evaluation Metric**: Davies-Bouldin Index (DB Index).

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2. Results and Analysis
Optimal Number of Clusters
- **Number of Clusters**: 8.
- **DB Index**: 1.25 (best score for k=8).

Cluster Characteristics
- **Cluster 0**:
  - High spenders ($5,612.73) with frequent purchases (7.63 transactions).
  - Moderate product prices ($273.46).
- **Cluster 1**:
  - Moderate spenders ($2,353.07) with low transaction frequency (2.8).
  - Preference for higher-priced products ($355.76).
- **Cluster 2**:
  - Moderate spenders ($2,379.96) with average frequency (3.89).
  - Affordable product preferences ($253.85).
- **Cluster 3**:
  - Average spenders ($3,189.94) with frequent buying (3.97).
  - High preference for category ~2.56.
- **Cluster 4**:
  - Moderate spenders ($2,714.13) with above-average frequency (5.07).
  - Lower-priced products ($224.41).
- **Cluster 5**:
  - Top spenders ($6,086.49) with frequent purchases (7.95).
  - Slightly premium products ($292.33).
- **Cluster 6**:
  - Lowest spenders ($943.74) with infrequent purchases (2.5).
  - Cheapest products ($139.94).
- **Cluster 7**:
  - High spenders ($4,174.97) with frequent purchases (6 transactions).
  - Premium product preferences ($293.63).

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3. Business Insights
- **Cluster 0**: High-value frequent shoppers. Retain them with loyalty programs and exclusive offers.
- **Cluster 1**: Moderate spenders of premium products. Encourage frequent purchases via targeted promotions.
- **Cluster 5**: Top spenders and frequent buyers. Reward loyalty with VIP benefits and personalized experiences.
- **Cluster 6**: Low-value occasional buyers. Use discounts to increase spending and engagement.

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4. Conclusion

The clustering analysis successfully segmented customers into 8 distinct groups, each demonstrating unique behaviors and preferences. These clusters provide actionable insights for developing tailored marketing campaigns, improving retention, and maximizing revenue.