

Customer Segmentation for Targeted Marketing

Question/Hypothesis

The primary question explored in this project is,” How can customer purchase behavior be used to segment customers and target them with personalized marketing strategies?”

The hypothesis driving this analysis is that analyzing customers’ purchase data will reveal distinct purchasing behaviors, which can be used to segment customers effectively for personalized marketing strategies.

Dataset Summary

The dataset used for this analysis originates from Kaggle and focuses on online retail data. This dataset includes records of customer transactions, featuring attributes such as ,Invoice number, stock code,customer ID, product description, quantity, unit price,Invoice date and total amount spend. The dataset consists of over 500,000 rows, representing a range of transactions.

Key features of the dataset include:

- Customer ID: a unique identifier for each customer
- Invoice number: represent individual transactions
- Stock Code: Product code for items purchased
- Description: Description of the product.
- Quantity: Number of units purchased per transaction.
- Unit Price: Price per unit of the item.
- Invoice Date: Date of the transaction

Analysis Methods

This project followed a multi-step process to explore the dataset and extract meaningful insights.

1. Data Cleaning

- Rows with missing or invalid Customer ID values were dropped.
- A new feature, Total Spend, was created by multiplying Quantity by Unit Price.

- Zeros and negative values in price and quantity were filtered out
2. Visualization techniques were employed to uncover insights from the data:
- Bar charts showed the distribution of customer spending, revealing that most customers spent modest amounts, while a few contributed significantly to revenue.
3. Customer Segmentation
- To simplify the segmentation process, customers were grouped based on two key metrics:
- Average Spending: Amount of money spent, on average
 - Transaction Frequency: The number of transactions completed by each customer.

Inference

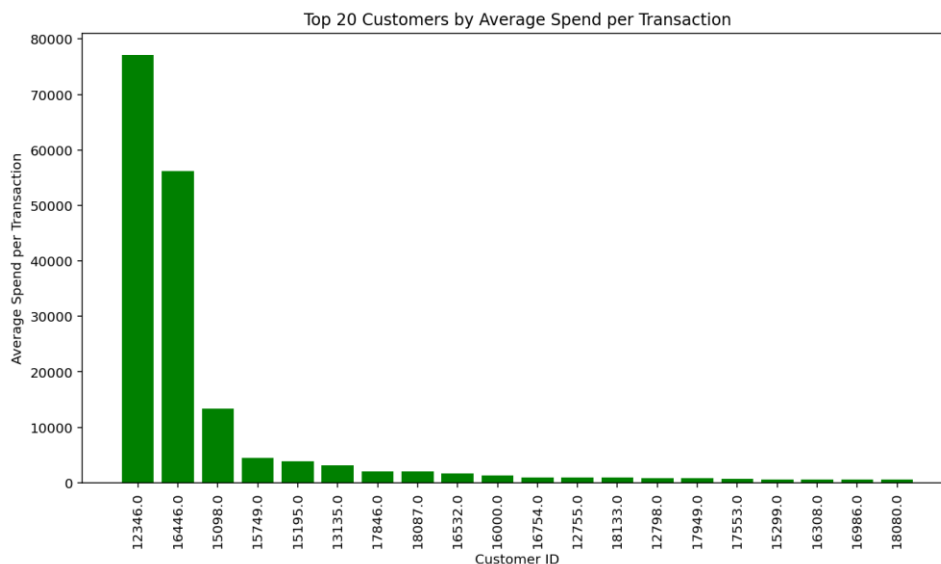


Figure 1: Top 20 Customers by Average Spend per Transaction

The bar chart above illustrates the top 20 customers ranked by their average spend per transaction. One key finding is that a small subset of customers contributes disproportionately to overall revenue. For instance, customers with IDs 12346 and 16446 exhibit significantly higher average spending, exceeding \$70,000 and \$50,000 per transaction, respectively. This observation highlights the presence of high-value customers whose purchasing behaviors stand out from the rest. In contrast, the majority of customers show lower spending averages, forming a long tail of moderate to low-value segments. These trends highlight the need to focus on personalized marketing strategies to keep high-value customers loyal, while also finding ways to increase engagement and spending among other customer groups.

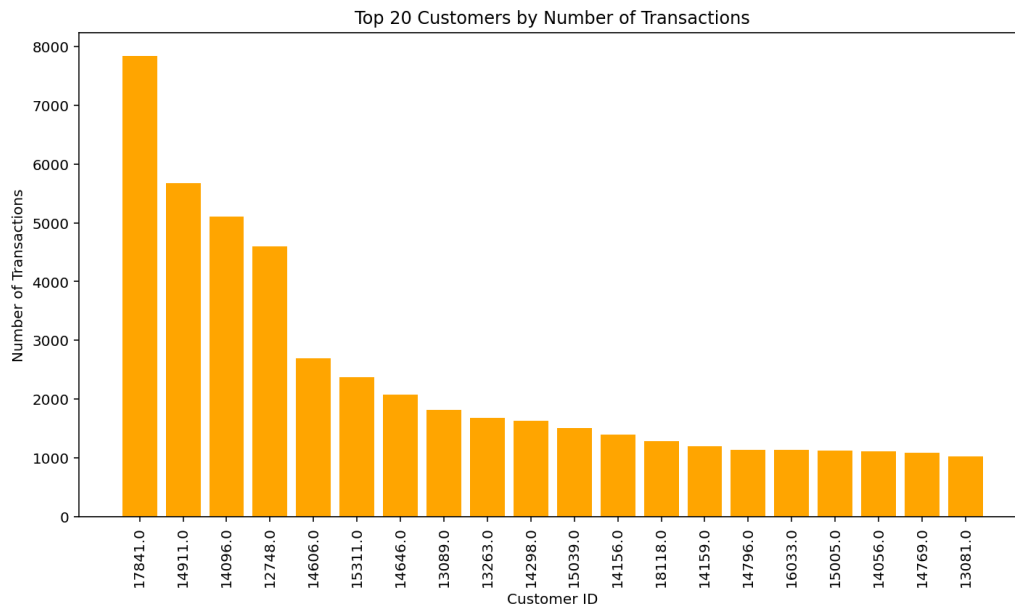


Figure 2: Top 20 Customers by Number of Transactions

The bar chart illustrates the top 20 customers ranked by the number of transactions. Customer ID 17841 stands out with over 7,000 transactions, significantly surpassing others in the dataset. Following closely are customers with IDs 14911 and 14096, each with transaction counts exceeding 5,000.

This trend indicates that a small group of customers engages in frequent transactions, possibly reflecting loyalty or habitual purchasing behavior. In contrast, the majority of the top 20 customers exhibit a gradual decline in transaction frequency, highlighting varying levels of engagement.

Understanding the behaviors of high-frequency customers can help businesses design loyalty programs and promotions that capitalize on this consistent activity. On the other hand, analyzing the lower end of the top customers could reveal opportunities to increase engagement among these segments.

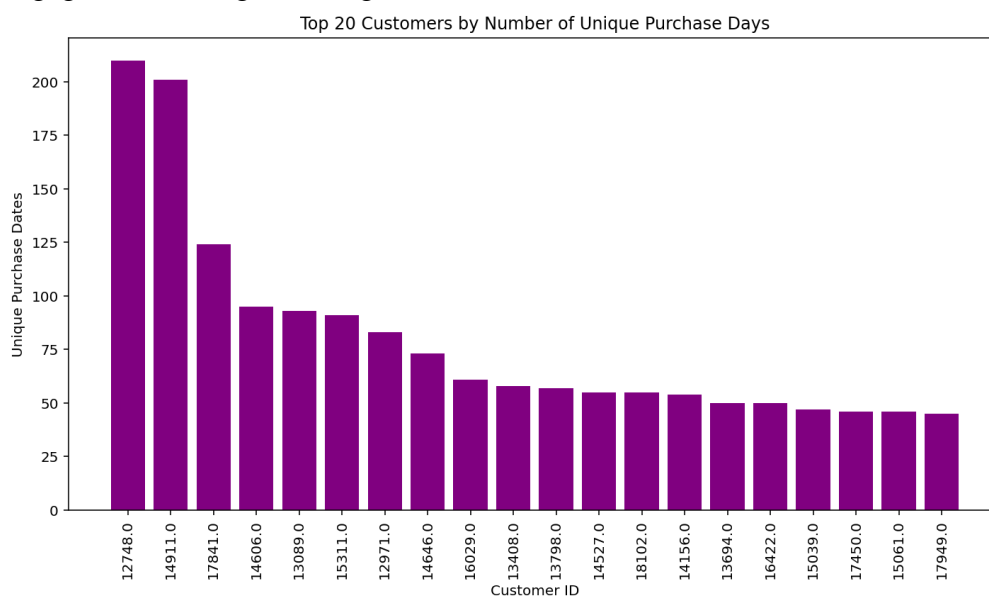


Figure 3: Top 20 Customers by Number of Unique Purchase Days

This bar chart highlights the top 20 customers based on the number of unique days they made purchases. Customers with IDs 12748 and 14911 lead the group, each having over 200 unique purchase days, followed by customer 17841 with a notably lower count. The remaining customers display a gradual decrease in unique purchase days, with most having fewer than 100.

These findings suggest that certain customers, such as 12748 and 14911, exhibit consistent purchasing behavior over a prolonged period. Such patterns may indicate strong customer loyalty and frequent interaction with the business. Conversely, customers with fewer unique purchase days may represent seasonal or infrequent buyers, who could be targeted with campaigns to increase engagement.

The segmentation revealed several important segments:

1.High-

Value Customers:

They exhibited consistent purchasing behavior and high average spend making them ideal targets for loyalty programs and exclusive offers.

2.Moderate Customers:

While their spending and frequency were lower than high-value customers, they showed potential for growth through targeted offers such as discounts or promotional campaigns.

3.Low-Value Customers:

Low-value customers were the largest group but accounted for a small percentage of revenue. Email marketing , reminders are necessary to increase activity.

These findings show that customer transaction data can be effectively used to group customers into meaningful segments, making it easier to target them with personalized marketing strategies.

Conclusions

The analysis confirmed that meaningful customer segments could be identified using basic transactional data. The segmentation approach revealed distinct groups (high-value, moderate, and low-value customers), each requiring different marketing strategies. Key conclusions include:

1.Prioritize High-Value Customers:

High-value customers are crucial for revenue growth. Businesses should focus on retaining these customers by offering loyalty rewards or exclusive perks.

2.Engage Moderate Customers:

By offering the right offer, it's possible to encourage moderate customers to spend more and shop more frequently.

3.Engage Low-Value Customers:

To engage low-value customers, creative strategies like personalized email campaigns or special discounts on their next purchase can be effective in encouraging their loyalty.

Future Work

- Future enhancements to this analysis could include:
- Integrating customer demographics to provide deeper insights into purchasing behavior.
- Exploring time-based trends to refine marketing strategies.

This project demonstrates the power of even simple segmentation techniques in deriving actionable insights from transactional data. By focusing on customer-specific strategies, businesses can optimize marketing efforts and improve overall customer satisfaction.