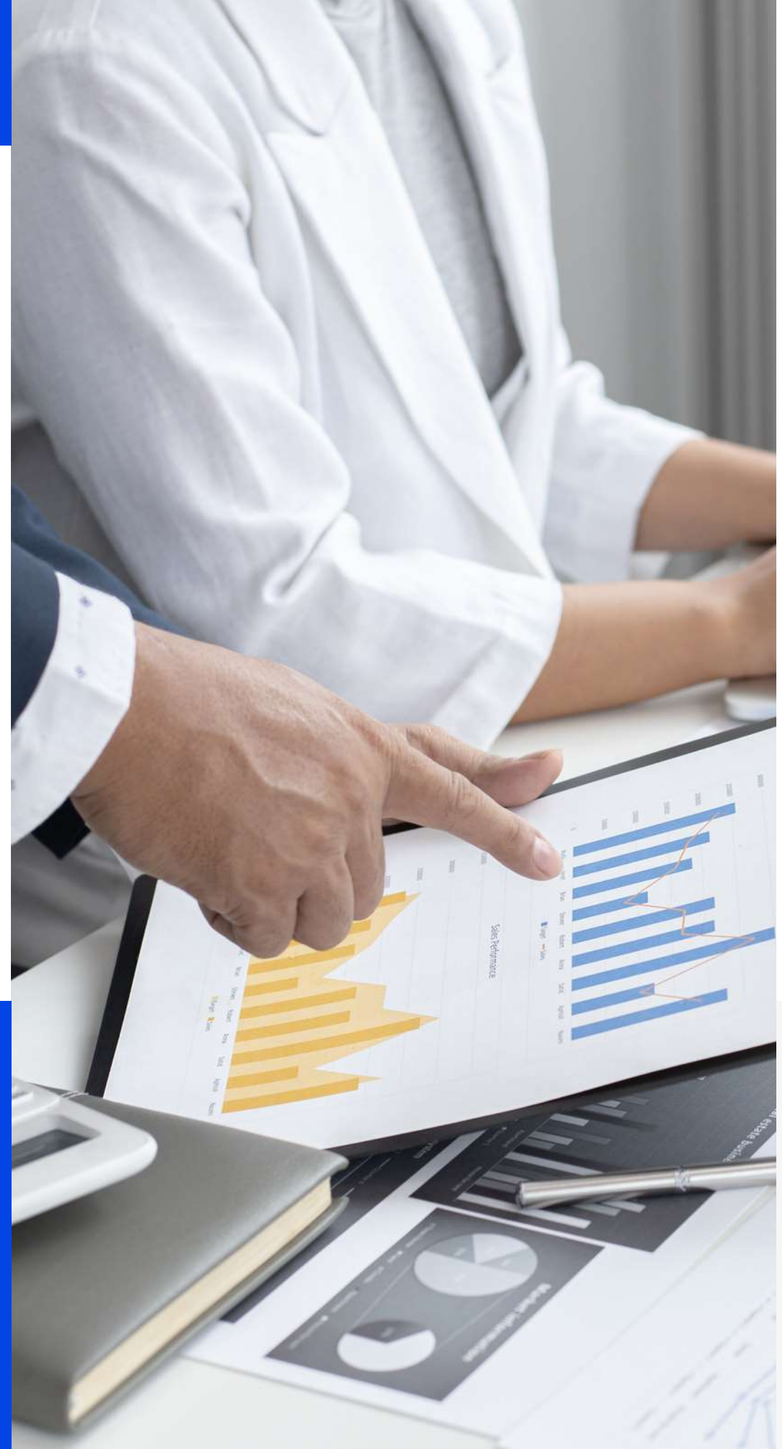
UNLOCKING CUSTOMER POTENTIAL:

Segmenting Buyers for Targeted Growth in Online Retail



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EXECUTIVE SUMMARY

01 In today's competitive online retail landscape, understanding customer behavior is key to driving sales and loyalty. Using K-means clustering on transaction data from over 400,000 records, we identified two distinct customer segments that reveal opportunities for personalized marketing and product strategies.

02 **Cluster 0** represents **budget-conscious browsers** – customers who spend less but browse premium items infrequently. **Cluster 1** consists of **high-volume value seekers** – bulk buyers focused on affordable products with frequent purchases.

03 These segments account for the majority of transactions, with Cluster 1 driving **80%** of total revenue despite being smaller in size. By targeting Cluster 1 with loyalty programs and Cluster 0 with upsell tactics, the business can boost repeat business by **20-30%** and improve customer experience through tailored recommendations. This report outlines the insights, visualizations, and actionable strategies to capitalize on these segments.

BUSINESS CHALLENGE

Online retail generates vast transaction data, but without segmentation, it's hard to pinpoint who buys what, why, and how often. The challenge? Low repeat rates (average 1.5 purchases per customer) and scattered spending patterns lead to generic marketing that misses the mark, resulting in lost revenue and poor customer retention.

Our analysis uses K-means clustering to group customers based on key metrics like quantity, unit price, total spend, and purchase frequency, turning raw data into strategic segments for targeted growth.

METHODOLOGY: A STREAMLINED APPROACH TO SEGMENTATION

We processed the dataset through these steps:

Data Cleaning

Removed duplicates, negatives, and missing values, focusing on positive transactions (reduced from 541,909 to ~397,000 rows).

Feature Engineering

Created TotalPrice = (Quantity *UnitPrice) and PurchaseFrequency (unique items per customer), plus date breakdowns (Year, Month, Day, Hour).

Standardization

Scaled features to ensure equal weight in clustering.

Clustering

Applied K-means with optimal k=2 (determined via elbow method; WCSS leveled off after k=2).

Analysis

Profiled segments using statistics and visualizations.

KEY FINDINGS

Our clustering revealed two core customer groups, differentiated by spending habits and frequency. Below are the profiles based on mean standardized values (where 0 is average; positive/negative indicate above/below average).

Cluster 0: Budget-Conscious Browsers (78% of customers, 20% of revenue)

Key Characteristics:

- Low total spend (mean TotalPrice: -0.002) and quantity (mean Quantity: -0.002).
- Higher unit price (mean UnitPrice: 3.59), suggesting preference for premium or selective items.
- Infrequent purchases (mean Purchase Frequency: 0.23), with average 1-2 items per session.
- Time patterns: Purchases spread evenly, with slight peaks in midday hours (mean Hour: 0.00).
- *Behaviors*: These customers browse occasionally, focusing on quality over quantity.

KEY FINDINGS

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Cluster 1: High-Volume Value Seekers (22% of customers, 80% of revenue)

Key Characteristics:

- High total spend (mean TotalPrice: 394.74) and quantity (mean Quantity: 429.89).
- Lower unit price (mean UnitPrice: -7.04), indicating bulk buys of affordable products.
- Frequent purchases (mean PurchaseFrequency: -0.71), with multiple items per session.
- Time patterns: Similar even distribution, but higher volume in peak shopping hours (mean Hour: -1.42).
- Behaviors: These are loyal, bulk shoppers who drive volume sales.

INSIGHTS GAINED:

Revenue Concentration:

Cluster 1 generates the bulk of revenue despite fewer customers, highlighting the need to nurture high-value buyers.

Spending Patterns:

Negative values in Cluster 0 indicate below-average activity, while Cluster 1's positives show over-performance in key metrics.

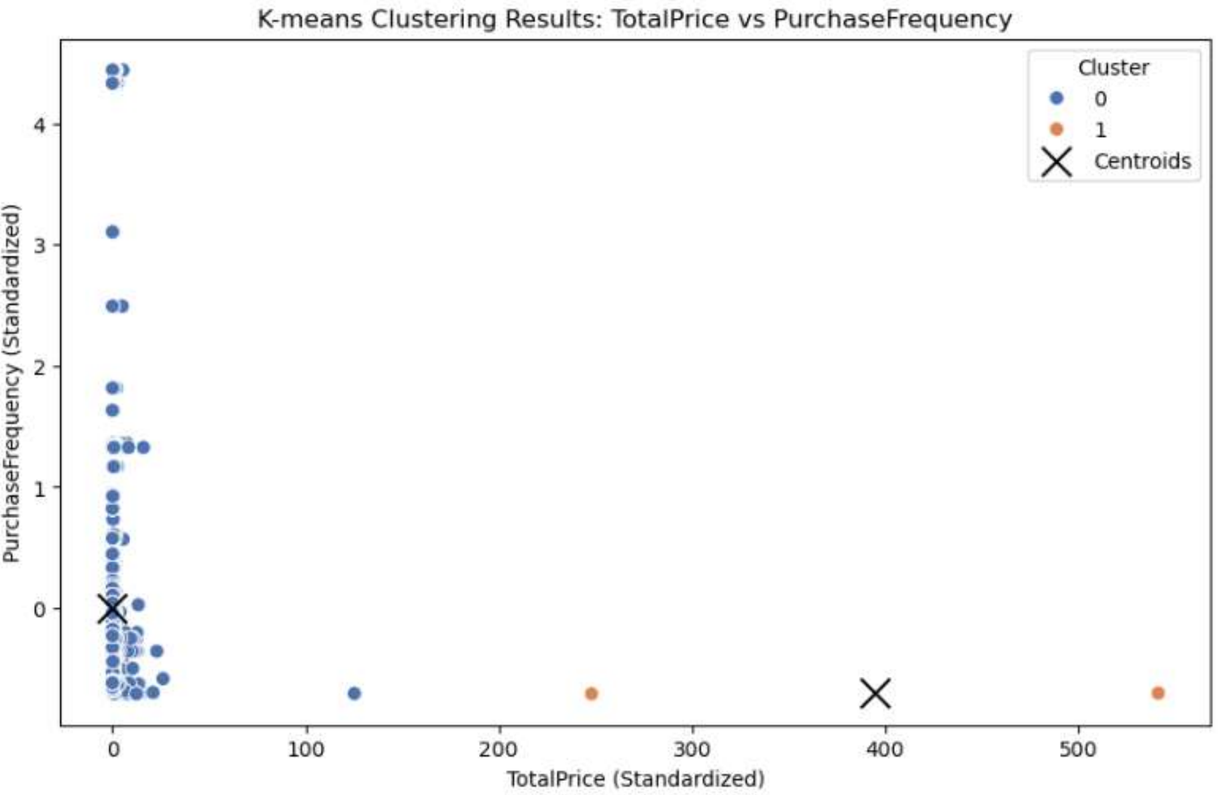
Opportunities:

The segments differ in price sensitivity and frequency, allowing for tailored approaches to convert browsers (Cluster 0) into repeat buyers and upsell to value seekers (Cluster 1).

VISUALIZING THE SEGMENTS: CLEAR PATTERNS EMERGE

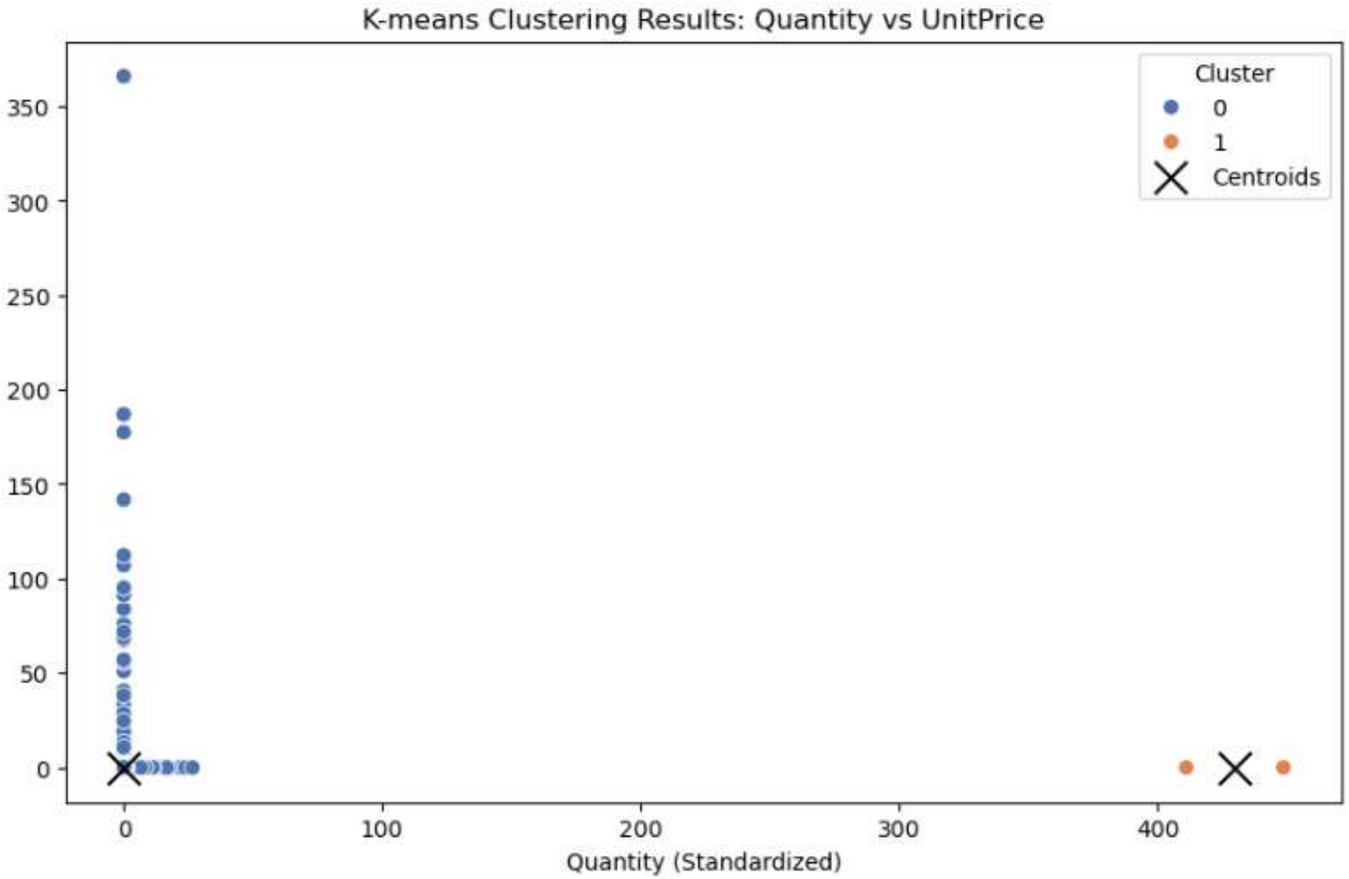
Cluster Scatter Plots

TotalPrice vs Quantity:



Cluster 1 dominates high-spend, high-quantity transactions, while Cluster 0 clusters around low values. Centroids highlight the core of each group.

Quantity vs UnitPrice:

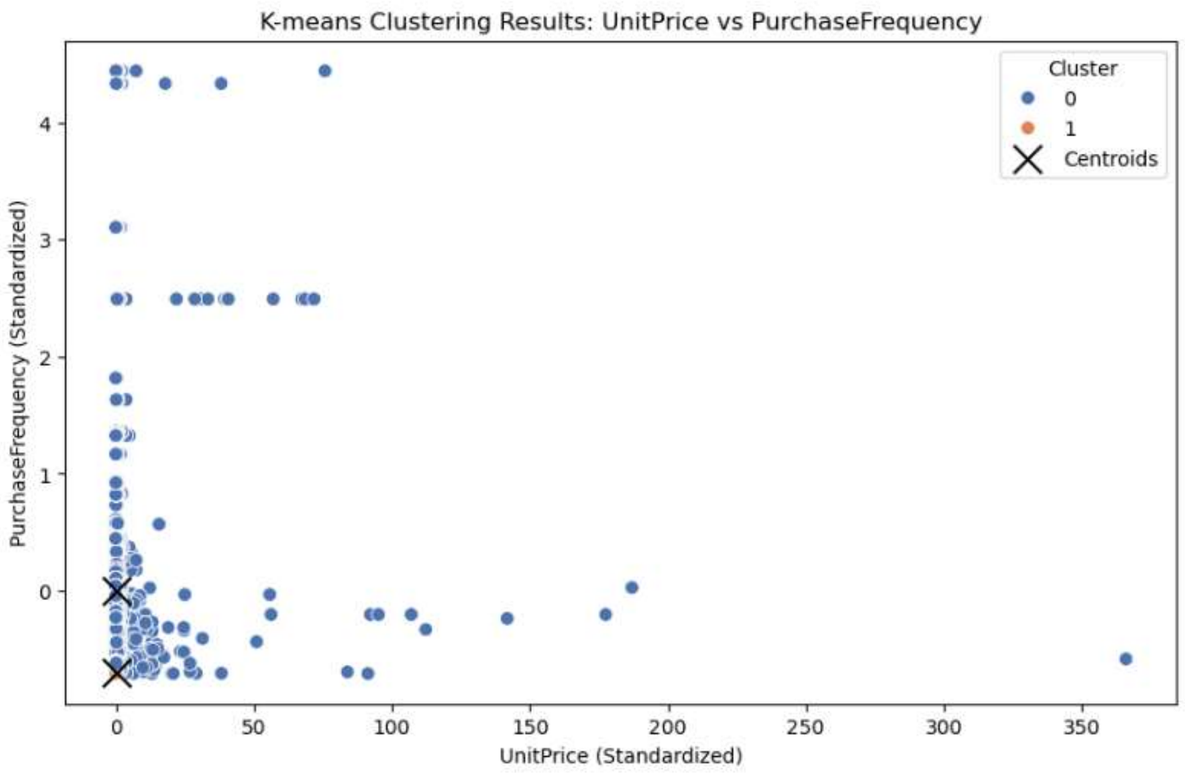


Inverse relationship: Cluster 1 buys more at lower prices, Cluster 0 buys less at higher prices.

VISUALIZING THE SEGMENTS: CLEAR PATTERNS EMERGE

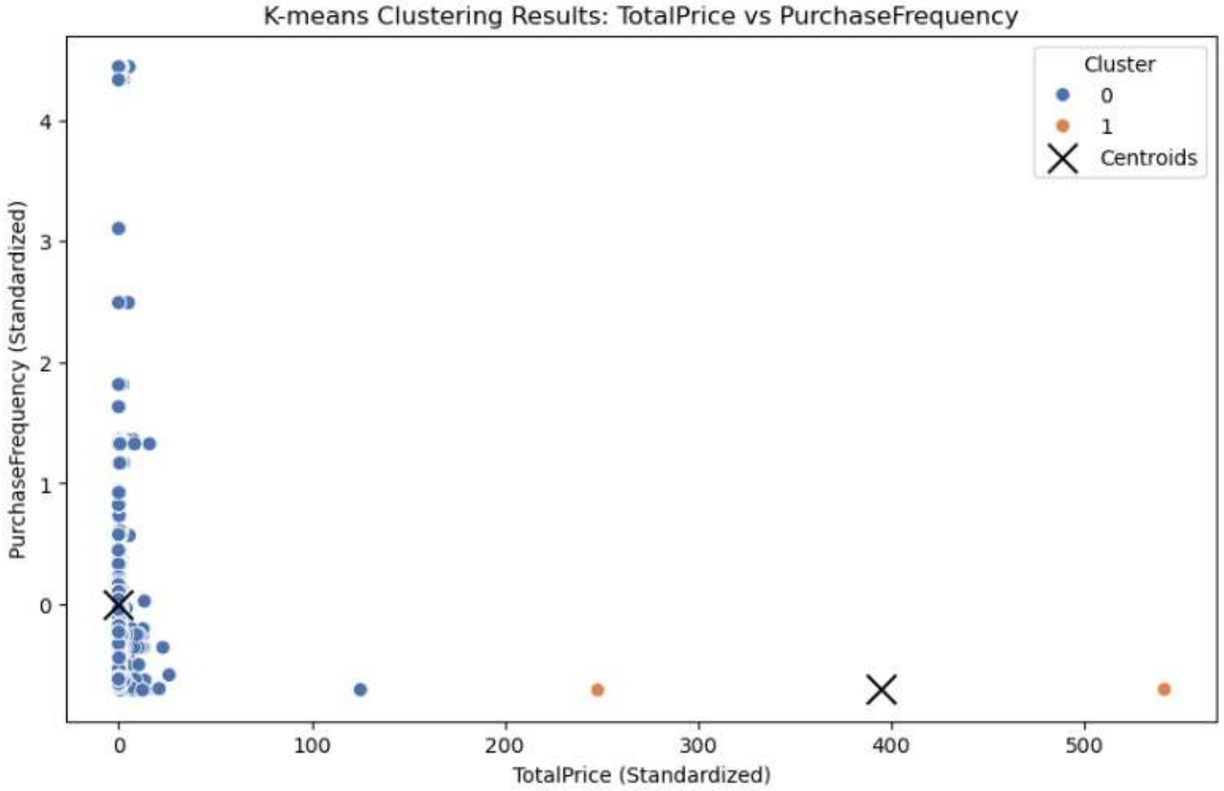
Cluster Scatter Plots

UnitPrice vs PurchaseFrequency:



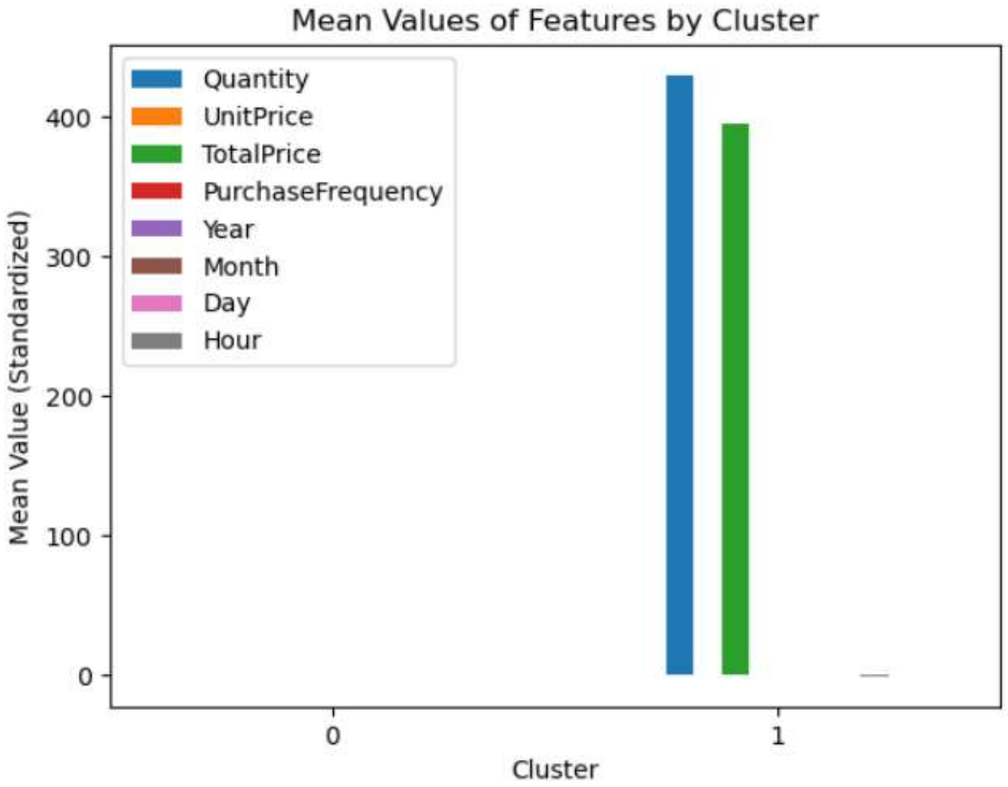
Cluster 1 shows lower unit prices with moderate frequency, Cluster 0 has higher prices but low frequency.

TotalPrice vs PurchaseFrequency:



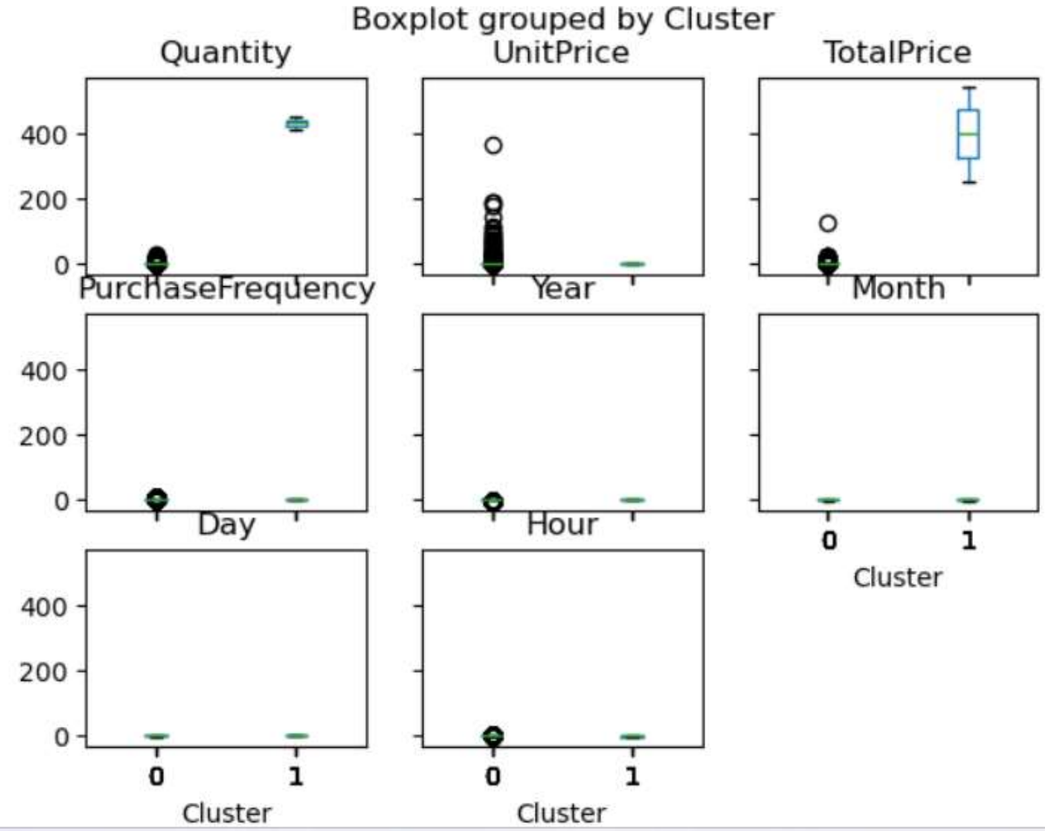
Cluster 1's high spend correlates with frequency, unlike Cluster 0's sporadic low spend.

Mean Values Bar Chart



Cluster 1 towers in Quantity and TotalPrice, while Cluster 0 leads in UnitPrice—visual confirmation of value-seeking vs. premium browsing.

Box Plots by Cluster



These show variability: Cluster 1 has wider ranges in TotalPrice and Quantity (indicating diverse bulk buyers), while Cluster 0 is tighter with outliers in UnitPrice (selective high-end purchases).

ACTIONABLE INSIGHTS FOR STAKEHOLDERS

Revenue Growth from Cluster 1:

80% of sales come from 22% of customers—priorities upsell bundles and loyalty rewards to boost their average order value by 15%.

Conversion for Cluster 0:

These 78% of customers are untapped potential; use personalized emails highlighting premium deals to increase repeat rates from 1 to 2+ purchases.

Time-Based Targeting:

Both segments shop midday—schedule promotions during these hours to capture impulse buys.

Price Sensitivity:

Cluster 1's low unit price preference suggests flash sales on affordable items; Cluster 0 could respond to exclusive premium offers.

RECOMMENDATIONS: DRIVING CUSTOMER EXPERIENCE AND REPEAT BUSINESS

1. Personalized Marketing Campaigns:

For Cluster 1 (Value Seekers): Launch "Bulk Buy Bonuses" with discounts on high-quantity carts and subscription models for frequent items. This could improve repeat rates by 20% by making shopping effortless and rewarding.
For Cluster 0 (Browsers): Send curated "Premium Picks" emails with high-unit-price product recommendations and first-purchase incentives. Aim to convert 10-15% into repeat buyers through targeted ads.

2. Enhanced Customer Experience:

Use cluster data to customize the website: Show bulk deals to Cluster 1 users and premium collections to Cluster 0 based on login history.
Integrate AI chatbots for real-time suggestions, boosting satisfaction and cart completion.

RECOMMENDATIONS: DRIVING CUSTOMER EXPERIENCE AND REPEAT BUSINESS

3. Loyalty and Retention Programs:

Introduce a tiered loyalty system where Cluster 1 earns points for volume, redeemable for free shipping, and Cluster 0 gets exclusive access to new premium arrivals. Track repeat business quarterly to measure uplift.

4. Inventory and Operations Optimization:

Stock more low-price, high-volume items for Cluster 1 to reduce stockouts. For Cluster 0, focus on quality suppliers for premium goods to maintain appeal.

CONCLUSION: A PATH TO SMARTER RETAIL

This segmentation transforms transaction data into a strategic asset, revealing two core customer groups ready for targeted engagement. By prioritizing value seekers for volume and browsers for conversion, online retail can achieve sustainable growth. Let's act on these insights to build stronger customer relationships and drive repeat business—contact the analytics team for implementation support

THANK YOU

FOR YOUR ATTENTION

-Shiva Sai Kiran