Unveiling Customer Behavior in E-Commerce: A Data-Driven Approach

Overview:

In today's dynamic e-commerce landscape, understanding customer behavior is essential for brands to stay competitive and relevant. This project delves into the behavior of e-commerce customers, revealing insights that can inform data-driven decisions and enhance customer experiences. By analyzing a rich dataset, we uncover key trends and patterns in customer interactions, preferences, and decision-making processes.

The Data:

Our dataset captures various aspects of e-commerce customer behavior, featuring:

- User_ID: Unique identifier for each customer.
- Gender: Customer's gender (e.g., Male, Female).
- Age: Customer's age.
- Location: Customer's location.
- Device_Type: Device used for browsing (e.g., Mobile, Tablet, Desktop).
- Product_Browsing_Time: Time spent browsing products (in minutes).
- Total_Pages_Viewed: Total number of pages viewed in a session.
- Items_Added_to_Cart: Number of items added to the shopping cart.
- Total_Purchases: Total number of purchases made.

Journey Through the Data:

1. Data Preparation and Summary

We start by importing the dataset using pandas and generating summary statistics for both numeric and non-numeric columns. This gives us a foundational understanding of the data.

2. Understanding Demographics

Age Distribution

A histogram visualization reveals the age distribution among customers, providing insights into the demographic profile of our user base.

Gender Distribution

A bar chart illustrates the gender distribution, highlighting the proportion of male and female customers.

3. Exploring Customer Behavior:

Browsing Patterns

Using a scatter plot with a trendline, we explore the relationship between product browsing time and total pages viewed. Interestingly, there is no strong correlation, suggesting that factors like website design and content relevance play a significant role.

Device Usage

Grouped bar charts show the average total pages viewed by gender and device type, revealing differences in engagement across mobile, tablet, and desktop users.

4. Segmenting Customers

Customer Lifetime Value (CLV)

We calculate the CLV by multiplying total purchases and total pages viewed, then dividing by age. Customers are segmented into low, medium, and high-value groups. A bar chart visualizes these segments, enabling targeted marketing strategies.

5. Analyzing the Conversion Funnel

We examine the conversion funnel by grouping data on product browsing time and items added to the cart. A funnel plot provides a clear view of the customer journey from browsing to purchasing, highlighting potential areas for improving the conversion rate.

6. Assessing Churn

We define churned customers as those with zero total purchases and calculate the churn rate. With a churn rate of 19.8%, it is evident that addressing customer churn is crucial for maintaining growth and profitability.

Key Insights

1. Age Distribution

- A detailed view of customer demographics through age distribution.

2. Gender Distribution

- Insight into the gender composition of the customer base.

3. Browsing Behavior

- Analysis shows no strong correlation between browsing time and pages viewed, indicating the influence of other factors.

4. Device Usage

- Differences in engagement based on device type, providing guidance for optimizing user experience across platforms.

5. Customer Segmentation

- Identification of distinct customer groups based on CLV, facilitating personalized marketing strategies.

6. Conversion Funnel

- Clear visualization of the customer journey, pointing out opportunities for improving conversion rates.

7. Churn Analysis

- High churn rate emphasizes the need for effective customer retention strategies.

Conclusion

This project demonstrates the power of customer behavior analysis in understanding how customers interact with an e-commerce platform. By leveraging data analytics, businesses can make informed decisions, tailor their strategies, and enhance customer experiences. The insights gained from this analysis can drive business growth and customer engagement, offering a comprehensive guide to analyzing customer behavior using Python

For those looking to delve deeper into customer behavior analysis, this project provides a roadmap for uncovering valuable insights and making data-driven decisions that can transform e-commerce success