Descriptive Analysis of E-commerce Customer and Sales Data

Objective:

To explore and summarize customer purchase behavior, sales performance, return trends, and demographic patterns in order to inform data-driven decision-making across marketing, sales, and operations.

1.Data source

-https://www.kaggle.com/datasets/shriyashjagtap/e-commerce-customer-for-behavior-analysis

2. Data Cleaning & Preparation

- Remove duplicates and standardize column naming (resolve duplicate `Age` vs `Customer Age`)

- Handle missing values in the `Returns` column

- Convert `Purchase Date` to datetime format and extract year/month/day

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3. Customer Demographics Analysis

- Distribution of customers by:

    - **Age groups** (<20, 20–30, 30–40, etc.)

    - **Gender**

- Average spending by age group and gender

- Preferred payment methods across demographics

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4. Sales Performance Analysis

● Total sales and number of purchases over time (monthly/quarterly/yearly)

● Sales by **product category**

● Average order value and quantity per transaction

● Top categories by revenue and volume

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5. Return Behavior Analysis

● Return rate overall and by:

    ○ **Product category**

    ○ **Customer segment** (age/gender)

    ○ **Payment method**

● Financial impact: percentage of lost revenue due to returns

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6. Customer Purchase Behavior

● Frequency of purchases per customer

● Repeat vs one-time customers

● Average revenue per customer

● Popular product categories among frequent buyers

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7. Payment Method Trends

● Usage breakdown of payment methods (PayPal, Credit Card, Cash)

● Average transaction amount by payment method.

● Return rate associated with each method.

Deliverables

- Detailed written report with:

  - Tables summarizing key metrics

  - Charts/graphs for trends and comparisons

- Insights and **practical business recommendations**

- Dashboard in streamlite.