# Sales Trends & Customer Behavior Analysis – Internship Report

## 1️⃣ Introduction

This project focuses on analyzing e-commerce sales data to identify trends, top product performance, and high-value customer engagement patterns. The analysis was conducted using SQL with an emphasis on Window Functions, CTEs (Common Table Expressions), and Subqueries to showcase advanced query techniques.

## 2️⃣ Data Description

The dataset is designed to simulate a real-world e-commerce environment and consists of the following tables:

|  |  |
| --- | --- |
| Table | Description |
| customers | Contains customer details including location |
| products | Contains product names and categories |
| orders | Contains order metadata, including date and total amount |
| order\_items | Contains line-item details for each order |

## 3️⃣ Methodology

SQL Techniques Used:  
- CTEs – Breaking complex queries into smaller, manageable parts  
- Window Functions – Ranking products and segmenting customers  
- Subqueries – Filtering datasets based on calculated conditions  
- Aggregations – Summarizing sales and customer data

## 4️⃣ Analysis Steps

• Step 1: Monthly Sales Trends (CTE: MonthlySales) – Aggregated total sales and order count by month using DATE\_FORMAT(order\_date, '%Y-%m-01') in MySQL.

• Step 2: Top Product of Each Month (CTE: TopProductsMonthly) – Ranked products using RANK() OVER (PARTITION BY month ORDER BY total\_quantity DESC).

• Step 3: Customer Lifetime Value (CTE: CustomerLTV) – Calculated lifetime value, order count, and average order value.

• Step 4: Identify Top 10% Customers (CTE: TopCustomers) – Used NTILE(10) OVER (ORDER BY lifetime\_value DESC) to identify the top 10% of customers.

• Step 5: Combine All Insights – Joined MonthlySales, TopProductsMonthly, and TopCustomers for the final report.

## 5️⃣ Final Results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Month | Total Sales | Total Orders | Top Product | Units Sold | Top Customers’ Orders |
| 2023-01-01 | 2000.00 | 2 | Laptop | 1 | 1 |
| 2023-02-01 | 750.00 | 2 | Headphones | 2 | 1 |
| 2023-03-01 | 350.00 | 2 | Coffee Mug | 3 | 0 |
| 2023-04-01 | 2120.00 | 2 | Laptop | 2 | 1 |
| 2023-05-01 | 2650.00 | 2 | Smartphone | 2 | 1 |

## 6️⃣ Key Insights

- Seasonality & Spikes: Sales surge in months with big-ticket items.

- Product Trends: Top-selling products vary monthly, indicating shifting demand.

- Customer Segmentation: Top 10% of customers are repeat buyers and contribute heavily to sales.

- Stock Management: Inventory planning should focus on products appearing multiple times as leaders.

- Retention Opportunities: Target high-value customers with loyalty campaigns.

## 7️⃣ Recommendations

- Implement loyalty programs for top customers.

- Promote high-margin products during peak months.

- Use historical rankings for demand forecasting.

## 8️⃣ Conclusion

This SQL analysis demonstrates how advanced techniques like CTEs, Window Functions, and Subqueries can uncover trends, identify valuable customers, and support business decisions. The methodology is scalable and can be integrated into BI tools for live dashboards.