The key insights **and** takeaways **from the Exploratory Data Analysis (EDA) performed in the NITHIN_KM.py script, along with the corresponding figures:**

Github link : Zeotap_assignment

1. Customer Analysis

Customers by Region

Figure: Bar plot showing the number of customers by region.
Insight:
The majority of customers are from **South America**, followed by **Asia**, **Europe**, and **North America**.
This indicates that the business has a strong presence in South America.

Takeaway:
Marketing efforts can be focused on regions with fewer customers (e.g.,Asia,North America) to expand the customer base.

Customer Sign-ups Over Time

Figure: Bar plot showing the number of customer sign-ups over time (monthly).
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Insight:

Customer sign-ups have been **consistent over time**, with some months showing higher spikes.
There is no clear trend of increasing or decreasing sign-ups.

Takeaway:

Investigate the months with higher sign-ups to understand what drove the growth (e.g., marketing campaigns, promotions).
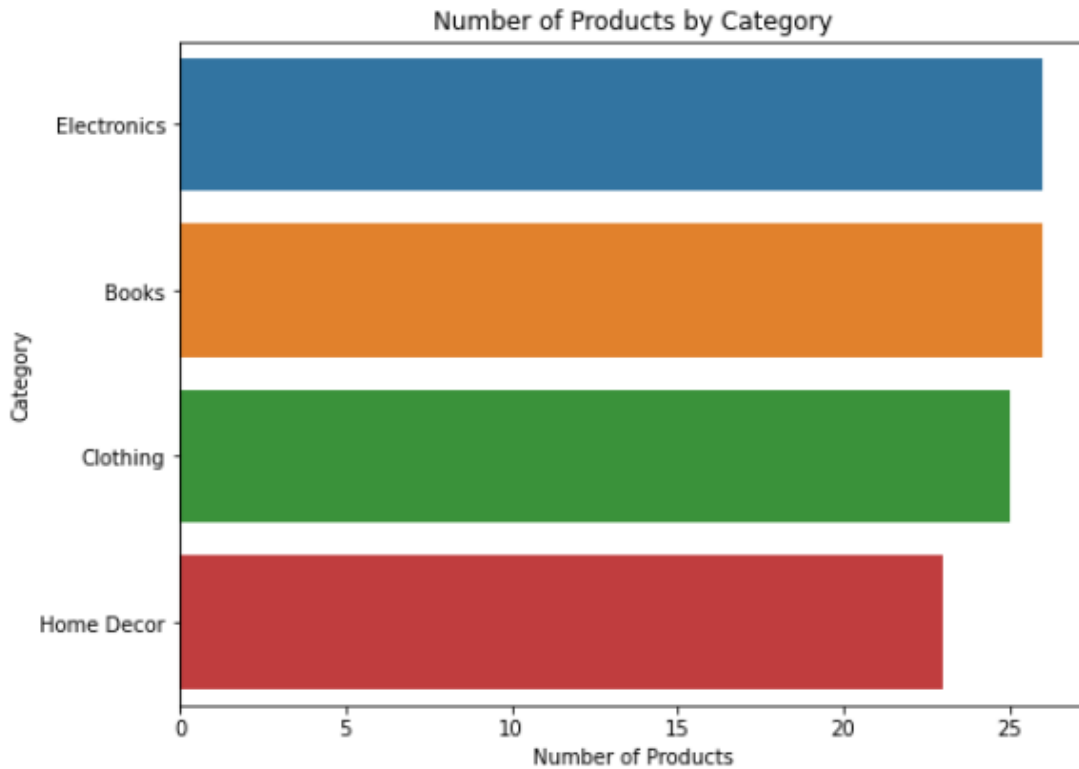
2. Product Analysis

Products by Category

Figure: Horizontal bar plot showing the number of products by category.
Insight:

The **Electronics** category has the highest number of products, followed by **Books**, **Clothing**, and **Home Decor**.

Takeaway:The business may want to focus on expanding the **Home Decor** category, as it has the fewest products.
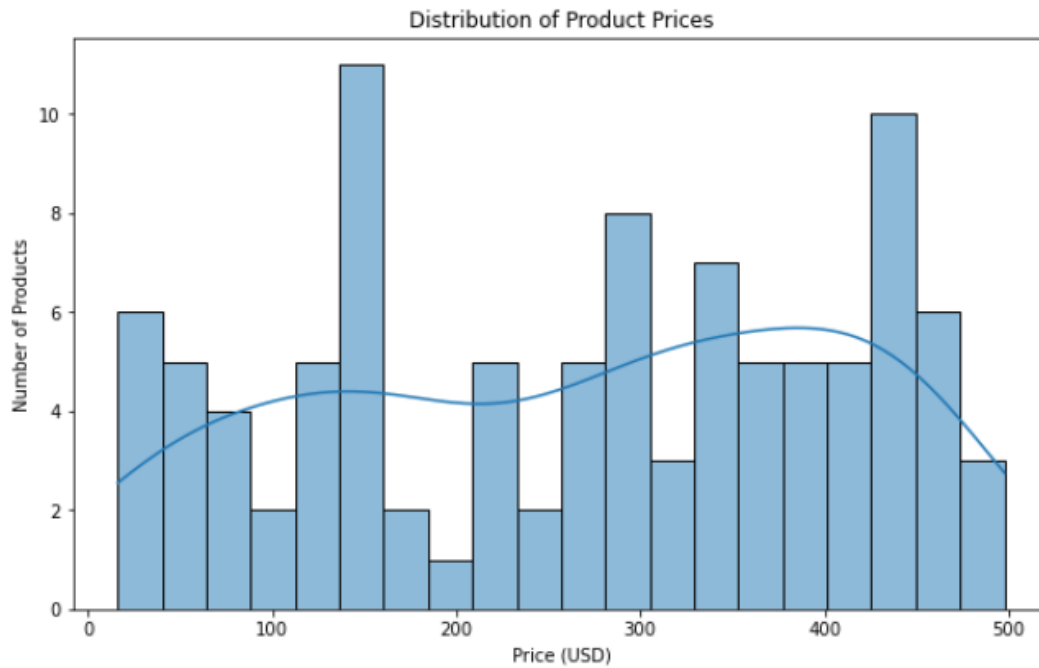
Price Distribution

Figure: Histogram showing the distribution of product prices.

Insight:

Most products are priced in the **lower range** (e.g., 0–0–200), with fewer high-priced products.

The distribution is **right-skewed**, indicating a few expensive products.

Takeaway:

Consider introducing more mid-range products to cater to customers who are willing to spend more.

3. Transactions Analysis
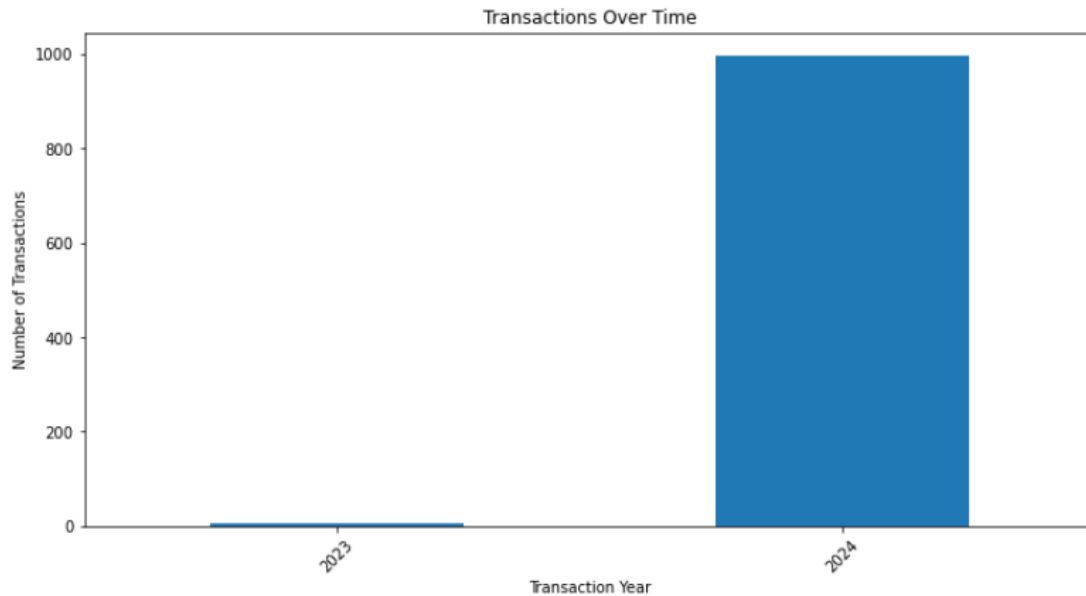
Transactions Over Time

Figure: Bar plot showing the number of transactions over time (yearly).

Insight:

Transactions have been **consistent over time**, with no significant spikes or drops.

Takeaway:

Investigate whether seasonal trends exist (e.g., higher sales during holidays).
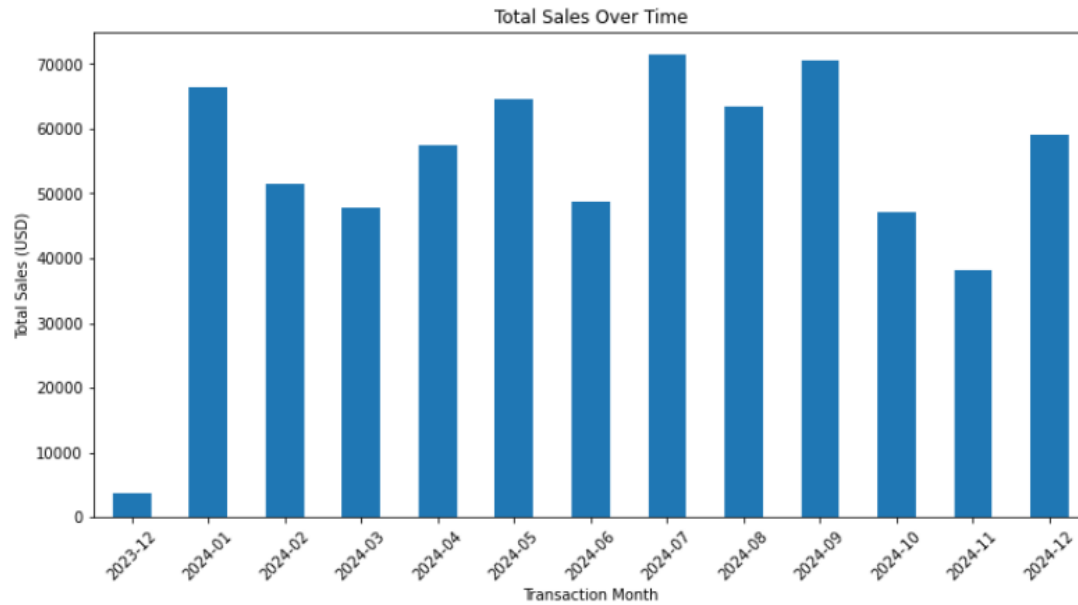
Figure: Bar plot showing total sales over time (monthly).

Insight:

Total sales follow a similar trend to the number of transactions, indicating steady revenue growth.

Takeaway:
Focus on increasing the average order value to boost revenue without needing more transactions.

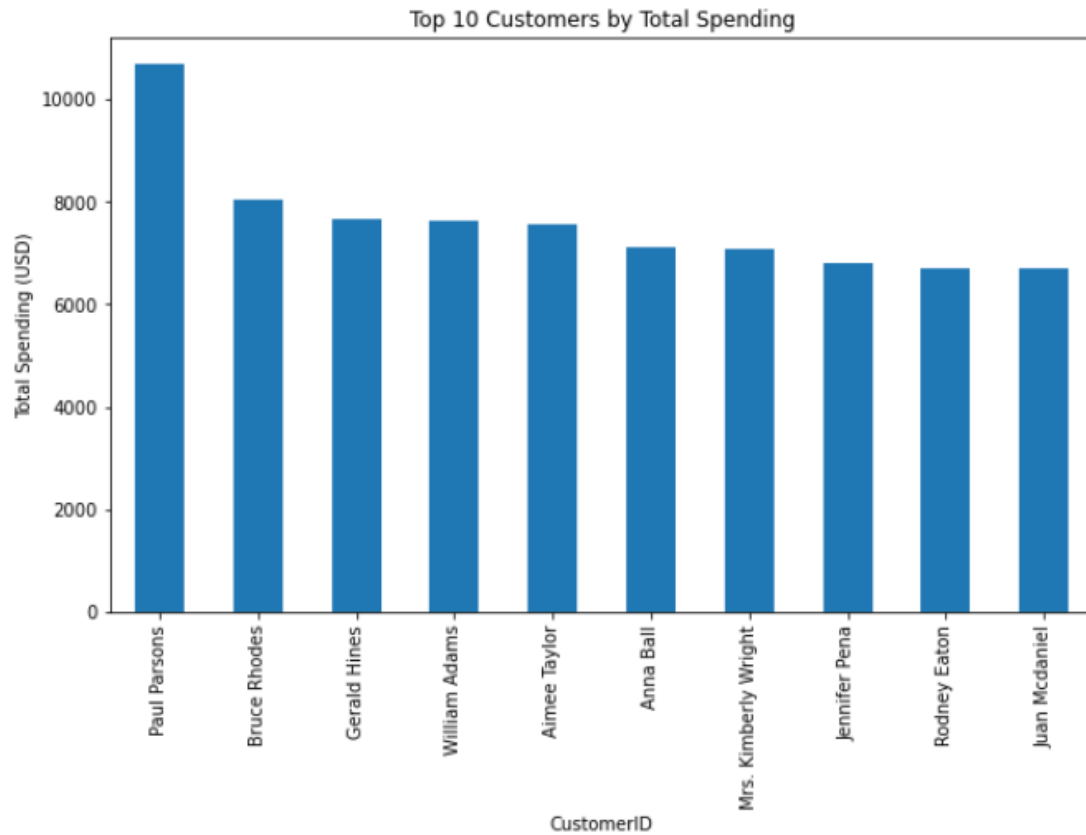## 4. Customer Purchasing Behavior

Top Customers by Total Spending

Figure: Bar plot showing the top 10 customers by total spending.

Insight:

A small group of customers contributes significantly to total revenue.
These customers are likely **high-value customers**.

Takeaway:

Implement loyalty programs or personalized offers to retain these high-value customers.
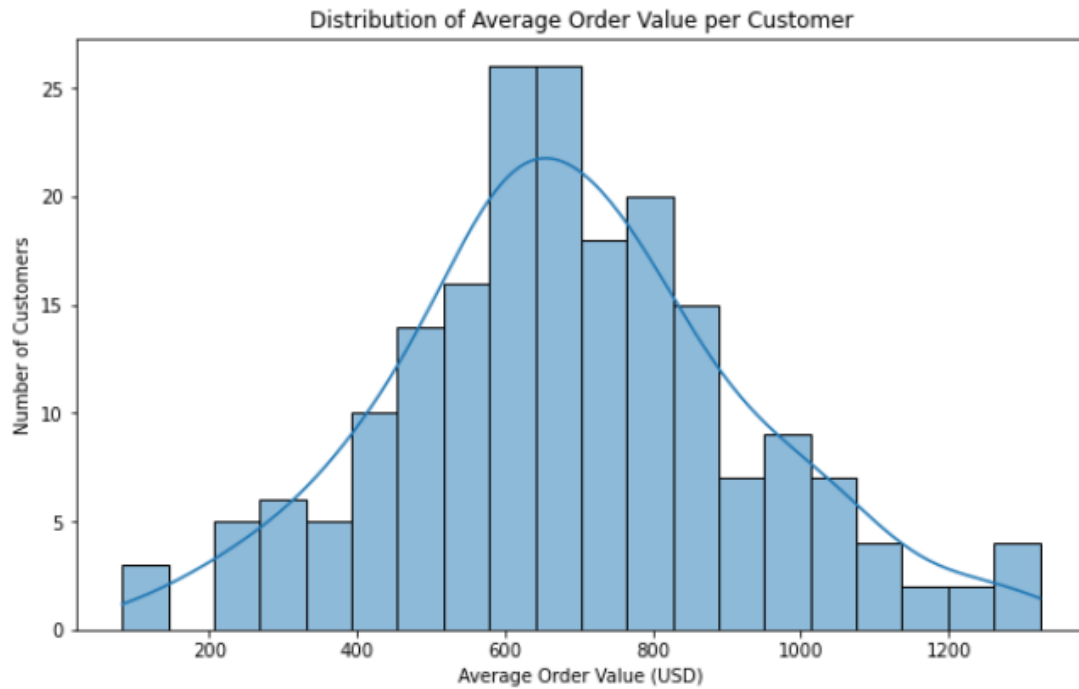
Average Order Value per Customer

Figure: Histogram showing the distribution of average order value per customer.

Insight:

Most customers have a **low average order value**, with a few outliers spending significantly more.
Takeaway:
Encourage customers to increase their order value through upselling or bundling strategies.

5. Product Performance
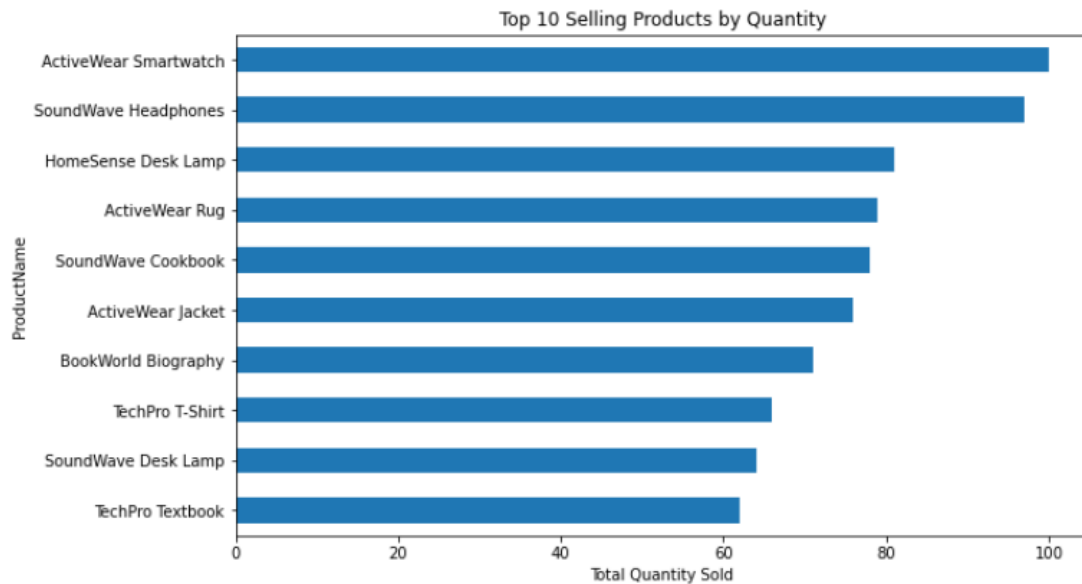
Top Selling Products by Quantity

Figure: Horizontal bar plot showing the top 10 products by quantity sold.

Insight:

Certain products are **highly popular** and account for a large portion of total sales.

Takeaway:

Stock more of these popular products and consider offering discounts on less popular items to boost sales.
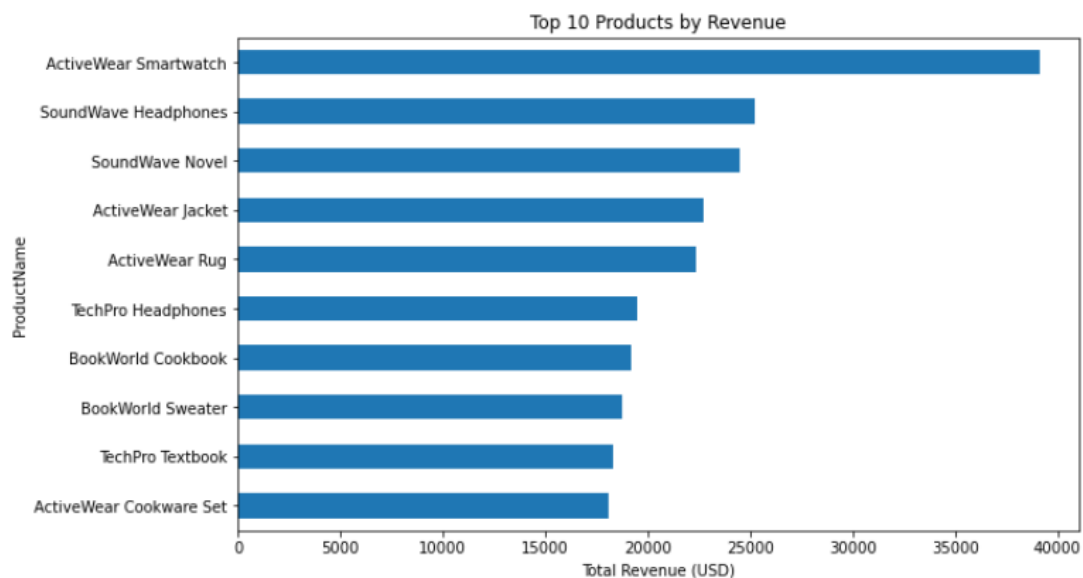
Revenue by Product

Figure: Horizontal bar plot showing the top 10 products by revenue.

Insight:

The top-selling products by quantity are not always the top revenue generators.

Some **high-priced products** contribute significantly to revenue despite lower sales volume.

Takeaway:

Focus on promoting high-revenue products to maximize profitability.
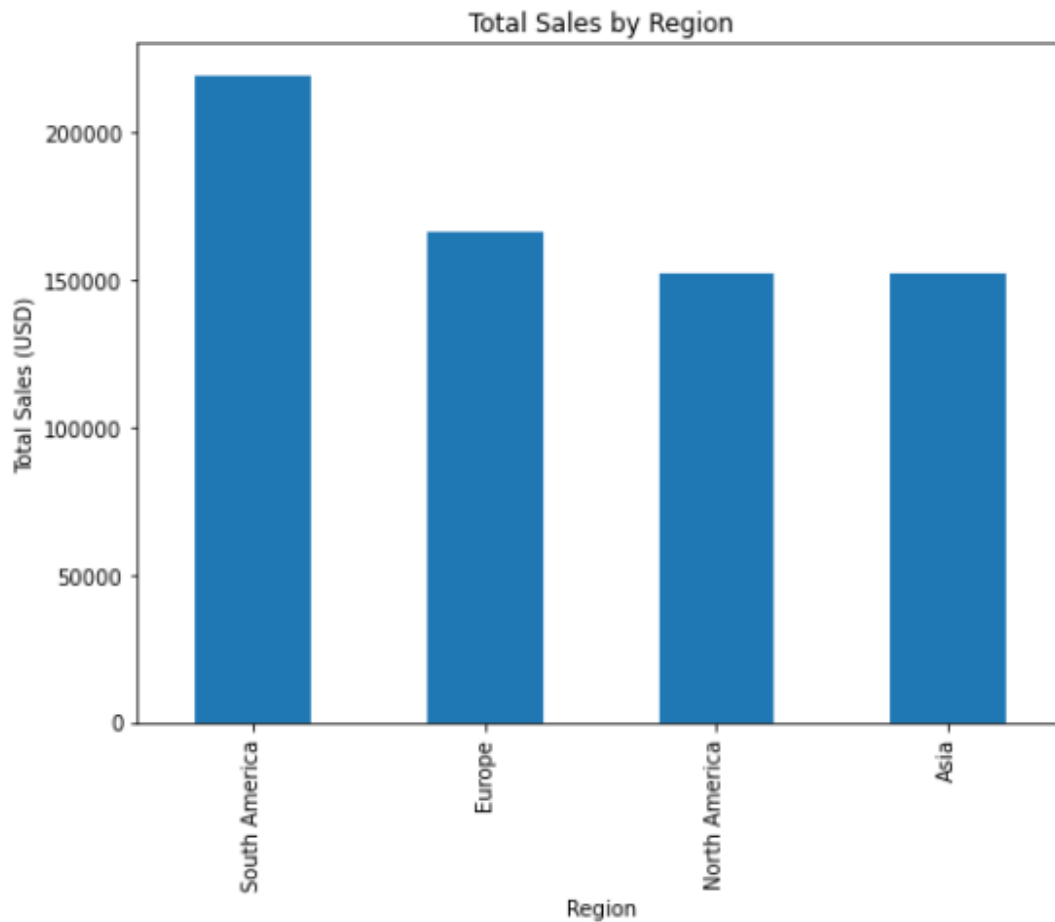
6. Regional Sales Analysis

Total Sales by Region

Figure: Bar plot showing total sales by region.

Insight:

South America generates the highest sales, followed by **Asia**, **Europe**, and **North America**.

Takeaway:

Allocate more resources to regions with higher sales potential (e.g., South America and Asia).
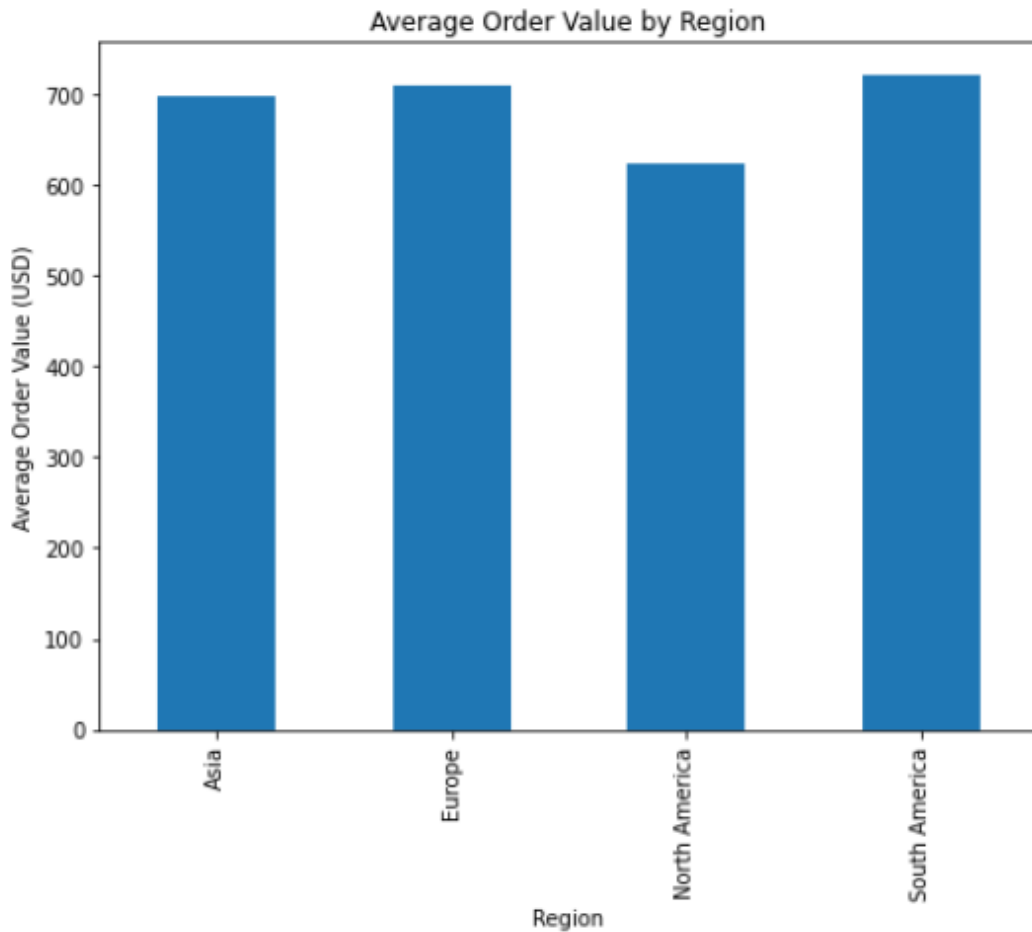
Average Order Value by Region

Figure: Bar plot showing the average order value by region.

Insight:

North America has the highest average order value, despite having fewer customers.

Takeaway:

Target North American customers with premium products or services to capitalize on their higher spending.

7. Category-wise Sales
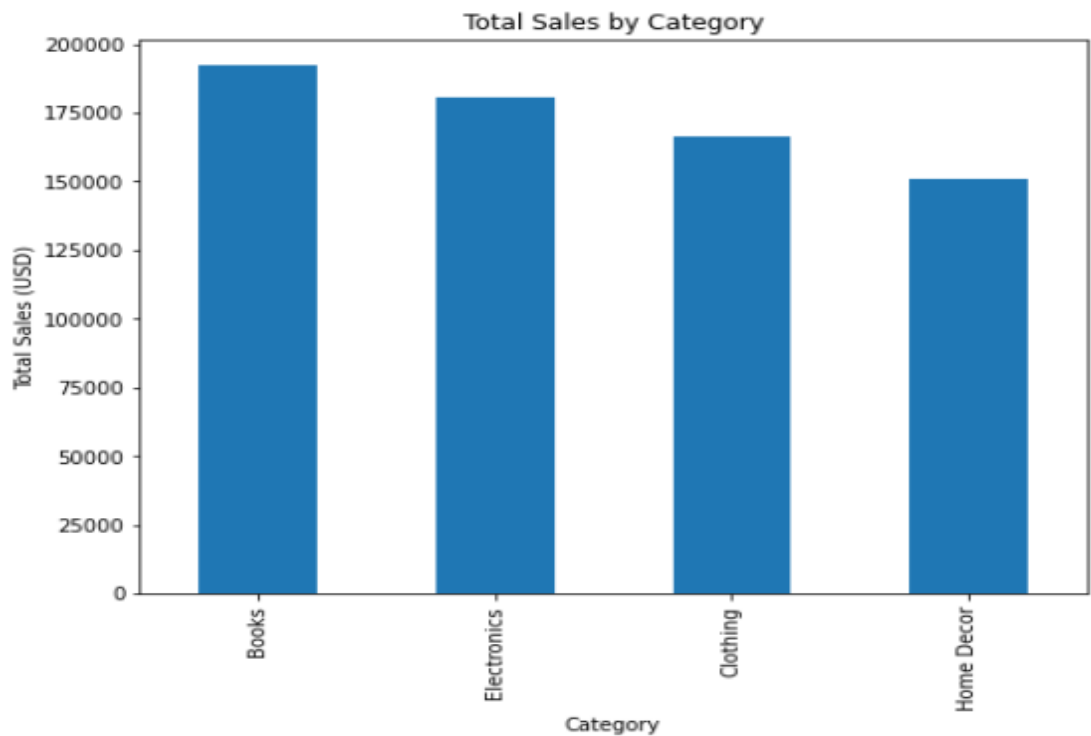
Sales by Product Category

Figure: Bar plot showing total sales by product category.

Insight:

The **Electronics** category generates the highest revenue, followed by **Books**, **Clothing**, and **Home Decor**.

Takeaway:

Focus on expanding the Electronics category, as it is the most profitable.
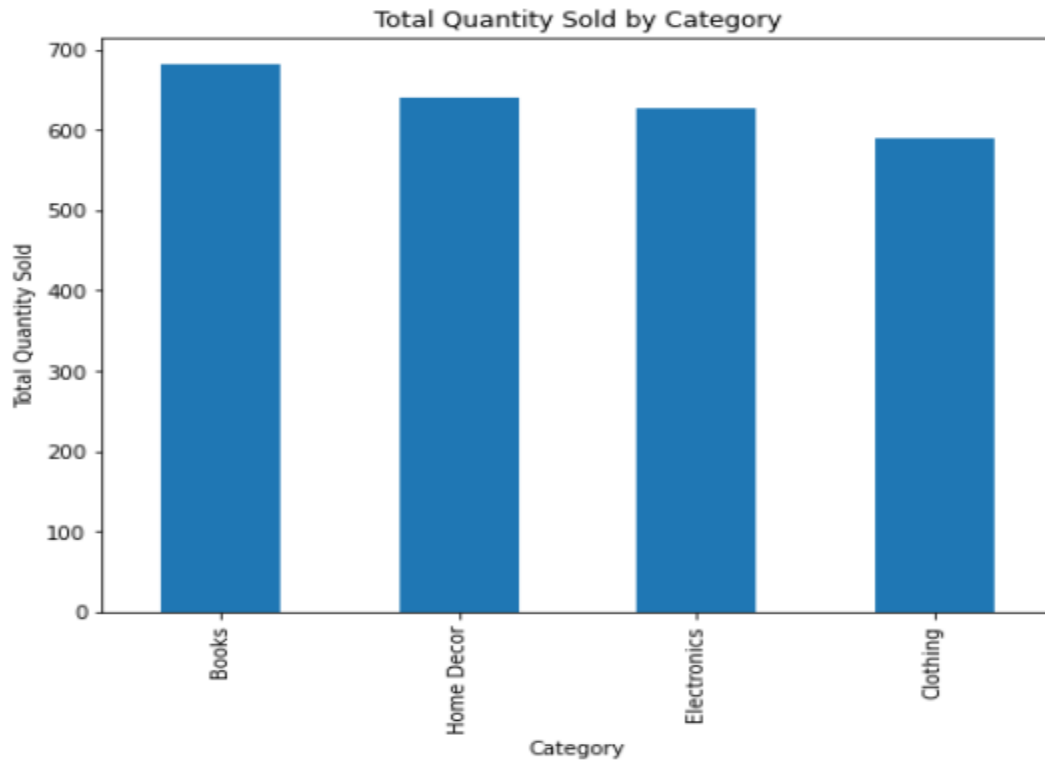
Quantity Sold by Category

Figure: Bar plot showing the total quantity sold by category.

Insight:

The **Books** category has the highest quantity sold, despite generating less revenue than Electronics.

Takeaway:

Consider increasing the price of books or bundling them with higher-margin products.
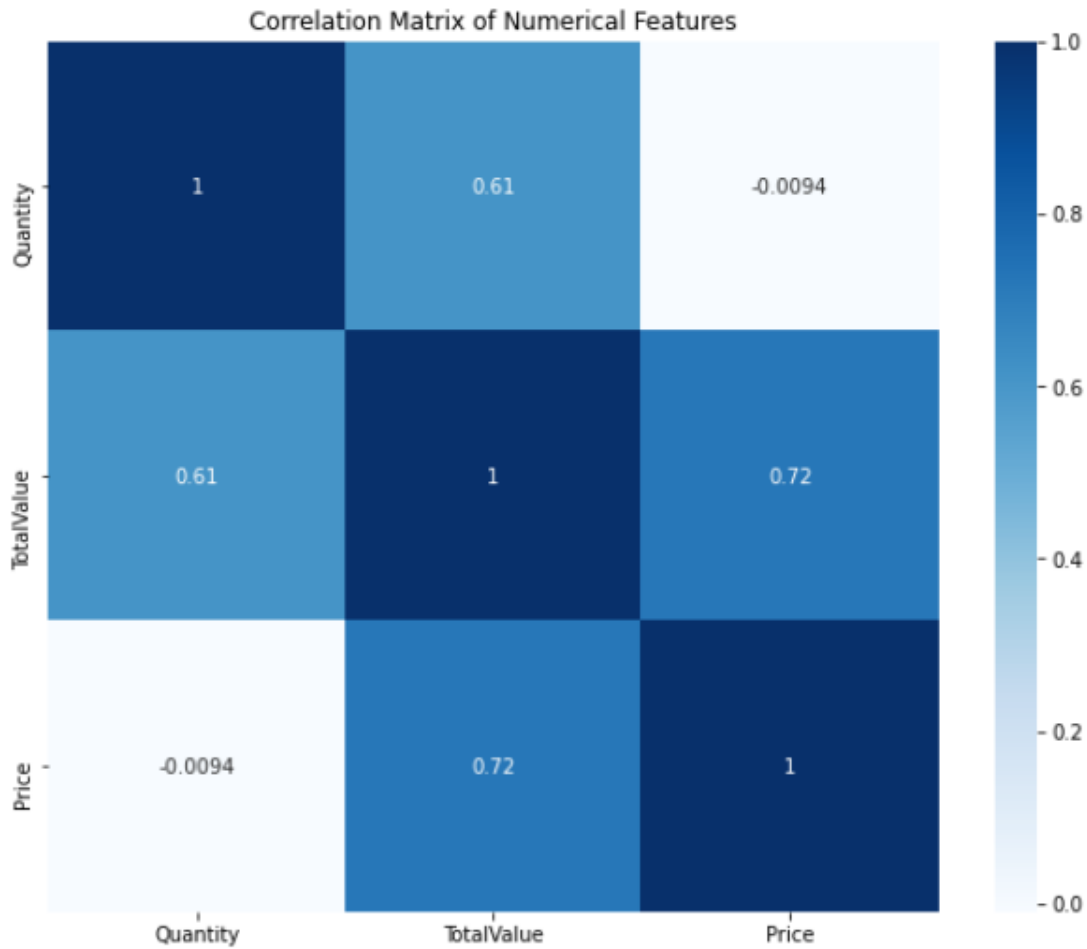
8. Correlation Analysis

Correlation Matrix

Correlation Matrix of Numerical Features

Figure: Heatmap showing the correlation between numerical features.

Insight:

TotalValue (total sales) is strongly correlated with **Quantity**, indicating that higher quantities lead to higher revenue.

There is no strong correlation between **Price** and **Quantity**, suggesting that price is not a major factor in purchase decisions.

Takeaway:

Focus on increasing the quantity sold rather than raising prices to boost revenue.

Summary of Key Takeaways

Customer Base: South America has the largest customer base, but North America has the highest average order value.

Product Focus: Electronics is the most profitable category, while Books sell the most units.

Revenue Growth: Steady revenue growth can be achieved by increasing the average order value and focusing on high-revenue products.

Marketing Strategy: Target regions with fewer customers (e.g., North America) and implement loyalty programs for high-value customers.

Pricing Strategy: Consider bundling or upselling to increase the average order value without raising prices.

These insights can guide strategic decisions to optimize marketing, product offerings, and pricing strategies.