E-Commerce Data Analysis Report

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Table of Contents

1. Introduction

Objectives

This project aims to:

1. Calculate the monthly sales of the store and identify which

month had the highest sales and which month had the lowest sales.

2. Analyse sales based on product categories and determine which category has the lowest sales and which category has the highest sales.

3. The sales analysis needs to be done based on sub-categories

4. Analyse the monthly profit from sales and determine which month had the highest profit.

5. Analyse the profit by category and sub-category.

6. Analyse the sales and profit by customer segment

7. Analyse the sales to profit ratio

Problem Statement

Understanding sales and profit trends is critical for optimizing product offerings and improving business strategies.

Scope and Relevance

The analysis provides actionable insights to help stakeholders enhance sales strategies, identify growth opportunities, and optimize inventory.

2. Dataset Overview

Source: [Sample - Superstore]

Variables

- Order Date, Ship Date, Sales, Profit, Category, Sub-Category, Customer Segment

Structure

- Rows: 9995
- Columns: 21

Preprocessing

1. Converted date columns to datetime format.
2. Created additional columns: Order Month, Order Year, Order Day of Week.

3. Methodology

Tools Used: Python, Pandas, Plotly

Techniques:

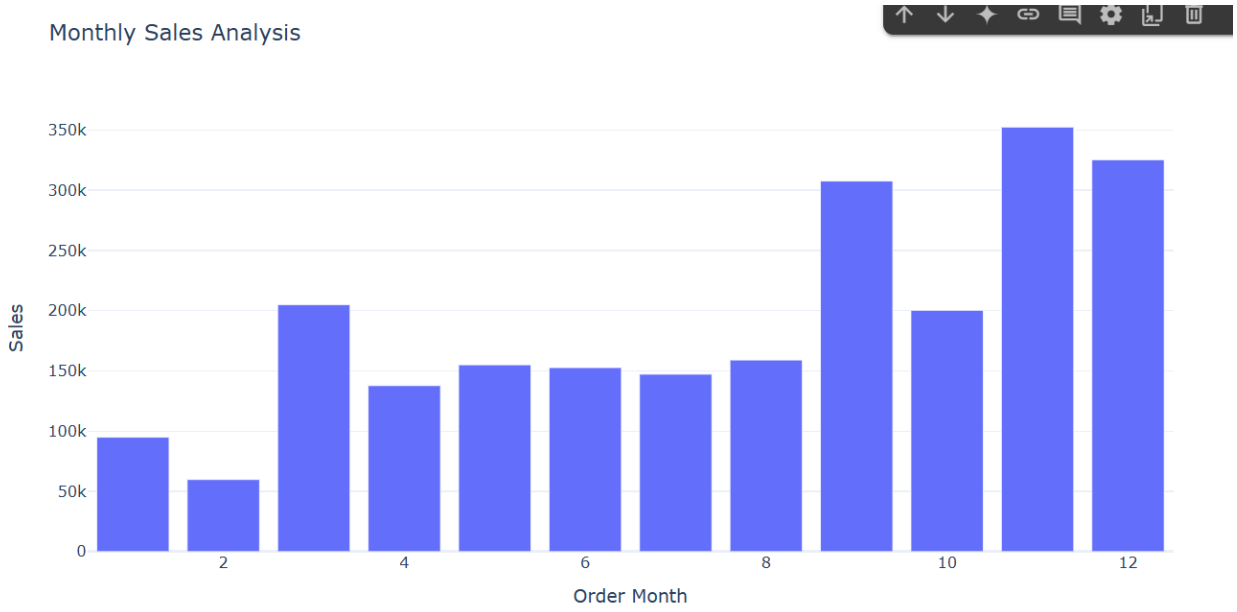
- Data visualization with bar charts and pie charts
- Aggregation using group-by operations

4. Exploratory Data Analysis (EDA)

4.1 Monthly Sales Analysis

Monthly sales data reveals fluctuations in performance. The highest sales occurred in **November**, while the lowest were recorded in **February**.

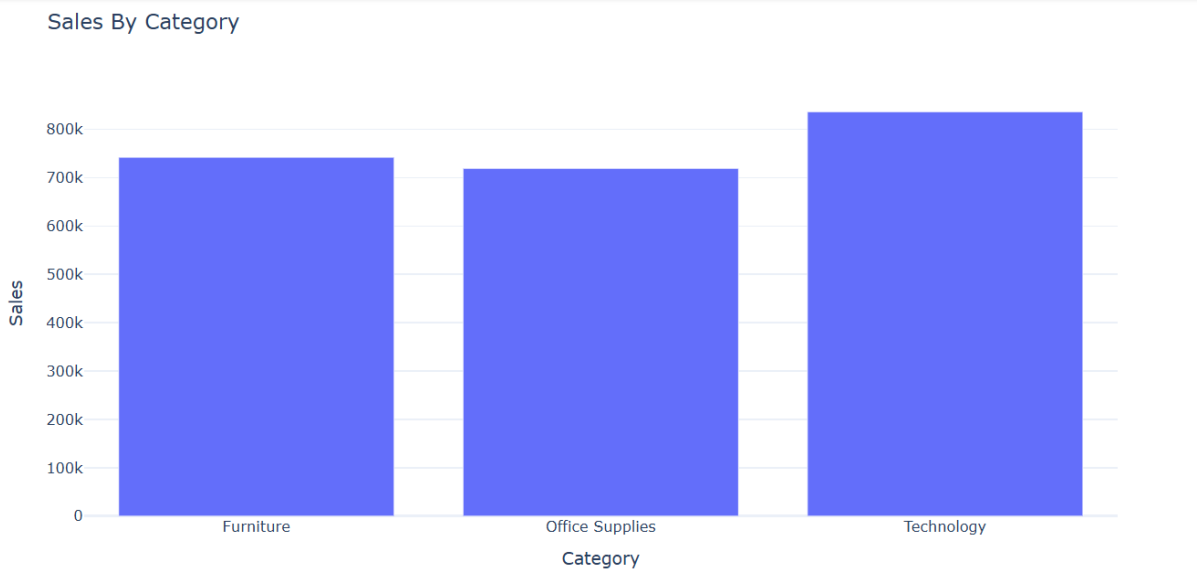
Visualization:

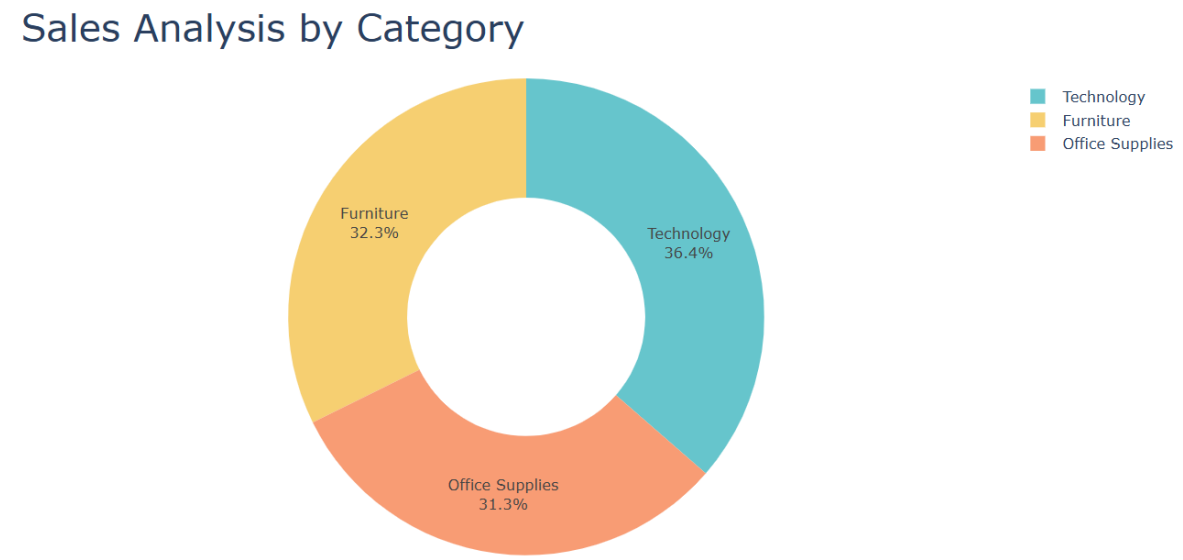


4.2 Sales by Category Analysis

Sales by category show that **Technology** contributed the most, whereas **Office Supplies** had the least sales.

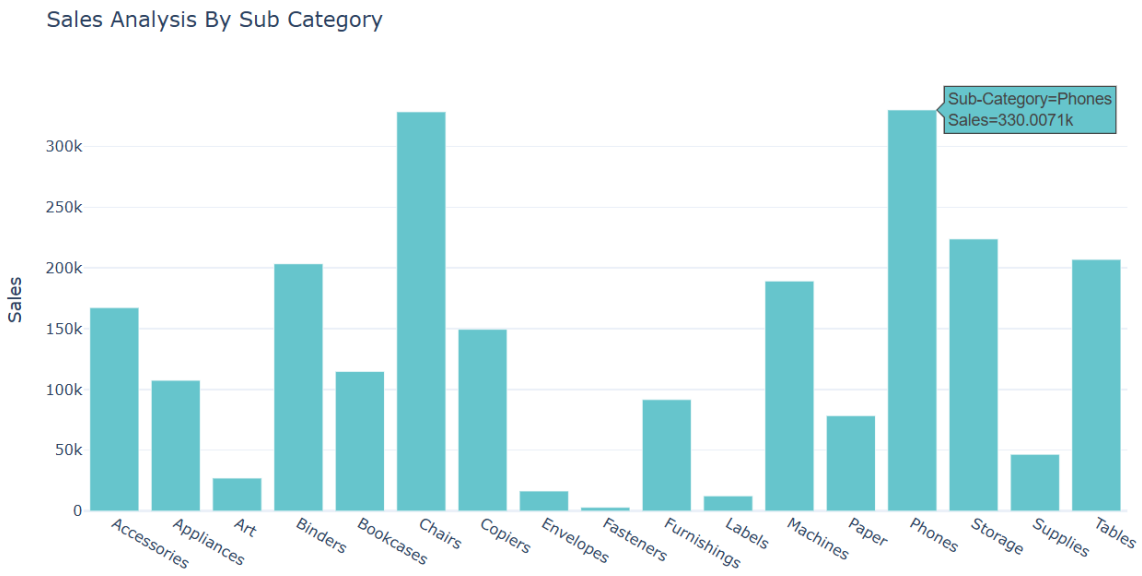
Visualization:





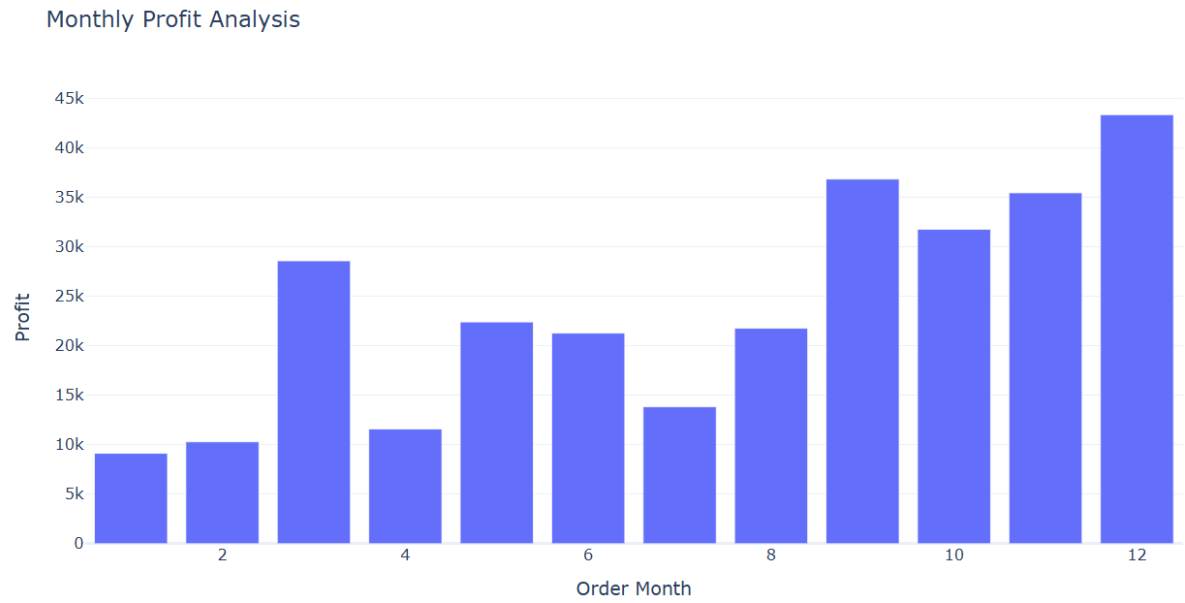
4.3 Sales by Sub-Category Analysis

Sub-category analysis highlights **Phones** as the top contributor to sales.



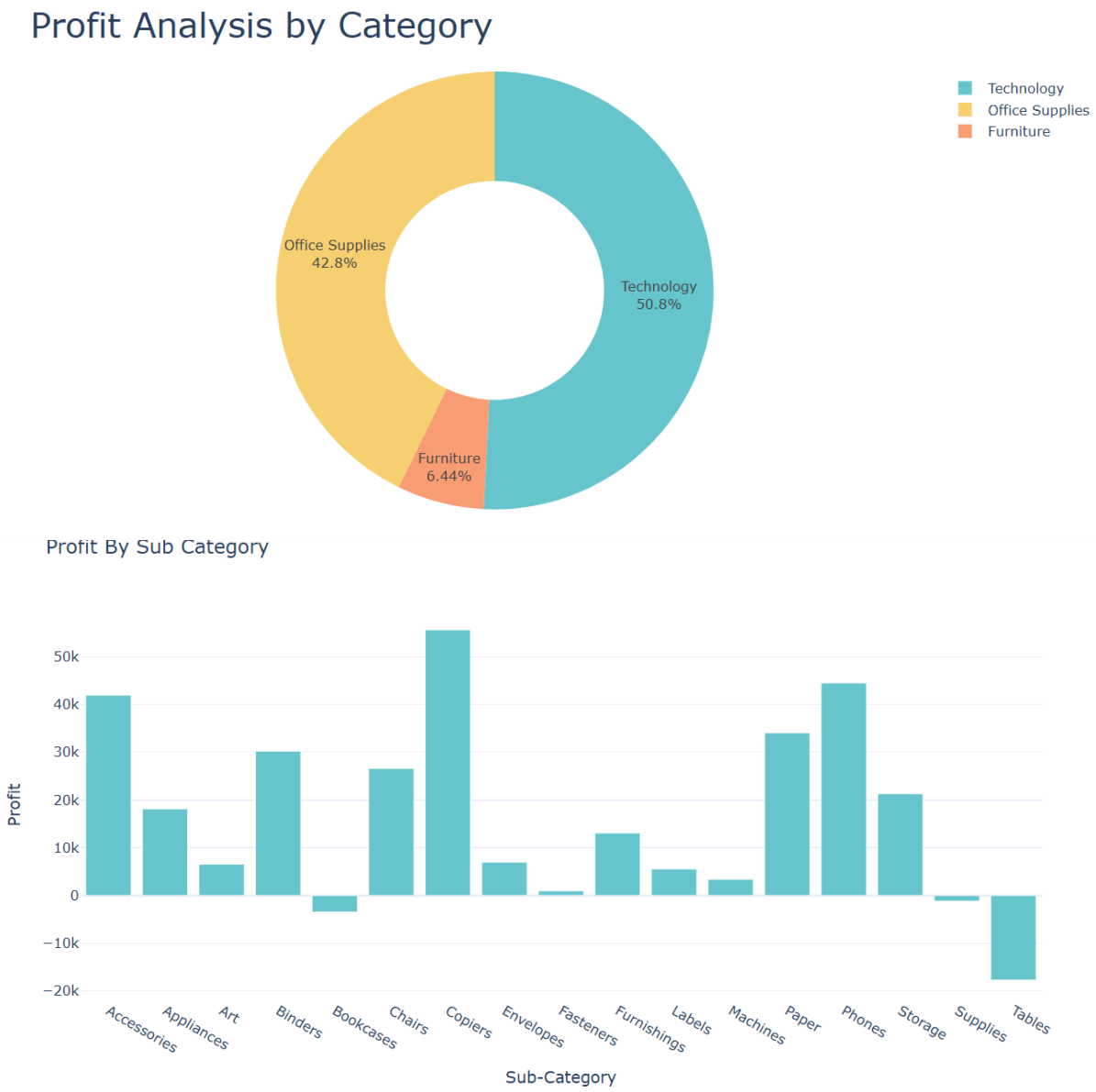
4.4 Monthly Profit Analysis

Profit trends mirrored sales trends, with the highest profit recorded in **December** and the lowest profit in **January**.

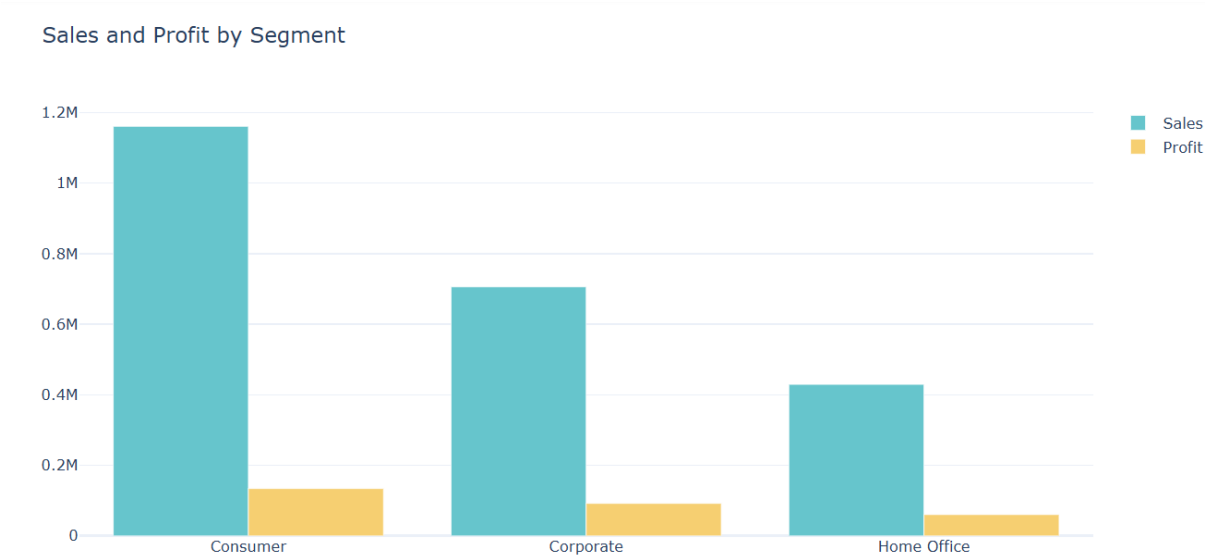


4.5 Profit by Category and Sub-Category Analysis

Profit analysis indicates that Technology is the most profitable category, aligning with its high sales performance.



4.6 Sales and Profit by Customer Segment



4.7 Sales-to-Profit Ratio Analysis

	Segment	Sales_to_Profit_Ratio
0	Consumer	8.659471
1	Corporate	7.677245
2	Home Office	7.125416

5. Key Insights

1. **November** had the highest sales, while **February** had the lowest.
2. **Technology** was the top-performing category, while **Office Supplies** underperformed.
3. **Phones** had the highest sales among sub-categories.
4. **December** recorded the highest profit, and **January** had the lowest.

6. Recommendations

1. Focus on promoting **Technology** items during peak months like **November**.
2. Reassess inventory for low-performing categories like **Office Supplies**.
3. Enhance marketing efforts for sub-categories like **Phones** to sustain high sales.

7. Limitations

1. Seasonal effects not fully analyzed.
2. Limited data granularity.

8. Future Scope

1. Incorporate external factors such as market trends.
2. Expand analysis to include regional performance.

9. Conclusion and Results

Conclusion: The analysis provides a comprehensive understanding of sales and profit trends within the dataset. November emerged as the month with the highest sales, while February saw the lowest sales. The Technology category outperformed others, with Phones leading sub-category sales. December was identified as the most profitable month, contrasting with January, which had the lowest profit. These findings highlight significant areas for strategic improvements and optimization.

Results:

1. **Highest Sales Month:** November
2. **Lowest Sales Month:** February
3. **Top Category:** Technology
4. **Lowest Category:** Office Supplies
5. **Top Sub-Category:** Phones
6. **Highest Profit Month:** December
7. **Lowest Profit Month:** January

10. References

- Kaggle
- Tools: Python, Plotly, Pandas