

Retail Business Performance & Profitability Analysis

♦ Introduction

This project aims to analyze a retail dataset to assess business profitability, identify underperforming product categories, optimize inventory turnover, and detect seasonal trends. The ultimate objective is to provide strategic insights to improve business performance using interactive dashboards and data-driven decision-making.

♦ Abstract

We utilized a structured data science workflow to analyze transactional retail data. The focus areas were profitability, inventory turnover, and temporal trends across various categories, sub-categories, regions, and seasons. Slow-moving and overstocked items were identified to suggest actionable improvements in inventory and product management.

♦ Tools Used

- **Python (Pandas, NumPy):** Data preprocessing and manipulation
 - **SQL:** Analytical queries on profitability and sales segmentation
 - **Seaborn & Matplotlib:** Visual trend analysis (optional plots)
 - **Google Colab:** Integrated analysis, visualization, and reporting environment
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♦ Steps Involved in Building the Project

1. Data Cleaning & Feature Engineering

- Converted **Order Date** to datetime.
- Extracted **Month**, **Year**, and derived **Season**.
- Estimated **Inventory_Turnover** based on sales velocity (if not provided).

2. Exploratory Data Analysis (EDA)

- Analyzed category-wise profit trends.
- Examined monthly and seasonal profit variations.
- Assessed correlation between **Inventory_Turnover** and **Profit**.

3. Strategic Tagging

- Flagged "Overstocked & Unprofitable" items using 25th percentile thresholds for low turnover and low profit.
- Generated insights for inventory and pricing optimization.

4. SQL Integration

- Wrote and exported SQL queries to identify low-margin products and top-performing categories.
- Provided **.sql** file as a deliverable.

◆ Conclusion

This analysis provides actionable insights for retail stakeholders. Weak negative correlation between inventory turnover and profitability suggests that profit doesn't always scale with faster sales. Several sub-categories in Office Supplies and Furniture were flagged as overstocked and unprofitable.