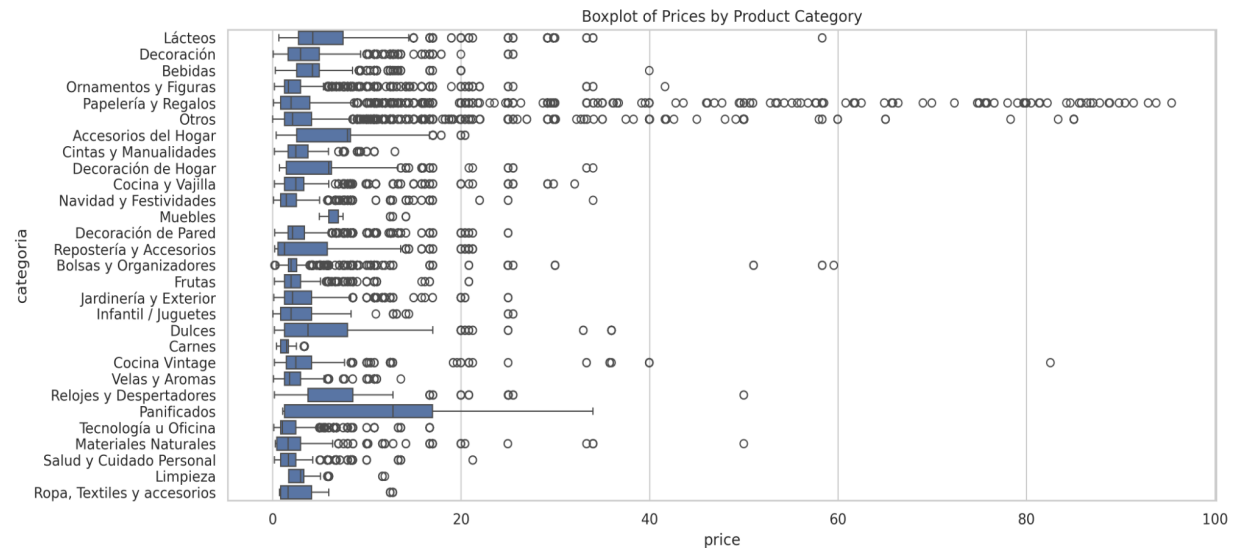# Retail Sales Analysis — Portfolio Project

This project explores over 500,000 retail transactions to uncover sales trends, customer behavior, and product performance insights. Using Python and various data science libraries, I cleaned and structured the dataset, created business-relevant categories, and visualized key patterns.
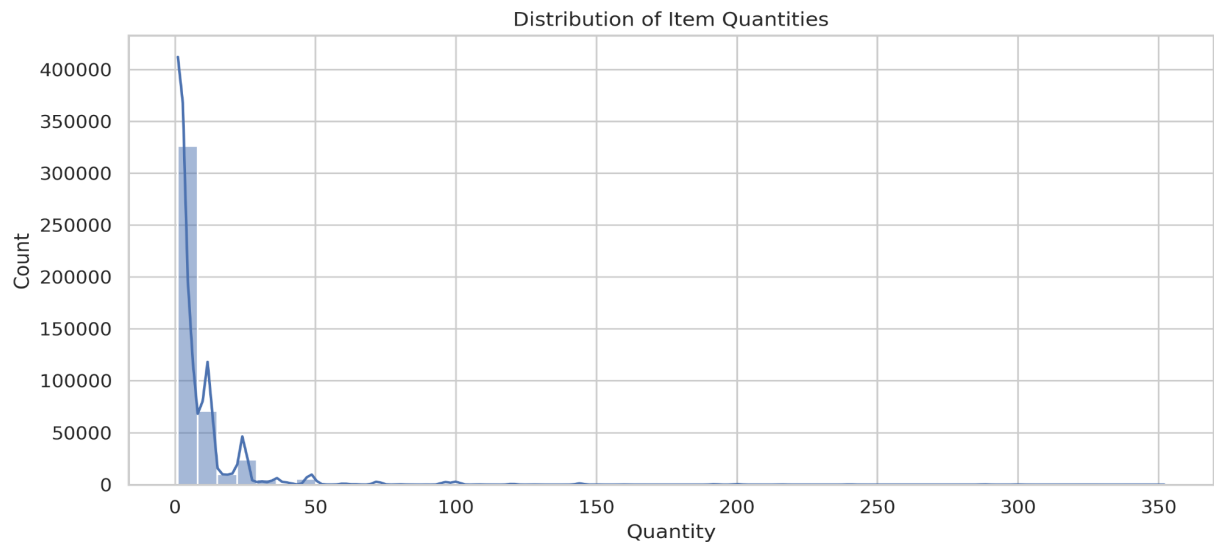
Objectives:

Clean messy transaction data and handle missing values Engineer features such as weekday, hour, and invoice groupings Categorize products into 25+ business-focused groups Visualize trends in quantity, price, and sales by time and category

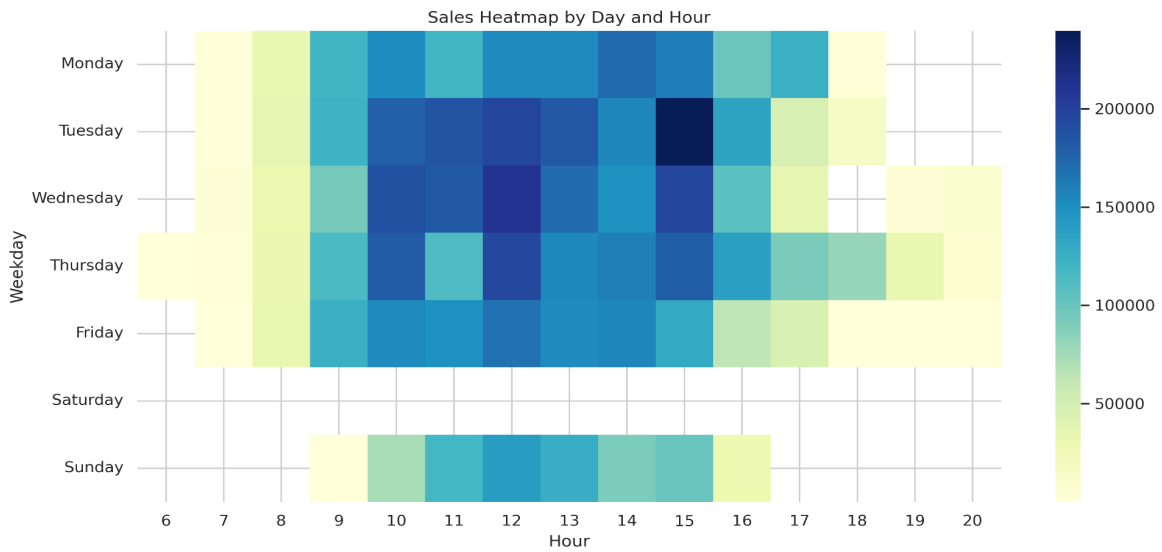**Tools:** Python, Pandas, Seaborn, Matplotlib, Plotly, Statsmodels, Prince, SciPy
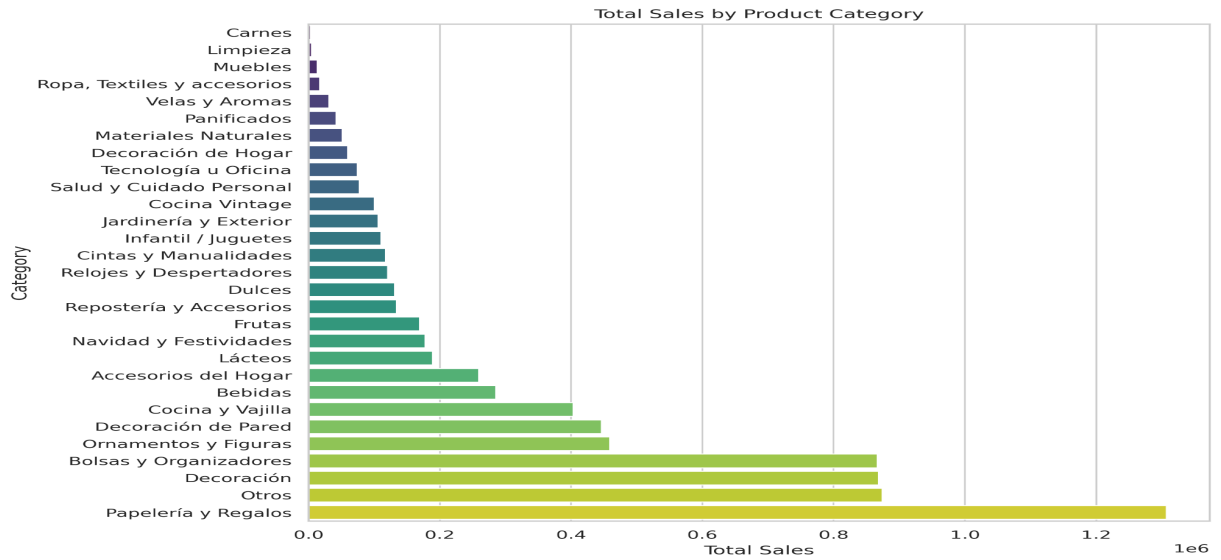
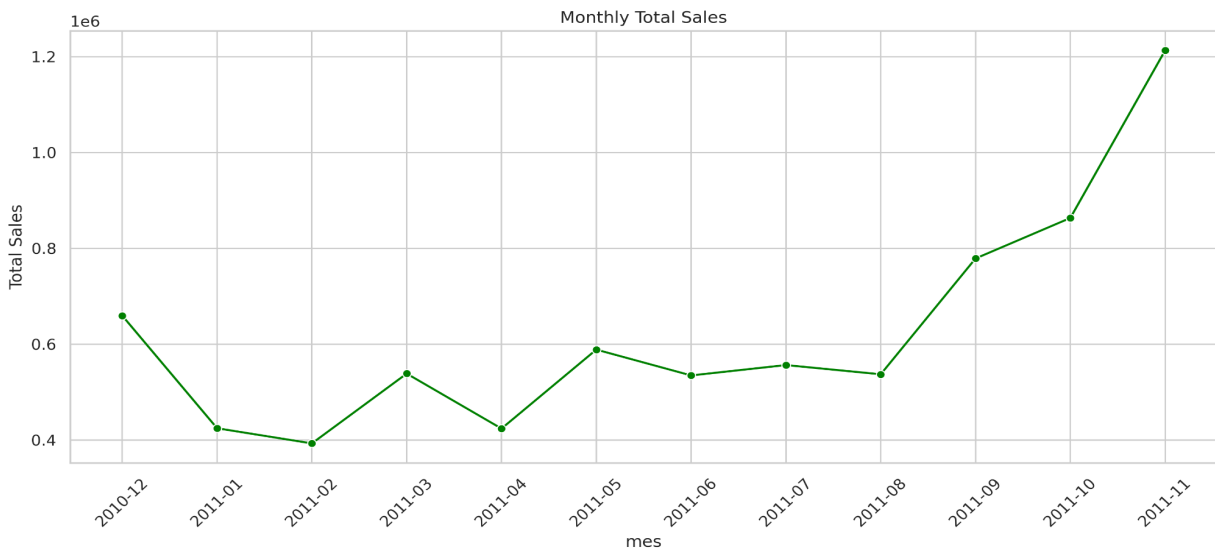### *Boxplot of Prices by Product Category*

Boxplot of Prices by Product Category

Distribution of Item Quantities

Distribution of Item Quantities

Sales Heatmap by Day and Hour

Total Sales by Product Category

Total Sales by Product Category

Monthly Total Sales

Monthly Total Sales

Conclusion:

This project demonstrates my ability to work with real-world data, extract actionable insights, and deliver clean, clear visual outputs. It is ideal for businesses looking to understand sales performance and customer behavior.