

Customer Sales Analysis

Sales analysis by categories, clients and regions, identifying trends
and anomalies

Artem Beikun 08.08.2025

Introduction

- ❖ **Project Overview:**

This project analyzes customer sales data to understand purchasing behaviors, identify top products and customers, and detect seasonal trends and anomalies. The insights aim to support business decisions and improve sales performance.

- ❖ **Dataset:** The dataset from Kaggle contains sales transactions with order, product, customer, and geographic information over multiple years.

Project Goals

- ❖ **Objectives:**

- ❖ Identify frequent buyers and top revenue-generating customers
- ❖ Analyze sales by product category and region
- ❖ Explore seasonality and sales trends
- ❖ Detect anomalies in purchase patterns
- ❖ Calculate key metrics: Average Order Value, Recency, Purchase Frequency

- ❖ **Tools:**

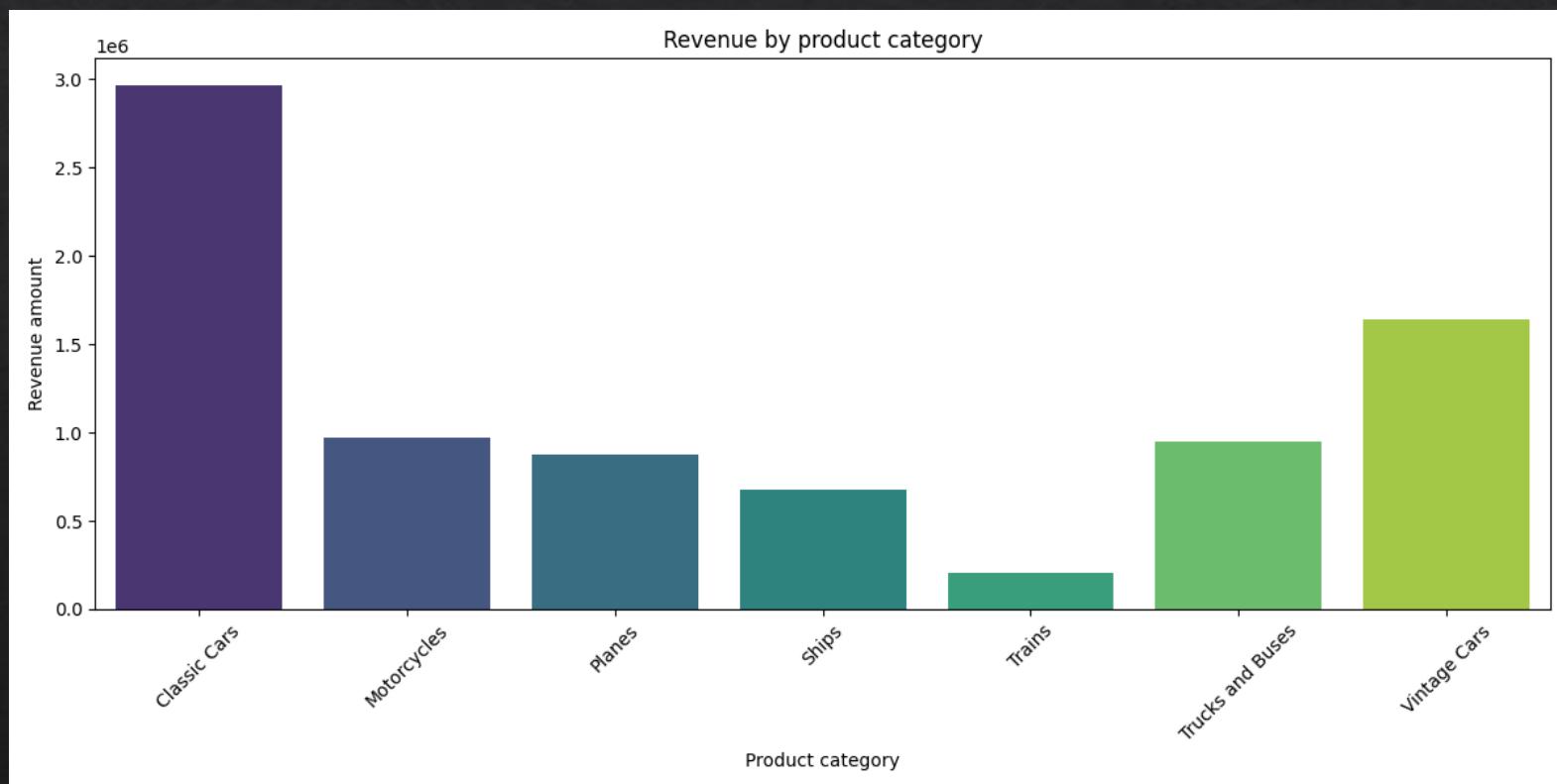
Python (pandas, matplotlib, seaborn) and PostgreSQL for data processing and visualization.

Data Preparation

- ❖ Imported sales data with encoding consideration (cp1251)
- ❖ Handled missing values: filled text columns with ‘Unknown’ and numeric columns with 0
- ❖ Converted order dates to datetime format
- ❖ Added new columns for total sales per order and order month
- ❖ Verified data types and completeness to ensure accuracy

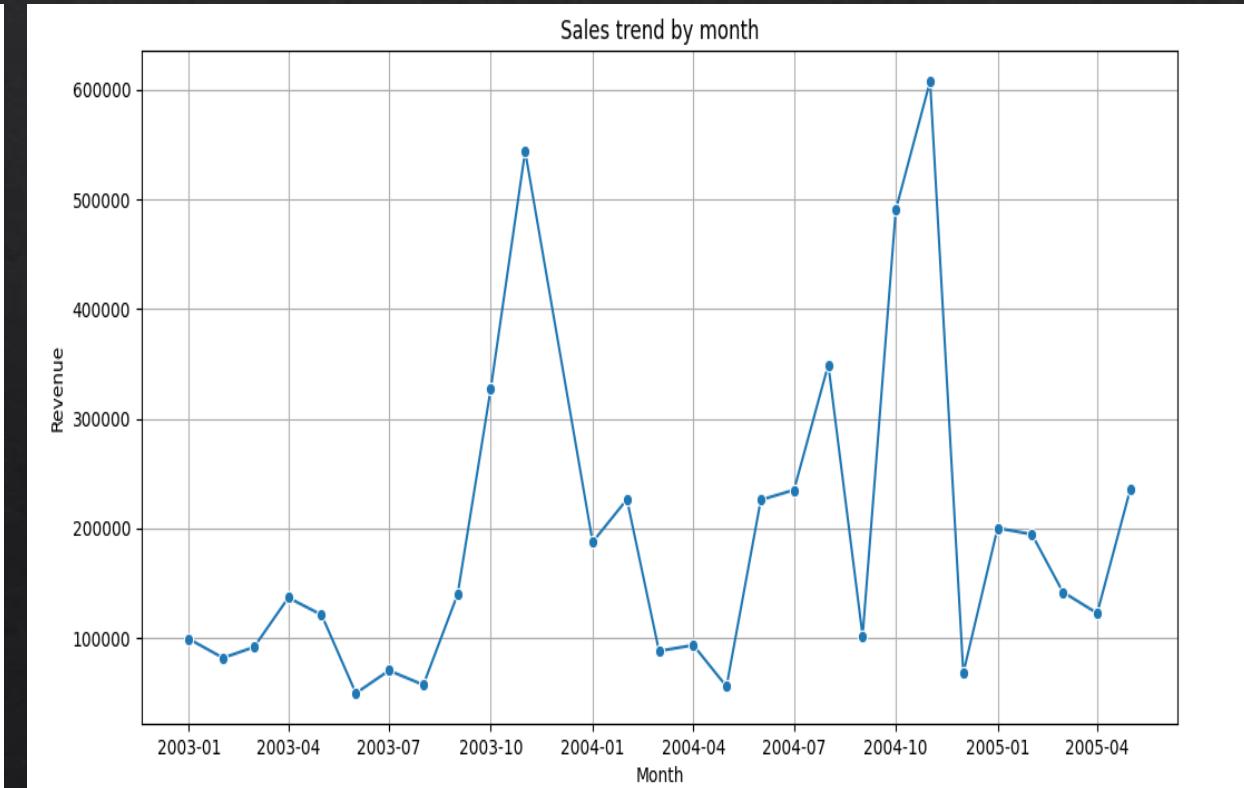
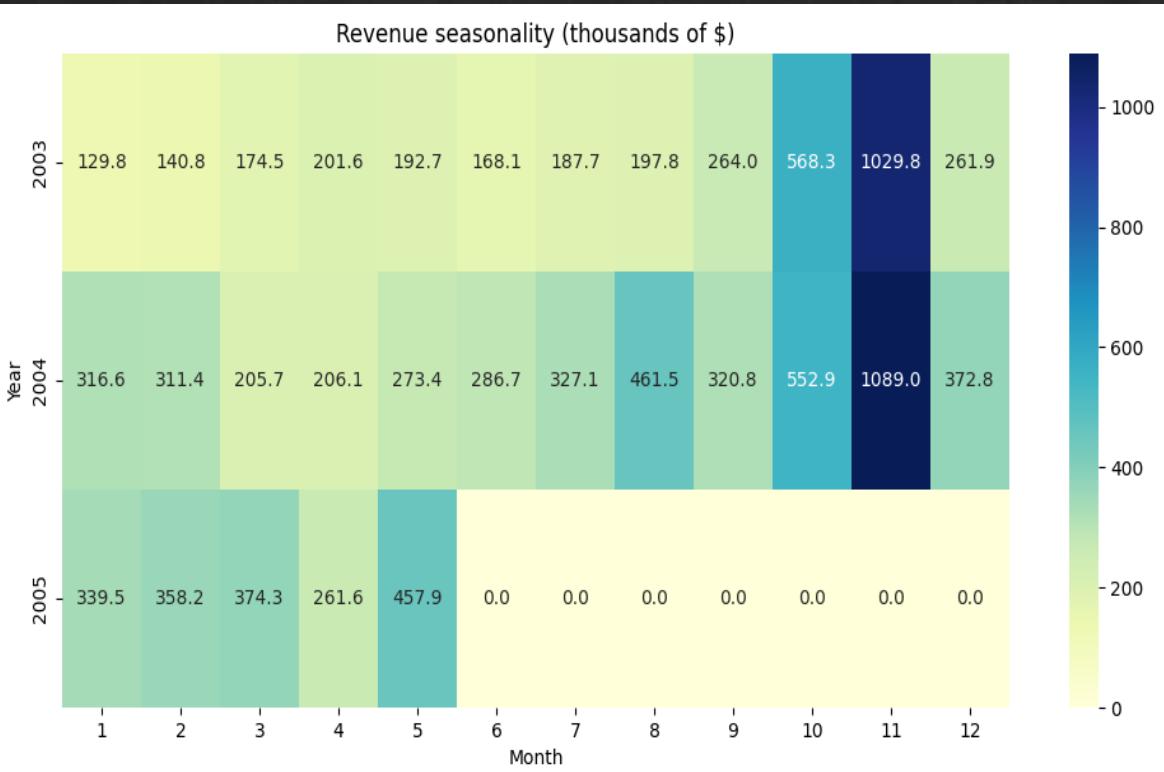
Key Sales Metrics

- ❖ Average Order Value (AOV): Average revenue per order calculated as total sales divided by number of orders
- ❖ Total Sales by Product Category: Identified which product lines generate the most revenue
- ❖ Top 5 Customers: Ranked by total purchase amounts
- ❖ Order Counts per Customer: Number of orders made by each client



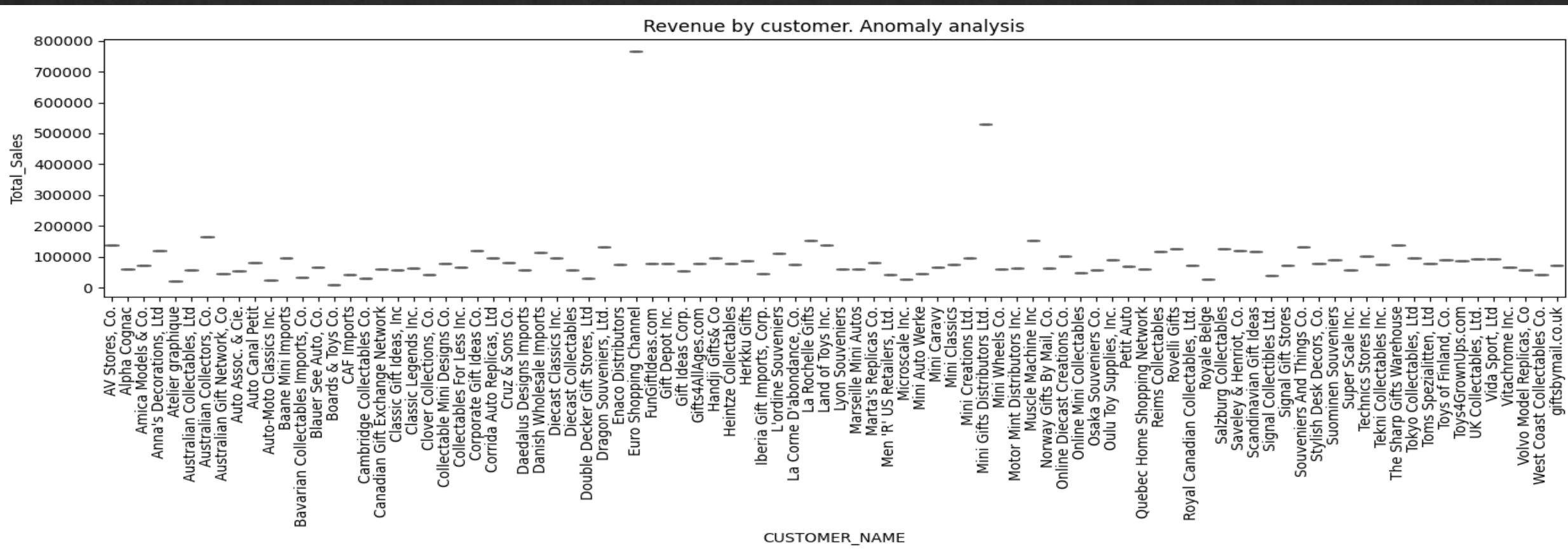
Time-based Sales Analysis

- ❖ Visualized monthly sales trends showing revenue fluctuations over time
- ❖ Created a heatmap to reveal seasonal sales patterns by month and year
- ❖ Calculated recency (days since last order) to understand customer engagement
- ❖ Identified periods with sales peaks and drops for strategic planning



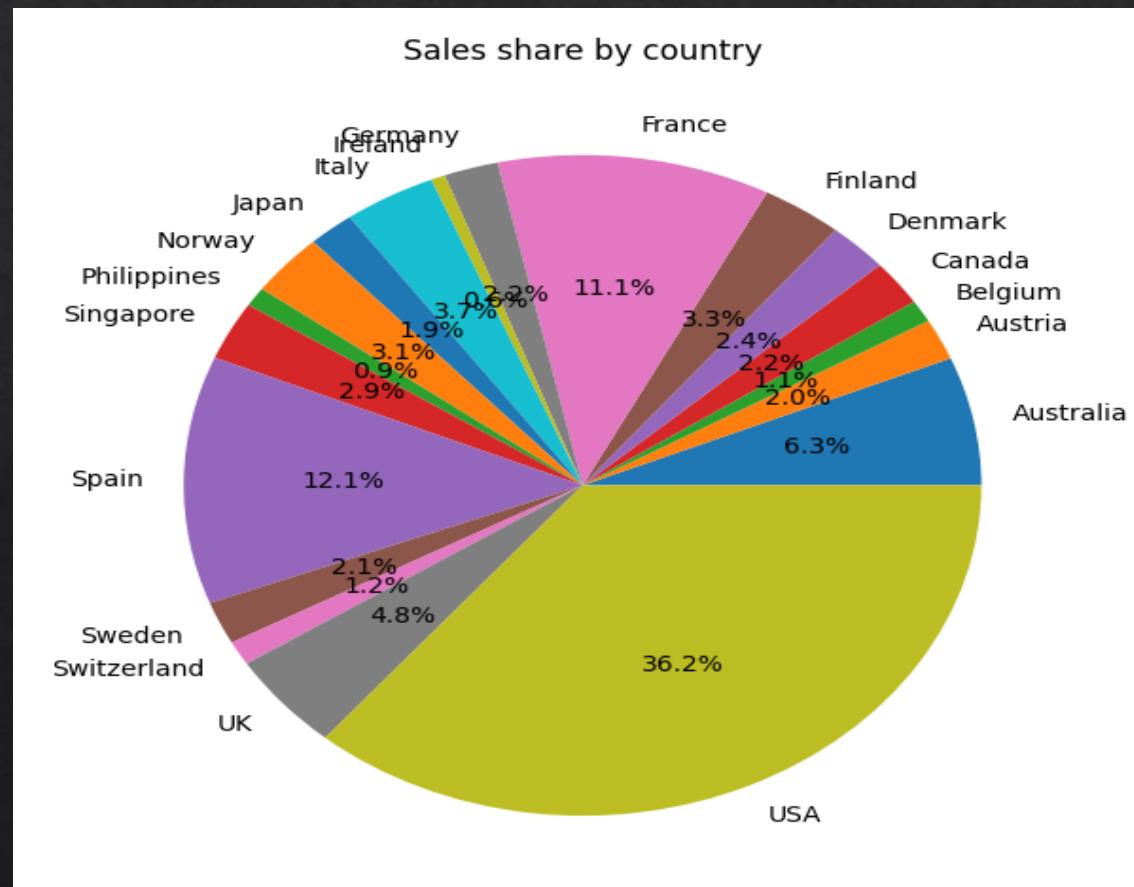
Customer Analysis

- ❖ Analyzed customer purchase behavior and revenue distribution
- ❖ Identified top 5 customers by total sales
- ❖ Examined order frequency and anomalies in purchase patterns
- ❖ Boxplot visualization reveals revenue spread among customers and highlights outliers
- ❖ Detected customers with irregular purchase intervals, helping identify potential churn risks



Geographic Sales Analysis

- ❖ Examined sales distribution across different countries
- ❖ Identified key markets generating the highest revenue
- ❖ Insights useful for targeted marketing and regional sales strategies
- ❖ Pie chart illustrates the share of total sales by country



Conclusions

- ❖ The highest revenue is generated by specific product categories such as Classic Cars and Trucks and Buses, with average sales per order around \$3,000.
- ❖ Sales exhibit clear seasonal patterns, with significant peaks in October and November each year, as shown by the heatmap and monthly trend analysis.
- ❖ A small group of customers contributes disproportionately to total sales: the top 5 customers (e.g., Euro Shopping Channel, Mini Gifts Distributors Ltd.) account for over 40% of total revenue.
- ❖ Purchase frequency varies widely; some customers have gaps between orders exceeding 90 days, which could indicate potential churn risk and areas for customer retention focus.
- ❖ Geographically, sales are concentrated mainly in countries such as USA, Canada, Germany, and France, which should be prioritized for marketing and expansion efforts.

Recommendations

- ❖ Focus marketing and sales efforts on high-revenue product categories (Classic Cars, Trucks and Buses) and top customers to maximize ROI.
- ❖ Plan promotions ahead of seasonal peaks in October–November to leverage increased buying activity.
- ❖ Implement retention strategies for customers with irregular purchase patterns to reduce churn.
- ❖ Tailor marketing and sales strategies to key countries like USA, Canada, Germany, and France to drive growth.

Thank you for your attention!
Feel free to ask any questions.