CentraleSupélec

RETAIL SALES ANALYSIS

GitHub: https://github.com/arunjegathesh/DataViz/tree/main

Website: https://arunjegathesh-dataviz-streamlit-app-u7y335.streamlit.app

Youtube Link: https://youtu.be/x6crOpLG0LQ

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Let us look at a classic case study where one would have to do a comprehensive analysis of Retail data

MOTIVATION

A competitor retail chain is experiencing decline in sales for multiple stores across the country. The management team sees this as an opportunity to expand and invest heavily in new product categories. They would like to understand their customer behaviour better and cater to their needs by expanding in regions with heavy transaction rate. They have approached our business analysis firm to help them identify the reasons behind the decline in sales and suggest strategies to reverse the trend.

Our approach will involve the following steps:

Data Collection: Our team will collect and analyse data based on sales, and customer feedback. We will also gather data on the industry trends.

Data Analysis: Our team will use advanced analytical tools and techniques to analyse the data and identify patterns and trends that may be affecting the sales.

Proposal: Based on our analysis, we will provide them details outlining the key factors affecting their sales and recommend strategies to capitalise on the declining sales of the competitor

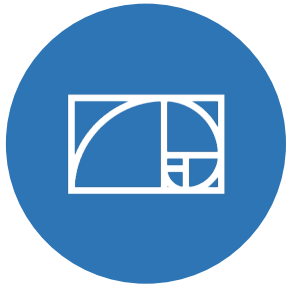
Implementation: Our team will work closely with you to implement the recommended strategies and monitor their effectiveness.

We will be focusing on the key parameters which will help us achieve our goal

OBJECTIVES

Understanding Customer Behaviour

Analysing what products customers buy, how frequently they make purchases, and what factors influence their buying decisions



Identifying trends and patterns

Detect trends and patterns in customer behaviour, such as seasonal fluctuations in sales, changes in customer preferences over time, or the impact of marketing campaigns on sales.

Evaluating performance

Gain insights into sales evaluate the performance of their sales channels, such as brick-and-mortar stores, online stores, and mobile apps.

Forecasting future sales

By analysing historical sales data, businesses can develop forecasts for future sales, which can help them plan their operations and make strategic decisions about pricing, promotions, and product development.

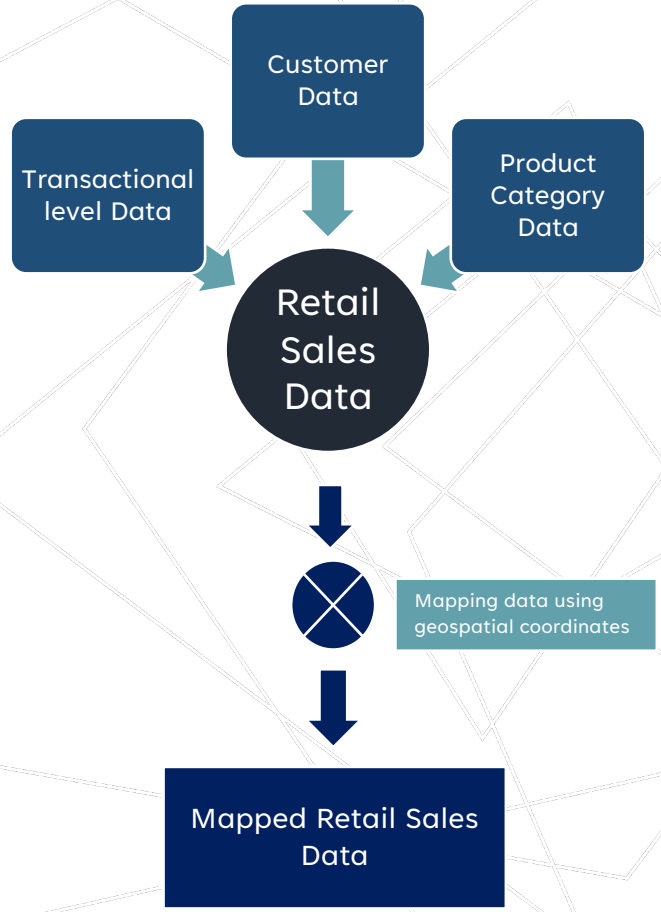
The first step would be to understand the collected data and consolidate it to perform analysis

DATA

Customer Data is concatenated with product category data and transactions data.

‘Customer Id’ is used as the key for customer data whereas a unique attribute called ‘join_key’ was created to merge the rest.

Since latitude and longitude coordinates were missing in the dataset, geojson data of France mapped to the existing dataset.



Identifying Revenue Trends Across France

Task 1: Demographic Analysis

- A Choropleth Map allows us to identify which cities or regions are the most profitable and which are the least profitable, and to compare these regions on a relative basis.
- This information can be used to inform decisions around marketing and distribution strategies, such as where to allocate resources to maximize sales, where to open new stores, and where to focus promotional efforts.
- Additionally, a choropleth map can help to identify patterns and trends in sales data, such as which regions are experiencing growth or decline in sales over time, which can help inform longer-term strategic planning. Overall, a choropleth map can provide a quick and intuitive overview of sales performance across different regions, allowing for more informed and data-driven decision-making.

An intuitive overview of sales performance based on geography

REVENUE GENERATED ACROSS THE CITIES

The regions with the highest revenue in 2014 were Nouvelle-Aquitaine and Grand Est, maintaining a steady increase in comparison to their counterpart regions.

Analyzing Yearly Trends and Seasonality

Task 2: Seasonality Analysis

- Analysing seasonality trends can help businesses understand how customer buying behaviour changes throughout the year. This can help businesses plan their inventory more effectively.
- Seasonality trends can help businesses identify the most popular products in different seasons, which can help them optimize their product offerings and adjust their inventory accordingly.
- By analysing seasonality trends, businesses can forecast sales for the upcoming months or seasons. This can help them plan their production, inventory, and staffing needs more effectively.
- Analysing seasonality trends can help businesses identify the optimal pricing strategies for different products in different seasons. This can help them maximize their profits and remain competitive.

Seasonality Insights

SEASONALITY TRENDS OVER THE MONTHS

Looking at the year 2014, the product category 'Bags' has fluctuated the most hitting an all-time high in the month May and low in the month of October. All categories have achieved similar order values around the month of November suggesting a lot of purchases happened before holiday season.

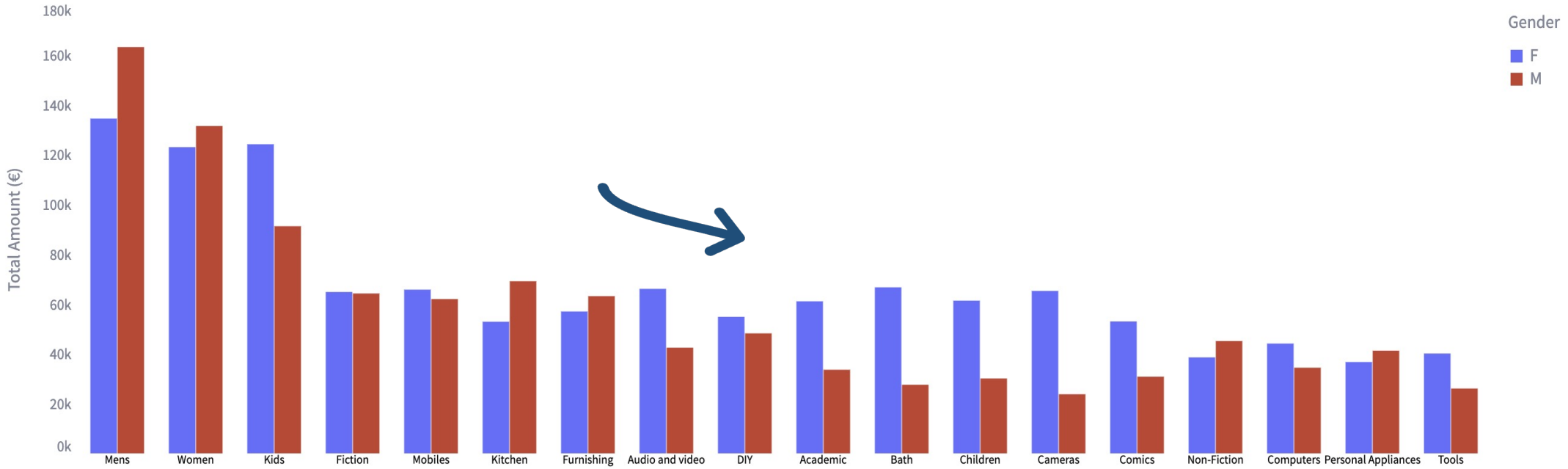
Understanding Customers Across Categories

Task 3: Customer Analysis

- By analysing customer behaviour across product sub-categories, we can gain insights into which products are more popular among our customers. This can help us tailor our marketing efforts and product offerings to better meet customer needs and preferences.
- Identifying cross-selling opportunities across product sub-categories, we can identify which products are often purchased together. This can help us develop targeted cross-selling strategies to increase revenue.
- Inventory Management can be improved by gaining insights into which products are more likely to be purchased at different times of the year. This can help in managing inventory levels better and avoid stockouts or overstocking.
- Customer experiences can be personalised by identifying individual customer preferences and provide personalized recommendations and offers. This can help us improve customer loyalty and increase customer lifetime value.

Diving into Revenues by Categories

CUSTOMER ANALYSIS ACROSS PRODUCT SUB-CATEGORIES



The charts convey how each gender interacts with the product sub-categories. Glancing at it we understand apart from the ‘Men’, ‘Women’, ‘Kids’, performance of most of the sub-categories is below par.

Understanding Quantities Sold Per Categories

Task 4: Category Analysis

•Radar charts are effective for displaying multiple variables simultaneously, making them a useful tool for comparing retail sales data across different categories, genders, and years.

•In this scenario, the chart can be used to show the quantity and transaction amounts for different product categories over the course of several years.

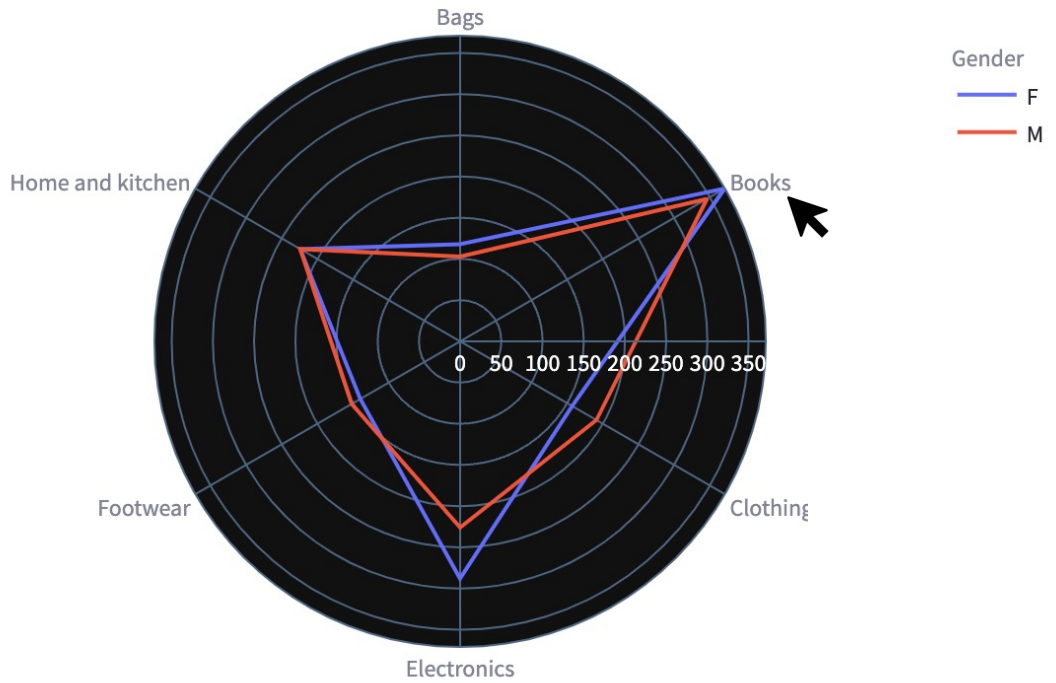
•The radar chart can also be split by gender, making it easier to see how buying habits differ between male and female customers.

•Using a radar chart in this way can help identify trends and patterns in retail sales, making it easier to spot areas of growth or decline across different categories and genders.

•Additionally, because the chart displays multiple variables, it can be a space-saving way to present a lot of information in a single visual.

Diving into Sub-Categories

CUSTOMER ANALYSIS ACROSS PRODUCT SUB-CATEGORIES



We can understand ‘Books’ category has been selling the most quantity in France and both the genders have contributed equally to the number of transactions.

Data driven strategies proposed by the analytics team for capitalizing on the market opportunities

Opposite to the expectation, Corsica has the highest revenue among all regions. Explore the underlying data to identify this deviation in revenue towards Corsica and Brittany.

Among all the categories, Average Order Value looks very similar except Books category. More focus of business in Books category is suggested as it generates better revenue per product sold

Over the years, we see an increasing trend in the overall revenue generated in Women product category while total revenue generated by female is going down. Customer engagement strategies needed to improve revenue generation among female buyers

After the Books category, Electronics generates better revenue, quantity thereby better Average Order Value. Gen Z focused marketing campaigns of electronics products will generate better customer engagement thereby drive-up overall revenue generated

FUTURE WORK

Customer segmentation

Based on demographics, buying behaviour, and purchase history. This can help retailers tailor their marketing efforts and product offerings to specific groups of customers.

Sales forecasting

Use statistical models to forecast future sales based on historical data, seasonality, and other factors. This can help retailers plan inventory and make informed business decisions.

Sentiment analysis

Analyse customer reviews and feedback on social media to gauge customer sentiment towards specific products, brands, and the retail experience overall.

Competitor analysis

Compare sales performance and customer demographics across different retailers to identify strengths, weaknesses, and opportunities for growth.

Price optimization

Analyse sales data and customer behaviour to determine optimal pricing strategies for different products and markets. This can help retailers maximize revenue while remaining competitive.

Impact of external factors

Explore the impact of external factors such as weather, economic conditions, and social trends on sales performance. This can help retailers adjust their strategies and operations to better align with changing market conditions.

CONTRIBUTION

Sanjana GUPTA
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Presentation:
Speaker 1 (00:00 – 02:15)

Data Cleaning

TASK 3:
Customer Analysis across Product sub-categories
- Interactive tooltips (hover)

Arun JEGATHESH
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Presentation:
Speaker 4 (05:53 – 09:50)

Deploying project on the web
- Linking of views bidirectionally on the website
- UI widgets to filter data

Swapnil PADE
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Presentation:
Speaker 3 (04:12 – 05:52)

TASK 2:
Seasonality Analysis
- Interactive tooltips (hover)

TASK 4:
Category Analysis
- Interactive tooltips (hover)

Sarvani SAMBARAJU
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Presentation:
Speaker 4 (02:15 – 05:00)

Merging of datasets and adding features

TASK 1:
Demographic Analysis
- Interactive tooltips (hover)

THANK YOU!