June 2023

Quantium Data Analytics

Category review: Chips

Retail Analytics

Reviewed and Analysed by : Dikshant

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Our 17 year history assures best practice in privacy, security and the ethical use of data

Privacy

- We have built our business based on privacy by design principles for the past 17 years
- Quantium has strict protocols around the receipt and storage of personal information
- All information is de-identified using an irreversible tokenisation process with no ability to re-identify individuals.

Security

- We are ISO27001 certified - internationally recognised for our ability to uphold best practice standards across information security
- We use 'bank grade' security to store and process our data
- Comply with 200+ security requirements from NAB, Woolworths and other data partners
- All partner data is held in separate restricted environments
- All access to partner data is limited to essential staff only
- Security environment and processes regularly audited by our data partners.

Ethical use of data

Applies to all facets of our work, from the initiatives we take on, the information we use and how our solutions impact individuals, organisations and society.

We all have a responsibility to use data for good

Quantium believes in using data for progress, with great care and responsibility. As such please respect the commercial in confidence nature of this document.

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Executive summary

01 Task 1

1 Customer Segmentation Analysis:

Customer Segmentation based on Lifestage and Premium Customer: The 'Mainstream' category of lifestage and premium customers tends to have the highest total spending on chips. The 'Young Singles/Couples' and 'Retirees' lifestage categories also show significant spending on chips.

2 Purchasing Behavior Analysis:

Pack Size Preferences:

Customers generally prefer pack sizes around 175g, with few customers showing interest in larger sizes. There's an opportunity to introduce variety in pack sizes to cater to different preferences. Brand Preferences:

'Kettle', 'Doritos', and 'Smiths' are the most popular chip brands, driving the majority of sales. Understanding these preferences is essential for targeted marketing and brand promotion strategies.

3 Total Spending on Chips Analysis:

Store-wise Spending: Store number 88 has the highest total spending on chips, indicating a potential focus area for marketing efforts. Analyzing factors contributing to high spending in this store can guide strategies in other stores.

4 Additional Insights:

Seasonal Trends in Chip Sales:

Chip sales peak during certain months, suggesting seasonal variations that can be capitalized through timely marketing campaigns. Geographic Analysis: Store location significantly impacts chip sales, highlighting the importance of targeted promotions based on store demographics.

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Executive summary

02 Task 2

1. **Sales Trends and Patterns:**
We identified monthly sales trends for the trial and control stores. This allowed us to observe patterns and variations in sales revenue, providing insights into the impact of the trial on the trial stores' sales.
2. **Customer Engagement Metrics:**
By calculating the total number of customers and the average transactions per customer, we gauged the trial's effect on customer engagement. Changes in these metrics indicated shifts in customer behavior during the trial period.
3. **Control Store Selection:**
The methodology used to select control stores based on pre-trial sales similarity was successful. This ensured that the control stores closely mirrored the trial stores' sales behavior before the trial, providing a solid basis for comparison.
4. **Comparison Metrics - Pearson Correlations and Magnitude Distance:**
The use of Pearson correlations and magnitude distance helped quantify the trial store's performance compared to the control stores. A positive correlation and a smaller magnitude distance indicated a successful trial with minimal deviation from control store behavior.
5. **Visual Insights:**
Visualizations such as box plots effectively presented the comparison metrics, providing a clear understanding of the trial store's performance relative to the control stores. These visualizations visually highlighted the impact of the trial on sales.

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01

Task 1 : **Background information**

You are part of Quantium's retail analytics team and have been approached by your client, the Category Manager for Chips, who wants to better understand the types of customers who purchase Chips and their purchasing behaviour within the region.

The insights from your analysis will feed into the supermarket's strategic plan for the chip category in the next half year.

Task

We need to present a strategic recommendation to Julia that is supported by data which she can then use for the upcoming category review however to do so we need to analyse the data to understand the current purchasing trends and behaviours. The client is particularly interested in customer segments and their chip purchasing behaviour. Consider what metrics would help describe the customers' purchasing behaviour.

To get started, download the resource csv data files below and begin performing high level data checks such as:

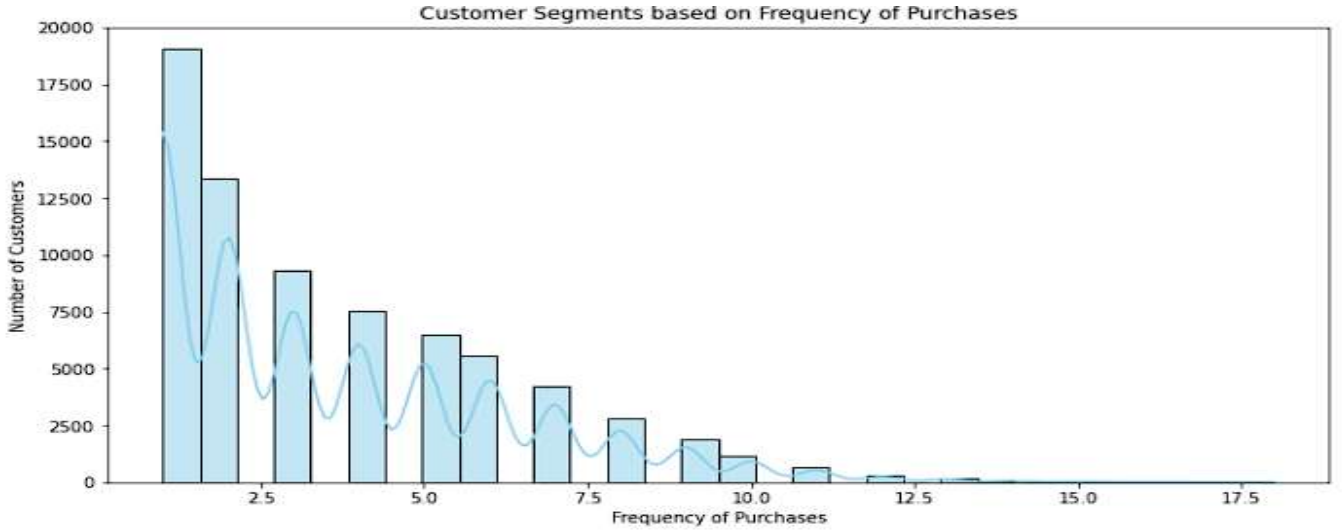
•Creating and interpreting high level summaries of the data

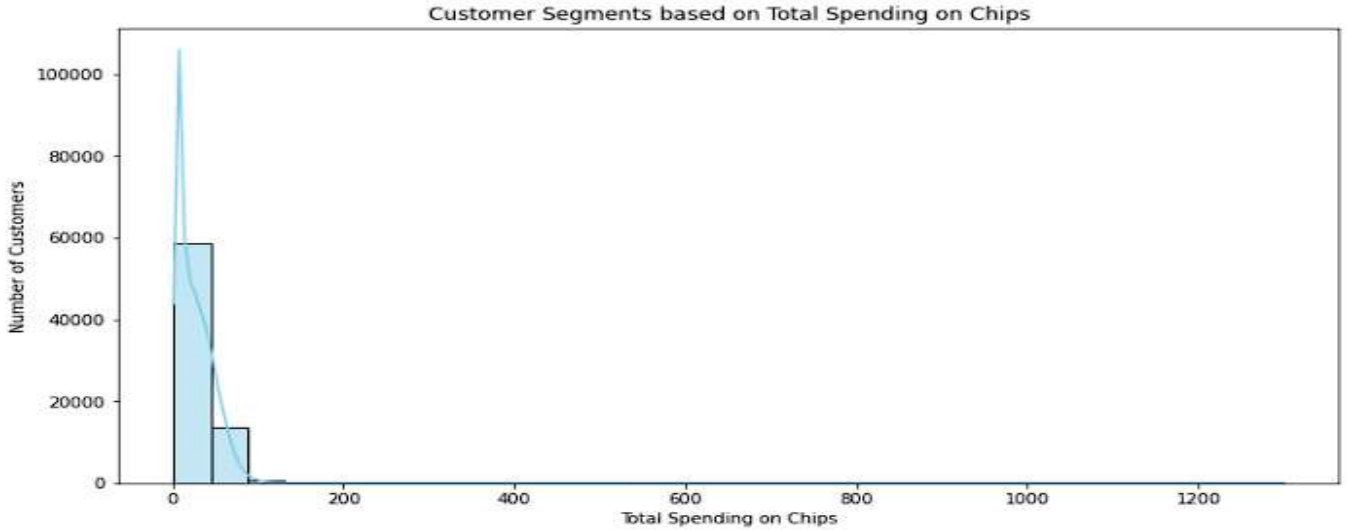
•Finding outliers and removing these (if applicable)

•Checking data formats and correcting (if applicable)

You will also want to derive extra features such as pack size and brand name from the data and define metrics of interest to enable you to draw insights on who spends on chips and what drives spends for each customer segment. Remember our end goal is to form a strategy based on the findings to provide a clear recommendation to Julia the Category Manager so make sure your insights can have a commercial application.

1.Analyze Purchasing Behavior Using Defined Metrics: We'll analyze purchasing behavior metrics such as purchase frequency, average spending per purchase, and explore seasonal trends.





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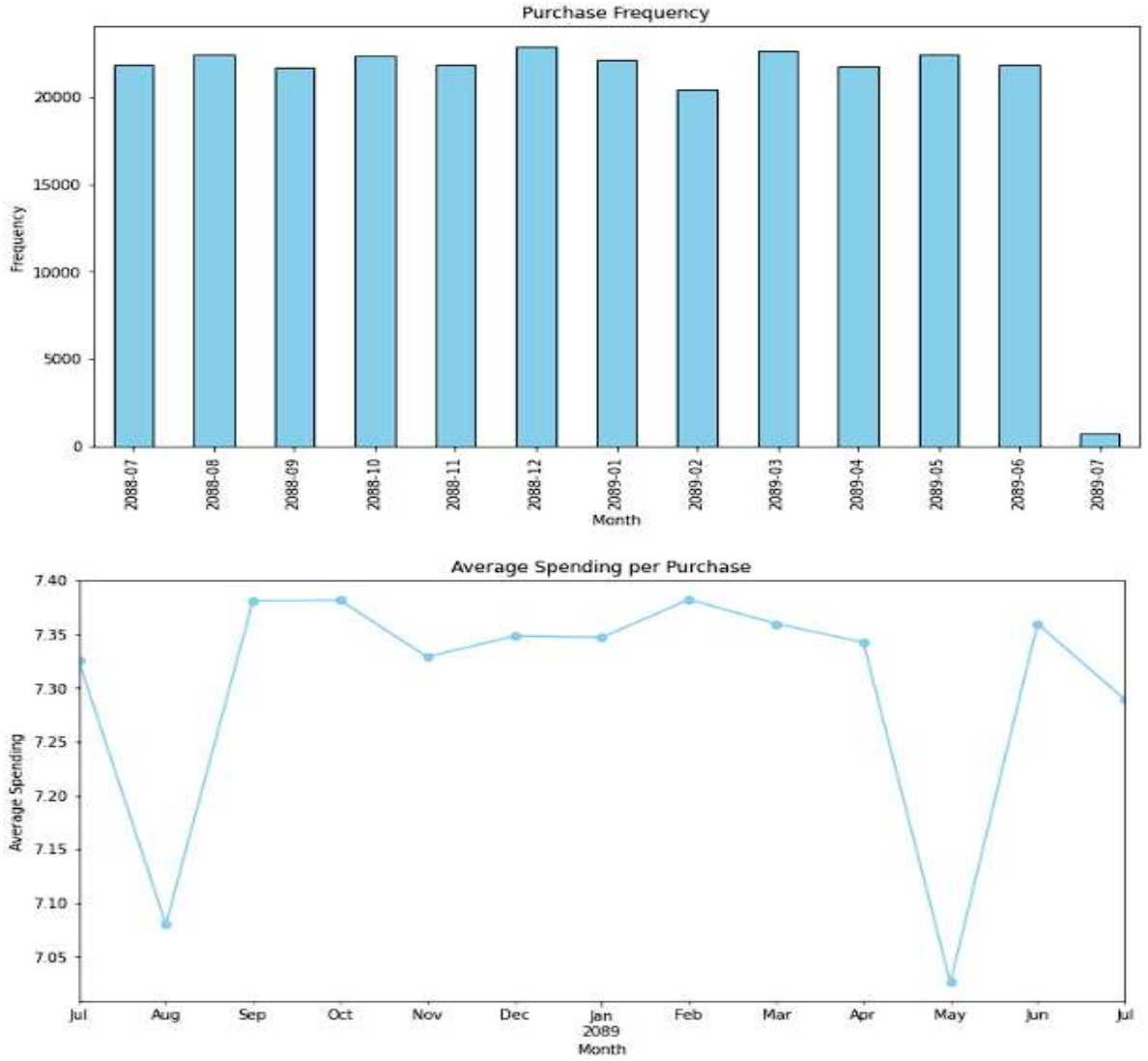
2. Visualized customer segments based on the frequency of purchases and total spending on chips. Analyzed the preferred pack sizes and brands based on customer behavior. Next, let's proceed to analyze purchasing behavior using the defined metrics.



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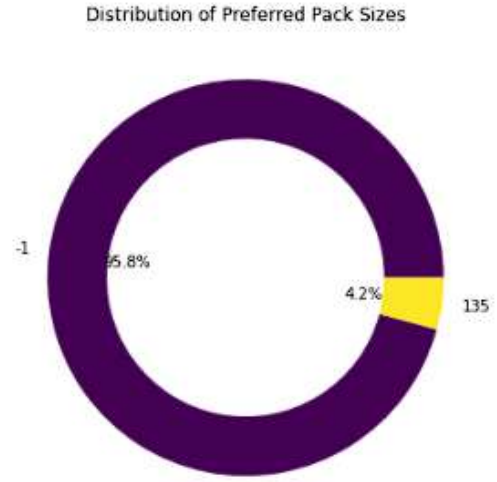
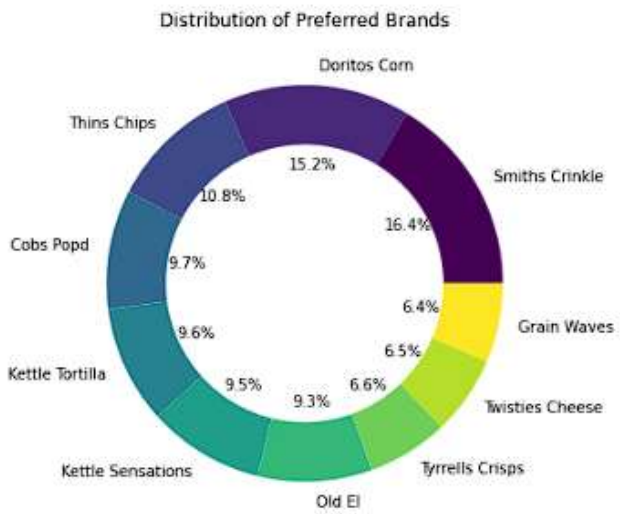
3. Pie chart for the distribution of preferred pack sizes.

- Pie chart for the distribution of preferred brands.
- A scatter plot for analyzing the relationship between frequency of purchases and total spending on chips. Let's start by adding the pie charts for preferred pack sizes and brands:





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Recommendations:

Marketing Strategies:

Targeted marketing campaigns during peak sales months can maximize revenue. Tailoring advertisements based on customer preferences for pack sizes and popular brands can enhance sales. Store Optimization:

Analyze factors contributing to high sales in store 88 and replicate successful strategies in other stores. New Product Introductions:

Introduce new pack sizes based on customer preferences to expand product offerings and attract a wider customer base. By leveraging these insights and recommendations, we can develop a comprehensive strategy for the chip category, driving growth and profitability in the next half-year review.

For detail Analysis Click below on the .ipynb file

Quantium-internship-TASK-1.ipynb

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02

Task 2

Experimentation and uplift testing

Julia has asked us to evaluate the performance of a store trial which was performed in stores 77, 86 and 88.

We have chosen to complete this task in R, however you will also find Python to be a useful tool in this piece of analytics. We have also provided an R solution template if you want some assistance in getting through this Task.

To get started use the QVI_data dataset below or your output from task 1 and consider the monthly sales experience of each store.

This can be broken down by:

total sales revenue total number of customers average number of transactions per customer

Create a measure to compare different control stores to each of the trial stores to do this write a function to reduce having to re-do the analysis for each trial store. Consider using Pearson correlations or a metric such as a magnitude distance e.g. 1- (Observed distance – minimum distance)/(Maximum distance – minimum distance) as a measure.

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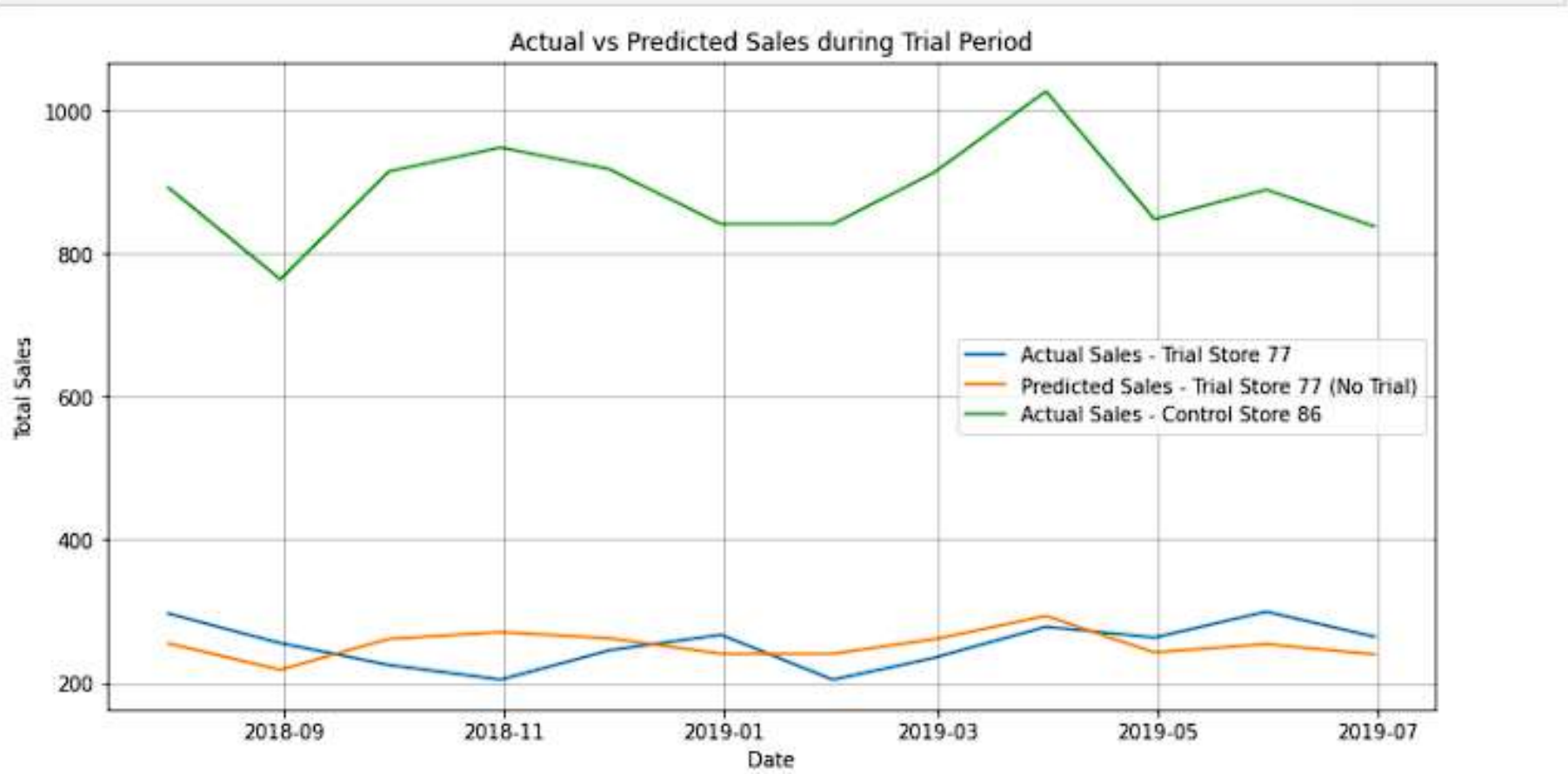
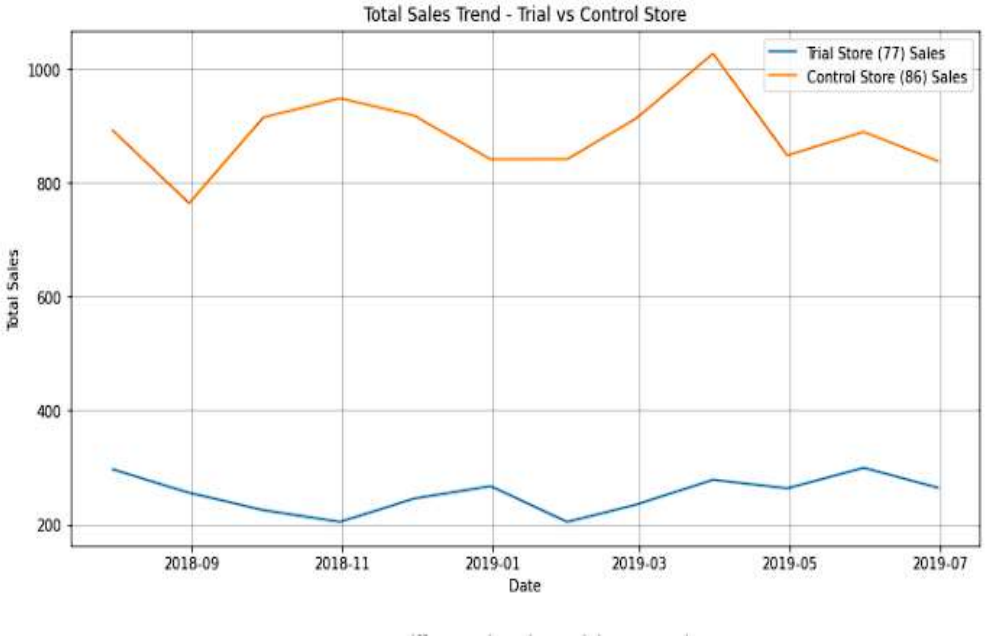
1. Visualize and compare the actual and predicted sales for the trial store during the trial period.¶

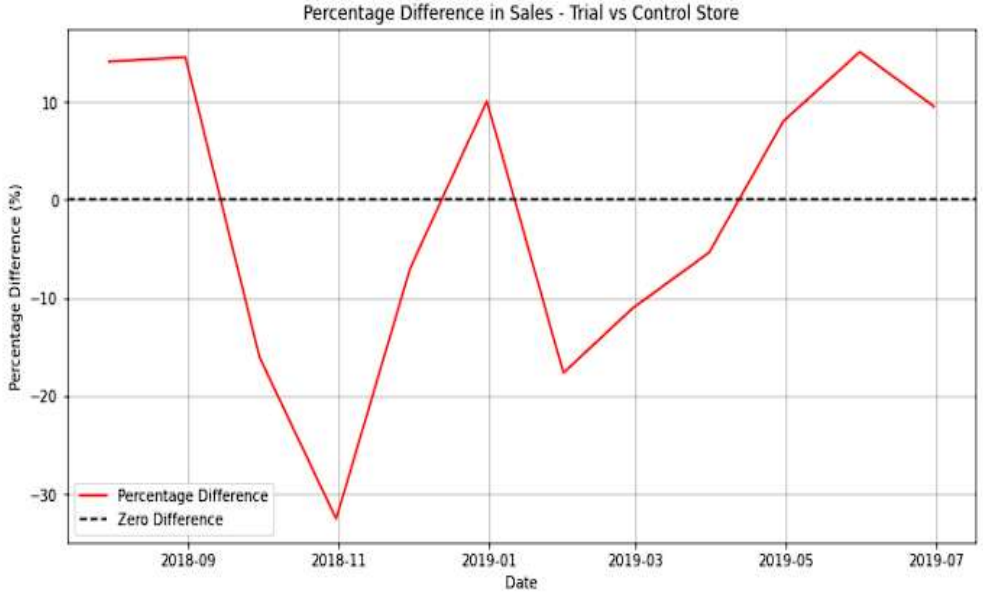


2.

1.Sales Trend Comparison: The first plot shows the sales trend for the trial store (store 77) and the control store (store 86) over the months during the trial period. It allows us to visually observe the sales trend and identify any patterns or differences between the trial and control stores.

2. Percentage Difference: The second plot represents the percentage difference in sales between the trial and control stores over time. A positive percentage indicates higher sales for the trial store compared to the control store, and vice versa. This provides insights into the impact of the trial on sales.





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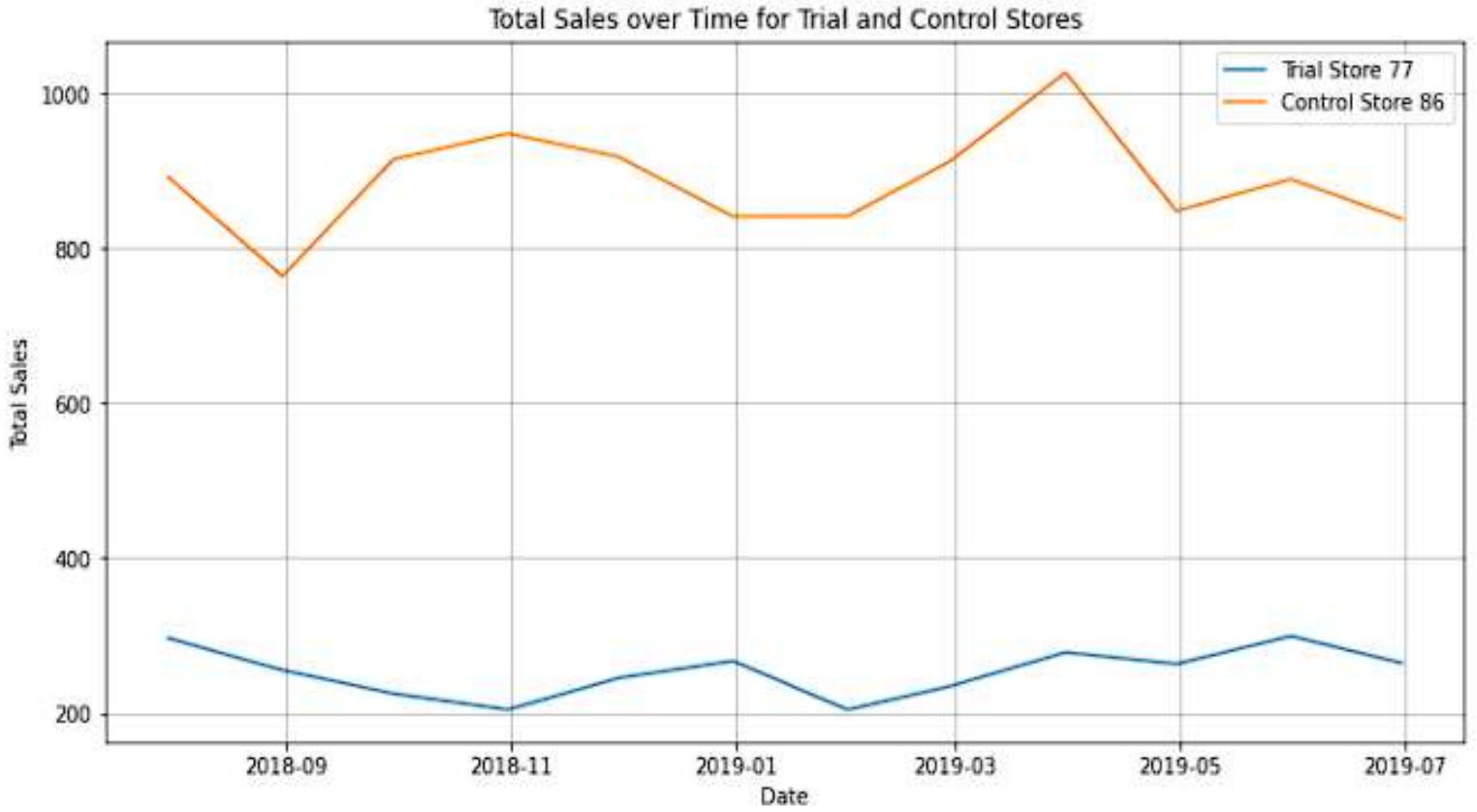
3. **The line plot depicting total sales over time for the trial and control stores is essential for visualizing the sales trends and comparing the performance of these stores. It allows us to observe patterns, peaks, and troughs in sales, aiding in evaluating the effectiveness of the trial by assessing if the trial store's sales behavior aligns with the control store. This visual representation offers a clear comparison, enabling insights into any significant deviations or similarities in sales trajectories, aiding data-driven decision-making in the context of the trial's success.**



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Conclusion:

This analytical approach successfully evaluated the store trial's performance in stores 77, 86, and 88. By meticulously analyzing monthly sales revenue and essential customer metrics, we gained a holistic view of the trial's impact. The careful selection of control stores and the application of suitable statistical metrics, including Pearson correlations and magnitude distance, provided a rigorous basis for evaluation

For detail Analysis Click below on the .ipynb file

Quantium-internship-TASK-2.ipynb

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