Project: Analyzing a Market Test

Complete each section. When you are ready, save your file as a PDF document and submit it here.

Step 1: Plan Your Analysis

To perform the correct analysis, you will need to prepare a data set. (500 word limit)
Answer the following questions to help you plan out your analysis:

1. What is the performance metric you'll use to evaluate the results of your test?

   The result of the test will be evaluated by a gross margin as the performance metric. As well as, the predicted impact on profitability should be at least an 18% increase in profit compared to the comparative period while compared to the control stores. To justify the increased marketing budget.

2. What is the test period?

   The period of test was the 12 weeks (2016-April-29 to 2016-July-21) where five stores in each of the test markets offered the updated menu along with television advertising.

3. At what level (day, week, month, etc.) should the data be aggregated?

   The week level is an appropriate aggregating level to the data.

Step 2: Clean Up Your Data

In this step, you should prepare the data for steps 3 and 4. You should aggregate the transaction data to the appropriate level and filter on the appropriate data ranges. You can assume that there is no missing, incomplete, duplicate, or dirty data. You're ready to move on to the next step when you have weekly transaction data for all stores.

In order to provide the cleaned and organized data, we did the following steps:

1. Use the select tool to change the type of Invoice date to date type, gross margin, and sales to fixed decimal in Round roasters transactions dataset. Also, Sq_ft and AvgMonthSales to int64 in Round roasters stores dataset.

2. Join previous datasets by StoreID field and choose the appropriate fields that are StoreID, Invoice Date, Invoice Number, Gross margin, sales, Sq_ft, AvgMonthSales, and region. Also, filter the invoices that are not between 2015-02-06 and 2016-07-21.

3. Define and add the **week** field by the following formula *" FLOOR(DateTimeDiff([Invoice Date],'2015-02-06','days')/7+1) ",* as well **week_start** is " DateTimeAdd('2015-02-06',7*([Week]-1),'days') " and **week_end** is DateTimeAdd([Week_Start],6,'days').

4. Summarize the store which has 76 weeks counted and grouped by StoreID and counts distinct of the week and joined with a previously joined dataset, then summarized by

grouping selected fields and the summation of gross margin and sales (GM&S).

5. Create weekly_store_tradffic dataset by summarization of StoreID, week, week_start, with a count of the invoice number. Also, Store_Sales_Analysis by previous summarization with the region, StoreID, AvgMonthSales, and summation of GM&S.

6. Join the summarization of grouping by region and storeID fields with treatment-stores dataset after adding test_group field with 'treatment' value as a treatment to that dataset. After that, we have added test_group to the left join side with 'CC' value as a control unit.

7. Create Store_list dataset by concatenating the left join with joined side.

The following figure represent the steps.

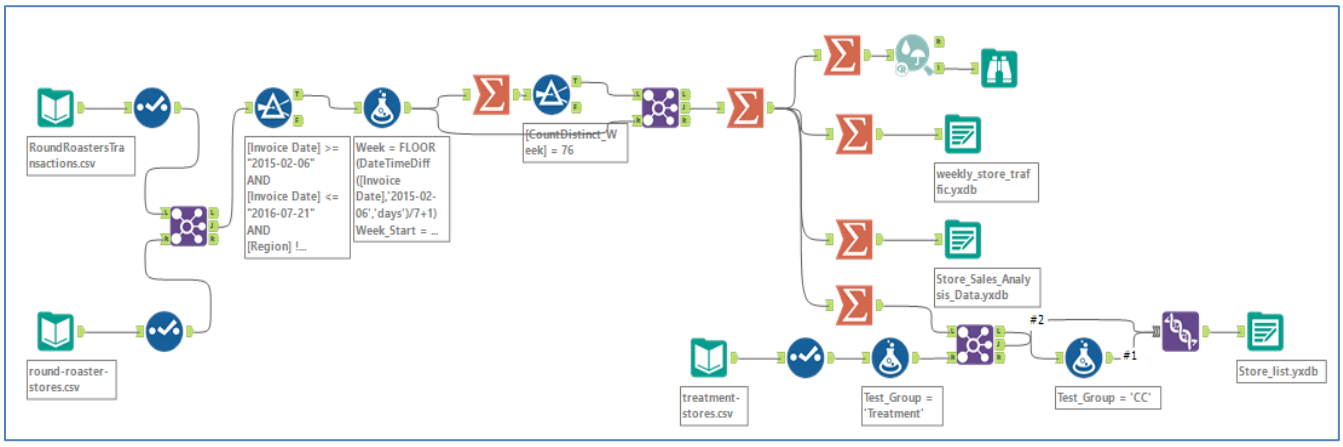

Figure 1: Workflow of Step 2 Clean up data

Step 3: Match Treatment and Control Units

In this step, you should create the trend and seasonality variables, and use them along with you other control variable(s) to match two control units to each treatment unit. Note: Calculate the number of transactions per store per week to calculate trend and seasonality.

Apart from trend and seasonality...

1. What control variables should be considered? Note: Only consider variables in the RoundRoastersStore file.

   The control variables should be considered are Sq_ft and AvgMonthSales.

2. What is the correlation between your each potential control variable and your performance metric?

Figure 2: Correlation matrix of control variables

According to Figure 2, The AvgMonthSales has a strong positive (dark red) correlation with the Gross margin which is 0.79. On the other hand, the Sq_Ft has a weak correlation (light sliver) with a Gross margin which is -0.02.

3. What control variables will you use to match treatment and control stores?

   The used control variables are trend, seasonality and AvgMonthSales.

4. Please fill out the table below with your treatment and control stores pairs:

Treatment Store	Control Store 1	Control Store 2
1664	7162	8112
1675	1580	1807
1696	1964	1863
1700	2014	1630
1712	8162	7434
2288	9081	2568
2293	12219	9524
2301	3102	9238
2322	2409	3235
2341	12536	2383

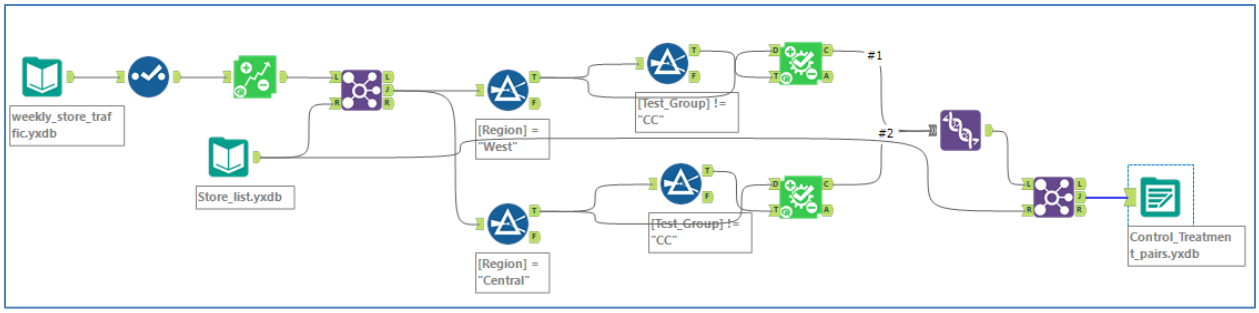

Figure 3: Workflow of Step 3 Match Treatment and Control Units

Step 4: Analysis and Writeup

Conduct your A/B analysis and create a short report outlining your results and recommendations. (250 words limit)

Answer these questions. Be sure to include visualizations from your analysis:

1. What is your recommendation - Should the company roll out the updated menu to all stores?

   According to the result of A/B analysis, the company should roll out the updated menu to all stores. Since the profit growth exceeds 18% compared to the comparative period which achieved the increased marketing budget.

2. What is the lift from the new menu for West and Central regions (include statistical significance)?

   The Central region:

Figure 4: AB Test Analysis for Gross Margin Central Region

As Figure 4 shown the rolling out the new menu result in the central region, it has 43.5% improvement at a significance of 99.5% over the existing menu. On the other hand, the average lift as a result of rolling out the new menu would be 43.5% per store per week or approximately $835 per store per week. It seems a good change.

The West region:

Figure 5: AB Test Analysis for Gross Margin West Region

In Figure 5, the rolling out of the new menu result in the west region has been represented, it has 37.9% improvement at a significance of 99.5% over the existing menu. Moreover,

the average lift as a result of rolling out the new menu would be 37.9% per store per week or approximately $526 per store per week. As well as, it looks like a good change.

3. What is the lift from the new menu overall?

Figure 6: AB Test Analysis for Gross Margin Overall

According to Figure 6, The result of rolling out of the new menu has 40.7% improvement at a significance of 100% over the existing menu overall. On the other hand, the average lift as a result of rolling out the new menu would be 40.7% per store per week or approximately $681 per store per week. Rolling out the new menu would improve gross margin; therefore, the change should be applied across all stores.

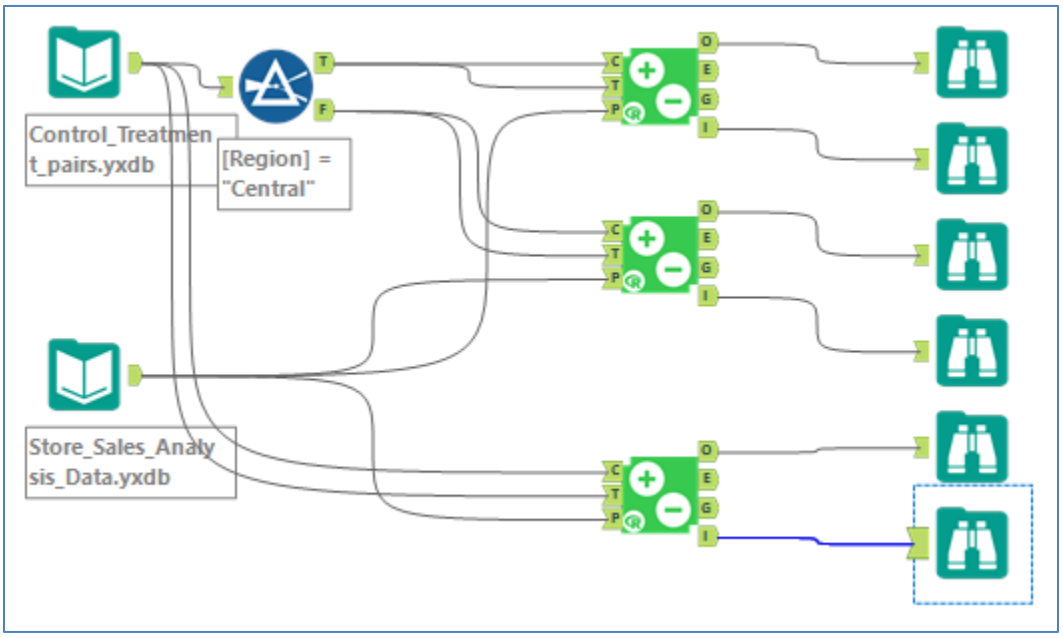

Figure 7: Workflow of Step 4 Analysis and Writeup

Before you Submit

Please check your answers against the requirements of the project dictated by the rubric here. Reviewers will use this rubric to grade your project.