Project: A/B Test a New Menu Launch

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Project Overview

Your client is a coffee restaurant in the United States of America, Round Roasters. The executive team conducted a market test with a new menu and needs to figure whether the new menu can drive enough sales to offset the cost of marketing the new menu. The client has requested analysis of the A/B test and a recommendation to whether the Round Roasters chain should launch this new menu.

Business Problem

Round Roasters is an upscale coffee chain with locations in the western United States of America. The past few years have resulted in stagnant growth at the coffee chain, and a new management team was put in place to reignite growth at their stores.

The first major growth initiative is to introduce gourmet sandwiches to the menu, along with limited wine offerings. The new management team believes that a television advertising campaign is crucial to drive people into the stores with these new offerings.

However, the television campaign will require a significant boost in the company's marketing budget, with an unknown return on investment (**ROI**). Additionally, there is concern that current customers will not buy into the new menu offerings.

To minimize risk, the management team decides to test the changes in two cities with new television advertising. Denver and Chicago cities were chosen to participate in this test because the stores in these two cities (or markets) perform similarly to all stores across the entire chain of stores; performance in these two markets would be a good proxy to predict how well the updated menu performs.

The test ran for a period of 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.

The comparative period is the test period, but for last year (2015-April-29 to 2015-July-21).

The client has requested the results of the experiment be analyzed to determine whether the menu changes should be applied to all stores. The predicted impact to profitability should be enough to justify the increased marketing budget: at least 18% increase in profit growth compared to the comparative period while compared to the control stores; otherwise known as *incremental lift*. In the data, profit is represented in the *gross_margin* variable.

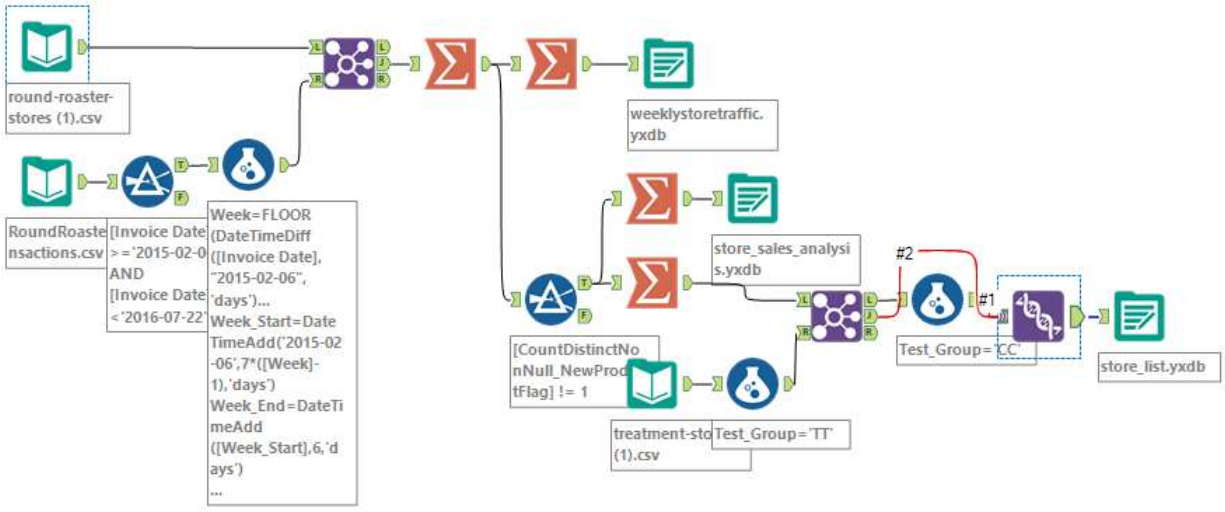
Requirements gathering provided three data files for analysis:

- Transaction data for all stores from 2015-January-21 to 2016-August-18
- A listing of all Round Roasters stores
- A listing of the 10 stores (5 in each market) that were used as test markets.

Step 1: Plan Your Analysis

1. What is the performance metric you'll use to evaluate the results of your test?
    - The performance metric used to evaluate the results of the test is the overall amount of sum of gross margin (profit growth). If the overall gross margin (profit growth) is at least 18%.
2. What is the test period?
    - The test period will be from April 29, 2016 – July 21, 2016. Total test period = 12 weeks.
3. At what level (day, week, month, etc.) should the data be aggregated?
    - The data will be aggregated to a weekly level.

Step 2: Clean Up Your Data



The data was cleaned by:

1. Identifying the number of weeks needed for the analysis. 76 weeks of data total is needed (February 6, 2015 – July 21, 2016). 52 weeks of data + 12 weeks needed to test for seasonality + 12 weeks for the test period.
2. 4 new fields were created to calculate the weekly store traffic and sales (week, week_start, week_end, newproductflag).
3. The round roaster stores file was merged with the round roaster transactions file to create the weekly store traffic data.
4. The treatment stores file was merged with the weekly store traffic data to create the store sales analysis and store list.

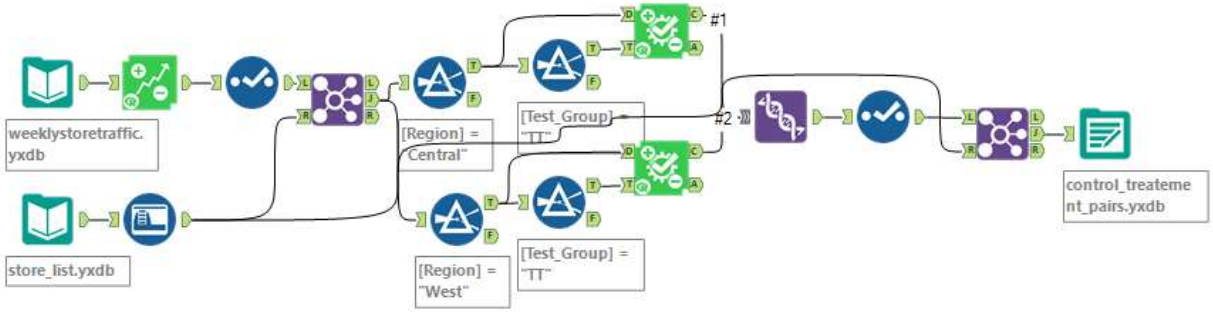
Step 3: Match Treatment and Control Units

Apart from trend and seasonality...

1. What control variables should be considered? Note: Only consider variables in the RoundRoastersStore file.
    - The control variables that will be considered are Average Monthly Sales & Sq Ft.
2. What is the correlation between your each potential control variable and your performance metric?

Record #	FieldName	Sum_Sum_Gross Margin	Sq_Ft	AvgMonthSales
1	Sum_Sum_Gross Margin	1	-0.061913	0.787444
2	Sq_Ft	-0.061913	1	-0.09899
3	AvgMonthSales	0.787444	-0.09899	1

    - The Pearson Correlation Analysis confirms that the Average Monthly Sales correlation to the performance metric (Gross Margin) has a correlation of 0.787.
3. What control variables will you use to match treatment and control stores?
    - The control variables that will be used to match treatment and control stores are Average Monthly Sales, Trend, and Seasonality.



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

Step 4: Analysis and Writeup

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

- With the information collected from the AB Test Analysis for both the Central & West regions, YES, the recommendation is that the company should roll out the updated menu to all of it's stores.

2. What is the lift from the new menu for West and Central regions (include statistical significance)?
    - The lift from the new menu for the West Region is 37.9% with a statistical significance of 99.5%
    - The lift from the new menu for the Central Region is 43.5% with a statistical significance of 99.6%
3. What is the lift from the new menu overall?
    - The lift from the new menu overall is 40.7% with a statistical significance of 100%.

CENTRAL REGION AB TEST ANALYSIS RESULTS

WEST REGION AB TEST ANALYSIS RESULTS

OVERALL AB TEST ANALYSIS RESULTS


40.7
681.2
100
Time Comparison Plot
Comparison
Test
140
105.25
64.5
23.75
-17
2015-06
2015-07
2016-06
2016-07