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Amazon Sales Analysis

Matthew has a small business where he sells new and used products through Amazon.com. We wanted to explore historical data on his sales. The ultimate goal was to use more sophisticated tools and analyses to gain better insights into sales prices, ad spend, click-through rates, seasonality, etc.

Three datasets were used in our analyses: transactional sales, advertising, and cost of goods sold data. Some data limitations involved the number of days of historical data (70 days) due to file change. Also, we did not have available other insightful data, including: # of reviews and review scores; similar competitor prices; sales rankings; sales data results from others; and keyword rankings, for example.

Hypothesis #1: Does advertising in this dataset always increase sales? Hypothesis: No.

* There is a positive correlation between ad spend and units sold, revenue and profit.
* This suggests higher ad spend correlates with higher sales.
* May be worth exploring ad spend higher and lower than this dataset.
* Hypothesis was not supported by this dataset.
* Products may need to be evaluated on an individual basis.

Hypothesis #2: Does lowering price in this dataset always increase revenue? Hypothesis: No

* Two products were analyzed.
* Price Optimization
* There is a correlation between price and revenue.
* Low price and high price yields lower revenue.
* Data suggests there is an optimal price range.
  + Many small business aren’t doing these tests and could be losing $$$.
* Hypothesis was supported.

Hypothesis #3: Do products used during summer sell better during warmer months? Hypothesis: Yes

* Copper Hummingbird Feeder Ant Guard by Tip-Top Garden Supply, we analyzed.
* The sales were boosted during the summer months, from June to August.
* The ramp-up started in the spring.
* There is a positive correlation between ‘summer items’ and the associated months.
* The hypothesis is correct.

Hypothesis: #4: Does click-through rate positively correlate with ad spend? Hypothesis: Yes

* Ad Spend is the $ spent per product per day.
* There is a lower click-through rate associated with higher spend.
* There is a lower click-through rate associated with higher spend.
* However, earlier we saw that higher ad spend does correlates with higher sales in this dataset. Conversion rate?
* The hypothesis was not correct, in this dataset.

Important takeaways from our project include the fact that data has multiple variable interactions, or interplay between those variables. A more detailed analysis would have included multivariate analyses using more advanced statistical techniques. Our analysis was simplified mainly due to time constraints. In addition, correlation is complex, and it does not necessarily prove causation. We also learned that it is important to use flexible code and not to hardcode values. We often had to go back to our starting point to change code, when we ran into coding and syntax errors. We also learned to wrap each step into a function which allows for easy reuse of variables.

If we were to continue this analysis, we would explore the option of adding other data sets, especially data that one may not think would affect the data that we analyzed here to see if there were any trends. We would also look into automating the reporting through the Amazon API. We briefly looked into the API option but determined it was going to be too complex to pursue during the time allotted. Also, automating adjustments on prices and advertising changes. We could also use additional coding languages or reporting tools to further gain insights.