

## BUS501: AI in Digital Marketing

### Topic 1: Attribution modeling

**Question 1.** You are a data scientist at a marketing agency. Your client, a fast-growing e-commerce, hired your company for optimal allocation of marketing budget (for dramatic cost-saving, more precisely), so that they can double up the sales within a quarter, but the only data you got is attached *data.json*. Since it only has a flow data for touchpoints, you ask the client if past budget allocation data is available. The client team says it is highly confidential, and the client also boldly claims that a high-paid data scientist must pull a rabbit out of a hat. Your boss tells you that it is usual and a data scientist at a marketing agency (sell-side) must do the job for the client (buy-side) in such a tough circumstance.

Given that the unknown information, marketing cost for each channel, can be added to the model in any time, you jump onto attribution modeling for the client's marketing channels.

- 1 Give an illustration that LTA (Last Touch Attribution) is likely worse model than MTA (Multi-Touch Attribution)
- 2 By the simple illustration, the client as well as your own boss are not convinced that your MTA model is necessary for this data analysis. To be more persuasive, you give an imaginary budget assignment for marketing channels and re-distribute the budget by the importance measured by your MTA model. Since you do not have the cost data for each marketing channel, you are given to present at least 3 different scenarios.
- 3 Now that your boss understands your MTA model's value, but the client still thinks your scientific approach is just imagination. She is not so much interested in optimal budget allocation and cost saving, as for the more conversion, thus more revenue with the same budget. Given above scenarios, assuming conversion ratio from the previous marketing channels are constant and goods for conversion are also unchanged, present at least a scenario with more conversion in graph comparison.
- 4 Instead of budget assignment for each marketing channel, the client is now willing to share detailed information of conversion. It turned out that each conversion is a product number, and prices for conversion from 1 to 11 are CHF 50 to CHF 100 with CHF 5 in steps. How does this fact affect your analysis above? Can you still argue your 3 scenarios perform better than LTA cases? What are the conditions for MTA being dominant modeling strategy against LTA, in your data set?
- 5 Since you feel the job is unfinished, due to missing budget data for marketing channels, you've checked average price for influencers, youtubers, TV show, Email and etc. But the only viable piece of information are that Newspapers are 10 times more expensive than AdWordsKeyword channels, influencers and youtubers are 1/2 of Newspaper, and TV shows and PPL are 2 times more expensive than Newspaper. Assuming all other channels' price the same as Newspaper, how does this fact affect your analysis above?
- 6 Among channels without pricing information, your SIAI friend at a Retargeting service shared some information about the market average ad cost for e-commerce, which turns out 3 times more expensive than Newspaper. Does this single change affect your results? If so, in what way? What are the conditions?
- 7 Now that your client's Product 10 and 11 are priced double. How does this affect your conclusion?
- 8 Your client also tells you that the reason for doubling price is because of increasing refund for the two items. It used to be  $10 \pm 1\%$  for all products, but Product 10 and 11 experiences upto 40% refund. Although you wonder if there is any cause for the sudden increase, you are given to find out if you have to change the MTA model.

9 For the past a month, the client's sales increased distinctively and you earned some credit. Now with more budget, the client wants to replace some influencers and youtubers with fresh blood, because she believes they are the cause of higher refund. In your model scenarios, can you prove or disprove that?

10 What other channels do you want to fire? How would you re-allocate the budget?

Bonus After all the analysis above, if you have to do 1) and 2) again, would you change your presentation? If so, how would you do so?

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