



Targeted Campaign by Uplift Model



Introduction

In today's age of consumerism, marketing plays an important role of creating awareness, driving consumer engagement and growing businesses. Leveraging the right targeting techniques has become the most crucial factor for building and sustaining sales. From a retailer's perspective, one of the key challenges is to identify market segments that hold potential customers for their products.

Consider this: Over the past decade, retailers have increased their marketing expenditure by more than 15 percent. However, this has not translated into proportional increase in business in terms of new customer acquisition or sales. For example, Mc Donald's – one of world's leading food service retailers – has increased their marketing expense by more than 15 percent in the last six years; however, the overall revenue grew merely by about 12 percent. One of the key reasons for this is that marketing campaigns are not targeted to the right set of audience, taking into account their buying behavior – which in turn leads to lower than expected response rates.

An efficient audience targeting will enable retailers to identify various segments with their influential decision parameters and design the right strategy to maximize response rate for a given a campaign budget. But how do we analyze millions of behaviors and their billions of transactions distributed across multiple channels, to figure out the audience base who are most likely to respond to a campaign? This is the biggest task when it comes to targeted marketing.

An advance in computing has swept away media distribution barriers, releasing a Pandora's box of new content. The resulting fragmentation has shattered the notion of the mass-media consumer, forcing marketers to use hard quantitative data and analytical techniques to find and reach their audience.

Targeted Campaign by Uplift Model

The benefits of targeted marketing are two-fold: one, the total cost of marketing and acquisition decreases, and two, a well targeted campaign increases the likelihood amongst target audience to respond. This leads to enhanced response rates and Return on Marketing Investment (ROMI).

To effectively target the right set of audience, it is imperative to know the different segments. Broadly, on the basis of campaign response behavior, target audience can be segmented into four exclusive segments:

- Responded because of an action
- Responded regardless of an action
- Did not respond and no impact
- Did not respond because of negative impact

Analytically, there are different techniques available to target customers in a campaign scenario, but the Uplift Model is one of the most efficient and graceful ways to target customers by addressing the needs of different segments.

In a nutshell, Uplift Model consists of following:

Response model – developed independently for test and control group

Population is scored with both the models

Customer level difference of score – calculated between two models

Rank order customers on difference score – used to select top deciles for model performance and subsequent targeting

Uplift Model approach:

Following Uplift Modelling may be a more suitable approach for campaign design. The base population (includes all four segments of customers) is divided into two groups: **Test** (who are administered the targeted campaign) and **Control** (who are not).

1. The propensity of each customer is calculated using the algorithm below, separately for test and control

$$P_i = \frac{EXP(\alpha + \beta'X_i + \gamma T_i + \delta'X_i T_i)}{1 + EXP(\alpha + \beta'X_i + \gamma T_i + \delta'X_i T_i)}$$

Where

- Pi is the propensity of a customer to respond to a campaign
 - Xi and Ti are explanatory variables
 - Xi*Ti captures the interaction between the variables – this elevates the accuracy of the model to capture a higher uplift over other models available
 - Xi = explanatory variables for X or up-sell at the level of a customer
 - Ti = 1, if 'i' is in the Test group
= 0, if 'i' is in the Control group
2. Linear regression is used using the same set of variables to predict expected revenue/profit (separately for test and control)

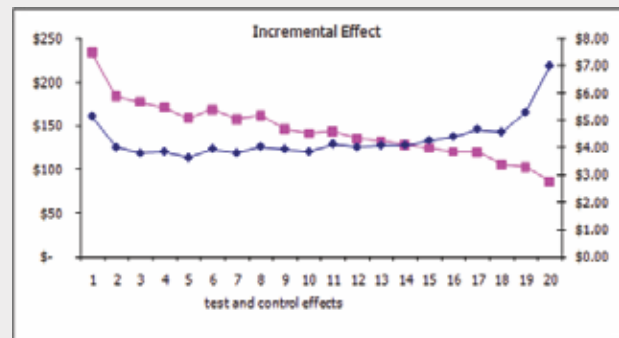
$$Y_i = \alpha + \beta'X_i + \gamma T_i + \delta'X_i T_i$$

3. The incremental revenue/profit (difference between test and control) is calculated as -

$$= \left[\frac{EXP(\alpha + \gamma + \beta'X_i + \delta'X_i)}{1 + EXP(\alpha + \gamma + \beta'X_i + \delta'X_i)} \right] * [\alpha + \gamma + \beta'X_i + \delta'X_i] - \left[\frac{EXP(\alpha + \beta'X_i)}{1 + EXP(\alpha + \beta'X_i)} \right] * [\alpha + \beta'X_i]$$

4. **Selection:** Customers are rank-ordered on incremental revenue/profit and top demi-deciles are selected for model performance and subsequent targeting

The incremental effect of the campaign is calculated for each demi-decile (in intervals of 5% of customers each) and an illustrative schematic is demonstrated below.



- It is quite visible from the above chart that the top demi-deciles (decile number 1-4) captures higher incremental profitability/revenues for the Test group. The targeting should ideally be done for the target group where the incremental profitability is positive.
- The ROI is calculated for each demi-decile and a business decision can be taken to send out targeted campaigns above a threshold value of the incremental ROI. The frequency or duration of the campaigns could be altered for customer segments with positive incremental ROI.
- Most response rate modeling frameworks in the market do not capture these finer differentiations in the group anyways buying and group needs reminder to buy. Executing appropriate targeted campaigns customized to this split can lift response rates by 8 to 10 times over targeted campaigns that do not address this split appropriately.

Benefit of the model:

A normal targeting on buyer propensity usually targets the top decile and measures the performance with test control scenario. Following scenario explains the incremental benefits of the current technique.

Let us assume the following three scenarios:

- A person gets an e-mail and spend (+ve effect)
- A person came, irrespective of an e-mail (Null effect)
- Person did not come, in spite of an e-mail (-ve effect)

Uplift Model can identify all these similar profitable, non-profitable and neutral segments within the customer base, which normal targeting model will fail to distinguish effectively. Uplift Model-based targeting framework is a powerful tool that enables retailers to identify profitable target segments for customer-centric activities, integrating and analyzing various customer data to realize better return on investment for marketing expenditure.

Targeting strategy

Following are the guidelines that can be useful to capture some of the business applicability for response and Uplift Modeling:

Business situation	Response
Response modeling for direct marketing	Don't contact customers who will not respond
Uplift response modeling	Don't contact people who will anyway respond
Targeted retention with churn modeling	Channelize the retention offer based on customer profile
Churn Uplift Modeling	Don't contact customers who would leave on contacting

To summarize the benefit estimation framework for Uplift Model-based targeting in simple 4-5 steps.

Start with dividing the base population in two sets of data – Test and Control – with their buyers in the campaign advertised division.

Step 1

Build a propensity model for Test and Control, separately

Step 2

Build a sales/margin model for Test and Control, separately

Step 3

Score the population based on these four models

Step 4

Define incremental benefit as: $(\text{Test Propensity model Probability} * \text{Test Sales Model Expected}) - (\text{Control Propensity model Probability} * \text{Control Sales Model Expected})$

Based on the magnitude of this value, we can decile the people and see the incremental effect.

About the author

Dipojjwal Ghosh is currently a Principal Consultant at Wipro Technologies, India. Presently, he is involved in the development of analytical apps for consumer and utilities domains on Wipro's Data Discovery Platform. Data Discovery Platform is Wipro's proprietary Insights-as-a-Service offering which accompanied with its industry-specific apps, empowers customers with relevant insights to make faster, better decisions. Dipojjwal received his M.Tech in Quality, Reliability and Operations Research, from Indian Statistical Institute, Kolkata. He has around 10 years of research and analytical experience in manufacturing and retail domains. He also has experience in developing statistical and operations research models in Customer, Demand Sensing Inventory and Merchandising Analytics.



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