

Case Study: Optimizing Promotional Strategy with Rapid Recursive[®]

The Data

The KDD Cup 1998 dataset^a is a portion of a donor database belonging to a charitable fundraising organization which at one time ran one of the largest direct mail order operations in the United States. At the time the dataset was collected, the organization's overall database contained roughly 13 million records of donors and potential donors. The dataset used in this particular case study contains 400 demographic and behavioral variables on nearly 190,000 of the 13 million people. Every individual included in this dataset had made at least one donation prior to this set of mailings. Importantly, the data contain the response histories of each individual donor to each specific campaign recorded over a 24-month time period.

a. This dataset is available through the Donald Bren School of Information and Computer Science at UC Irvine, <https://kdd.ics.uci.edu/databases/kddcup98/kddcup998.html>

This case study demonstrates the capabilities of Supported Intelligence's Rapid Recursive[®] solutions to increase profits by improving customer targeting. In this case study, we apply our solutions to a large, publicly available dataset of donors to a well-recognized charitable organization.

This organization had access to traditional analytics such as the "customer lifetime value" metric, which is based on expected revenue and promotional costs assuming unchanged behavior. In this case study, we examine whether using the Rapid Recursive methodology can improve upon the advice given by traditional methods, using a real-world measure of success that takes into account costs as well as revenue.

Methodology

Supported Intelligence's approach employs the following three-step methodology:

- 1. Feature Selection and Engineering**
Using statistical learning techniques, we identify variables in the dataset that help to predict donor behavior. We also create new variables, based on combinations of existing variables, to capture new types of information.
- 2. Customer Segmentation and Predictive Modelling**
We then use quantitative techniques to segment the donors based on the variables chosen in the previous step, and develop a predictive model for members of each segment.
- 3. Strategy Optimization using Rapid Recursive[®] Technology**
Using the segment identification and predictive modeling created previously, we compose, error-check, and solve a recursive model of value for the business, using our patent-pending Rapid Recursive[®] toolbox. The solution includes a recommendation for an optimized promotional strategy that maximizes the gross profits (revenues less costs of promotional activity) for the organization.¹

The results of this optimized strategy are compared with those from traditional methods below.

1. Gross profits was defined as the revenue from contributions less the total cost of mailing and processing. Other operating costs (including the cost of the software and data analysis) were assumed to be the same under both the traditional and Rapid Recursive methodology.

Results

Recursive modeling from Supported Intelligence demonstrated promising results when tested on the KDD Cup 98 dataset.

First, our predictive model for customer behavior is extremely accurate. After training the model on one portion of the dataset, we are able to predict the behavior of donors in the other portion of the dataset **within 3% of gross profit over a 12 month period** (See Figure 1 at right). This provides a solid basis for the development of an optimal promotional strategy.

Second, using the promotional strategy recommended by our recursive model is expected to produce a roughly **34% increase in gross profits over 12 months**. Table 1 shows statistics for the actual performance of the organization using traditional methods, the predicted performance using the traditional methods, and the predicted performance using the recursive model.

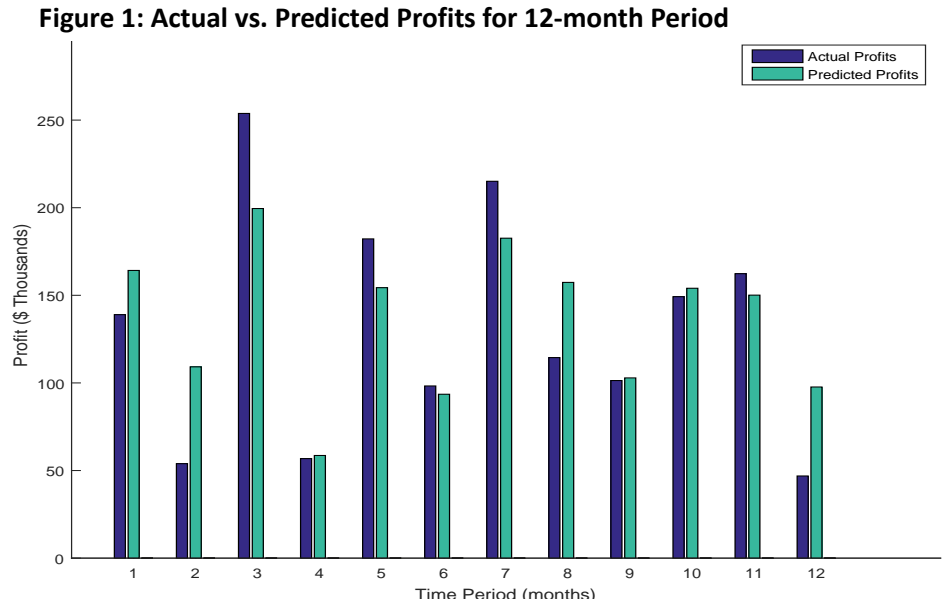


Table 1: Response Rate and Gross Profit Comparisons over a 12-month Period

Case	Promotions Sent	Response Rate	Donations Received (\$ Millions)	Profits (\$ Millions)
Actual Performance	661,293	22.0%	2.03	1.57
Predicted Performance: Existing Strategy	661,293	20.6%	2.08	1.62
Simulated Performance: Rapid Recursive Strategy	296,553	58.1%	2.31	2.11

These statistics demonstrate the following:

- We can develop an extremely accurate predictive model.
- A recursive model can be used to optimize the organization's mailing policy, in terms of maximizing gross profits.
- The recursive approach is likely to more than double the response rate (22% to 58%)
- The recursive approach is likely to increase donations received by 14%; and would also lower costs by 56%.
- **The recursive approach is likely to improve gross profits by 34%.**

Conclusion

The results indicate that Rapid Recursive methods can improve, often substantially, the results of marketing and promotional activities by lowering costs, increasing revenues, or both. In particular, the results indicate that an optimal strategy often outperforms one that results from a standard analytical method, when evaluated under real-world conditions taking into account both costs and revenues.

The methods used in this case study can be applied in multiple industries, including: retail, restaurant, hospitality, fundraising, and others. In addition to selecting which customers to target, we can also address questions such as which promotion to send, for how large of a donation to ask, and when to change or abandon an ineffective campaign.

If your organization spends substantial resources on promotional activities and advertising, consider requesting a confidential data analysis by Supported Intelligence's experts.



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