Chapter 4
Selection of Customers for Marketing Campaign as a Multi-Criteria Problem

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ABSTRACT

Here we discuss the issue of planning a telemarketing campaign which will promote new services and use databases of the current customers. The databases can contain data of hundreds of thousands up to a few million customers. To ensure the best possible efficiency of the marketing action, certain conditions have to be satisfied: among other things, the campaign has to be planned so as to present at most one offer to each prospective customer. The problem discussed here can be treated as a vector maximization problem. The consecutive components of the vector criterion function are the numbers of the services sold of each kind. The campaign may have as its objective the creation of a plan which maximizes the profit or the total number of the services sold. The problem can be also regarded as hierarchical; one can also apply other known scalarization approaches, which will be described here. The problems to be solved are large-scale binary linear programming problems. We present a possible solution of these problems using the R package.

INTRODUCTION

Methods of decision analysis and operations research can be used in many fields of human activity. One of the possible fields of application are marketing decisions. Their consequences are discussed in the categories of profits and losses, and therefore prior to making the decision we analyze the situation, establish decision criteria and search for optimal solutions.

Companies providing mass services can use techniques of direct marketing[1] to expand their base of customers who use selected services. One of the traditional techniques of direct marketing is telemar-

DOI: 10.4018/978-1-4666-8808-7.ch004

keting, thanks to which the telemarketer can get in touch with the customer via the telephone. During the call, the telemarketer presents the offer of a selected service to the customer, and the customer has the opportunity to immediately express his/her opinion about the service offered and, possibly, make a decision concerning the offer presented.

For obvious reasons, it is inadvisable to propose to a customer a service that she or he already uses. It is also desirable to avoid the situation in which many telemarketers in the same campaign present proposals for new services to the same customer. Therefore, we assume that in one telemarketing campaign no more than one offer is presented to each customer. If the customer's response is positive, the offer can be extended to other services.

Nowadays, due to the personal data protection, the possibility of creation of customer databases and profiles is limited. Their use in telemarketing encounters legal obstacles. For that reason the possibility of using the databases of current customers for conducting marketing actions to promote new services seems particularly attractive.

In this chapter we discuss the issue of the selection of new customers in a telemarketing action conducted by the company under consideration. Each of the services offered is provided in several variants which together form a portfolio of services. An example is a company providing access to pay television, with internet access and landline telephony as value-added services.

The goal of the company is to maximize the number of new contracts for each service separately. We will consider as many objectives as there are services offered by the company. We assume that the company databases contain data ranging from a few hundred thousand to a few million customers. Therefore, when organizing an advertising campaign based on direct marketing techniques, we encounter serious problems related to large-scale optimization.

Due to the intensity of marketing campaigns it is necessary to create a model which allows to efficiently select customers participating in the given edition of the campaign. When estimating the propensity of customers to purchase services, we use computer simulation. A customer selection model is regarded as useful if it can be used to generate the necessary data within hours.

Due to the large size of the database used, the resulting optimization problem is a large-scale problem. In this model, the decision variables take on binary values. A problem essential from the application point of view arises, that of the accessibility of tools which potentially allow to determine the optimal solution within an acceptable time.

As output of the selection problem discussed we will obtain lists of customers to be offered the participation in the planned marketing campaign, divided by services. The lists will be in form of a binary matrix. Based on them, telemarketers will offer previously determined new services to the selected customers.

The aim of the chapter is to present a mathematical formulation of the problem of selection of customers for a marketing campaign and solve it as a multicriteria problem. Due to its nature, the problem can be solved by means of linear multicriteria tools. The proposed method is based on Monte Carlo simulations of probability and uses historical data. Additionally, some related numerical and implementation issues in the statistical package selected will be covered. That part of the chapter will provide easily accessible support in creating marketing campaigns. The considered problem will be illustrated by a numerical example.