Chapter VI

Neural Networks for Target Selection in Direct Marketing

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INTRODUCTION

Nowadays, large amounts of data are available to companies about their customers. This data can be used to establish and maintain a direct relationship with customers in order to target them individually for specific product offers and services from the company. Large databases of customer and market data are maintained for this purpose. The customers to be targeted in a specific campaign are selected from the database given different types of information, such as demographic information and information on the customer’s personal characteristics (e.g., profession, age and purchase history). Usually, these selected customers are contacted directly by mail promoting the new products or services. For this reason, this type of marketing is called direct marketing. Among others, a growing number of bank and insurance companies are adopting direct marketing as their main strategy for interacting with their customers. Apart from commercial firms and companies, charity organizations also apply direct marketing for fund raising. Charity organizations do not have customers in the regular sense of the word, but they must be able to trace people who are more likely to donate money in order to optimize their fund-raising results. The targeted individuals are then contacted by mail, preferentially in relation to other individuals in the database.

Thus, direct marketing has become an important application field for data mining. In the commercial field, various techniques, such as statistical regression (Bult & Wansbeek, 1995), regression trees (Haughton & Oulabi, 1993), neural computing (Zahavi & Levin, 1997), fuzzy clustering (Setnes & Kaymak, 2001), and association rules (Pijls & Potharst, 2000) have been applied...
to select the targets. Modeling of charity donations has only recently been considered (Jonker et al., 2000). It is unlikely that there will be a single method that can be used in all circumstances. For that reason, it is important to have access to a range of different target selection methods that can be used in a complementary fashion. Learning systems such as neural networks have the advantage that they can adapt to the nonlinearity in the data to capture the complex relations. This is an important motivation for applying neural networks for target selection. In this chapter, neural networks are applied to target selection in the modeling of charity donations. Various stages of model building are described using data from a large Dutch charity organization as a case study.

The outline of the chapter is as follows. The section on direct marketing explains briefly what it is and discusses the target selection problem in direct marketing. Target selection for a charity organization is also explained. The next section discusses how neural networks can be used for building target selection models that a charity organization can use. The section on data preparation considers how the actual data for training the neural networks is obtained from the organization’s database. The actual model building steps are explained in the following section. The results of the neural network models are discussed afterwards, followed by a comparison of the results with some other target selection methods. Finally, the chapter concludes with a short discussion.

**DIRECT MARKETING**

In this section, a general description is given of direct marketing and the target selection problem in direct marketing. One or more media are used in direct marketing as advertising media to solicit a response on the part of the customer. An important characteristic of direct marketing is the possibility for individually targeting customers, after which their responses can be measured at an individual level. Hence, customer-specific information can be collected about purchase history and other related characteristics and then be used later on for selecting individuals targeted in specific campaigns.

**Target Selection**

It often does not pay off for direct marketing companies to send a product offer to all customers in the database, since the product may only be interesting to a subset of the total customer base. The costs of such a full-scale mailing campaign can soon become too great and rise above expected returns. For that reason, the customers who are most likely to be interested in the offer should be