Chapter IV

A Neural Network Application to Identify High-Value Customers for a Large Retail Store in Japan

Edward Ip
University of Southern California, USA

Joseph Johnson
University of Miami, USA

Katsutoshi Yada
Kansai University, Japan

Yukinobu Hamuro
Osaka Sangyo University, Japan

Naoki Katoh
Kyoto University, Japan

Stephane Cheung
University of Southern California, USA

INTRODUCTION

Let’s begin by considering a few facts. It costs six times more to sell to a new customer than to sell to an existing one. A company can boost its profits by 85 percent by increasing its annual customer retention by 5 percent.
(Kalakota, Robinson, and Tapscott, 1999). The proactive management of customer relationships can thus become a vital element in the strategic arsenal that firms build to gain competitive advantage. Early adopters of information technology gained competitive advantage by exploiting the tremendous amount of customer data that is available, in cyberspace and the physical marketplace. For example, the credit card industry used data mining techniques such as neural networks to effectively manage their customer relationship life cycle (Berry and Linoff, 2000). As a result, they achieved a high rate of success in keeping their most profitable customers.

Advances in technology for the warehousing and mining of data, along with the increased availability of customer information, have now made it possible to develop sophisticated tools to accomplish the tasks of decision support and effective management of customers (Swift, 2000). The explosive growth of the Internet has accelerated this trend, as online transaction information and visitor click streams data can now be readily captured, processed, and analyzed. In the retail business, the issue of leveraging information for customer retention and loyalty management is becoming increasingly important. Numerous studies have shown that retaining the right customers is a determinant of long-term profitability (Reichheld, 1993). This chapter presents a case study on a data mining system designed to manage customer relationships, with a focus on early identification of loyal and highly profitable customers. Specifically, we report on a neural network application for this purpose. We also compare the performance of the neural network with two other predictive mining tools: decision tree and logistic regression.

The data source for this study comes from a Japanese nationwide drugstore chain, Pharma, with annual revenues of $600 million (70 billion yen). There are 1,300 Pharma membership retail stores located throughout Japan. The structure of these chain stores is similar to that of franchises in the American system, but with some significant differences. For example, each Pharma store can use its own name. At the same time, all stores operate under a centralized information system, which handles daily transaction data from the company’s 2.3 million customers, monitors inventory, and processes replenishing orders for the member stores. Pharma had been systematically collecting detailed transaction data and customer information since the early 1990s. The company leverages this information as an asset to generate an alternative source of revenue by acting as an information broker. For example, it provides research reports on consumer taste and behavior to manufacturers, and it conducts marketing research for manufacturers using tools such as customer checkout interviews, which are supported by its sophisticated information system.

Pharma faces a high level of competition from other retailers in the physical marketplace. During the decade-long recession of the 90’s, Japanese
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