Behavior Analysis of Customer Churn for a Customer Relationship System: An Empirical Case Study

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ABSTRACT

This article describes how the bank industry in Taiwan must function in today’s tough and fiercely competitive domestic credit card market and subdued global market. Banks are increasingly emphasizing the importance of retaining customers in order to sustain market share and remain profitable. This study proposes a new model which local banks can use to detect potential customer churn and provide an early warning indicator of problems that could lead to loss of customers. The model incorporates a customer relationship management database with a built-in time factor and applied temporal abstraction to represent data for a specific time period as defined by experts. Association rule mining is applied to analyze and detect abnormal customer behavior. The results of this article indicate that the system is relatively effective in detecting customer churn early on and thus helpful at assisting banks to address issues before they escalate. Furthermore, the tested rules are further scrutinized by experts to establish the relationship between the defined rules and management. This study provides an expert system for banks to assess the quality of their marketing campaigns and reestablish faltering customer relationships.

KEYWORDS
Association Rules, Banking Industry, Customer Churn, Customer Relationship Management (CRM), Temporal Abstraction,

1. INTRODUCTION

Recently, with the growth of intense competition in today’s business environment, companies are forced to develop effective marketing strategies in order to survive. Marketing managers are forced to focus more attention and resources on customer retention (Tamaddoni, Stakhovych, & Ewing, 2016). The maintenance of good relationships with current customers is more important than the acquisition of new customers (Karakostas, Kardaras, & Papathanassiou, 2005; Navimipour & Soltani, 2016). A small improvement in customer retention can lead to a significant increase in profit (Van den Poel & Lariviere, 2004). In short, retaining the customer base has become a critical issue for managers.

Several studies have shown that acquiring a new customer is usually five to six times more expensive than retaining an existing customer (Athanassopoulos 2000; Slater & Narver 2000). Customer churn management is aimed at minimizing losses caused by customer attrition and at

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retaining high-value customers, thereby maximizing profit. Recently, companies have become interested in identifying potential churners (Keramati et al., 2016).

According to the credit card and financial information published on the website of the Banking Bureau of the Financial Supervisory Commission, monthly customer churn accounts for approximately 1% of the total number of cards in circulation (annual customer churn is approximately 12%). Clearly, in Taiwan’s highly competitive credit card market, ignoring the problem of customer loss can seriously affect business development. Customers may choose to switch to credit cards issued by other banks if they lose out on preferential treatment or value-added services. However, if the issuer can formulate the correct strategies to retain customers, it will enhance customer loyalty and customer contribution. Simply reducing the rate of customer churn can contribute to an enterprise’s operating profits and sales.

A customer churn prediction model can be used as an early warning tool for businesses, and extracting critical factors related to customer churn can provide additional useful knowledge that supports decision making (Chu, Tsai, & Ho, 2007). There are many existing studies on the topic of customer churn detection or prediction. However, most of these pay more attention to providing different classifiers to improve the accuracy rate (Coussement, Benoit, & Van den Poel, 2010; De Bock & Van den Poel, 2011; Kisioglu & Topcu, 2011) than proposing a framework which identifies critical factors and generates actionable suggestions. Most of these studies have used only customer demographic data (such as place of residence and age) and billing data (such as average payment amount and average minutes of usage) to predict customer churn. It has been observed however, that customer relationships and satisfaction are often seen as key factors for customer retention, and their effects have been investigated by many (Gustafsson, Johnson, & Roos, 2006; Hennig-Thurau & Klee, 1997). On the other hand, customer churn occurs gradually over time. The problem is that a gradual reduction in the amount of consumption per card cannot be seen by looking at the average value in the last three months prior to the occurrence of customer churn. If the bank were to become aware of the signs of upcoming customer churn earlier, they might be able to put into place relevant countermeasures to avoid continued decline in the quantity of cards issued.

In order to fill these gaps in the body of research, this study proposes a framework which integrates the techniques of temporal abstraction and association rule mining to observe gradual downward trends in the amount of customer consumption, with the added dimension of customer care. To the best of our knowledge, there have been no studies of customer churn using real transaction data aimed at understanding the temporal variation of behavioral trends and considering the dimension of customer care.

Customer behaviour analysis is a good way for firms to better understand the consumers’ intention. Especially, changes in customer behavior over time can offer valuable information from which meaningful implications can be drawn. Data mining tools can be applied to discover interesting patterns from customer databases. Such information can shed much light on the process of customer churn, so that actions can be taken in advance to retain them. This study applies the method of temporal abstraction to collect and transform the data to understand the process of temporal evolution, and association mining is used to filter interesting user behavior rules. The rules established for various types of customer churn can clearly explain changes in customer behavior over time, giving more complete reference information for management to plan relevant strategies, actively care for existing customers and reestablish damaged customer relationships. To the best of our knowledge, there has been no analysis of customer behaviors using association rules extracted from real usage patterns aimed at understanding behavioral differences between churn customers and normal users.

The proposed framework can be used to establish a rule model of customer churn, designed to assist credit card issuing banks with the formulation of marketing strategies as quickly as possible in order to reduce loss. In addition, the experimental results are determined based on rules extracted from a large customer relationship management database generated by the bank. The accuracy of the rules is empirically confirmed and their validity is also verified by consultation with experts.
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