Customers churn prediction and marketing retention strategies. An application of support vector machines based on the AUC parameter-selection technique in B2B e-commerce industry

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A B S T R A C T

E-commerce has provided new opportunities for both businesses and consumers to easily share information, find and buy a product, increasing the ease of movement from one company to another as well as to increase the risk of churn. In this study we develop a churn prediction model tailored for B2B e-commerce industry by testing the forecasting capability of a new model, the support vector machine (SVM) based on the AUC parameter-selection technique (SVMauc). The predictive performance of SVMauc is benchmarked to logistic regression, neural network and classic support vector machine. Our study shows that the parameter optimization procedure plays an important role in the predictive performance and the SVMauc points out good generalization performance when applied to noisy, imbalance and nonlinear marketing data outperforming the other methods. Thus, our findings confirm that the data-driven approach to churn prediction and the development of retention strategies outperforms commonly used managerial heuristics in B2B e-commerce industry.

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1. Introduction

Customer churn is a salient concept in contemporary marketing and should not be ignored by B2B e-commerce companies. Nowadays, due to improved access to information, customers are more transient and it is easier and less costly for them to switch between competitors (Kamakura et al., 2005; Tamaddoni Jahromi, Stakhovych, & Ewing, 2014, 2016; Wiersema, 2013). Companies are aware of this and are interested in identifying potential churners in order to attempt to prevent defection by targeting such customers with incentives. Therefore, with the purpose of retaining customers, academics as well as practitioners find it crucial to build a churn prediction model that is as accurate as possible in order to minimize the customer risk of churn.

Customer churn indicates the propensity of customers to cease doing business with a company in a given time period (Tamaddoni Jahromi et al., 2014; Verbeke, Martens, Mues, & Baesens, 2011; Xie, Li, Ngai, & Ying, 2009). Customer churn prediction consists in building a prediction model that ranks the customers from most likely to leave the company to least likely to leave the company. Hence, an accurate and effective churn prediction model is a model that assigns high churn probabilities to churners, and low churn probabilities otherwise, based on past customers’ behaviour (Coussement & Bock, 2013). Customer churn prediction also help companies to develop different and tailored retention measures for churners and non-churners, targeting churners with tailored incentives to persuade them to stay.

Companies should be equipped with models that can accurately identify customers who are likely to churn. This becomes even more critical and clearer in B2B contexts due to the today’s austere global economic outlook, increased web-based comparison-shopping, and considering the characteristics of the e-commerce context where the average value of customers is higher than for customers in B2C. In fact, in B2B contexts, where customers are fewer in numbers, make larger and more frequent purchases, and are more valuable (Rauyruen & Miller, 2007), customer retention is considered central to developing business relationships (Eriksson & Vaghult, 2000; Kalwani & Narayandas, 1995). Moreover, due to the large amounts of money that B2B customers typically spend, retention can be extremely financially rewarding for companies operating in this context (Rauyruen & Miller, 2007).

However, although the idea of persuading churners to stay is accepted also in B2B contexts, it is not straightforward in practice (Tamaddoni Jahromi et al., 2014) as pointed out by two research gaps: the lack of empirical research in the literature and the lack of consensus on the more effective and accurate churn prediction model. In fact, among all studies focused on predicting customer churn across different industries, the majority are within B2C contexts, whilst the B2B context has received a little attention from both academic and practitioners.

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methods can overcome the shortcomings of traditional methods developing a nonlinear mapping ability, strong robustness and good prediction precision. In addition, they can lead to low generalization ability and fuzzy construction of the models. For instance, the NNs do not explicitly express the uncovered patterns in an easily way.

Nevertheless, the existing literature showed that results of these models are few and often conflicting, especially in B2B contexts, indicating the need to develop a churn prediction model tailored for B2B companies. The importance of this need is even clearer when the characteristics of B2B contexts (i.e. large purchases with far higher transactional value) is considered (Rauyruen & Miller, 2007; Tamaddoni Jahromi et al., 2014). As consequence, in this study we introduce SVM(auc) for churn prediction to B2B contexts, evaluating its predictive power and comparing it with those of logistic regression and neural network.

2.2. Churn management in e-commerce context

E-commerce has provided many new opportunities to consumers (Hajli, 2014). The rapid expansion of internet, e-commerce and social media has made the study of consumer behaviour on e-commerce a fundamental research agenda (Hajli, 2014; Liang & Turban, 2011). E-commerce and social media are likely to develop marketing strategies through trust-building mechanisms and affecting customers’ intention to purchase online products or to churn. In fact, the rapid growth of e-commerce raises important research questions about the levels of loyalty and churn management in the web environment. This rapid growth reflects the compelling advantages that e-commerce and social media offer over conventional brick-and-mortar stores, including easier interconnectivity and participation on the web (Mueller, Hutter, Fueller, & Matzler, 2011), easier share information (J. Chen, Xu, & Whinston, 2011), greater flexibility, enhanced market outreach, lower cost structures, faster transactions, broader product lines, greater convenience, and customization (Srinivasan, Anderson, & Ponnavaulu, 2002). These advancements have developed social commerce into a vibrant and lucrative e-commerce channel, highlighting This is an important point as customer involvement through social media is a key factor in the development of new marketing strategies (Park, Lee, & Han, 2007). E-commerce offers different values to firms, such as facilitating word-of-mouth communication (Y. Chen, Fay, & Wang, 2011; Hajli, 2014), increasing sales (Agnihotri, Kothandaraman, Kashyap, & Singh, 2012), sharing information in a business context (Lu & Hsiao, 2010), generating social support for consumers (Ali, 2011) and increasing the risk of churn.

However, e-commerce and social media also come with their own set of challenges. The importance of retention for companies becomes even clearer in the e-commerce context, where customers make larger and more frequent purchases with higher transactional values (Rauyruen & Miller, 2007; Tamaddoni Jahromi et al., 2014). As consequence, competitors in the world of e-commerce and social media are only a few ‘mouse clicks’ away and consumers are able to compare and contrast competing products and services with minimal expenditure of personal time or efforts. Therefore, the e-commerce feeds the ease to move from one company to another (i.e. customer churn).

Finally, according to (Yu et al., 2011) it is possible to highlight seven major characteristics of e-commerce customer churn management: (1) the prediction of churn and non-churn is a typical binary classification issue; (2) the data is usually imbalanced; i.e., the number of e-commerce churn customers constitutes only a minority of the data (usually 5–10% of the total samples); (3) the data includes the relational and non-relational, thus the task of integration them is complicated; (4) large learning applications will inevitably have some types of noise in the data; (5) the task of predicting e-commerce churn requires the ranking of subscribers according to their likelihood to churn (Au et al., 2003); (6) it is difficult to learn about customer status because of the virtual of e-commerce; (7) identifying churn reasons is tedious.
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