Chapter 80
Credit Risk Evaluation Based on Text Analysis

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ABSTRACT

The main difficulty of credit risk evaluation is to evaluate borrowers' willingness of repayment, which is a subjective factor depending on the thoughts and ideas of borrowers. Text description is a kind of human behavior which reflects the mental process of writers. The authors identify the characteristics of borrowers from their text descriptions and further use them to evaluate the credit risk of loans. Experimental results show that: (1) textual information is a good choice when traditional financial information is missing. The authors can achieve similar accuracy using only textual information as traditional methods which use financial information and credit information from the third party. (2) Textual information is a good complementary information source to traditional financial information sources. Using textual information can improve the performance of credit risk evaluation system when combined with traditional financial information.

1. INTRODUCTION

Credit risk is the potential that a borrower or counter-party will fail to meet its obligations in accordance with agreed terms. The goal of credit risk evaluation is to estimate the potential of default on a particular loan and help lenders to make correct decisions. It is a crucial step in relevant economic activities. The rise of online P2P lending, as a new economic model, brings new opportunities and challenges for the

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research of credit risk evaluation (Namvar, 2014). Besides the financial information used in traditional models, there are various new sources of information from the Internet for evaluating the credit risk of loans (Lin et al., 2013). The objective of this paper is to study how to evaluate the credit risk of loans by analyzing borrowers' text descriptions.

The fundamental problem of credit risk evaluation is the information asymmetry between lenders and borrowers. That is, lenders have less information about borrowers' capability and willingness of repayment than borrowers do. The key of credit risk evaluation is to evaluate the willingness of repayment of borrowers from available information. Borrowers with strong willingness of repayment may delay the repayment within a short time because of the lack of capability of repayment. They will try their best to repay the loans. In contrast, borrowers with weak willingness of repayment will try their best to delay or evade the loans even they have the ability to repay them. However, the willingness of repayment is a subjective factor, which depends on the thoughts and ideas of the borrower. It is hard to be evaluated.

Text description is a kind of human behavior which reflects the mental process of writers (Holtgraves, 2011; Tausczik & Pennebaker, 2010). It should be a good information source for credit risk evaluation. In this paper, we identify the characteristics of borrowers from their text descriptions and further use them to evaluate borrowers' willingness and capability of repayment.

The rest of this paper is organized as follows. In Section 2, we present some related works. In Section 3, we describe how to extract and use textual features for credit risk evaluation. Empirical evaluation of the proposed method is shown in Section 4. Discussions and conclusions are given in Section 5 and Section 6.

2. RELATED WORK

Traditional credit risk evaluation methods focus on the financial information of borrowers. Emekter et al. (2015) studied the relationship between various financial factors and the default rate. Their results showed that credit grade, debt-to-income ratio, FICO score and revolving line utilization play an important role in loan defaults. Loans with lower credit grade and longer duration are associated with high default rate. Puro et al. (2010) studied the relationship between loan amount, interest rate and the funding success. Their experimental results showed that lower interest rates decrease the chance of getting the loan funded, while smaller loan amounts increase the chance of funded.

Potzsch and Bohme (2010) found that soft information can effectively alleviate the problem of missing hard information like financial information and improve the accuracy of credit risk evaluation. Social information is one kind of soft information. Recently, researchers begin to study the relationship between the online social information and credit risk. Brandes et al. (2011) studied the impact of social information on the interest rate of funded loans and found that lenders use social information to trust some borrowers more than it is suggested by their credit grades. Greiner and Wang (2009) studied the role of social capital in online P2P lending market and found that borrowers with more social capital tend to get loans funded and obtain lower interest rates. Herrero-Lopez (2009) studied the influence of social interaction in online P2P lending. Their results showed that fostering social features, such as joining in a trusted group, could increase the chance of getting a loan funded. Lin et al. (2013) studied the relation between the online friendships and transactional outcomes in the online P2P market and found that online friendships of borrowers act as signals of credit quality. Borrowers with friends are more likely to get their loans funded with lower interest rates.

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