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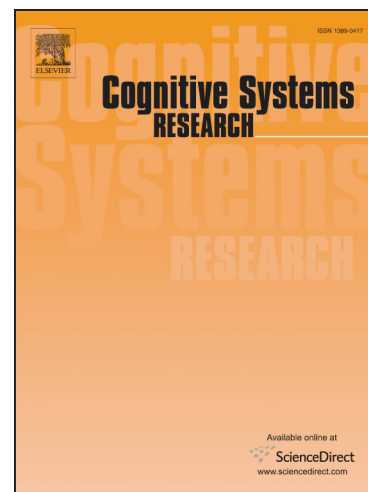
Enterprise Credit Risk Evaluation Based on Neural Network Algorithm

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Abstract: To explore the enterprise credit risk evaluation, the application effect of several common neural network models in Chinese small and medium-sized enterprise data sets was compared and the optimal parameters for each model were determined. In addition, the classification accuracy and the applicability of the model were compared, and finally the common problem of optimization neural network algorithm based on population was solved: need to determine the dimensions in advance. The experimental results showed that the probabilistic neural network (PNN) had the minimum error rate and second types of errors, while the PNN model had the highest AUC value and was robust. To sum up, the algorithm makes some contributions to solve the financing problem of small and medium-sized enterprises in China.

Keywords: credit risk assessment; artificial intelligence; neural network

1. Introduction

Credit risk is an important issue in the decision-making and profit of the banking industry. Credit risk is still a single biggest risk that is difficult to offset for banks and it expresses the concept of future loss. Because the customer does not fulfil the repayment obligation, the credit risk also embodies the loss of the bank's profit.

Usually, the general approach of credit risk assessment is to apply the classification model to past customer data, including default and non-default customers, so as to find the relationship between user characteristics and potential default. The credit risk assessment model based on statistical data has become the main analysis tool for the financial institutions to assess the credit risk. By analysing the multiple risk factors of the evaluation object, the credit risk assessment is an independent process of assessing the borrower's willingness and ability to repay. The credit risk assessment model has been widely used to assess corporate risk by bond investors, debt issuers, and government officials. They provide a means to determine the risk premium and bond market, so that companies can assess the possible return on investment to issue bonds. The advantages of building a credible credit risk assessment system are: reducing the cost of credit analysis, ensuring fast decision-making, guaranteeing credit collection and reducing possible risks.

The credit risk assessment was initially judged by the personal experience manager, and then based on the 5C factor. However, with the rapid increase of applicants, it is almost impossible to do the work manually. Many institutions in the credit industry are proposing new models to support credit decisions. Recent studies have shown that the existing artificial intelligence (AI) technology, such as decision tree (DT), support vector machine (SVM) and so on, in the problem of credit risk assessment, shows a better performance than the statistical model and optimization method. Different from statistical models, AI model does not require the assumption of variable distribution, and can acquire knowledge directly from training data sets. In the field of credit risk assessment, especially when the credit risk assessment problem is nonlinear mode classification, the performance of AI model is better than that of the statistical model.

2. State of the art

Chang et al. [1] proposed a short-term credit risk assessment model based on decision tree, which is used to evaluate credit risk. The goal is to use a decision tree to filter short term breaches to produce a highly accurate model that can distinguish between default loans. In this paper, a credit risk model is established by combining Bootstrap aggregation with the minority of sampling techniques to improve the stability of decision tree and the performance of unbalanced data. Zhang et al. [2], based on the neural network of particle swarm optimization genetic algorithm, studied the cross border e-commerce credit risk assessment model, and put forward the construction process of credit risk assessment model based on PSO-GA in BP neural network. The results showed that the above model could effectively meet the requirements of the cross-border e-commerce credit risk assessment. Bao [3] used BP neural network simulation to obtain the credit rating of individual borrowers from P2P network. And the simulation was carried out in the absence of data. Compared with the website rating, the simulation results were more accurate, and the credit risk of individual borrowers could be effectively evaluated. On the basis of the analysis, some suggestions and countermeasures of the network platform were given. Bekhet and Eletter [4] proposed two credit scoring models using data mining technology to support the loan decision of commercial banks in Jordan. The loan application assessment will improve the effectiveness of the loan decision, control the task of the loan office, and save the analysis time and cost. Loan applications that are accepted and rejected from different commercial banks in Jordan are used to establish a credit scoring model. The results