



Research on Financial Credit Model Construction Method based on Machine Learning Technology

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Abstract. With the continuous development of science and technology, the application scenarios of finance are constantly changing, and financial credit in as a specialized credit information service under the conditions of market economy. At the same time, with the arrival of the digital era, the application scenarios of online financial business are increasing, the competition among financial institutions is getting more and more intense, and the degree of mastery of new technologies has directly affected the investment efficiency of financial institutions. Financial credit is an important data support that connects the demanders of funds and financial institutions. The limitations of traditional financial credit are mainly reflected in the fact that, first, it is not accurate, second, it is not timely, and third, it is inefficient and costly under manual operation. This can lead to unfavorable competitive advantage. Therefore, this paper proposes the use of emerging technologies to solve this problem. For example, Big Data, Artificial Intelligence, Blockchain, Internet of Things and other technologies to re-measure and build the model of financial credit. At the same time, artificial intelligence and machine learning technologies are used to automatically calculate a corporate financial credit score and conduct financial behaviors and activities based on the results of the score.

Keywords: financial credit, fintech, machine learning, big data, artificial intelligence.

1 INTRODUCTION

We will illustrate the role of financial credit in the modern economic system in multiple dimensions. Finance is one of the most important aspects of modern economic development. [1] In the current financial field, risk control plays a central role. Due to the different groups of modern people, different enterprises analyze the economy differently, resulting in the uncertainty of the borrower's risk control still exists, therefore, a major means to ensure economic stability is to strengthen the financial risk control.

In recent years, the financial industry has become more and more closely connected with science and technology innovation, which means that there are higher requirements for the cutting-edge information base, which proves that the traditional credit is not able to meet the requirements of the financial industry for information big

data nowadays, and the industrial revolution in history has also confirmed this to us. In the context of the digital economy, to seize the new opportunities of the new round of scientific and technological revolution industrial revolution, we must give full play to the advantages of big data and machine learning scenarios, and promote the deep integration of digital technology and artificial intelligence. To promote the construction of a new national competitive advantage, we need to seize the first opportunity in today's era and seize the high ground for future development. [2-3] The current themes in finance are fintech, green finance, financial openness, and asset management. The same included bond credit rating and credit card rating is also one of the major indicators used in financial credit. The foremost reason for bond credit ratings is to facilitate investors in making bond investment decisions. Bond credit rating is the level of bonds issued by certain authoritative organizations according to certain criteria through a comprehensive investigation of the financial and business conditions of the bond issuer. Now facing the new scorecard policy can be used as an important indicator for investors to measure the risk of bond investment and the basis for bond management organizations to manage bonds. [4-7] From another perspective, with the deep application of big data, IoT and machine learning, it can promote the accuracy of financial credit. This is because the combination of bond credit ratings and big data is utilized to reduce the cost of financing for creditworthy issuers. Generally speaking, in the face of the higher credit rating bonds, the easier to get the trust of investors, can be sold at a lower interest rate, [8-9] in the use of then the Internet of things and bond credit rating combination, can make investors to more intuitive point of view to determine whether to raise funds, the understanding of the individual data is more intuitive, and finally makes the investors have more trust in the credit rating method.

2 RELEVANT STUDIES

On top of machine learning, we have introduced the study of scorecards. Scorecard as a tool that can define the risk and credit of individuals and companies, not only in banking and personal data, but also in other fields such as health care, education, research and so on. In the article Exploration and Experimentation of SME Growth Scorecard Based on Machine Learning, it is said that in the exploration and experimentation of SME growth scorecard based on machine learning, through multi-dimensional comparison of small and medium-sized enterprises, machine learning is a branch of computer science and artificial intelligence, the core of which lies in the use of algorithms and data to further simulate the process of human learning and methodology, thus improving its accuracy in the process of continuous training. process of training to improve its accuracy. Similarly, it was mentioned that in the field of data science, machine learning is an important component that is capable of predicting and categorizing various items through training algorithms and statistical methods and is one of the key elements of data mining. At the micro level, machine learning methods can effectively contribute to the optimization of applications and the implementation of business decisions and are particularly influential in areas such as data analytics and artificial intelligence. At the macro level, with the rapid development of Big Data and Artificial Intelligence

technologies, the market demand for related technical talents continues to grow, and the scope of application of these technologies is also expanding. [10]

Therefore, we conclude that machine learning has an important role in the construction of scorecards. It emphasizes the diverse application areas of scorecards and the key role of machine learning in scorecard research. In addition, it emphasizes the importance of machine learning in the field of data science and artificial intelligence, and its impact on the micro and macro levels. This passage provides the reader with a basic understanding of scorecards and machine learning, and points out their potential value in finance and technology. However, further development of the discussion on the specific application of machine learning in scorecards and the practical implications of this technological development for SMEs would have made the passage richer and deeper.

3 METHODOLOGICAL DESIGN

At the step-by-step level, the impact of FinTech on the growth of SMEs is examined first, thus providing a basis for the study by analyzing the impact of FinTech on the growth of SMEs, as well as its role and position in the financial industry. Secondly, it explores the development and application of FinTech and examines the impact of emerging technologies (e.g. artificial intelligence, big data, cloud computing, etc.) on the financial industry and the application of FinTech in practice. FINAL STUDY OF THE INNOVATION DRIVERS OF FINTECH: Focuses on analyzing the unique position and role of FinTech as an innovation driver driving the development of the financial industry. At the level of ideas, the impact of FinTech on the growth of SMEs is explored by scrutinizing its role and status, and its development trends are examined. Against the backdrop of the emergence of emerging technologies, we explore the current status of FinTech's application in the financial industry, and then consider its significance and impact on SMEs. It also focuses on the innovative driving force of FinTech and analyzes its uniqueness as an important driving force for the development of the financial industry.

At the methodological level, this paper conducts a review of the literature and a case study to collect and analyze relevant theoretical and practical cases to gain a deeper understanding of the impact of FinTech on the growth of SMEs. Qualitative research and quantitative data analysis were used to explore the application of FinTech in practice and its specific impact on SMEs. Modeling and construction of analytical frameworks and models suitable for the purpose of the study were also constructed in order to systematically assess the impact of FinTech on SMEs' growth. The methodological approach of constructing a model that takes into account the impact of qualitative factors as well as the analysis of quantitative data is used to assess the impact of FinTech in a more comprehensive way. By analyzing the innovation driving force of FinTech, it reveals its unique role and significance in the financial industry and provides theoretical and practical references for the future development of FinTech.

By sorting out the above steps, ideas, methods and uniqueness, the purpose and methods of the study can be more clearly grasped, thus providing guidance and support for the implementation of the study. In the face of financial credit instability this study

adopts a mixed research design, including quantitative analysis of the impact of scorecards on credit scores and qualitative analysis of the practical application of scorecards in financial credit decision-making. First we obtain historical loan data and scorecard data from several financial institutions. A certain number of loan applicants are selected through a pair sampling method to ensure that the sample contains individuals of different ages, genders, incomes, and credit histories. The main objective is to test scorecard scores against credit scores. After collecting personal information and scorecard scores from loan applicants and dealing with missing values and outliers, we evaluated the relationship between scorecard scores and credit scores using statistical analysis methods such as correlation and regression analysis.

We also qualitatively analyzed and explored the practical application of scorecards in financial credit decision-making and collected relevant data. Finally, the interview data were coded and analyzed using content analysis to reveal the impact and limitations of scorecards in financial credit decisions. Correlation and multiple linear regression analyses were used to assess the relationship between scorecard scores and credit scores and to explore impact scores. Of course, there are drawbacks that may affect the reliability and validity of the findings in the face of the limitations of the sample. Quantitative analysis was conducted using statistical software (e.g. SPSS or R) and qualitative analysis was conducted using qualitative data analysis software (e.g. NVivo). With the above methodological design, we will be able to comprehensively analyze the impact of scorecards on financial credit and provide valuable data support and decision-making recommendations for financial institutions.

4 EMPIRICAL ANALYSIS (EXPERIMENTAL ANALYSIS)

Figure 1 shows the construction process.

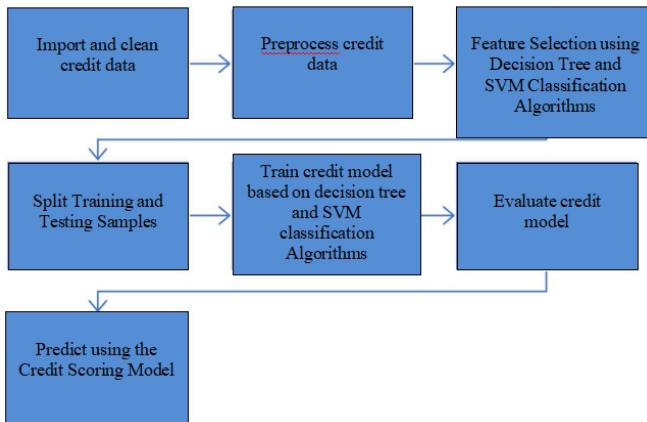


Fig. 1. Process of credit data processing and credit model construction based on decision tree and SVM classification algorithm.

4.1 Experimental Environment

This experiment uses Python programming language to implement the data analysis processing and modeling process, using data processing and machine learning libraries and packages including pandas, numpy, random, scikit-learn, deap, TensorFlow, PyTorch and so on.[11]

4.2 Data Sources and Pre-Processing

The data for this experiment comes from the UCI Machine Learning Repository, which downloads Germany Credit data totaling 1002 entries, mainly containing Status of existing checking account, Duration in month, Credit history, Purpose, Credit amount, foreign worker, Job, and 69 fields. It mainly contains 69 fields such as Status of existing checking account, Duration in month, Credit history, Purpose, Credit amount, foreign worker, Job and so on. Because the field names in the dataset are too long, this paper preprocesses the downloaded dataset Germany Credit by replacing the original field names with the pattern of A1, A2...A69, so as to avoid the selection errors caused by the overly long fields in the process.[12]

4.3 Analysis of Experimental Results

In the traditional processing of credit data, a fitting curve is constructed for the current data, and the weights of each feature item are calculated, thus forming a decision tree regression model to calculate the credit evaluation rules. In the whole calculation process, not only because of the large data space, which leads to the slow calculation process, but also because of the influence of the data items with low correlation, which leads to the accuracy of the final credit model. Therefore, a reasonable selection of data can not only effectively reduce the calculation, but also effectively improve the accuracy of the model.[12]

The credit model scoring indexes include : the interval of credit scoring (excellent, good, fair, poor, very poor credit); the accuracy of credit rating (we based on the sample data of lending, 50 enterprises, and then after the experiments, as shown in Table 1, the evaluation model of financial credit constructed based on the decision tree and SVM method, the accuracy reaches 96.5%, the recall rate reaches 97.3%, and the overall progress is higher than the traditional scorecard model algorithm. higher than the traditional scorecard credit model algorithm. In the practical application, the misjudged enterprise information can be effectively screened using more attribute labeling data, which can improve the accuracy rate.

Table 1. Accuracy table of different credit algorithm models.

Name of training algorithm	accuracy	recall rate
Financial Credit Scoring Algorithm Constructed Based on Decision Tree and SVM Methods	96.55%	97.3%
Financial Credit Scoring Algorithm Based on Traditional Scorecard	89.2%	85.9%

5 CONCLUSION

This study employs a variety of research methods, including data investigation and collation, machine learning, and scorecard building methods. Among them, the data investigation and collation aims to collect and analyze the literature related to business growth in order to sort out the factors affecting business growth and their measurement methods. The comparative analysis method judges the predictive ability of each model by comparing the assessment results of the growth models constructed by the four models. The statistical analysis method is mainly applied in the process of constructing the growth scorecard model, which involves data organization and modeling analysis. In the field of financial credit, information asymmetry is a common problem, leading to different sources of information between the trading parties in the operation of the financial market.[10] In order to improve financial credit, big data and artificial intelligence technologies need to be utilized to achieve information sharing and exchange. Thus, information needs to be collected and organized at affordable costs, and pricing power needs to be determined according to different levels of risk to control the risk of default and to increase the probability of being a trustworthy person. At the big data level, additional sources of information and specialized improvements to the scorecard are also needed to improve the efficiency of both parties. In summary, by introducing the method of financial credit model construction based on machine learning technology, this paper delves into the importance of financial credit in the modern economy and the limitations of traditional models. With the continuous development of science and technology, the demand for information in the financial industry is getting higher and higher, and the traditional financial credit model can no longer meet the needs of modern financial business. Therefore, it has become an inevitable trend to reconstruct the financial credit model by utilizing emerging technologies. This paper proposes a method of re-measuring and reconstructing the financial credit model by using big data, artificial intelligence and other technologies, and verifies the effectiveness and accuracy of the method through empirical analysis. This innovative method brings new opportunities and challenges to the development of the financial industry, which will provide more accurate and timely credit information for financial institutions and promote the healthy development of the financial industry. In the future, we can further explore the application of machine learning technology in the field of financial credit, continuously improve and optimize the financial credit model, and provide more support and promotion for the digital transformation of the financial industry.

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