

Financial Risk Prediction and Management of Enterprises Based on Financial Big Data

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Abstract. With the financial globalization, the data management mode of the financial industry has shifted from data sets to multi-service integration, and the construction of data centers in the financial industry has also been rapidly launched around the needs of business development. Therefore, financial enterprises need a lot of data analysis as the basis for decision-making. It is necessary to conduct more in-depth exploration and research on how to effectively integrate BD(big data) with diverse structures in the financial field, realize efficient data collection, and improve data processing efficiency. In the BD environment, how to use big financial BD technology to prevent financial risks in financial audit has become a widespread concern. This paper expounds the era of BD and its characteristics, and puts forward how to build a data platform for enterprise financial risk prediction and how to collect, manage and analyze data under the background of BD, in order to put forward feasible suggestions for financial audit on how to prevent financial risks under the background of BD.

Keywords: Big Data, Financial Risk, Financial Big Data.

1. Introduction

In the process of financial risk prediction and prevention, financial BD (big data) technology has increasingly become a powerful weapon in the financial industry, and risks are identified, measured, calculated and analyzed through massive data. Once a financial enterprise has established a credit relationship with its customers, the credit risk will be aggravated due to the distortion of information and the limited repayment ability or poor repayment consciousness of customers. In addition, once the non-performing loans are recorded too much, it will affect the financial situation and threaten the development of the whole financial industry [1].

The financial sector has become an active practitioner of financial BD technology. In the rapidly changing era, the traditional risk prediction and prevention strategies in the financial field have been unable to meet the emerging new problems. Therefore, only by keeping up with the pace of the development of the times and using BD to carry out financial risk research is an effective and inevitable path.

2. The era of BD and its characteristics

With the vigorous development of the Internet, the business volume of more and more enterprises is increasing, and the scale of the data generated is also increasing [2-3]. With the growth of data scale, the cost and resources consumed in processing these data are also increasing rapidly, which brings new challenges to the traditional computer field. The new problems in the era of BD include software and data processing ability (including computing ability and concurrent response ability), resource sharing and data management, etc. These challenges are widely distributed in the storage, analysis and management of BD and data security. Because of the great value in BD, the processing of BD has become an important issue that people care about.

With the financial globalization, the data management mode of the financial industry has shifted from data sets to multi-service integration, and the construction of data centers in the financial industry has also been rapidly launched around the needs of business development. In this technical environment, the independence of each system makes the whole enterprise environment become multiple application and data islands, and it is difficult to share data and resources with each other,

which leads to the underutilization of server and storage performance and the continuous increase of the number of servers and storage devices [4].

For a financial enterprise, it can't wait for a long time, so it needs to plan and budget in advance, and determine the investment of company resources by prioritizing the business. Therefore, financial enterprises need a lot of data analysis as the basis for decision-making. It is necessary to conduct more in-depth exploration and research on how to effectively integrate BD with diverse structures in the financial field, realize efficient data collection, and improve data processing efficiency.

3. Financial risk prediction of enterprises based on financial BD

3.1 Financial loan risk prediction

As an important core of modern economy, the contemporary financial industry has a direct impact on the economy. As the main part of the financial industry, the quality of the management of bank loans and credit assets has a more direct impact on the economic system. The loan risk occurs not only in the credit check stage, but also in the whole credit process [5]. In the actual credit approval process, most credit inspection processes are not very strict and comprehensive, so the possibility of non-performing loans is increasing every day. Because commercial banks have to review all kinds of materials and information of customers before granting credit to customers, they also collect and store all kinds of data of customers. How to use financial BD technology to analyze and model this customer information to establish a new customer credit evaluation system has become a new opportunity for commercial banks to prevent non-performing loans.

Learning under the control of logistic regression can solve the problem of binary classification well. The essence of its classification: we need to find the boundary of decision-making in space and then complete the logical regression of decision-making. Using the characteristics of the logistic regression algorithm itself, it is very suitable for forecasting whether the bank customer's loan will default. In the linear regression equation, if the parameters are large, even if the data is slightly moved, it will have a great impact on the results. However, if the parameters are small enough, the slightly moved data will not lead to an impact. A professional saying is that it has strong anti-interference ability [6-7].

Take the gradient descent method in linear regression as an example. Assuming that the required parameter is θ and $h_{\theta}(x)$ is our assumed function, the cost function of linear regression is as shown in Formula (1):

$$J(\theta) = \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2 \quad (1)$$

Therefore, in the gradient descent method, the iterative formula for the final iterative calculation of parameter θ is as follows:

$$\theta_j := \theta_j - \alpha \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)}) x_j^{(i)} \quad (2)$$

In this formula, α is the learning rate, and the above iterative formula is a formula without adding the regularization term L2.

To solve the problem of loan default prediction, due to the extremely unbalanced nature of data, model training and result prediction are prone to over-fitting. Therefore, L2 regularization term is more suitable for analysis. In the experiment, L1 and L2 regularization terms will be used for training and experiment respectively, and the most suitable penalty coefficient will be selected [8].

BD prediction is the core application of BD. The advantage of BD prediction is that it turns a very difficult prediction problem into a relatively simple description problem, which is beyond the reach of traditional small data sets. From the perspective of forecasting, the results of BD forecasting are not only simple and objective conclusions used to deal with real business, but also can be used to help enterprises make decisions.

3.2 Market risk prediction

The main reason of market risk is the authenticity of data, in addition, it also includes the illegal behavior in financial transactions and the monopoly of data information. Under the background of BD, massive financial data not only meets the demand of financial audit for information quantity and quality, but also puts forward higher requirements for the construction of audit platform. In terms of data storage, the audit data platform should store the data in an orderly manner according to logic, and use certain computer data processing technology to transform the disordered data into data that can be easily used for auditing, which requires the participation of professional computer personnel [9]. Different from traditional auditing, the construction of data platform integrates the knowledge of many disciplines, which puts forward higher requirements for auditors' ability, which will be a new challenge for auditing under the background of BD.

The data processing process mainly includes data acquisition, data information extraction and data analysis, etc. In the whole data processing process, the heterogeneity, integrity, scale, real-time performance and complex processing flow of data are all problems faced by BD systems. Semantic-based BD processing system On the one hand, the system associates various data by using semantic technology, realizes data sharing by integrating the relationships among complex data in the form of RDF, and queries and calculates data from the semantic level; On the other hand, the efficient processing of BD is realized by using distributed computing technology; Compared with the traditional business intelligence technology (such as database and data warehouse), one advantage of semantic technology is that it can freely establish the query architecture as needed, without repeatedly creating the data warehouse task [10].

Semantic technology can link data through relationships and realize data integration of heterogeneous data. Fig. 1 describes the system architecture of a semantic-based BD processing system.

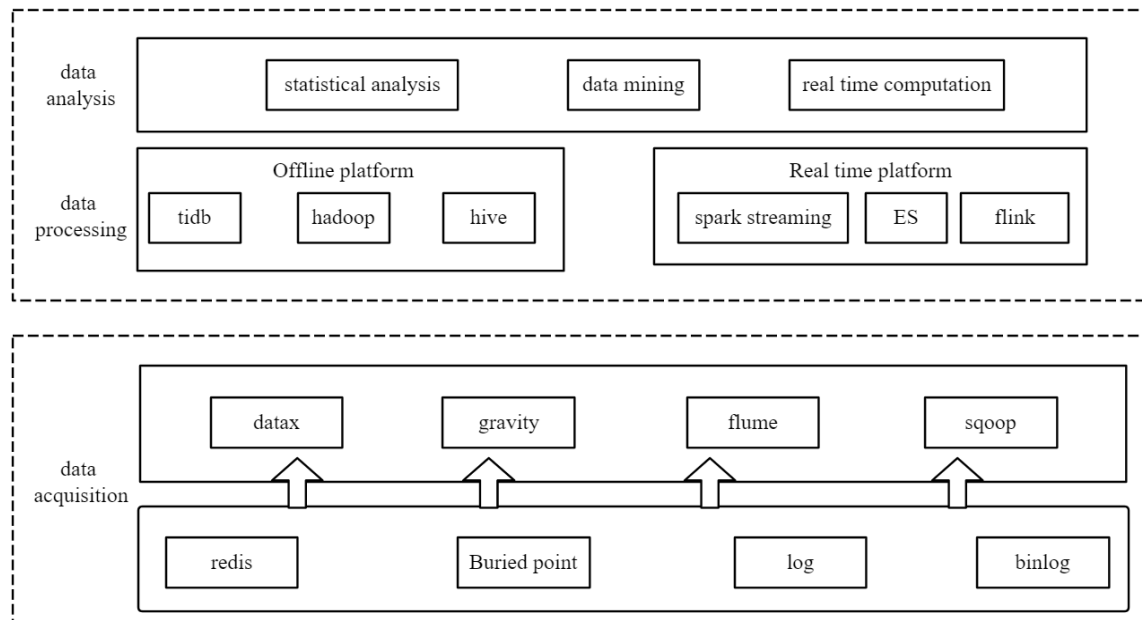


Figure 1 System architecture of semantic-based BD processing system

Data integration refers to the process of sharing or merging data from two or more data sources to create an enterprise application with more functions. From the perspective of integration means, it mainly includes physical integration, logical integration and application integration [11]. Relational data is usually stored in the traditional relational database, which organizes data information in the form of records, while semantic data resources are usually stored in a huge knowledge base, which stores data information in the form of describing examples. On the whole, it explains where financial audit collects data under the background of BD, what data to collect and what methods to adopt for data collection.

3.3 Information security risk prediction

With the development of financial BD technology, it is easy to collect and obtain a lot of private information of users, including financial information, by centralizing and quantifying information. Once the information is leaked, it may cause huge losses to customers. First, the data is separated and not shared. In order to achieve supervision, all departments in the financial industry only analyze the data of their own departments, so that the interrelated data are separated and not shared; Second, some data are closed and delayed. In some special cases, the data will be completely closed, so it can't be analyzed. Even if it can be analyzed, its advantages will not be brought into play due to the delay of the data, and problems and hidden dangers still exist.

4. Financial risk management countermeasures

4.1 Establish the concept of financial BD

It is necessary to change from simple analysis of reasons to analysis of relevance, and to improve efficiency on the basis of analysis accuracy; The third is to change from sampling survey to comprehensive analysis. To analyze financial risks with the help of BD, we should not rely on experience, but should carry out quantitative analysis with the help of data, which not only requires that the analysis should be comprehensive and timely, but also ensure the quickness and effectiveness of data. Analyzing the outline of financial risks by BD can help people to prevent financial risks reasonably, and then realize planning financial risks.

4.2 Data management of financial audit

Data collection is for the management and utilization of data. In the process of financial audit, it is first necessary to use BD collection technology to collect all the required data. After the data collection is completed, how to deal with the data and how to manage these data better will be more important.

After the data of financial institutions are collected, stored and managed in a unified way, it is necessary to use financial BD technology to analyze massive and complex data, find out possible problems, and then evaluate the risks faced, determine the focus of the audit, find audit evidence, and draw audit conclusions. In financial audit, we only need to directly apply the required models or procedures to the audit of the same type of problems, and the system will consciously check out the problem data, realize computer automatic audit, reduce possible mistakes in human audit and improve the audit.

4.3 Constructing financial risk data sharing mechanism

At the data management level, it is necessary to collect and integrate all kinds of financial data information, further realize the use and sharing of risk information in the financial industry, and ensure that the financial industry can do a good job in preventing financial risks in time. Ensure real-time prevention of financial risks in the whole industry. At the same time, it is necessary to open data access channels and establish a data sharing software platform, so as to facilitate the relevant departments and links to obtain risk data, and use BD to carry out scientific analysis, etc., to strengthen the audit of customer credit, and avoid financial risks from all levels.

4.4 Improve the legal system of BD

Use financial BD technology to comprehensively analyze massive data and corresponding data models, identify and judge abnormal changes in data in time, find risk signals, and then predict possible risks. The second is the data mining layer. This is the key layer of financial BD technology for risk prediction. Only by deeply mining a large number of data can we find out the financial risk law hidden behind BD. Sound laws and regulations are the premise of financial risk prevention and control. At present, there is still a big legal gap in the application of BD. The state should adapt to the

development of the situation and introduce effective laws and regulations to adapt to the development of BD, so that BD can guard against financial risks and escort it under the protection of the legal system, so that BD can play its application role.

5. Conclusions

The financial sector has become an active practitioner of financial BD technology. In the rapidly changing era, the traditional risk prediction and prevention strategies in the financial field have been unable to meet the emerging new problems. Therefore, only by keeping up with the pace of the development of the times and using BD to carry out financial risk research is an effective and inevitable path. As far as the financial field is concerned, it is a powerful means to use BD to predict and prevent risks. By identifying, calculating, analyzing and measuring the risks of massive data, we can not only tap the potential risks, but also make full use of information data to create more value, thus helping the financial field to achieve risk management and promote the long-term development of the financial field.

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