Application of Artificial Intelligence and Big Data in Modern Financial Management

Ning Wang
Qinhuangdao campus of Northeast Petroleum University
Qinhuangdao, China
wangning@163.com

Yang Liu
Qinhuangdao campus of Northeast Petroleum University
Qinhuangdao, China
liuyang@163.com

Zhongmin Liu
Qinhuangdao campus of Northeast Petroleum University
Qinhuangdao, China
liuzhongmin@163.com

Xinying Huang
Qinhuangdao campus of Northeast Petroleum University
Qinhuangdao, China
huangxinying@163.com

Abstract—This paper summarizes the related contents of artificial intelligence and big data, analyzes the development of financial field comprehensively, and presents the application of artificial intelligence and big data in the field of finance and taxation. This paper presents a risk estimation method of financial information management system in the context of big data. This method sets up logical nodes according to the system module, and builds a risk estimation model by looking for the logical relationship between the data. Based on the background of big data, the batch and flow calculation methods of big data are selected to calculate the system program risk index and financial data dishonesty risk index.

Keywords-artificial intelligence; big data; financial management; risk index

I. INTRODUCTION

Artificial intelligence is a new technology science that can be researched, developed and used to simulate and expand the theoretical method and technology application of human intelligence. It is the intersection of natural science, social science and technology science. In essence, artificial intelligence is a simulation of the information process of people's consciousness and thinking. It is a technical method of simulation, extension and expansion based on the study of the essence of intelligence to produce a new kind of intelligent machine that reacts in a similar way to human intelligence [1].

In recent years, artificial intelligence has made great achievements in robotics, language image recognition, expert system and so on. It is widely used in robotics, economic and political decision-making, control system, simulation system and other fields. Artificial intelligence can replace financial personnel in the field of finance and taxation to deal with highly repetitive accounting issues.

It can realize cross business and cross post technical operation, deeply excavate the data information of solidified business, strengthen the transformation of financial function, save labor cost, reduce the error probability of manual operation, improve the efficiency of fiscal and tax work, and improve the effectiveness of internal control and risk control.

II. THE APPLICATION OF ARTIFICIAL INTELLIGENCE AND BIG DATA IN THE FIELD OF FINANCE AND TAXATION

A. Application of Artificial Intelligence Technology

The emergence of artificial intelligence technology will effectively improve the accuracy of the above algorithms and models, and provide more effective risk assessment. For example, anti-fraud, artificial intelligence automatically mining text, data, images and other information for in-depth understanding, discovering and labeling risk warnings; credit risk management, artificial intelligence can optimize risk model and solve the quantitative indicators among variables; tail risk, through enhanced learning algorithm, can introduce extreme events into risk analysis.

The starting point of the whole intelligent risk control starts from the acquisition of data, and the main data sources are the data submitted when the user registers, the data generated during the use process, the data generated during the transaction, the data of the third-party organization, etc. The second step is to establish the model, the most important of which is anti-fraud and credit evaluation. The third step is to optimize and iterate the model in practice that is machine learning. For example, IBM has implemented cognitive services based on natural language, which can provide enterprises with risk monitoring services including supervision, risk and compliance, transaction accounts, bank accounts, investment accounts and insurance accounts[2].

B. Analysis and Application of Financial and Tax Big Data

Big data technology provides new impetus for social development. With the deepening of reform in the field of finance and taxation in China, more and more finance and taxation information has been incorporated into the big data information database. The increase of data information brings challenges to the management and development of finance and taxation to a large extent. The application of big data in the

field of finance and taxation transforms new technology into productivity, ends the traditional era of simulation training for accounting and taxation majors, ushers in the information era of real operation in the field of finance and taxation, and changes the practice mode in the field of finance and taxation.

The financial and tax management department can provide accurate data analysis for enterprise capital investment through the analysis of financial and tax big data, and guide enterprises to make scientific investment decisions, so as to meet the requirements of economic development and global economic integration for enterprises. Big data analysis of finance and tax breaks the traditional channels of data analysis of finance and tax, widens the information channels of tax data, and is more conducive to the realization of the goal of integration of finance and tax.

The establishment of big data practice center can realize comprehensive data collection in Internet and hardware resources. Through the management system established in the financial and tax management information platform, the information is selected, classified and processed, and then the intelligent information identification function of big data technology is used for data information storage, analysis and other in-depth processing. Enterprises should take big data technology management as the core of financial and tax management, change the concept of business management, strengthen the training of information theory and practical operation skills of financial and tax management personnel, and improve the information level of financial and tax management. We will improve the financial and tax management system of enterprises and the establishment of the financial and tax management information platform, give full play to the joint efforts of management, and strengthen information sharing and effective use of resources. In big data analysis, we need to strengthen data security to avoid disclosing business secrets and personal privacy.

III. RISK ESTIMATION METHOD OF FINANCIAL INFORMATION MANAGEMENT SYSTEM IN THE CONTEXT OF BIG DATA

A. Model of financial information management system

In the process of risk assessment of traditional financial information management system, the amount of data that can be processed is less. Only the method of sampling survey is used to assess data risk, and the information association between data is ignored. Therefore, in the context of big data, fully consider the impact of system hardware, software, human factors, integrate all data information, and refer to the previous estimation model of system function and device description, build a financial information management system risk estimation model. Each module of the first mock exam completes a common task and the data is processed. Through the interconnection of communication modules, a series of integrated tasks or a single sub task function set can be realized, as shown in Fig. 1[3].
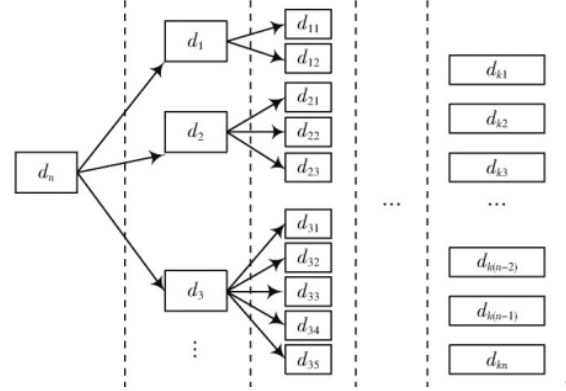

Figure 1. Function structure tree of risk assessment model

It can be seen from Figure 1 that the built evaluation model takes into account the logic node d of the financial system. When using this node to exchange data or execute instructions for the system, the behavior characteristics of the system hardware, software and operators are abstractly understood. The communication link between nodes is the way of financial information interaction, so as to illustrate the interaction relationship between data [4]. For the above structure, the financial system risk assessment model is set up as follows:

$$\varepsilon = \prod_{k=1}^{k} k_i n \frac{A_d}{B_d} \qquad (1)$$

When the calculated results exceed the given safety range, it indicates that there is a risk in the system, so far the estimation model has been built [5].

B. Calculate Risk Iindicators Based on Big Data Background

On the basis of the estimation model, when the evaluation results exceed the specified standard security range, the risk index is calculated by big data analysis method for massive financial information data. The purpose of risk index is to investigate all kinds of faults that may occur in the information management system, as well as the causes and results of faults. The evaluation method of this paper adopts this concept to calculate the quantitative consequences under the severity function based on the estimation model of system operation and the quantitative possibility of the failure characteristics of system operation program, through the utility theory and the estimation of risk preference function, so as to realize the calculation of risk indicators[6], as shown in Fig. 2.
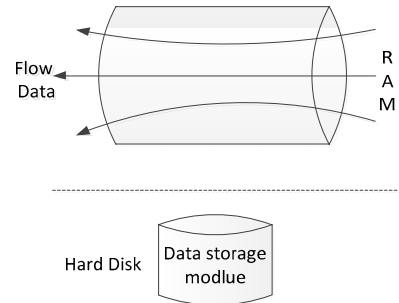
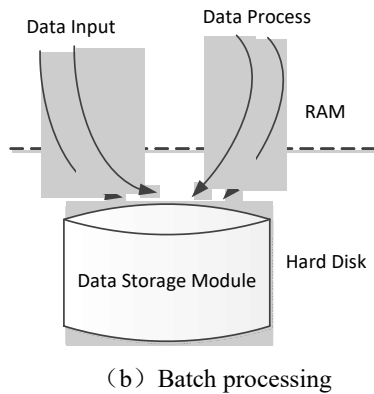

（a）Flow Processing

（b）Batch processing

Figure 2. Calculation model of risk index

It can be seen from Figure 2 that when calculating risk indicators, batch calculation and flow calculation are used to process financial data, so as to improve the throughput of the risk estimation method for data processing. Among them, batch processing is carried out for the data that will not change basically, and flow calculation method is adopted for the data that changes dynamically in real time[7]. The cross-line risk index of system operation procedure reflects that under different management modules, the amount of data information of each control unit during operation exceeds the specified value that the system can carry, while the risk index of dishonesty. It represents the risk that each data node will lose relevant data information when the management system fails.

IV. CONCLUSION

Under the background of artificial intelligence and big data, financial data is more diversified. From the original single and fixed data, it has evolved into the current form of multiple models, multiple structures and real-time changes. The traditional system risk estimation method cannot meet the needs of financial system upgrading. The estimation method of this paper takes the huge and complex financial data as the primary research focus, so that all financial data can be analyzed, evaluated and calculated to ensure the authenticity of financial data.

REFERENCES

[1] J. Yang. Build the application platform of financial big data to help the construction of smart finance, Shanxi Finance and Taxation, Taiyuan, vol.10, pp. 46-47, Oct 2017.

[2] P. Guo. Build the application platform of financial big data to help the construction of smart finance, Financial Science, vol.2, pp. 109-110, Feb 2019.

[3] X.C. Ma, C.S. Zhong. Research on the support model and implementation mechanism of personalized adaptive learning system from the perspective of big data, China Educational Technology, vol. 4, pp.97-102, Apr. 2017.

[4] X.B. Tang, Z.M. Zhou. Research on dynamic monitoring of network Emergency under the background of big data, Statistical Research, vol. 34, pp.44-54, Feb. 2017.

[5] F.Y. Zhan. The construction of university financial audit information system for the new financial accounting system, Journal of Wuhan University of Science and Technology, vol. 40, pp. 240-244, Mar. 2018.

[6] Y.S. Liu, Y.Y. Chen. Management tone and credit risk warning of listed companies, Financial Economics Research, vol.33, pp.46-54, Apr. 2018.

[7] X.D. Chen. Risk assessment of educational information management system based on modern statistical theory, Modern electronic technology, vol. 41, pp. 149-152, May 2018.