



Multi-module Accounting Sharing Model from the Perspective of Regional Network

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Abstract. In order to improve the multi-module accounting sharing ability and the accuracy of shared data query, a multi-module accounting sharing model under the regional network perspective is proposed. The big data fusion and fuzzy association mining method are used to extract information and construct features of multi-module accounting big data. The adaptive learning algorithm is used to optimize the learning of multi-module accounting sharing big data. The effective feature quantity of multi-module accounting sharing big data is mined through efficient item set mining method, and the fuzzy feature distribution of multi-module accounting sharing big data is obtained. Based on big data technology, the application model of multi-module accounting sharing information platform is established. The distributed grid computing method is used for multi-module accounting sharing big data information fusion and hierarchical clustering. According to the clustering results, combined with the regional network networking design method, a multi-module accounting sharing platform model is constructed to realize multi-module accounting sharing. The experimental results show that the proposed method has a high precision ratio and a small root mean squared error, which can effectively improve the multi-module accounting sharing ability and the accuracy of shared data query.

Keywords: Regional Network · Big Data Technology · Mining Fuzzy Association Degree · Multi-Module · Accounting Sharing · Sharing Platform

1 Introduction

At present, with the deepening of economic globalization, information technology represented by cloud computing and the Internet is widely used, massive data is growing rapidly, enterprise informatization is becoming more and more mature, and market competition is extremely fierce. Taking this opportunity, the scale of enterprise groups is expanding rapidly, and they continue to carry out global operation and refined management. However, once they enter the mature period or the economy is in a downward trend, they will inevitably face some prominent problems, such as slow income growth, cost increase, low efficiency and poor control of subsidiary companies, which seriously hinder their effective operation and development. In order to achieve the purpose of efficiency improvement, cost reduction and value enhancement, enterprise groups integrate advantageous resources, optimize business processes, carry out management innovation, and

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shared accounting services came into being. Accounting sharing is a brand-new financial management model based on information technology that has been developed in recent years. The core of accounting sharing is the centralization of financial business processing, with the goal of optimizing the organizational structure, improving efficiency, and reducing operating costs, and ultimately enhance the overall value of the enterprise [10]. With the advent of the intelligent era of big data, the process of enterprise accounting sharing and intelligent construction has been accelerated, and the enterprise accounting sharing operation and management model has been continuously transformed from a traditional model to an intelligent and automated management model. The establishment of a multi-module accounting sharing platform can not only improve the efficiency of corporate financial accounting and reduce costs, but also provide enterprises with a large amount of financial data and business data, which facilitates decision support [11]. Therefore, research on the construction method of a multi-module accounting sharing platform is of great significance in the intelligent management and design of accounting information, and the research on the design method of a related multi-module accounting sharing platform has attracted great attention.

Reference [4] proposed the optimization research of Financial Sharing Mode based on blockchain technology. Starting from the basic architecture of blockchain, it established the infrastructure model and specific optimization path of financial sharing model, designed the internal and external structure of Financial Sharing Model based on blockchain technology, and formed the financial sharing mode. The feasibility and effectiveness of the model and method are better verified. Reference [15] proposes a financial sharing mode based on consortium blockchain, which divides the whole financial sharing system into business module, capital module and strategy module. The consortium blockchain includes the financial department of subsidiary company, business module and capital module of Financial Sharing Center. Use the DPoS consensus mechanism to jointly maintain a ledger, use the P2P network to realize the decentralization of books, and form a financial sharing model through data sharing. This method ensures the traceability of information and improves the security and integrity of data. However, the above methods have the problems of low accuracy of multi-module accounting sharing capabilities and shared data query.

To solve the above problems, this paper proposes a multi module accounting sharing model from the perspective of regional network. Using big data fusion and fuzzy association mining method, information extraction and feature construction of multi module accounting big data, using adaptive learning algorithm, multi module accounting sharing big data optimization learning, through efficient use of item set mining method, obtain multi module accounting sharing big data fuzzy feature distribution. Based on big data technology, the application model of multi module accounting sharing information platform is established. Using distributed grid computing method, information fusion and hierarchical clustering, multi module accounting sharing big data, combined with regional networking design method, multi module accounting sharing is realized. The model has high precision and small root mean square error, and can accurately realize multi module accounting sharing.

2 Multi-module Accounting Sharing Big Data Feature Distribution

In order to realize the construction of multi-module accounting sharing model from the perspective of regional network, the big data fusion and fuzzy association mining method [5, 8] are used to extract information and construct features of multi-module accounting big data. The distribution set of correlation characteristics of multi-module accounting sharing big data is obtained as follows:

$$F_m(x, y) = \sum_j^m u_j(k) \frac{\hat{x}}{k} P^j \quad (1)$$

In formula (1), \hat{x} is the concept set of fuzzy correlation feature distribution of multi-module accounting shared data, $u_j(k)$ is the remaining data storage voucher, k is the feature with the highest feature correlation, and P^j is the probability density function of the associated budget account feature distribution [9]. Quantitative statistical analysis method is used for cloud computing fusion processing of multi-module accounting sharing big data, the distributed fusion model of multi-module accounting sharing big data features is constructed, the distributed reorganization of multi-module accounting sharing big data information is carried out under the cloud computing platform, and the ability of multi-module accounting sharing big data management and information fusion is improved.

Combined with the adaptive learning algorithm [1] to optimize the learning of multi-module accounting shared data, the frequent dynamic measurement distribution of multi-module accounting shared data is obtained as:

$$U_{i,j}(t) = \frac{\left[-p_{i,j}(t)[z_i(t) - z_j(t)]^2\right]}{\Delta p(t)sp_{i,j}(t)} \quad (2)$$

In formula (2), $p_{i,j}(t)$ is the amount of cross-correlation information of the multi-module accounting shared data; $sp_{i,j}(t)$ is the marked sample feature quantity of the multi-module accounting shared data; $\Delta p(t)$ is the adaptive gain coefficient of the multi-module accounting shared data; $z_i(t)$, $z_j(t)$ are expressed as the ambiguity function of multi-module accounting shared data [3]. Based on the above analysis, conduct multi-module accounting and sharing big data mining. Through the efficient use of itemset mining method, the association rule mining of multi-module accounting shared big data is carried out, and the fuzzy distributed association set of multi-module accounting shared big data is obtained as:

$$D''_{i,j}(t_{n+1}) = \frac{D'_{i,j}(t_{n+1}) + U_{i,j}(t)D'_{i,j}(t_n)}{2} \quad (3)$$

It obtains the degree of difference between accounting data statistics at time t_{n+1} and time t_n , and mines the effectiveness characteristics of multi-module accounting shared big data, and obtains the ambiguity feature distribution of multi-module accounting shared big data as:

$$I_{i,j}(t) = \frac{\sum F_m(x, y)U_{i,j}(t)}{\sum D''_{i,j}(t_{n+1})} \quad (4)$$

Through the above analysis, the method of fuzzy association mining and big data information fusion is used to extract the association features of multi-module accounting sharing big data, mine the effective feature quantity of multi-module accounting sharing big data, and obtain the fuzzy feature distribution of multi-module accounting sharing big data.

3 Multi-module Accounting Sharing Platform Model

Multi-module accounting sharing platform is to adapt to the development goal of intelligent, collaborative, dynamic and simplified accounting service industry, integrate cloud computing and big data driving elements into the accounting field, so as to realize information sharing, resource docking, process tracking and feedback, business integration and optimization, and intelligent decision-making [7, 12, 13]. This paper proposes a multi-module accounting sharing information platform application model based on big data, including six functions: information resource sharing, intelligent accounting, accounting transaction, real-time monitoring, decision analysis and management control, to realize enterprise accounting resource sharing and business restructuring, as shown in Fig. 1.

According to Fig. 1, the application model of multi module financial accounting sharing information platform based on big data provides users with rich and diverse financial accounting information query services by using big data technology, and implement services such as inquiry quotation, government supervision, data exchange, and information communication through data exchange technology, and improve the level of modern financial and accounting informatization. According to the accounting data generated in the process of accounting operation, this paper analyzes and judges the operation status of enterprises, so as to integrate the resources of accounting, capital flow and information flow, and realize the sharing of accounting information resources. Apply computer database technology, launch accounting application software, realize remote docking through the platform, ensure the normal operation of the enterprise, enhance the competitiveness of the enterprise, and realize the intelligentization of accounting. The multi-module financial and accounting sharing information platform also provides important financial risk forecasts, comprehensive coverage of the blind spots of financial accounting, and personalization of financial and accounting transactions. Through real-time supervision of accounting enterprises and setting industry access standards,

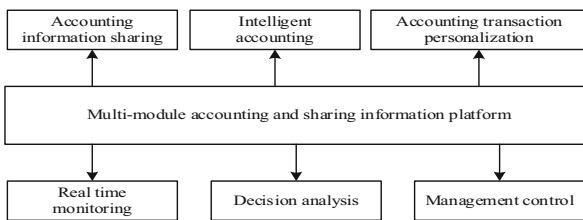


Fig. 1. Application model of multi-module financial and accounting sharing information platform based on big data

government departments monitor the entire process of accounting and establish an efficient government supervision information system, provide policy information output for accounting enterprises, and realize effective real-time monitoring. The multi-module financial and accounting sharing information platform uses machine learning to build models to analyze massive amounts of data, and control a single variable to simulate the financial and accounting plan, so as to find the optimal plan and realize the financial and accounting auxiliary decision-making analysis. For the protection of information security, through data mining and analysis, a security protection system is designed to detect network intrusions in real time, strengthen security management measures, and realize accounting management control [14].

The distributed grid computing method is used to carry out multi-module accounting and accounting sharing big data information fusion and clustering analysis, analyzing the relevance of multi-module accounting and sharing big data, fusion scheduling multi-module accounting and sharing big data, and obtaining the statistical characteristics of data integration:

$$K(x_i, x_j) = \frac{1}{\sqrt{T}} s_C(t) \quad (5)$$

The multi-module financial and accounting shared big data integrated with N sub-spaces is hierarchically clustered [2]. According to the clustering results, combined with the method of regional network networking design, the multi-module financial and accounting sharing platform model is constructed as:

$$M = \frac{1}{2} \sum_{i=1}^l \sum_{j=1}^l y_i y_j \alpha_i \alpha_j K(x_i, x_j) - \sum_{j=1}^l \alpha_j \quad (6)$$

$$0 \leq \alpha_j \leq u(x_j)C, \quad j = 1, 2, \dots, l$$

According to the above analysis, the distributed grid computing method is used for multi-module accounting sharing big data information fusion and hierarchical clustering. According to the clustering results, combined with the regional networking design method, the multi-module accounting sharing platform model is constructed to realize multi-module accounting sharing.

4 Experimental Analysis

4.1 Experimental Data

In order to verify the application performance of the proposed method in the realization of multi-module accounting sharing, MATLAB software is used for simulation test analysis. The experimental data comes from the airy database, assuming that the spatial concept distribution of multi-module accounting shared data sampling is 400×400 , the initial sampling length of accounting information is 1024, the characteristic resolution is 200 Kbps. According to the above sample sampling and parameter setting, the multi-module accounting sharing platform is constructed.

4.2 Performance Index Analysis

(1) Precision ratio: The performance index refers to the ratio of the amount of information related to multi-module accounting sharing retrieved to the total amount of information shared by multi-module accounting retrieved. The closer the precision ratio is to 1, the higher the precision ratio is, indicating the higher the accuracy of accounting shared data query. The calculation formula is as follows:

$$P = \frac{A}{A + B} \quad (7)$$

In formula (7), A represents the amount of information shared by the multi-module accounting and B represents the total amount of information shared by the multi-module accounting.

(2) Root mean squared error: the performance index can reflect both the size of sharing error and the dispersion of sharing error. The smaller the root mean squared error is, the higher the ability of multi-module accounting sharing is. The expression is as follows:

$$RMSE = \frac{1}{p} \sqrt{\sum_{i=1}^p |w_y - w_s|^2} \quad (8)$$

In formula (8), w_y represents the multi-module accounting shared value, and w_s represents the multi-module accounting shared original value.

4.3 Analysis of Experimental Results

Using the reference [4] method, the reference [15] method and the proposed method respectively, the two performance indexes of precision ratio and root mean squared error are calculated by using the above formula, and the comparison results of precision ratio of different methods are obtained, as shown in Table 1.

Analysis of Table 1 shows that the precision ratio of different methods increases with the increase of iteration times. When the number of iterations is 1000, the precision ratio of the reference [4] method, the reference [15] method and the proposed method are 0.93, 0.80, and 0.99, respectively. It can be seen that the closer the precision ratio of the proposed method is to 1, the higher the precision ratio, which can effectively improve the accuracy of the query of shared accounting data. The root mean squared error comparison results of multi-module accounting sharing of different methods are as Table 2.

It can be seen from Table 2 that when the number of iterations is 1000, the root mean squared errors of the reference [4] method, the reference [15] method and the proposed method are 0.03, 0.05 and 0.022 respectively. It can be seen that the root mean squared error of the proposed method is small, which can effectively improve the multi-module accounting sharing ability.

Table 1. Comparison results of precision ratio of different methods

Number of iterations	Precision ratio		
	The reference [4] method	The reference [15] method	The proposed method
100	0.65	0.45	0.71
200	0.70	0.60	0.75
300	0.76	0.65	0.80
400	0.79	0.69	0.90
500	0.82	0.70	0.95
600	0.89	0.72	0.97
700	0.91	0.75	0.98
800	0.92	0.76	0.98
900	0.92	0.77	0.99
1000	0.93	0.80	0.99

Table 2. Root mean squared error comparison results of different methods

Number of iterations	Root mean squared error		
	The reference [4] method	The reference [15] method	The proposed method
100	0.030	0.051	0.021
200	0.031	0.052	0.022
300	0.029	0.048	0.019
400	0.029	0.051	0.020
500	0.032	0.053	0.024
600	0.028	0.047	0.025
700	0.032	0.046	0.018
800	0.027	0.054	0.020
900	0.033	0.051	0.023
1000	0.030	0.049	0.021

5 Conclusion

This paper proposes a multi-module accounting sharing model under the regional network perspective, using big data fusion and fuzzy association degree mining methods to extract information and feature construction of multi-module accounting big data, and obtain the ambiguity feature distribution of multi-module accounting sharing big data. Based on big data technology, the application model of multi-module accounting

sharing information platform is established. The distributed grid computing method is used for multi-module accounting sharing big data information fusion and hierarchical clustering. Combined with the regional networking design method, the multi-module accounting sharing platform model is constructed to realize multi-module accounting sharing. The multi-module accounting sharing platform constructed by the proposed method can effectively improve the multi-module accounting sharing ability and the accuracy of shared data query.

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