Hindawi
Mathematical Problems in Engineering
Volume 2022, Article ID 5854105, 9 pages
https://doi.org/10.1155/2022/5854105

Research Article

Research on Audit Simulation of Accounting Computerization Based on Internet Complex Discrete Dynamic Modeling Technology

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Received 15 December 2021; Accepted 17 January 2022; Published 23 March 2022

Academic Editor: Gengxin Sun

With the rapid development of science and technology, modeling technology involves more and more fields and the data objects studied are more and more abstract. Based on the Internet plus complex discrete dynamic modeling technology, this paper studies the auditing and control of computerized accounting computerization. In order to maintain the steady state of the discrete dynamic system, the lifting method boosting, least square method, gradient boost, and LS-Ensem algorithm are added in the modeling process. Then, in order to improve the data recognition ability of the system, the recognition algorithm is added. The results show that the complex discrete dynamic system composed of the above algorithms is different from the ordinary system and can be better suitable for small-scale data. It also improves the stability of the whole system and then improves the accuracy of the model. Compared with ordinary discrete systems, the complex discrete dynamic systems studied in this paper can better overcome external factors and avoid errors. The system can quickly analyze and process the data that need statistics and has good application value.

1. Introduction

Mathematical modeling technology and various system algorithms are important research directions of many researchers in recent years. With the increasing development of complex discrete dynamic modeling technology, modeling technology is applied in more and more industries [1]. Nowadays, modeling technology has been widely used in education, aerospace, audit, and other industries [2]. In the audit industry, there is an increasing demand for data audits. In order to solve this problem, many researchers have optimized the calculation of data in the traditional discrete model [3] and also according to the need for statistical calculation of the data for analysis and processing. However, in the traditional discrete model, only data with the same attributes can be processed and a large amount of data needs to be classified and screened artificially [4]. A series of problems such as missing data selection and wrong data input often occur in artificially selected data. This situation makes the discrete model unable to obtain the final data results accurately in data calculation and data analysis and does not achieve the purpose of data automatic processing [5]. Subsequent researchers proposed to replace the ordinary discrete model with the complex discrete dynamic model. Through the replacement of the model, the step of artificial filtering of the data is omitted. The application of the model not only saves human resources but also improves the data processing ability. However, under a large amount of data, the system may not always maintain a high-efficiency and high-precision processing effect [6]. Later, researchers solved the unstable state of the system by adding boosting algorithm and LS-Ensem algorithm to the complex discrete dynamic model [7]. Through the combination of algorithm and discrete dynamic model, the system can run stably in the processing of small-scale data and large-scale data. It also further improves the accuracy and processing speed of data.

In recent years, with the development of complex discrete dynamic systems in the Internet plus field, education field, and aerospace field, it is known from the existing data that many experts in this field add data promotion algorithms to complex discrete dynamic systems based on networking [8]. The system can calculate or analyze different data sets, so as to improve the data processing efficiency of the system. In the complex discrete dynamic system, the boosting algorithm of a small quadratic function is added to make the discrete dynamic system more stable. The sample data can be simplified, which speeds up the data processing speed of the system. Then, according to the above development of complex discrete dynamic modeling technology, this paper proposes to add gradient boost and LS-Ensem algorithms [9]. The complex discrete dynamic system with improved performance can accurately process the data to be audited and greatly reduce the generation of errors.

In this paper, the optimal boosting algorithm under a complex discrete dynamic system is proposed to audit and control the data required by accounting computerization. Innovation contributions include the following: (1) The boosting algorithm is added to the original discrete system to better deal with the situation of small sample data. Then, the algorithm is modified so that it can be called directly by the system and applied to the steady-state modeling of data. (2) The accuracy of the model is effectively improved by modifying the gradient descent theory. (3) Compared with the traditional complex discrete dynamic system, the complex discrete dynamic system based on an optimal boosting algorithm has more stable system performance and can accurately analyze different forms of data.

This paper is mainly divided into three parts. The first part mainly describes the development status of complex discrete dynamic modeling technology. The second part studies the audit and control of accounting computerization based on a complex discrete dynamic system. Firstly, by combining partial least squares algorithm, gradient boost algorithm, and LS-Ensem algorithm in boosting algorithm, the complex discrete dynamic system dealing with accounting computerization is stably optimized. Finally, the system identification algorithm is used to search, classify, and identify the parameter data required by accounting. The third part analyzes the research results of audit and control modeling of accounting computerization based on complex discrete dynamic systems and analyzes the data identification results of accounting computerization under the complex discrete dynamic system.

2. Related Work

The data calculation and processing of accounting computerization is an important content in the networked complex discrete dynamic system. Firstly, the boosting algorithm is used to accurately process the data required for calculation and analysis. Finally, the complex discrete dynamic system is modeled through the combination of system identification technology [10]. In the process of analyzing the data to be calculated by accounting, there are often problems such as data omission, neglect of small data, and data classification error [11]. In order to realize a complex discrete dynamic system instead of manual calculation, we must first solve the problems in data. In recent years, the purpose of data enhancement processing can be achieved by integrating boosting algorithms in the process of complex discrete dynamic modeling [12]. The key content is to add learning skills to the system, so as to achieve accurate data analysis. However, the discrete dynamic system with only boosting algorithm will be affected by external environmental factors, resulting in system errors and inaccurate data processing [13]. Many subsequent researchers also added gradient enhancement and LS-Ensem methods on the basis of boosting algorithms [14]. The complex discrete dynamic system combined with the above algorithm can accurately and efficiently process the data required for calculation and analysis and finally realize the system model construction of data audit and control of accounting computerization [15].

China has widely applied complex discrete modeling technology to various software programs, such as WeChat. This modeling technology is introduced into the bill details in WeChat [16]. It can store the daily expenditure and income of users and finally integrate the data as a whole. Each user can know his/her expenses in real time through weekly, monthly, and annual bills, which provides convenience for human life [17].

The complex discrete modeling technology is applied to the field of statistical employment types, and individual employment can be obtained through big data. Combined with the discrete modeling system, the number of employees and employment types can be analyzed as a whole and the final number of employees can be obtained quickly [18, 19]. The introduction of this technology can not only count employment but also indirectly calculate per capita income.

Through the combination of the detector and discrete modeling system, real-time sharing of geological data can be achieved [20]. By comparing the data generated by deformation displacement monitoring and crack relative displacement monitoring with the normal data, once the data deviation occurs, the inspector can immediately find and give an early warning [21].

The traditional garment industry mainly relies on manual production of clothing. With the continuous development of science and technology, automatic machinery is added in the process of producing clothing [22]. The combination of machinery and the complex discrete dynamic system can automatically compare the length, width, and other details of clothing, so as to improve the production efficiency and quality of products [23]. Based on the complex discrete dynamic system, this paper studies the audit and control of accounting computerization and finally realizes the data processing and calculation of the system [24]. In the process of establishing the discrete dynamic model, the system processing data is optimized by adding the boosting algorithm and then the boosting algorithm is optimized to avoid the influence of external factors on the data results. Finally, the system identification algorithm is used to strengthen the data classification processing. Finally, the complex discrete dynamic system of audit and control of accounting computerization is obtained.

3. Research on Audit and Control of Accounting Computerization Based on Complex Discrete Dynamic Systems

3.1. Research on Modeling Technology of Accounting Computerization Based on Complex Discrete Dynamic Systems. Complex discrete dynamic systems are models that depend on data. The type of model changes with the properties of data, and it can share data under the background of Internet plus. When processing nonlinear data samples, the system mainly receives the sample data and classifies the attributes, so as to make the data clearer. The traditional complex discrete dynamic model construction process mainly uses the small multiplication algorithm. When dealing with some floating-point numbers, the operation will produce errors and the result is similar to an infinite loop. The reason is that the binary 01 code used by the computer cannot accurately represent some decimal data with decimal places. Because binary values can accurately represent integers (which can be verified by converting integers to binary methods), decimal numbers can be multiplied by 10 or 100 to become integers, then integer operations can be performed, and finally, the results can be obtained by dividing by 10 or 100. The best approximate result can be obtained by intercepting the effective decimal places of the result and then by processing it. For decimal values that can be represented by binary values of finite length, the data type with storage bits greater than its length can be used to solve the error problem. The core of the small binary algorithm is to assimilate the data, which further improves the efficiency of the system in processing nonlinear data. If the system is dealing with small data, it is likely to have the phenomenon of data assimilation error, and the complex discrete system will also face problems such as system disorder, which will also lead to wrong output results. Based on the above situation, this paper proposes to add an optimized boosting algorithm to the complex discrete dynamic system to solve the problem of improper processing of microdata. Finally, the upgraded complex discrete system is applied to deal with the data that needs to be calculated by accounting. The data processing flow of computerized accounting under a complex discrete system is shown in Figure 1.

It can be seen from Figure 1 that the data processing process of accounting computerization is mainly through data acquisition, data storage processing, and data output. Each operation step is also executed around the data information to be calculated. By combining with the complex discrete dynamic system, the current situation of traditional manual statistics and calculation data is changed. The complex discrete dynamic modeling technology is optimized, and then, the sample data are calculated and processed, which greatly improves the data processing performance of the whole experiment and the stability of the discrete system. In the process of data storage and calculation of complex discrete dynamic systems, the accuracy of information processing is improved by combining partial least square (PLS) method. The relevant formula is as follows:

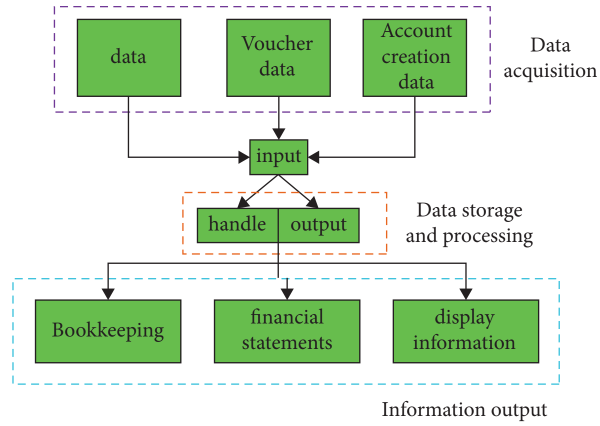

Figure 1: Information data processing flow chart.

$$f(x) = \inf\left\{ y \in Y:\ \sum_{t:\ h_t(x \le y)} \frac{\log 1}{\beta_t \ge \sum_t \log 1/\beta_t} \right\},$$

$$\forall x = XE_{\mathrm{i}}(i) = 1 - \exp\left(\frac{-e_t(i)}{\left\| e_t(i) \right\|_\infty}\right), \quad i = 1, \ldots, m, \tag{1}$$

$$\overline{L} = \sum_{i=1}^{m} E_t(i) D_t(i).$$

The system model in data storage calculation and the method of calculating data fitting loss are defined in the formula, which can further reduce the error caused by data. Because the traditional PLS method as a nonlinear modeling method cannot consider the data distribution information in the construction process, it needs to be further optimized if the whole complex discrete dynamic system can call and process the data better. The modeling process based on sample data and distribution is shown in Figure 2.

When storing and processing the data needed for accounting computerization, it is not enough to optimize the internal algorithm of the system. It is also necessary to combine the model system with software equipment to achieve computerized accounting. The traditional complex discrete dynamic system mainly uses the network channel for optimization operation; that is, the channel is widened. When the amount of data passing through the channel increases at the same time, the speed of data processing by the system will also increase. This data processing method is often applied when there is no requirement to calculate data. The results show that if the system is uniformly stable, its state space can be divided into several stable classes and each class has its corresponding steady-state solution domain. The system studied in this paper mainly carries out accurate analysis and operation on the data, which can maintain the stability of the whole complex discrete dynamic system in processing the data information to be calculated. The

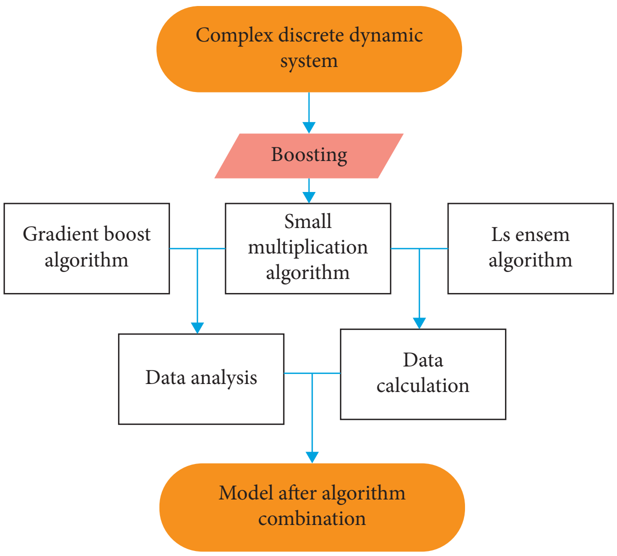

Figure 2: Overall flow chart of modeling.

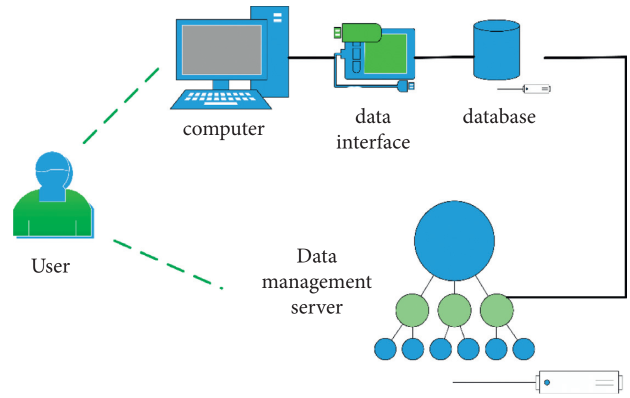

Figure 3: Accounting computerization equipment diagram.

software equipment applied in a complex discrete dynamic system is shown in Figure 3.

As can be seen from Figure 3, the data information to be processed is first stored in the memory and the stored data is put into the data controller for analysis or calculation. In the task of processing data, we also need to process the data more carefully. Therefore, this paper proposes to strengthen the processing inside the boosting algorithm. The PLS method in boosting algorithm is optimized. Firstly, the output model formula of PLS is obtained as follows:

$$\begin{aligned} w &= \frac{x' y}{(y' y)}, \\ &= \frac{D(1) \times y_1 x_1 + \cdots + D(m) \times y_m x_m}{D(1) \times y_1^2 + \cdots + D(m) \times y_m^2} \\ &= \frac{X'(D.y)}{x'(D.y)} \\ p &= \frac{X'(D.t)}{(t'(D.t))}, \\ c &= \frac{y'(D.t)}{(t'(D.t))}. \end{aligned} \tag{2}$$

The output model of the PLS method can be seen from formula (2). The parameters in the model are only related to p and c. In the optimized algorithm, the extended data part can be calculated only by using the sample data to be calculated in this paper. Although the small multiplication method changes the collection mode of data samples, it also has a certain impact on system modeling. However, considering that the system maintains a stable state when processing data, the gradient boost algorithm is added to the original modeling method. The relevant formula is as follows:

$$\begin{aligned} F &= \arg\min_{F \in \wp} E_{Y,X}(y, F(x)), \\ -g_t(x_i) &= -\left[\frac{\partial L(y_i, F(x_i))}{\partial F(x_i)}\right]_{F(x) = F_t - 1((x)}. \end{aligned} \tag{3}$$

According to the previous formula, the negative gradient value in the sample set size can be calculated and the value is substituted into the algorithm definition. The obtained function is as follows:

$$\alpha_t = \arg\min_{\alpha,\beta} \sum_{1}^{m} \left[-g_t(x_i) - \beta h(x_i; \alpha)\right]^2. \tag{4}$$

From the overall process of the gradient boost algorithm, it can be seen that it is a search algorithm through gradient iteration in function space. The same type of data needs to be searched in each iteration, and the algorithm can also optimize the search problem. This paper also proposes the LS-Ensem method based on the gradient boost algorithm, which avoids a large number of calculations in the iterative process and reduces the computational complexity of the algorithm. LS-Ensem formula is as follows:

$$\begin{aligned} -g_t(x_i) &= -\left[\frac{\partial L(y_i, F(x_i))}{\partial F(x_i)}\right]_{F(x) = F_t - 1(x)} \\ &= y_i - F_{t-1} x(x_i) = y_i, \\ \rho_t &= \frac{\sum_{i=1}^{m} h_t(x_i) y_i}{\sum_{i=1}^{m} h_t^2(x_i)}, \\ F_t(x) &= F_{t-1}(x) + \rho_t h_t(x). \end{aligned} \tag{5}$$

The LS-Ensem method can not only directly operate the data to be calculated but also ensure the accuracy of the system algorithm. In the processing of a large amount of data, it can also be processed efficiently. In the complex discrete dynamic system with various algorithms added, the curve of errors and the marginal distribution of data are shown in Figure 4.

It can be seen from Figure 4 that the complex discrete dynamic system after the optimization algorithm has a very small probability of error in the process of system operation.

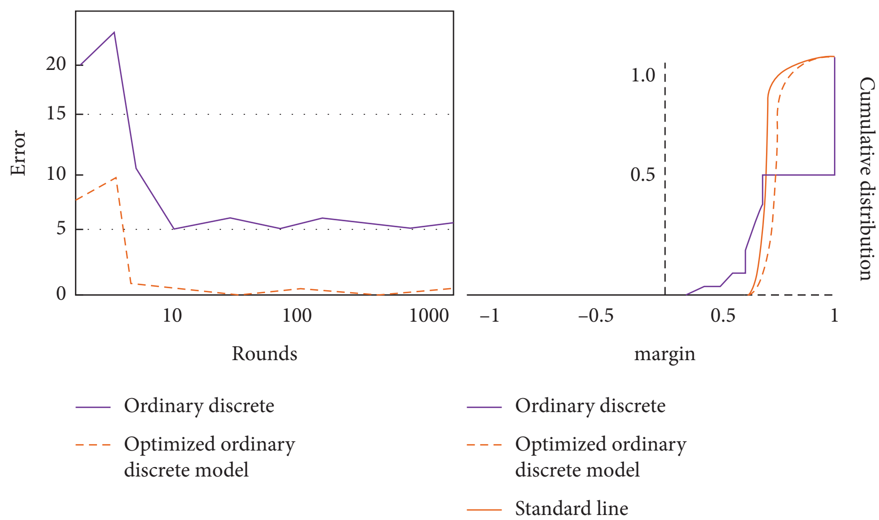

Figure 4: Error curve and marginal distribution diagram.

In the marginal distribution of data, it is closer to the standard marginal distribution. To sum up, the complex discrete dynamic model optimized by the algorithm system can better stabilize the system.

3.2. Research on System Identification Technology of Accounting Computerization Based on Complex Discrete Dynamic Systems. The complex discrete dynamic system optimized by the algorithm can maintain good system stability when performing data processing. In order to consider the data identification ability of the system in the process of accounting computerization, this section proposes to add the methods of search, clustering, and pattern classification to the system identification technology to realize the identification of complex discrete dynamic systems. The parameters identified by the data parameter nodes in the model have higher confidence than the data node parameters in the ordinary model. The confidence of node parameters is mainly reflected in the value of the internal matrix of the model. The smaller the value, the higher the confidence of node parameters. Therefore, the internal matrix value of the model is used as the performance index to search in the sample data to obtain the preliminary clustering of stage data. Then, by adding distance parameters, cluster adjustment, and interval segmentation, the sample data is assimilated, detected, and supervised.

Firstly, the data nodes are preliminarily clustered, and the calculation matrix and model parameters are calculated as follows:

$$\begin{aligned} \vartheta_j &= \left(\phi_j'\phi_j\right)^{-1}\phi_j' Y_j, \\ V_j &= \frac{SSR_j}{c-(n+1)}\left(\phi_j'\phi_j\right)^{-1}, \\ \mathrm{SSR}_j &= Y_j\left(I-\phi_j\left(\phi_j'\phi_j\right)^{-1}\phi_j'\right)Y_j. \end{aligned} \tag{6}$$

After calculating the model parameter values and matrix values, the node data of the data points can be compared with the matrix values. When the absolute value of the data node value is greater than the matrix value, it is proved that the data belongs to the same region. Therefore, the matrix value can be used as the standard to judge the data type, and the sample data can be judged. The average fitting error formula generated in the calculation process is as follows:

$$er_l = \frac{1}{c}\sqrt{\sum_{i=1}^{c}\left(y_{li}-\left[x_{li},1\right]\theta_l\right)}. \tag{7}$$

The formula can carefully filter the c data points and finally delete the data that does not need an operation. In the discrete dynamic system, the clustering of data nodes is shown in Figure 5.

It can be seen from Figure 5 that the complex discrete dynamic system with added function has better clustering performance. In order to further improve the correct clustering of data nodes in clustering, the data difference rate is added in the clustering process and optimized. The function for calculating the difference rate is as follows:

$$V_\theta = \max\left|\frac{\left(\theta_k-\theta_i\right)\cdot}{\max\left(\theta_k,\theta_i\right)}\right|. \tag{8}$$

By calculating the difference rate between adjacent data, we can judge whether assimilation can be carried out and finally achieve the correct classification of data nodes. The frequency distribution of data in the identification process is shown in Figure 6.

As can be seen from Figure 6, the frequency of the data in the identification process is in a high-frequency stable processing state. It is proved that adding the optimized data node clustering method to the system identification technology can keep the data comprehensive when dealing with the data parameters of the whole system. When the above-known data nodes are clustered, the data interval can

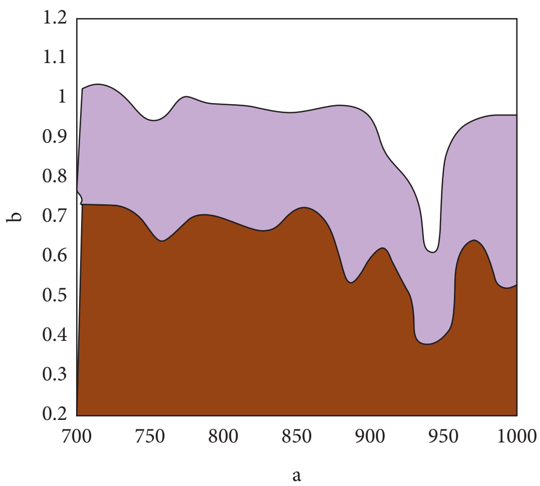

Figure 5: Comparison diagram of data clustering in a discrete dynamic system.

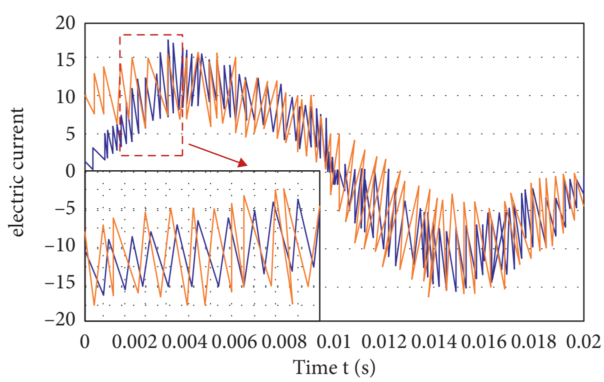

Figure 6: Frequency distribution diagram in data identification.

be segmented and the model can be identified. The combination parameters of relevant models can be obtained only by dividing the data and making statistics on the plane.

In order to more intuitively see the identification and processing ability of the system for data orders, the sample data is put into complex discrete dynamic systems with different functions. The proportion of identification processing capacity in different systems is shown in Figure 7.

As can be seen from Figure 7, compared with the other four types of complex discrete dynamic systems, the complex discrete dynamic system with optimization identification technology is faster in processing data. It can eliminate interference factors in the whole data processing process.

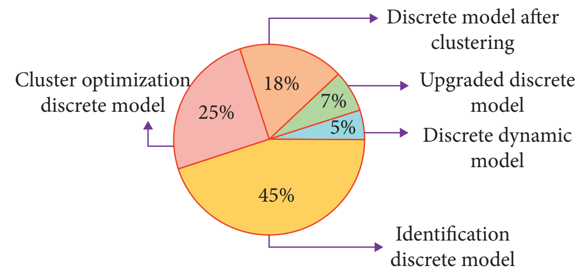

Figure 7: Percentage distribution of data identification processing by different systems.

4. Analysis of Research Results of Audit and Control of Accounting Computerization Based on the Complex Discrete Dynamic System

4.1. Analysis of Complex Discrete Dynamic Systems Based on Optimization Boosting Algorithm. In the complex discrete dynamic system studied in this paper, the steady state of the system is strengthened by adding an optimized boosting algorithm. In the experiment, 500 sets of data information needed to be calculated by accounting are added to the whole discrete dynamic system for testing. Firstly, the sample data is input into the complex discrete dynamic system, and the data object is refined by the internal processing algorithm of the system. Then, the method of calculating data is simplified, and the speed of calculating data is strengthened by minimizing the system loss. Finally, the final calculation result is obtained by outputting the data to the computer PC. In the whole experiment, we studied the processing state and processing efficiency of the system processing data and analyzed the system waveform and data processing trend returned by the computer PC. The system processing data waveform is shown in Figure 8. The efficiency trend chart of the system processing data is shown in Figure 9.

It can be seen from Figure 8 that the steady-state waveform of the complex discrete dynamic system with an optimized boosting algorithm is similar to that of the idealized system. In the task of processing sample data, the waveform of the complex discrete dynamic system without optimization is quite different from the standard waveform and the waveform fluctuation is also very large. As can be seen from Figure 9, the data processing efficiency trend of the two systems is obvious, but in contrast, the optimized discrete system is relatively stable and there is no downward trend in efficiency. In conclusion, the complex discrete dynamic system based on the optimized boosting algorithm has excellent stability.

4.2. Data Processing and Analysis Results. In order to further verify the performance of data node identification in complex discrete dynamic systems, 4000 groups of data are input into different systems. The system mainly carries out

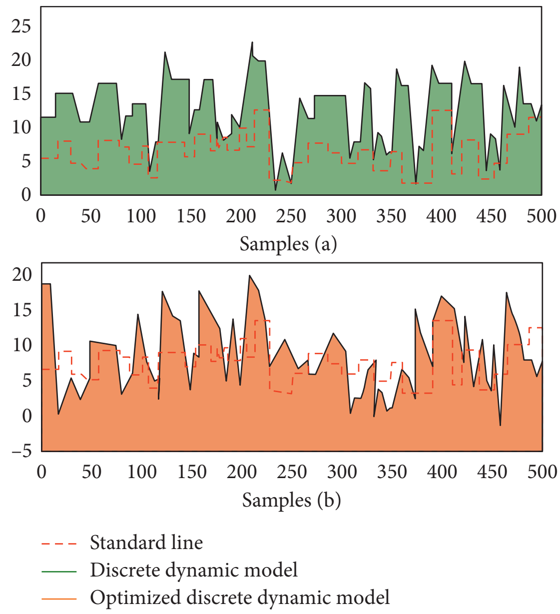

Figure 8: Waveform comparison diagram of system processing data.

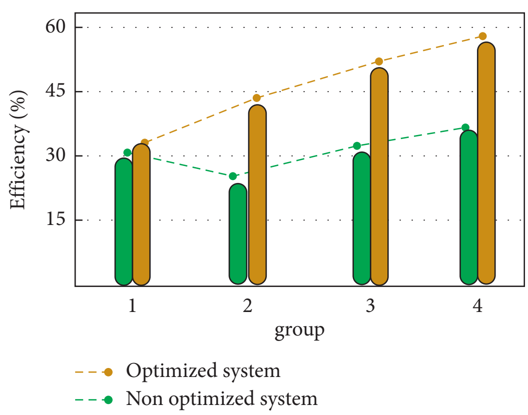

Figure 9: Efficiency trend chart of data in the system.

the relevant processing operations of search, clustering, and pattern classification from the attributes of data nodes. Because the data type of accounting computerization is different from ordinary text data, this paper also adds an optimization method suitable for digital calculation. Through the enhancement of data identification, the rate of sample data is evaluated. This optimization of system data identification technology can reduce the time waste caused by system operation data. This paper deals with the sample data set of an ordinary discrete dynamic system, a complex discrete dynamic system under identification technology, and a complex discrete dynamic system under optimal identification technology. Finally, the processing rates of data groups in three different systems are compared, and the comparison rate changes are shown in Figure 10.

It can be seen from Figure 10 that the complex discrete dynamic system under the optimization identification technology can still maintain an efficient processing rate when the amount of data continues to increase. The performance of the unoptimized discrete dynamic system has

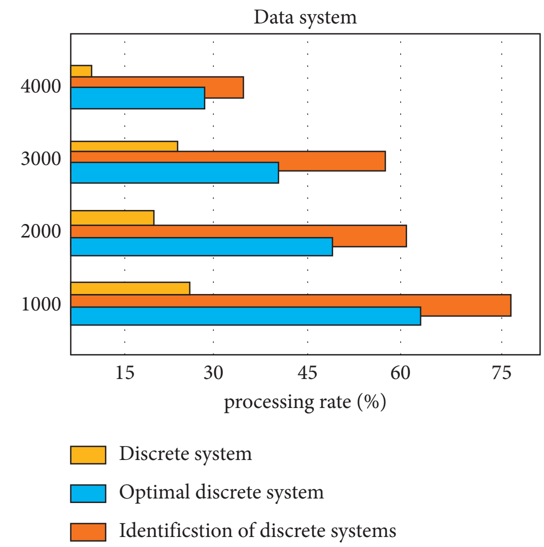

Figure 10: Mass data processing rate chart.

been greatly improved. With the large-scale increase of the amount of data, there is a phenomenon of rate instability in ordinary discrete dynamic systems and the output results may deviate seriously from the constants. By using the estimation and analysis technique of matrix eigenvalue bound and the estimation of the maximum eigenvalue of a nonnegative matrix, simple and practical new sufficient conditions for stability, instability, and mixed stability of discrete dynamic systems are obtained. According to the properties of matrix elements, the positive diagonal matrix is constructed, and combined with the scaling technique of inequality, the solutions of stability, instability, and mixed stability of discrete dynamic systems are obtained. Through the speed distribution of data processing above, we suggest that the complex discrete dynamic system based on optimization identification technology can process the relevant data and can also share data output results through the Internet plus.

5. Conclusion

Using modeling to analyze and solve problems is the most intuitive method. With the continuous transformation of data objects, most of them carry out system modeling through data and application fields. For the complex and nonlinear discrete dynamic system, the ordinary modeling method cannot achieve the expected processing accuracy, so it is difficult to further analyze and apply the results. Based on the above situation, this paper proposes to use the complex discrete dynamic system under the optimal boosting algorithm to audit and control the data required for accounting computerization. Adding boosting algorithm can be better applied to the case of small sample data, and then, we can modify the algorithm so that it can be directly called by the system and applied to the steady-state modeling of data. By modifying the gradient descent theory, the accuracy of the model is effectively improved. The results show that the complex discrete dynamic system based on the optimal boosting algorithm has more stable system performance than the traditional complex discrete dynamic system, and this can be accurately analyzed in the face of different forms of data. Finally, the identification technology in complex discrete dynamic systems is optimized, and the operations such as data search, clustering, and pattern classification are combined as a whole. The results show that the data processing efficiency of the complex discrete dynamic system based on optimization is improved with the increase of the amount of data. In the process of computing data processing, the running speed of the system is improved.

Data Availability

The basic data sources of the research results are included in this paper.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This project was supported by the Scientific Research Project of Qiqihar University (No. 135209531).

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