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Retraction

Retracted: Parallel Bookkeeping Path of Accounting in Government Accounting System Based on Deep Neural Network

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Journal of Electrical and Computer Engineering has retracted the article titled "Parallel Bookkeeping Path of Accounting in Government Accounting System Based on Deep Neural Network" [1] due to concerns that the peer review process has been compromised.

Following an investigation conducted by the Hindawi Research Integrity team [2], significant concerns were identified with the peer reviewers assigned to this article; the investigation has concluded that the peer review process was compromised. We therefore can no longer trust the peer review process, and the article is being retracted with the agreement of the editorial board.

References

[1] Q. Li, "Parallel Bookkeeping Path of Accounting in Government Accounting System Based on Deep Neural Network," *Journal of Electrical and Computer Engineering*, vol. 2022, Article ID 2616449, 10 pages, 2022.

[2] L. Ferguson, "Advancing Research Integrity Collaboratively and with Vigour," 2022, https://www.hindawi.com/post/advancing-research-integrity-collaboratively-and-vigour/.

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Research Article

Parallel Bookkeeping Path of Accounting in Government Accounting System Based on Deep Neural Network

Qing Li

Planning and Finance Department, Zhejiang Normal University, Jinhua 321004, Zhejiang, China

Correspondence should be addressed to Qing Li; jhglk@zjnu.cn

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"Parallel bookkeeping" is a key technical arrangement to achieve the goal of moderately separating and connecting the financial accounting system and budget accounting system established by the government accounting system. It is still a new thing for the majority of financial personnel in the government accounting subject. A deep neural network is the basis of deep learning. Up to now, the neural network has been applied in many fields, and its application in the financial field is more in-depth. The neural network is of great help to financial accounting. Integrating it into parallel bookkeeping in accounting can improve the work efficiency and accuracy of financial personnel. Through experimental analysis, it is found that its efficiency and accuracy are improved by 45% and 21.34% compared with the previous parallel bookkeeping path. The accounting parallel bookkeeping path based on the deep neural network studied in this paper not only has great practical significance for the work of financial personnel but also has far-reaching significance for the research of accounting paths in the future.

1. Introduction

In 2017, the Ministry of Finance issued the notice on printing and distributing the government accounting system—accounting subjects and statements of administrative institutions. In response to reporters' questions, "parallel bookkeeping" was first proposed. The financial personnel of administrative institutions need some time to understand and digest the concept of parallel bookkeeping. Since 2019, the new government accounting policy has been implemented. In order to facilitate the work of the majority of financial personnel, researchers have conducted a lot of analysis and exploration on "parallel bookkeeping," and began to study the integration of "parallel bookkeeping" with other technologies, including the internet of things, cloud computing, and big data. However, no researchers have deeply studied the deep neural network and "parallel bookkeeping" combined accounting path.

Since the promulgation of the new government accounting system, the emergence of parallel bookkeeping has also made researchers conduct a lot of research. Among them, Li J developed a multitask deep convolutional network, which can detect the existence of the target and the position and direction of the target relative to the region of interest. Secondly, the recursive neuron layer is used for structural detection, which improves the complexity and triviality of some work in accounting [1]. The accounting system studied by John T is a Java front-end and Oracle back-end application that supports the web. It provides general applications for some accounting work, helps adopt similar automatic processes, and improves the efficiency and security of accounting work [2]. The results of the activity-based costing (ABC) system studied by Durgham M show that the higher management instructions, the availability of the accounting system, the fierce competition, and the diversity of supporting activities actually exist in reality and the adoption of the ABC system can provide more accurate cost data [3]. Park studied and compared the traditional cost calculation and ABC and studied whether it is appropriate for ABC to be introduced into government agencies. However, ABC conflicts with the previous cost analysis system, so it is necessary to further study how to make cross-use of them [4]. Suhwan's research aims to understand the current situation of agricultural management accounting

information, education status, and policy needs through a questionnaire survey of advanced agricultural managers and find that the government needs to establish a postverification system [5]. Yun et al. studied the government accounting supervision system in the United States and South Korea and learned the reliability of financial information necessary for the establishment of an accrual accounting system [6]. However, with the progress of society, accounting work is becoming more and more complex and trivial, and the amount of data and information that accounting needs to deal with has increased greatly. These studies have failed to solve these problems. Their studies lack a certain theoretical basis, and to a certain extent, the method of financial accounting has not changed much.

The research done in this paper is about the bookkeeping path of the combination of the deep neural network and accounting methods. The accounting system promulgated in 2017 only adds some subjects to capital construction accounting but does not clearly stipulate the relevant operating rules of accounting. This paper explores the accounting work of account consolidation. Combining the deep neural network with the "parallel bookkeeping" path, a new bookkeeping path is developed, which can deal with the accounting work with a large amount of data and find a new bookkeeping system for the majority of accountants. Formulate a relatively scientific, reasonable, and practical accounting path to provide a reference for the financial staff of administrative institutions.

2. Accounting Methods in Government Accounting System

2.1. Calculation Method of Depth Neural Network. A deep neural network is a kind of machine learning, which is proposed based on the learning idea of the human brain. It can also be called deep learning. It is a system that can learn independently without manual supervision after network training [7]. In other words, if it is applied to accounting, the complex work can be sorted out and put into a deep neural network for training. The trained model can automatically learn and help financial personnel deal with complex work. By analyzing the composition of financial big data, the sources of information used for financial decision-making are explained. By analyzing the dynamic process of big data finance, the reshaping of financial decision-making behavior by the fusion of big data Internet and artificial intelligence is demonstrated.

The deep neural network is different from the traditional neural network. Its training mechanism is the training of each layer, which can eliminate the low efficiency and simple fitting problems of traditional neural network training [8]. The central idea of deep neural network theory is that all levels of network and training use unsupervised learning, that is, there is no need for manual operation in network layer training, and it can be processed automatically as long as there is financial data input [9]. The output data of each network layer of layer-by-layer learning and training will be used as the input data of the next layer. What needs to be supervised is all layers used for fine-tuning, that is, the fine-tuning layer needs to add a classifier to classify the financial data and then output the financial data. A classical neural network consists of three layers: the red one is the input layer, the green one is the output layer, and the purple one is the middle layer. The input layer has three input units, the hidden layer has four units, and the output layer has two units as shown in Figure 1.

In Figure 1, i_n represents the input of the nth data of financial data, and $i = 1, 2, 3, 4, \ldots G$; layer X represents the hidden layer; x_n represents the weight from the n-th data to $(n+1)$; S layer represents the output layer; S_n represents the output of the nth data of the processed financial data; h_y represents the amount of financial data of each layer; and Y_P is the sum of output data.

Next, we use the formula to deduce the learning process of a deep neural network. Assuming that the input variable of the financial data of the input layer is Count, its calculation formula is as follows:

$$\text{Count}_1 = \sum_{i=1}^{n} i_n + \int Q_n, \tag{1}$$

where Q_n is the threshold of the n-th input data and the corresponding data output is defined as E_n; then the calculation formula of E_n is as follows:

$$E_n = f\left(\text{Count}_1\right), \tag{2}$$

where $f(*)$ represents the activation function of the hidden layer because the hidden layer needs an activation function to activate the data when processing the data, so as to make the input financial data more flexible and improve the processing efficiency of the hidden layer countermeasure data. The activation function used by the neural network in accounting is a continuously derivable sigmoid function. Let us take a look at the expression of the sigmoid function first:

$$f(x) = \frac{1}{M^x + 1}. \tag{3}$$

In Figure 1, the evaluation formula of h_y of output financial data of each layer is as follows:

$$\begin{aligned} h_{y1} &= \sum_n i_n * n + G, \\ h_{y2} &= f(x) * \frac{Q_n}{x_n} + h_{y1}, \\ h_{y3} &= h_{y2} + \sum_s \frac{S_n}{n}. \end{aligned} \tag{4}$$

The sum h_y of the output data can be evaluated by the following formula:

$$Y_p = \left(h_{y1} + h_{y2} + h_{y2}\right) * n. \tag{5}$$

The automatic encoder in a deep neural network makes use of the characteristics of the artificial neural network, which can be regarded as an upgrade of the artificial neural network [10]. If the automatic encoder in the artificial neural network is operated improperly, it will lead to the equivalence between the output and the input financial data and

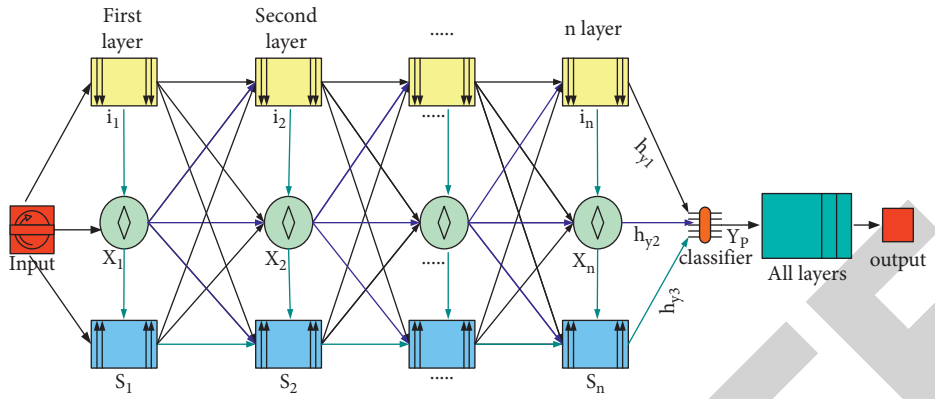

Figure 1: Structure diagram of deep neural network.

then the wrong calculation. The accounting needs to be accurate, especially the financial accounting of administrative institutions. Therefore, the automatic encoder in the deep neural network can eliminate such errors and learn and identify wrong data independently, so as to reduce the cumbersome affairs in financial work. The simple structure of the automatic encoder is shown in Figure 2:

The automatic encoder is multilayer in the deep neural network. After training the multilayer automatic coding, it cannot classify the data directly, so it needs to add a classifier to classify the data. Therefore, the automatic encoder can only reproduce the input characteristics of one data, which will produce a mapping layer. The application of a deep neural network to accounting is not only an innovation but also a new accounting path, and the structure diagram of a deep neural network can show that its data processing method is multilayer simultaneous processing and output at the same time. In accounting, a large number of complex data can be calculated by the neural network to improve work efficiency.

As can be seen from the structure of the automatic encoder in Figure 2, if there are two entries for input data, the amount of data input at each entry is Q_1 and Q_2, respectively. These data will be shunted to each neuron when they go to the middle layer. Each neuron has corresponding weights F, G, H, and j, and the data at the input port will be input to the same neuron from the two entries. The internal structure of each neuron is different, so it is required that the amount of data output by each neuron is calculated by different formulas, so the calculation formula of W is as follows:

$$\begin{aligned} W_1 &= Q_1\left(\overline{D_1} * E_1\right)\frac{Q_2}{4} * F, \\ W_2 &= Q_1 * \sum_G Q_2\left(Q_2 + E_2\right), \\ W_3 &= \frac{H}{Q_2} \times \left(E_3 + D_3\right), \\ W_4 &= \sum_2^J \frac{Q_1}{D_4/E_4 * Q_2}. \end{aligned} \tag{6}$$

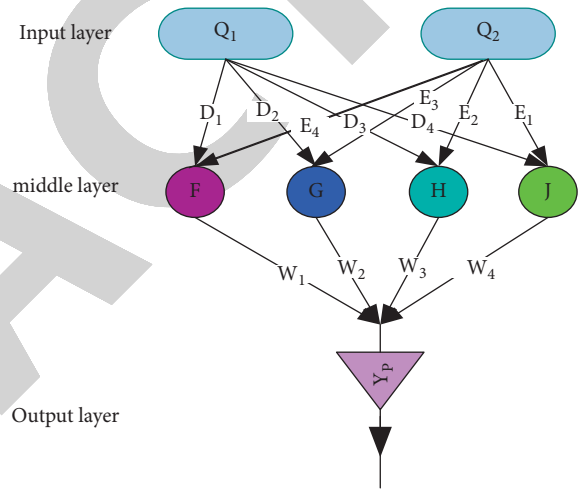

Figure 2: Simple structure diagram of automatic encoder.

After calculating the value of W, it can be found that there is a mapping layer in Figure 2. This mapping layer is equivalent to a self-checking system, which can map all data, and there will be a residual, which will promote the back-propagation of data. The change function form of the residual is

$$\vartheta(F \longrightarrow J) = \sum_Q^D \int_1 \frac{Y_P}{G} + \sqrt{W}\,(1 - H), \tag{7}$$

where Y_p represents the output quantity of the whole data. Of course, although there is an automatic encoder in the deep neural network, it still needs a data memory, so it is necessary to use big data for data analysis and classification. W represents the weight of neural network structure, and H is the amount of financial data. To make the deep neural network play a role in accounting, we need to combine our big data. Big data is a huge storage, management, and analysis system. It can realize the intelligence of a large number of financial data. In this way, the data classification before the data enters the system constructed by the deep neural network does not need to be classified manually,

which can save a lot of time and cost [11]. The combination of big data and deep neural networks needs to carry out the corresponding platform construction, and big data can carry out subject analysis and text classification and mine the information to be calculated for the financial information entering the system. The operation structure of big data and deep neural networks is shown in Figure 3.

When the data information enters the big data, it will be classified and sorted. When the information is classified, it needs to be classified with the help of formulas. Therefore, it is necessary to enter the formulas into the big data, and then input the data for system training. However, when the data enters the big data system, the data entering the system is divided into data blocks, and the data block is defined as N. Each piece of data has a data fingerprint. Let the data be stored in the big data storage system in the form of fingerprint and define the data fingerprint as M; because the data enters the deep neural network before entering the big data system, the total amount of data entering the big data system is Y_p; and the data amount $h_{yi}\, h_{y2}\, h_{y3}$ of each layer of the deep neural network will be shunted into data blocks, and given the data fingerprint before entering the big data, then the formula for calculating the number of data blocks of N_{y1} is

$$N_{y1} = \frac{hy1}{n} * \sum_{i_n} Y_P, \tag{8}$$

where i_n is the input of the n-th data of the information input layer in the above deep neural network and N represents the number of data input in the deep neural network. If the data is divided into N data blocks, it will be given the data fingerprint, enter the data storage sheet, and define the fingerprint of the n-th data block represented by M_n. The algorithm of N_{y2} is as follows:

$$N_{y2} = \frac{h_{y2}}{n} \oint N_{y1} * \sum_{x_n} Y_p. \tag{9}$$

The reason why N_{y1} needs to be included in formula (9) is that in the deep neural network, the book data of the input layer will be transmitted to the hidden layer for calculation again, so the data block of the input layer needs to be added to calculate N_{y2}, where x_n represents the nth input data in the hidden layer. By analogy, the algorithm of N_{y3} is as follows:

$$N_{Y3} = \frac{h_{y3}}{n} \oint N_{y1} \sqrt{N_{y2}} * \sum_{s_n} YP, \tag{10}$$

where S_n is the nth data output by the output layer. According to formulas (8)–(10), it can be known that some of the fingerprints given by the input data coincide, so the repeated data in the deep neural network will be automatically damaged in big data to reduce the pressure of later data analysis. Therefore, the algorithm of the final output data block n is as follows:

$$N = \left(\frac{N_{y3} + N_{y2} + N_{y1}}{3n} \right) * \sqrt[3]{YP}. \tag{11}$$

2.2. Accounting Form. The accounting process, also known as the financial processing procedure, refers to the processing method of combining accounting vouchers, accounting accounts, and financial statements [12]. At present, the most commonly used forms of accounting can be divided into three categories: Bookkeeping voucher accounting procedures, summary bookkeeping voucher accounting procedures, and account summary table accounting procedures [13].

2.2.1. Bookkeeping Voucher Accounting Processing Procedure. The accounting processing steps of bookkeeping vouchers are to register one by one in the general accounting system according to bookkeeping vouchers. The advantage of this program is concise, clear, and easy to understand. At the same time, the general ledger system can provide each unit with more detailed economic changes and economic business [14]. Its disadvantage is that the workload of general ledger registration is large, which is not suitable for large-scale units with large economic business volumes. However, with the rapid development of the economy, it is necessary to deal with large-scale accounting procedures [15].

2.2.2. Summary Bookkeeping Voucher Accounting Processing Procedure. This program can prepare summary collection vouchers, summary payment vouchers, and summary transfer vouchers according to various bookkeeping vouchers and then register the general ledger according to various summary bookkeeping vouchers [16]. It can reduce the workload of registering the general ledger and make it easier to connect accounts, but it is not conducive to the detailed division of labor and cooperation, which will lead to a huge workload of financial personnel and unable to evenly distribute work content. It is also impossible to carry out detailed accounting for financial data, so it is difficult to use it alone, but the cost of accounting processing procedures combined with bookkeeping vouchers will lead to cumbersome and repeated accounting work, and a lot of labor costs will be invested.

2.2.3. Account Summary Accounting Processing Procedure. The accounting processing steps of the account summary table are to regularly prepare the account summary table according to the accounting vouchers and register the general ledger according to the account summary table [17, 18]. The advantage of this procedure is that it can simplify the registration of financial personnel and realize the trial balance between accounts. This method is very easy to understand and master. However, due to the inconvenient recognition of accounts and the reflection of the corresponding relationship between accounts, it is difficult to deal with detailed accounting.

2.3. Path of "Parallel Bookkeeping". "Parallel bookkeeping" is the core of the government's accounting system. The so-called parallel bookkeeping is to clearly reflect the government's financial information and budget implementation information and properly separate the government's

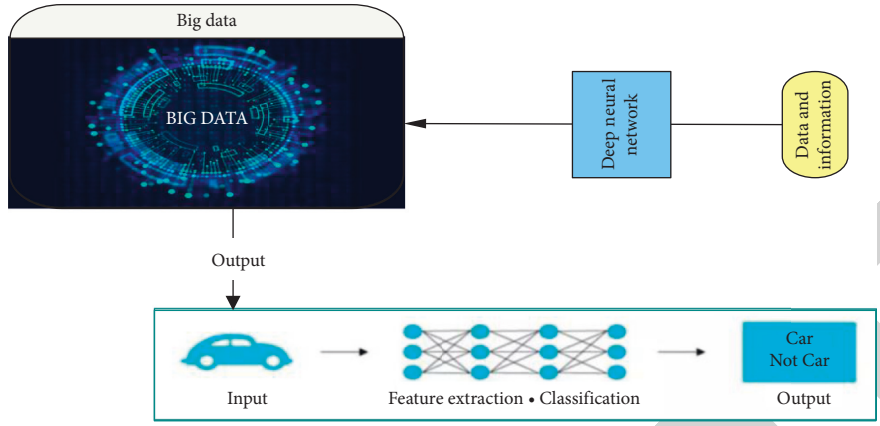

Figure 3: Operation structure of big data and deep neural network.

financial accounting and budget accounting. More financial data will be disclosed under the government's accounting system, which means that financial data are more transparent [19]. Under the principle of the dual system, department budget management must create two items of financial accounting and budget accounting for cash revenue and expenditure business.

Compared with the previous problems that the contents of financial accounting and budget accounting are difficult to correspond, it is easy to be confused that two entries need to be made in multiple accounts at the same time. The current "parallel bookkeeping" can make two entries under one account at the same time so that the financial accounting and budget accounting of each account will not be mixed with each other, and the complexity of accounting work is relatively reduced. "Parallel bookkeeping" means that the accounting work of financial personnel is more detailed, and according to the requirements of more financial information to be disclosed according to the government accounting system, the accounting rules displayed by "parallel bookkeeping" are more transparent than the previous accounting methods and promote financial disclosure. Compared with double-entry bookkeeping, parallel bookkeeping needs to generate two vouchers, which are budget accounting and financial accounting [20, 21]. In terms of double-entry bookkeeping, the path of parallel bookkeeping can make it easier for accountants to calculate financial accounting and financial budget accounting, and the parallel bookkeeping path is equivalent to the combination of two single paths, namely financial accounting and budget accounting.

Parallel bookkeeping is to integrate all kinds of external original vouchers into the accounting system of government financial accounting, and the financial accounting system will realize the consistency of the four elements of government accounting: main accounting, voucher, table, and reality; The financial processing of the budget accounting system is implemented in parallel according to the financial processing of the general financial accounting system. There is a unified and clear corresponding relationship between the financial accounting system and the budget accounting system. This can systematically generate the budget accounting system by developing reasonable system processing software [22]. The new government accounting system separates budget accounting based on a cash basis from financial accounting based on an accrual basis.

2.4. Construction of "Parallel Accounting" Path Based on Deep Neural Network. The combination of deep neural network and "parallel bookkeeping" path explored in this paper is to solve the cumbersome work in financial accounting and can generate a new accounting path. Accounting generally needs to be accounted for through multiple accounts. Moreover, each account needs financial accounting and budget accounting. Using the path of parallel bookkeeping can clearly complete the financial accounting and budget accounting of one account, but other accounts need to repeat this accounting process, resulting in cumbersome accounting work. The deep neural network can process data hierarchically, so we can build a multiaccount to carry out "parallel bookkeeping" at the same time. The basic structure diagram of the deep neural network and "parallel bookkeeping" path is shown in Figure 4.

From the above figure, we can see the simple structure of the shallow deep neural network and "parallel bookkeeping," as shown Figure 4. When data is input into different accounts, compared with the single account with only a "parallel bookkeeping" path, the path of parallel accounting of financial accounting and budget accounting, this integrated deep neural network can carry out parallel accounting for the required accounts, that is, The multilayer operation of the deep neural network becomes multiaccount operation at the same time, which can save a lot of repetitive work.

The accounting path of parallel bookkeeping is integrated into the deep neural network. The learning mechanism in the deep neural network can make the system infinitely recycled, and the deep neural network can classify and calculate the data received by the deep neural network [23, 24]. Due to the complexity of financial data, the deep neural network needs to classify it. If it is not integrated into the deep neural network, the financial personnel need to spend a lot of time classifying these financial data. After classification, the accounting of each account can be carried out. This process is cumbersome and troublesome, so the deep neural network needs to be integrated into accounting.

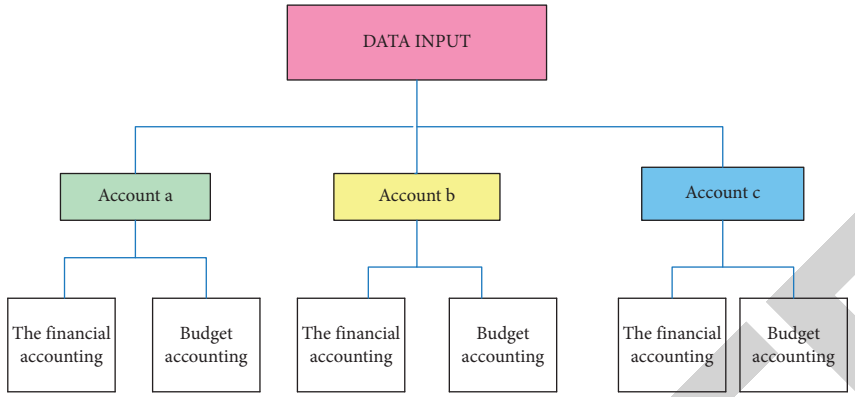

Figure 4: Basic structure diagram of the combination of deep neural network and "parallel accounting" path.

The automatic procedures of the "parallel bookkeeping" path based on a deep neural network have an accounting confirmation process. Before financial data accounting, the data of Internet economic and business activities will be standardized, that is, marked with a procedural language. The original vouchers of the financial staff club and related businesses are stored in the system data to confirm a series of elements. The flow diagram of accounting element confirmation of deep neural network is shown in Figure 5.

After the accounting elements are confirmed, they can enter the new bookkeeping path of parallel bookkeeping of accounting based on a deep neural network for the experiment, calculate them, record them into the general ledger, and then generate bookkeeping vouchers for data verification.

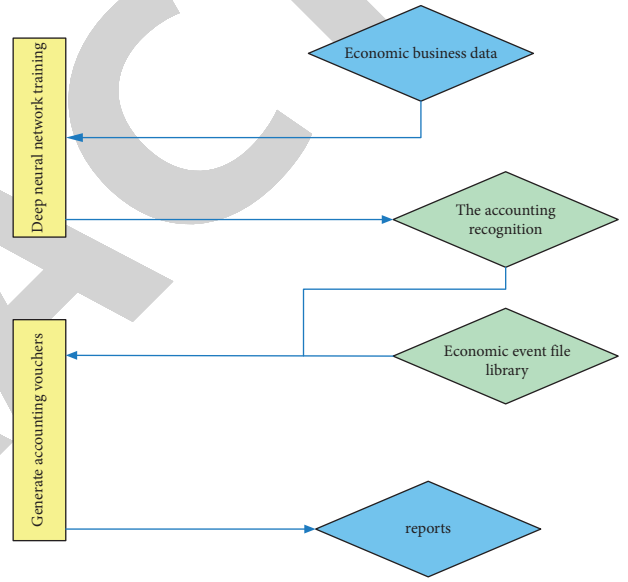

Figure 5: Flow chart of accounting element recognition.

3. Experiment and Result Analysis of "Parallel Bookkeeping" Path Based on Deep Neural Network

3.1. Experimental Design. Experiment 1: Efficiency comparison between parallel bookkeeping and double-entry bookkeeping.

Firstly, the accounting work required by a bank is compared with the way of parallel bookkeeping and retest bookkeeping, and a timer is used to record the accounting time of the two in each aspect. The accounts to be calculated are shown in Table 1.

Use the accounting path of parallel bookkeeping and double-entry bookkeeping to calculate the financial accounting and budget accounting entries of the bank's deposits, loans, investments, loans, income, and other funds at the same time and use a timer to record the time required for the two accounting paths for comparison. The time required for each item is shown in Table 2.

During the experiment, every time the financial personnel calculate the time required, they can find that the accounting path of parallel bookkeeping is faster than double-entry bookkeeping. In order to see this trend more intuitively, as shown in Figure 6.

It is obvious from Figure 6 that the accounting method of parallel bookkeeping is faster than that of double-entry bookkeeping. In the deposit account, it can be seen that the speed of parallel bookkeeping is 50% of that of double-entry bookkeeping. In the loan account, the speed of parallel bookkeeping is 65% of that of double-entry bookkeeping. Looking at the bookkeeping speed of other funds, the speed of parallel bookkeeping is more than three times that of retest bookkeeping. There are many trivial accounts in other accounts, which need more detailed accounting, so the accounting of this account takes the most time. Double-entry bookkeeping requires financial personnel to repeat a lot of the same work, and because double-entry bookkeeping requires multiple accounts for different bookkeeping and summary, the efficiency will be low. Parallel bookkeeping can calculate the financial accounting and budget accounting of an account at the same time. Although it also requires repeated work, compared with double-entry bookkeeping, parallel bookkeeping can calculate double entries for one account, while double-entry bookkeeping can only calculate one by one. Therefore, the efficiency of parallel bookkeeping is significantly higher than that of double-entry bookkeeping.

Experiment 2: The efficiency and accuracy of the accounting method and parallel bookkeeping are compared.

Table 1: Chart of accounts.

Economic business items	Financial and accounting entries	Budget accounting entries
Deposits	Financial deposits Current deposit Deposit in bank	Financial budget deposit Current budget deposit Budget deposit in bank
Loans	Short-term loans Overdue loans Mortgage	Short-term budget loans Overdue budget loans Mortgage
Investment	Long-term investments Short-term investments	Long-term budget investments Short-term budget investments
Borrowing	Borrowing from the central bank	Borrowing from the central bank budget
Income	Interest income Current income of financial enterprises Fee income Other operating income	Interest budget income Budgetary revenue from current transactions of financial enterprises Fee budget income Other operating budget income
Other payments	Interbank deposit Bank deposits funds Nonoperating expenses	Interbank deposit of budget funds Bank deposits budget funds Nonoperating budget expenditures

Table 2: Schedule required for parallel bookkeeping and double-entry bookkeeping (unit: h).

Economic business items	Time for parallel bookkeeping (unit: h)	Double-entry time (unit: h)
Deposits	1	2
Loans	1.3	3.4
Investment	0.7	2.2
Borrowing	0.5	1.4
Income	3	4.7
Other payments	2.4	7
The total time	8.9	20.7

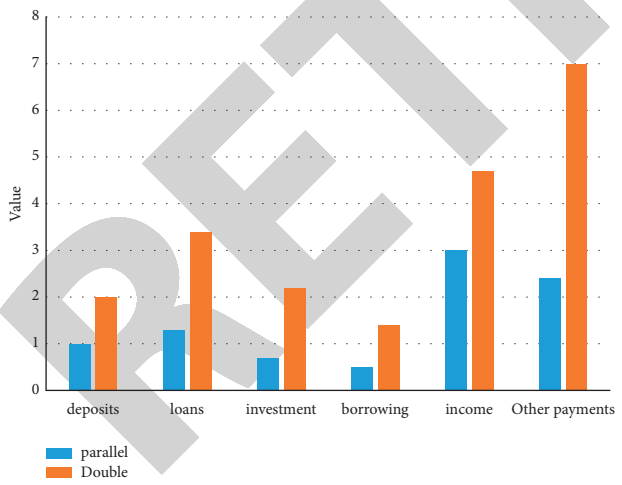

Figure 6: Time comparison chart.

We still use the bank's chart of accounts and compare the speed of parallel bookkeeping accounting path based on deep neural network and parallel bookkeeping accounting method in this paper. In the accounting process of a large amount of data in financial work, there will still be some wrong data to check. Once there is an error, we need to recalculate all accounts, which is a very cumbersome process. Therefore, while improving efficiency, we may pay attention to ensuring the accuracy of account checking and avoiding a lot of repeated work. Therefore, in order to calculate the accuracy of the two paths, the accounts to be accounted for are the account results that have been checked in the past. After accounting, they will be compared with the previously accounted data, and then calculate the accuracy of accounting. The time required for both is shown in Table 3.

The accuracy comparison between the two is shown in Table 4.

The visual diagram of the result is shown in Figure 7.

From Figure 7(a), we can see that in the time comparison between the parallel bookkeeping accounting method based on a deep neural network and the parallel bookkeeping accounting method in this paper, the trend of the broken line in each subject is lower than the square statistical bar of the other two accounting methods. From the deposit account, we can see that the bookkeeping path of this paper takes the least time. Compared with the parallel bookkeeping path, the efficiency of the bookkeeping path of this paper is more than 60% of that of the parallel bookkeeping path. Let us look at the complicated calculation of other funds because the parallel bookkeeping path is combined with the deep neural network. After training, the autonomous learning in the neural network can independently calculate other accounts by incorporating this calculation mode into the path, without checking one account by one like the parallel bookkeeping path, Therefore, the efficiency of the accounting path in this paper is higher than the traditional parallel accounting path.

From Figure 7(b), in the comparison of the accuracy between the parallel bookkeeping accounting method based on a deep neural network and the parallel bookkeeping accounting method in this paper, it is obvious that the bookkeeping accounting method in this paper is higher than the parallel path accounting method. In the accounting of deposit accounts, the accuracy of the bookkeeping route in this paper is 14.5% higher than that of the parallel bookkeeping route, and the accuracy of other funds is 2.25% higher. From the

Table 3: Time comparison between new accounting path and parallel accounting path in this paper (unit: h).

Economic business items	Time for parallel bookkeeping (unit: h)	Time of new accounting path (unit: h)
Deposits	1	0.3
Loans	1.3	0.5
Investment	0.7	0.2
Borrowing	0.5	0.1
Income	3	1.5
Other payments	2.4	1.1
The total time	8.9	3.7

Table 4: Comparison of accuracy of new accounting path and parallel bookkeeping path in this paper.

Economic business items	Parallel bookkeeping accuracy (%)	Accuracy of new accounting path (%)
Deposits	73.2	87.7
Loans	80.6	90.3
Investment	79.5	89.66
Borrowing	100	100
Income	84.35	94.6
Other payments	95.3	97.55

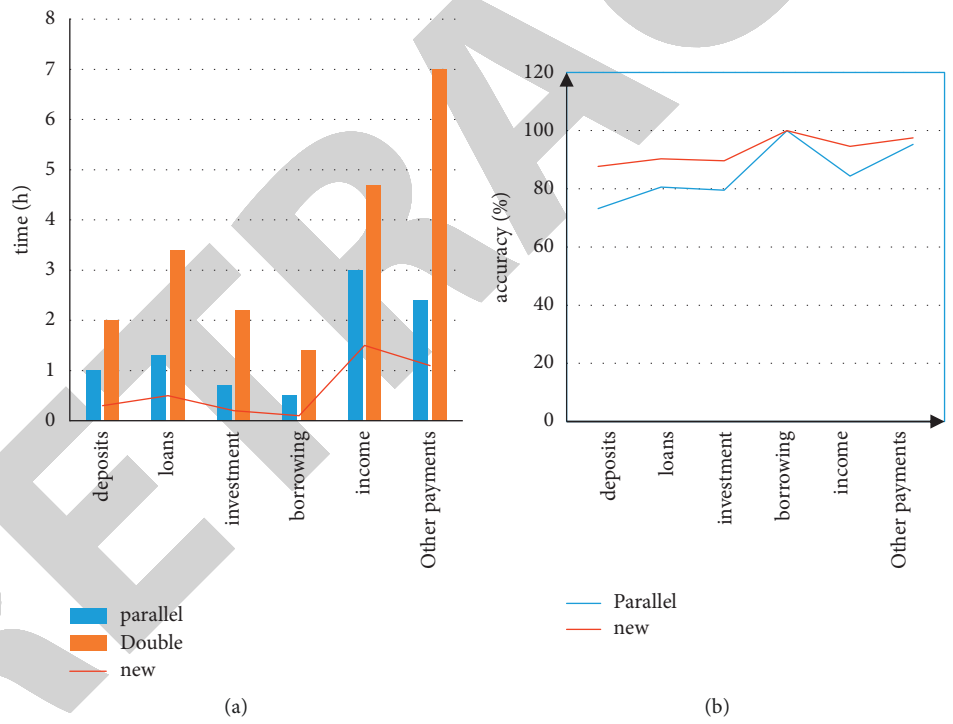

Figure 7: Comparison of the efficiency and accuracy of the accounting method and parallel bookkeeping in this paper: (a) time comparison chart and (b) efficiency comparison chart.

perspective of the checking method, this is the data of initial accounting and bookkeeping, which is obtained by comparing the accurate data calculated too much. Although parallel bookkeeping is faster than the previous bookkeeping methods in time, it is also a manual accounting method, which requires repetitive work and is prone to some small errors. However, the parallel bookkeeping method based on a deep neural network in this paper will classify the text and analyze the data in combination with big data, so the regulations in accounting will be clearer. However, the new accounting path is not perfect, so people will write wrong accounting data, but the error rate is lower than that of the manual parallel bookkeeping path.

3.2. Experimental Summary. The experiment of this paper compares the analysis of the efficiency and accuracy of the three accounting methods. After a series of experiments, it

can be found that the efficiency and accuracy of the parallel accounting path newly constructed in this paper based on a deep neural network are the highest, but the efficiency of retest accounting is the lowest due to the complexity of working procedures. In the era of information and data, we need to improve the efficiency of data information accounting, but we cannot ignore the accuracy of data accounting. The new accounting method constructed in this paper is more efficient than the previous one and has incomparable advantages in the accuracy of data accounting.

4. Discussion

This paper is committed to studying the accounting method of parallel bookkeeping path based on a deep neural network in order to promote the work efficiency of financial personnel. In accounting work, formulas need to be used for accounting, and manual operation requires a lot of time, which will make the efficiency low. Although the parallel bookkeeping path is more efficient than the previous double-entry bookkeeping, it is also manual accounting; however, by integrating the deep neural network into the parallel bookkeeping, all the formulas can be entered into the neural network. After training, the system can calculate independently. Finally, the accounting voucher can be obtained manually to retain the checked data. In this paper, with the combination of big data and deep neural networks, all the text and data input into the system will be intelligently classified and can be encoded, and then the parallel accounting path will be added to carry out accounting under the action of deep neural network.

Through the experimental analysis of this paper, although the parallel accounting path based on a deep neural network constructed in this paper cannot be 100% correct, it is more efficient than the previous accounting methods, and each accounting method is not applicable. However, the deep neural network can be applied to any place, small brokerage business, places with large economic business volume, detailed accounting, and large-scale financial data accounting. Because the experiment in this paper not only involves large-scale data accounting but also involves the accounting of other detailed data, but the accounting of detailed data in double-entry bookkeeping requires a lot of energy from financial personnel, so the parallel accounting path based on deep neural network studied in this paper is suitable for all kinds of data accounting [25].

Based on the transaction data of a bank, this paper lists the accounting subjects that the bank needs to calculate and then carries out the experiment with three different accounting methods. Experiments show that in the era of information and data, the traditional manual accounting method cannot complete the accounting of a large number of data transactions, so it is necessary to combine the data analysis technology and deep neural network with the traditional accounting method to improve the work efficiency of financial personnel. The parallel bookkeeping path based on a deep neural network in this paper is not only an extension of the parallel bookkeeping path but also an upgrade.

5. Conclusions

Through the parallel bookkeeping path based on the deep neural network constructed in this paper, firstly, all the calculation formulas are entered into the system constructed by the deep neural network, which can analyze and classify the information and data. Then the data information is classified by big data and enters the parallel bookkeeping path based on the deep neural network for financial data accounting. The experiment in this paper shows that the parallel accounting path based on the deep neural network constructed in this paper is higher than the previous traditional accounting methods in terms of time and accuracy. The accounting path studied in this paper is successful and can provide a reference for the work of financial personnel.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest.

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