

Research Article

Evaluation Method of Financial Internal Control in Colleges and Universities Based on Artificial Intelligence Technology

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The internal financial control of colleges and universities is the main tool to restrain the behavior of financial managers. With the improvement of the economic operation efficiency of colleges and universities, the application effect of internal control management system is poor. Therefore, the evaluation method of the university financial internal control based on artificial intelligence technology is proposed. First put forward the artificial intelligence technology in the application of financial internal control in colleges and universities, and then construct the financial internal organizational structure, on this basis, to meet the enormous workload processing requirements, the creation of financial internal control evaluation in colleges and universities, the chain at the same time use of financial system of general function, the university financial internal control evaluation data output to the financial system. The data acquisition program is used to obtain the relevant data in the evaluation report so as to realize the evaluation of internal financial control in colleges and universities under the artificial intelligence technology. The experimental results show that the evaluation acceleration is faster with the increase of the evaluation time of the key elements. The evaluation effect is the best; the closest to the ideal value of 0.01, and the error detection rate curve is relatively stable, with good effect.

1. Introduction

Financial internal control is the general name of a set of internal control measures carried out by the financial management departments of major universities in the implementation of college financial management tasks, which ensures the authenticity of accounting information generated in various economic activities, significantly promotes the efficiency of overall financial management, and increases the utilization rate of funds [1, 2]. For the financial internal control management in college, innovation and reform of the evaluation system of financial internal control can help to realize the effective utilization of funds and make the financial management more efficient and accurate, and further improving the fine management of financial work [3, 4]. Under the new situation, the college financial management is facing great financial risks, so it is urgent to strengthen the financial management [5]. However, there is no full understanding of financial risks in the current college financial management, and the corresponding measures

have not been taken to deal with the external economic environment and potential financial management crisis [6]. A set of perfect financial internal control system has not been established, resulting in serious constraints on the financial management level of the school [7].

Relevant scholars have put forward numerous studies on this. Reference [8] has proposed the influence of online learning tools on the success of students of core finance courses in business schools. Online learning system has significantly reduced the number of students who quit the courses before the end of the course. Moreover, the benefits of lower dropout rates transcend all classes and are greatest for students outside of finance majors. Although the use of online learning systems has reduced dropout rates, it does not appear to have led to significant increases in the scores of students who complete the course. Reference [9] puts forward suggestions for novice teachers teaching public finance undergraduate course, and discusses five aspects that novice instructors should consider in teaching public finance. First, teachers should determine their comfort level on the

qualitative and quantitative continuum, and second, teachers should know which resources to collect, including textbooks, government documents, and spreadsheet guides. The teacher should understand the department's course expectations along a qualitative and quantitative continuum, based on the student's career path. Teachers should also assess the students' proficiency in budgeting exercises and spreadsheets. Finally, the instructor should monitor how the course content aligns with regional employers and the Academic Program Advisory Committee. This method can improve the teaching effect of some teachers in public finance teaching, but it is not effective enough to improve quickly and has limitations.

Although the above research has made some progress, the research on workers' intelligent technology is not enough. Therefore, this research proposes an evaluation method of college financial internal control supported by the artificial intelligence technology. Artificial intelligence technology is a research, development, used to simulate, extend, and expand the intelligent person method, and application system of new science and technology, and can produce a new kind of response in the form of human intelligence similar intelligent machines, research in this field including robot, speech recognition, image recognition, natural language processing, and expert system, etc. One of the main goals of AI research is to enable machines to perform complex tasks that would normally require human intelligence. On this basis, in order to meet the huge workload processing demand, the university financial internal control evaluation chain is constructed. At the same time, the general financial system audit function is used to output the university financial internal control evaluation data to the financial system, and the relevant data in the evaluation report are obtained through the data collection program. The university financial internal control evaluation is a new perspective. To grasp the overall direction of financial development in colleges and universities, using artificial intelligence technology to discuss the ability of internal financial control in colleges and universities, and evaluating the effect of internal financial control in enterprises and colleges can better improve the practical operability of the evaluation work and promote the evaluation effect of internal financial control in colleges and universities.

2. Evaluation of College Financial Internal Control under Artificial Intelligence Technology

2.1. Artificial Intelligence Technology. Artificial intelligence technology is a frontier discipline, which belongs to the three interdisciplinary disciplines of natural science, social science, and technical science. In recent years, it has achieved rapid development, has been widely used in many disciplinary fields, and has achieved fruitful results. Artificial intelligence has gradually become an independent branch and has developed into an independent system both in theory and practice. The main material basis for the research of artificial intelligence and the machine that can realize the

technological platform of artificial intelligence is the computer. The development history of artificial intelligence is connected with the development history of computer science and technology. The significance of this research is that the vast amount of scientific and engineering calculations that should be done by the brain can now be performed not only by computers, but also more quickly and accurately, so that it is no longer regarded as "complex work that must be done by human intelligence". As new progress is made, it also moves in more meaningful and difficult directions. There are two different implementation ways of artificial intelligence technology in the evaluation of college financial internal control: one is to use the traditional programming technology to make the evaluation system of college financial internal control show the effect of intelligence. Another application is simulation method, which evaluates the effectiveness of college financial internal control by means of methods similar to human thinking. Through the above two ways, artificial intelligence technology can play an intelligent role in the evaluation of financial internal control. In the evaluation process of college financial internal control, the application of the first method should set the evaluation program logic by the manual way. When there is the problem of setting error, it is necessary to debug and compile the original program and to provide the patch or modified version to users. In the case of applying the second method, the programmer needs to design the corresponding intelligent system for different user groups. The system can be continuously improved and perfected in the later use process, and effectively deal with the tedious problems with good adaptability. In the practical application of simulation method, programmers should have a strong biological thinking, so it is more difficult than traditional artificial intelligence methods. However, the simulation method has obvious advantages. It omits the introduction of the rule activity in the editing process, which can deal with the complicated problems more efficiently and has strong promotion value.

2.2. College Financial Organization Structure. The current internal control evaluation applied in the college financial development belongs to the hierarchical management mode, in which all leaders are directly managed by the president, while many college students are uniformly managed by the Party Committee [10]. The principal shall formulate the main objectives of the internal control evaluation according to the financial management norms proposed by the state, and the principal in charge and financial management personnel shall jointly formulate the internal control evaluation system. In recent years, many universities are building financial internal control evaluation system, and its main performance is: the establishment of a financial team composed of financial management personnel, and a series of financial control and management of the school financial internal. Generally, the financial department of colleges and universities sets up multiple departments downward to be responsible for budget management, accounting management, and charge management [11, 12]. In addition, the accounting department and the fund settlement center of the

finance department are set up as two departments, respectively, and various businesses are reasonably allocated to the corresponding departments when carrying out the evaluation of financial internal control in colleges and universities. The specific composition of the internal financial organization structure of colleges and universities is shown in Figure 1.

According to Figure 1, the structure of management organization for college financial internal control is relatively simple, which is beneficial to improve the efficiency of financial management in colleges and universities [13]. Under this management mode, each department shall supervise each other and establish corresponding reward and punishment system.

2.3. Evaluation Chain of College Financial Internal Control.

In the process of expanding the scale of colleges, the task quantity of financial internal managers is increasing, but the professional level of managers is generally low, which greatly limits the efficiency of financial internal assessment [14]. The internal evaluation chain of colleges and universities is shown in Figure 2. The long evaluation chain requires many evaluators to intervene in the evaluation work. At present, the setting of internal financial evaluation workers in colleges and universities can meet the huge workload processing needs.

As shown in Figure 2, the current university financial internal control has the characteristics of clear evaluation process and clear division of labor. Under the condition of market economy, the university financial internal control evaluation chain environment has changed greatly. In order to improve the efficiency of financial management in colleges, it is necessary to update the concept of financial management, and improve ideological understanding. In particular, the ideological understanding of school leaders at all levels is very important for college financial management [15, 16]. To strengthen the financial management, we should establish the concept of legal system for leaders at all levels, have a clear understanding of the new situation, effectively improve the management ability and management level, start from ourselves, and model compliance with various financial systems, policies, and regulations; take the lead in learning management theories and methods, use modern management means, and implement correct leadership over financial work. The college financial management cannot just stay in the collection, allocation, and use of funds in the general sense. It must take improving benefits as the goal, introduce the “benefit maximization” of the financial management goal, make rational use of funds to realize the optimal allocation of various resources, including human resources, financial resources, and material resources, and reduce the idle waste and loss of school resources, achieve resource sharing, and enhance the strength of running a school [17]. In terms of internal control, enhance the internal control awareness of financial managers in colleges and universities [18]. Leaders are not only required to pay full attention to financial internal control, set an example and abide by the internal control system, but also need to

make faculty members realize that everyone in colleges and universities is the person in charge and executor of internal control, rather than the affairs of a few functional department personnel.

2.4. Data Collection for Evaluation of College Financial Internal Control.

The data collection work under the artificial intelligence technology needs to combine the evaluation process of the internal control in colleges, give full play to the role of the general financial management software, implement the intelligent evaluation operation under the audit function, input the obtained evaluation data results into the financial system, and the data collection program is used to obtain the information in the evaluation report. The data acquisition module mainly realizes server data acquisition and manual data acquisition. By deploying a data collection server in the financial department and connecting with the internal network of e-government, the real-time data collection function and real-time data collection are realized [19, 20]. There are also two servers in the computer room of the audit department. One is the data processing server, which is responsible for auditing the implementation of financial budget and processing and storing audit data [21]. The other is the data analysis server, which is responsible for the implementation of the platform model construction and the model construction used by auditors for query and analysis. The initially collected audit report data is pre-processed. See Figure 3 for details.

As shown in Figure 3, we can obtain the output results of the evaluation data of the college financial internal control, realize the data collection process of the evaluation of the college financial internal control, and on this basis, access the report data in the offline state, compare whether there is an error in the data point, if not, continue to process, and if so, output the location information of the point as the result of locating the error data [22, 23]. For the characteristic data with obvious correlation, the relevant data can be combined into one piece of data by operating the data, and other data can be deleted. Data merging is realized and the amount of calculation is reduced [24, 25].

2.5. The Realization of Evaluation of College Financial Internal Control under Artificial Intelligence Technology.

There is a certain split in the process of constructing the evaluation method of college financial internal control. Taking the Gini coefficient as the index [26], it is suitable for various types of data such as binary, continuous values, and continuous categories [27]. The specific idea of Gini coefficient is: assuming that the sample set J at a node A contains n data categories, the calculation formula of Gini coefficient is

$$D(A) = \sum_{j=1}^n J_j - 1. \quad (1)$$

In formula (1), J_j expresses the probability value of the attribute category at node j . When the Gini coefficient $D(A)$ value is the minimum value of 0, the attribute categories of all samples at j node are the same, and the maximum useful

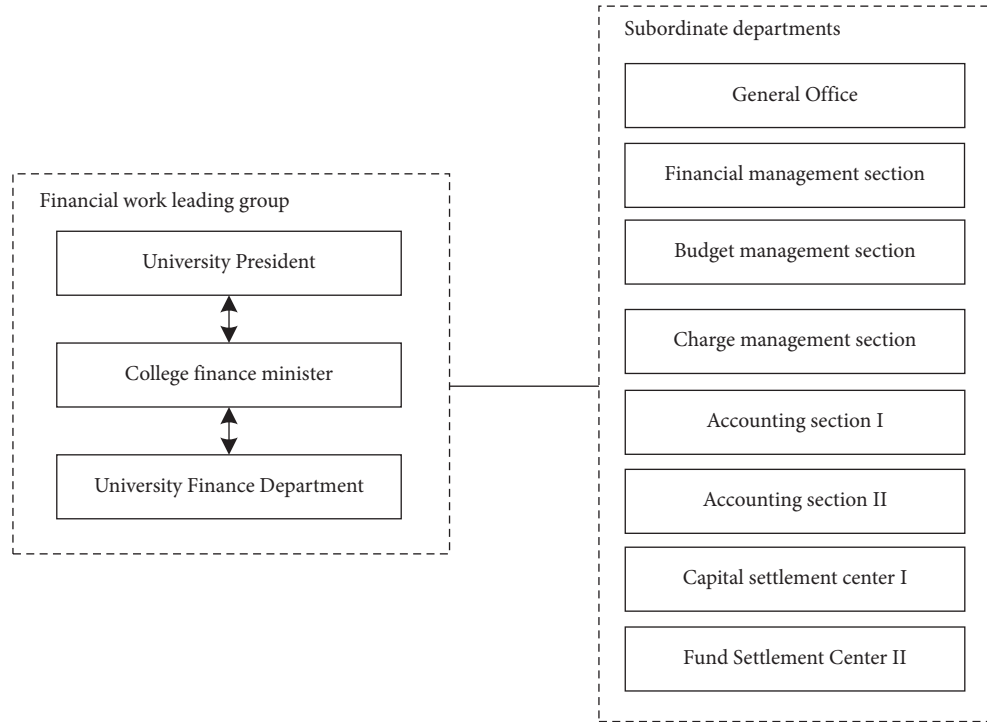


FIGURE 1: Internal financial organization structure of colleges and universities.

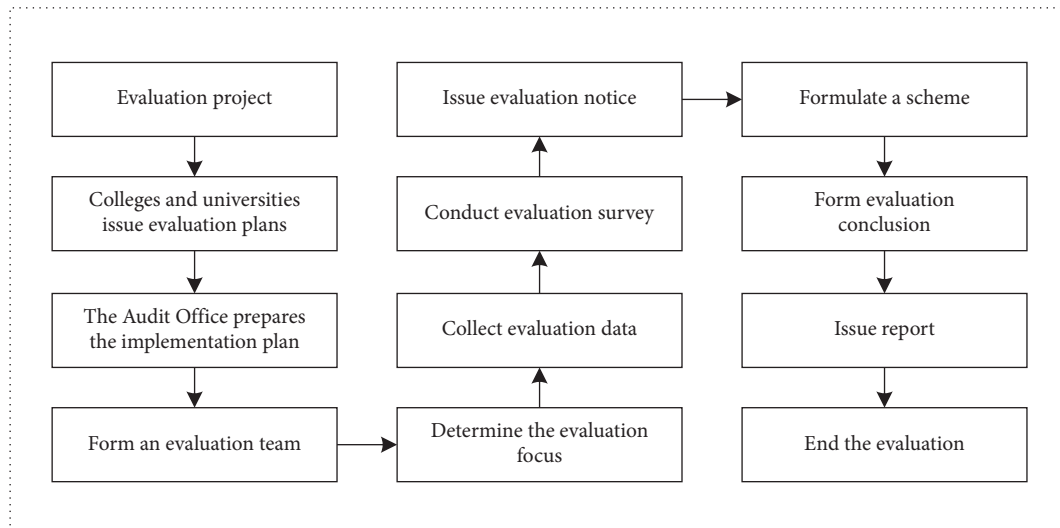


FIGURE 2: Evaluation chain of college financial internal control.

information can be obtained by performing a few calculations. When the Gini coefficient $D(A)$ value is the maximum value of 1, the attribute category distribution of all samples at the j node is chaotic and irregular, the accuracy of the obtained feature results is low, and the amount of useful information is less [28, 29]. If the data set with $D(A)$ of 1 is divided into different parts and extracted twice at the same time, multiple feature results can be obtained meanwhile.

To guarantee the accuracy of feature extraction of abnormal data, the boundary function $G(a, b)$ of random

forest is defined to reduce the generalization error of decision results [30], and the formula is

$$G(a, b) = K_L \times H_p \times Y_u. \quad (2)$$

In formula (2), K_L represents the probability that it is correct after two terms are split; H_p represents the probability of error after two term splitting; Y_u represents the average convergence value of group u data splitting [31]; formula (2) uses the error convergence law to calibrate the accuracy of the output result by adjusting the value of the boundary function.

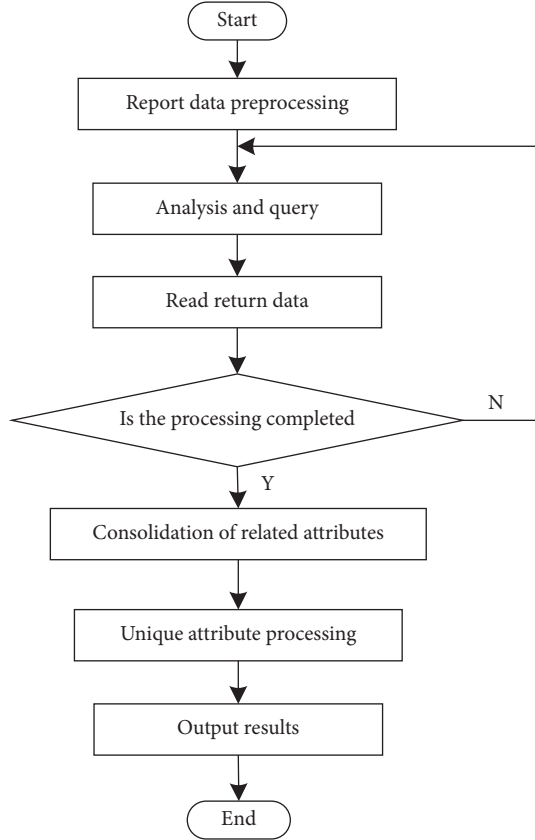


FIGURE 3: Flowchart of data collection and processing of college financial internal control evaluation.

After calibrating the output results of university financial data, use the selective integrated learning method to find the target value in the space, that is, establish a selective integrated learning model, integrate the test samples according to the attribute value, integrate all the same characteristic data of the extracted category into a smaller scale range [32, 33], and label each sample in the range. Determine whether these data are normal or abnormal or binary classification problems.

Set the label as L_a , where the positive value represents the positive data sample; negative values represent negative data samples; the test sample size is B . The average integration error within each subcategory is

$$W_c = L_a \times B \times \lambda_i \times \nu_i \times S_j. \quad (3)$$

In formula (3), λ_i expresses the sample eigenvalue of the i th data feature at the child node; ν_i expresses the eigenvalue of the i th data feature sample at the parent node, and s_j represents the specific detection results of the integration model for the j data feature [34]. According to the formula, assuming that the final voting result of m integrated data is not tenable, then the data with the same characteristic value can be selected as the output result. The calculation formula is

$$S_c = W_c \times F_c. \quad (4)$$

In formula (4), F_c represents the integration parameters, so it can be determined that the integration results of the

same eigenvalue data are the same. Continuously iteratively find the feature labels around the target data within the subcategory, and find the optimal solution [35] through the clustering algorithm, that is, there are abnormal data. The specific formula is

$$L(t) = l_i \times x_i \times (t - 1). \quad (5)$$

In formula (5), l_i represents the optimal solution obtained in the i th iteration; x_i represents the optimal solution obtained during iteration; t indicates the time required. According to the abnormal data results, formulate the corresponding university financial budget management model, as shown in Figure 4.

According to Figure 4, budget control, implementation, and adjustment are important functions of college financial budget. In view of the current situation of numerous financial budget managements, in order to obtain the next academic year's financial budget, the method of incremental adjustment is often adopted. In this process, the development status and funding standards of colleges should be considered, and the key links of budget management should be formulated to effectively improve the supervision and evaluation of budget implementation, and timely adjust the deviation in the budget management [36]. For the financial data of each attribute, it is necessary to ensure the accuracy of feature calculation and effectively realize the evaluation of college financial internal control under artificial intelligence technology.

3. Experimental Analysis

A private university is selected as the experimental object. The data used in this experiment are from the financial database of the rest industry. Several groups of relevant data sets are selected in the database for the experiment. In this paper, six standard data sets will be used for the control experiment, which are named data set A, data set B, data set C, data set D, data set E, and data set F. Create a new data set based on the data in multiple tables in the database connection area. The data set is an object containing data tables. You can temporarily store data in these data tables for use in applications. If the application requires data, the data can be loaded into the data set, which provides a cache of data to be used for the application in local memory. The data in the data set can be used even if the application is disconnected from the database. Data sets maintain information about changes to their data, so you can track data updates and send them back to the database when the application reconnects.

$$L = E - F. \quad (6)$$

In formula (6), E represents net profit and F represents cost. Using the calculation results of formula (6), the evaluation and grading of college financial internal control is divided into five good and bad grades: poor ability, poor ability, general ability, good ability, and excellent ability. The specific evaluation grade table is shown in Table 1.

According to Table 1, the evaluation level of college financial internal control can be divided into five levels. The comprehensive formula is shown in formula (7):

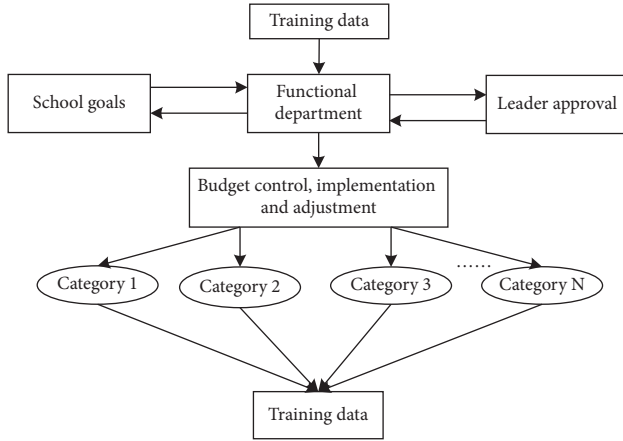


FIGURE 4: Structure of university financial budget management model.

TABLE 1: Evaluation classification.

Serial number	Digital range of L (%)	Ability
1	1~20	Very bad
2	21~40	Poor
3	41~60	Commonly
4	61~80	Very good
5	81~100	Excellent

$$R_r = \frac{Z}{P \times Q}. \quad (7)$$

In formula (7), R_r represents the profitability evaluation level of comprehensive enterprises; Z represents the standard value of college financial internal control; P represents the evaluation constant of college financial internal control; Q represents the evaluation benefit of college financial internal control. Combined with formula (7), the evaluation of college financial internal control in can be realized. See Figure 5 for details.

According to the specific evaluation process of the experiment in Figure 5, it can obtain the evaluation results of the key elements of the evaluation method of college financial internal control. The details are shown in Figure 6:

As shown in Figure 6, when the evaluation time of core elements is prolonged, the evaluation acceleration also increases. The evaluation acceleration of key elements of this method is always greater than that of reference [8] and reference [9]. This is because the university has built an internal financial management evaluation system, which makes the financial evaluation process clearer and the division of work between employees clearer. At the same time, the evaluation system of the university's internal financial management operating under the background of marketization has a certain practical effect. Attaching importance to ideological understanding and transforming financial management concept can promote the evaluation of core factors of the college financial internal control.

The six data sets mentioned above are standard data sets in the field of all abnormal data extraction, which are widely

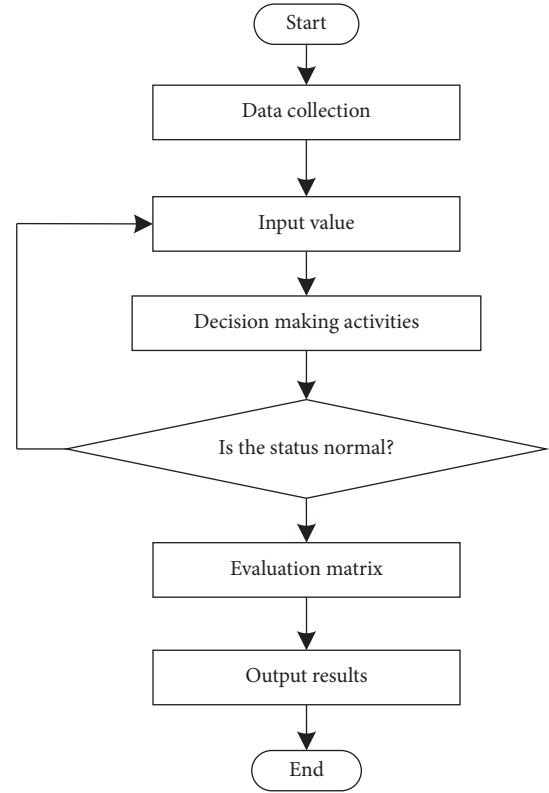


FIGURE 5: Flowchart of specific evaluation process of experiment.

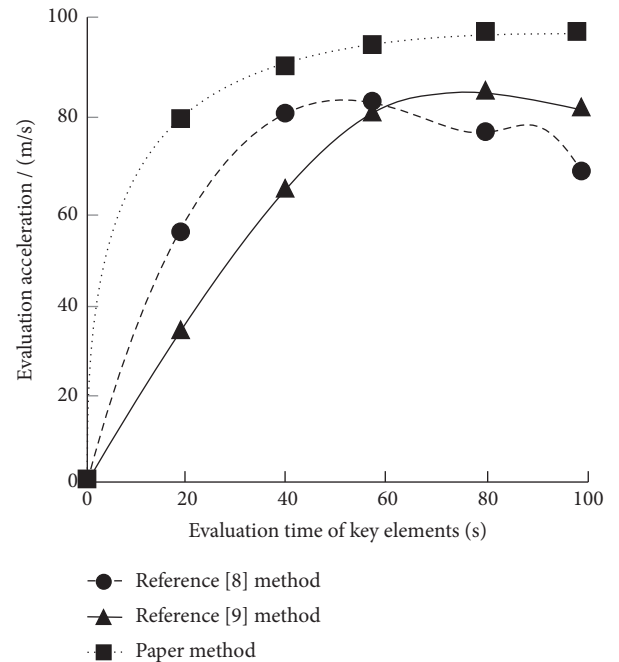


FIGURE 6: Experimental results of key element evaluation.

used in various network detection and platform applications. These data sets contain financial data with 40 different attributes and corresponding feature labels (normal data type or abnormal data type). Among them, there are 6 groups of discrete attribute data, and the other attribute

sets are all continuous, with strong correlation among these attributes.

In order to ensure the intuitiveness of experimental data, attributes are divided into three categories: the first is the data with associated basic features, the second is the data with associated content, and the third is the data with associated time. Abnormal data were interspersed in data sets with different attributes, among which the first type was interspersed in data sets A and B, the second type was interspersed in data sets C and D, and the third type was interspersed in data sets E and F, accounting for about 10% of all data. Before the experiment, these data need to be calibrated to ensure that the value standards of the training data set and test data set are within a reasonable range to ensure unified data processing. The specific calculation formula of H_{ab} is as follows:

$$H_{ab} = \frac{H - \min H}{\min H - \max H} \quad (8)$$

In formula (8), H_{ab} expresses the value of row a and column b of attribute sequence in the data set, H represents the attribute value, $\min H$ represents the minimum value, and $\max H$ expresses the maximum value. To enhance the referentiality of the experimental data, a control experimental group was set up in this study, which was evaluated by the method in reference [8] and reference [9], respectively. Compared with the evaluation method of college financial internal control proposed in this study, the target data function value evaluated by the three methods is tested. The closeness of the final value to 0.01 can reflect the consistency between the evaluation results and the expected setting, and there is a positive correlation between them. The experimental results are shown in Figure 7.

As can be seen from Figure 7, comparing the three methods, the evaluation effect of the method in this paper on abnormal data is the best, which is closest to the ideal value of 0.01. With the increasing number of iterations, the proportion of evaluation to target data is also increasing. The method presented in this paper has strong evaluation adaptability and can effectively deal with various large cardinality data. The ideal goal is achieved with a small number of iterations. However, the evaluation effect of reference [8] method and reference [9] method is relatively weak, mainly because these two methods do not fully consider the heterogeneity of data. Each data has different attribute characteristics, so it is difficult to classify the data with the same characteristics, which affects the accuracy of subsequent anomaly evaluation, resulting in an increase in error value and a decrease in the practicability of the algorithm.

To test the practicality of evaluation method for college financial internal control, this experiment uses the error detection rate index to further compare and analyze. The false detection rate is the ratio of the non-evaluated abnormal data to all abnormal data. The performance of the algorithm will improve as the value becomes smaller. The calculation formula is

$$W_{jl} = \frac{N_n}{N_m} \quad (9)$$

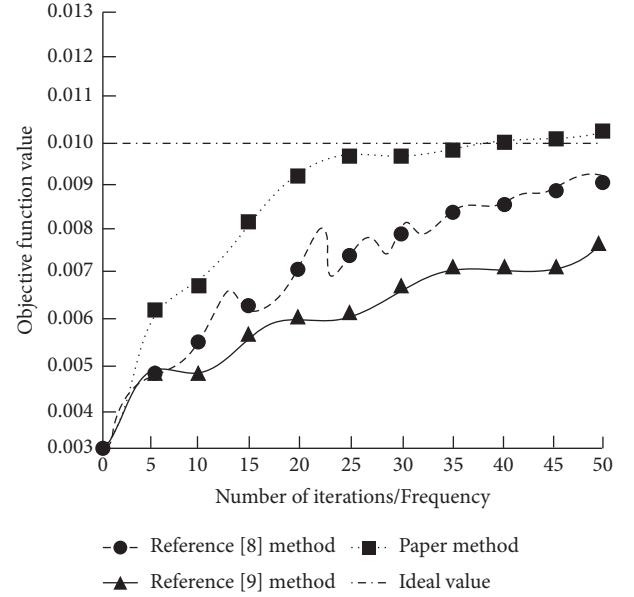


FIGURE 7: Comparison of evaluation effects of three methods.

In formula (9), the number of abnormal data after evaluation is expressed as N_n , and the total amount of abnormal data in the tested data set is expressed as N_m . The experimental results based on the index of formula (9) are shown in Figure 8.

As can be seen from Figure 8, under the small amount of basic data in the first half, the error detection rate curves of the three methods are relatively stable, indicating that less data will not affect the effectiveness of the evaluation method, and all of them can well adapt to the increase of data. But the second half of the relatively large variations in error detection rate curve, in addition to the method in this paper are the change trend of high specification reference methods and reference [8] and reference [9] method cannot well adapt to the large number of data environment, rising as the amount of data; evaluation of failure data has also been gradually rising, the proportion of the secondary evaluation number increase, the efficiency is low, and the error is bigger.

To sum up, the evaluation acceleration of the college financial internal control based on artificial intelligence technology is always higher than that of the reference method. The evaluation effect of the method in this paper on abnormal data is the best, which is closest to the ideal value of 0.01. With the increasing number of iterations, the proportion of evaluation to target data is also increasing. The method presented in this paper has strong evaluation adaptability and can effectively deal with various large cardinality data. The ideal goal is achieved with a small number of iterations. Regardless of the small amount of basic data in the first half and the second half, the error detection rate curve of the method presented in this paper is relatively stable, which can well adapt to the increase of data.

4. Discussion and Analysis

Countermeasures to perfect the college financial internal control system are as follows:

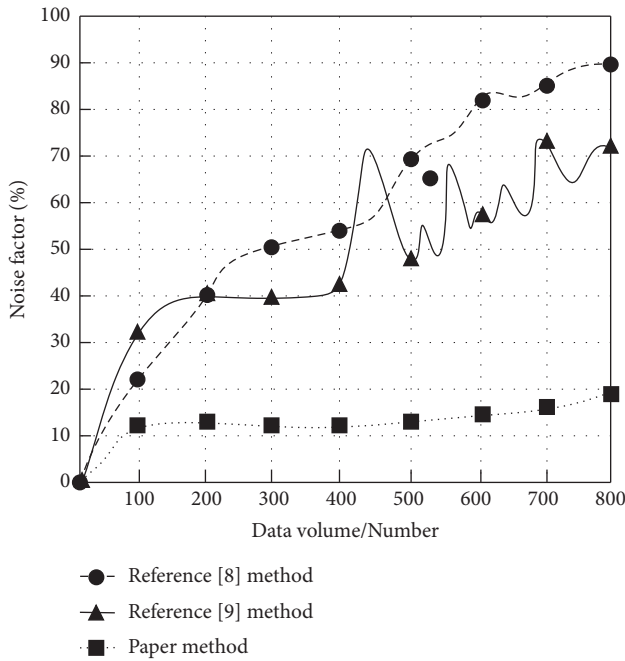


FIGURE 8: Comparison results of detection error rate.

4.1. Increase the Degree of Importance of College Financial Internal Control. With the ceaseless profundity of social economic reform, colleges must strengthen financial internal control fundamentally in order to obtain further development. Therefore, in the continuous deepening and in-depth reform in college, we must pay attention to the internal financial management. Therefore, in the implementation process, we must adhere to the renewal of ideas, give play to the leadership of the leadership, to update the financial management concept of the enterprise, and comprehensively improve the level of college financial management.

4.2. Improve the Business Level of Financial Management Personnel. Financial management personnel are the direct implementers of college financial management. Therefore, the school should attach great importance to the construction of financial management team, further establish and improve the accounting system, reasonably set up accounting posts, and strengthen the education of accountants' awareness of financial internal control, so that they can fully realize the importance of college financial internal control, and effectively implement internal control in every link of accounting work. In addition, we should regularly carry out business training for financial management personnel to enhance the professional ability of financial management personnel and make it have good professional ethics and professional ability, and achieve the goal of improving the efficiency of college financial management finally.

4.3. Further Improve the Budget Management System. In order to improve the level of college financial management and ensure the quality of internal control, it is necessary to construct a perfect financial budget management system.

Therefore, we must further perfect the school budget management system, to better promote the development of financial management, and improve the efficiency of financial management in college. Clarify the responsibilities of budget management among various departments, and establish a supporting budget tracking. The budget analysis and evaluation system implements strict supervision on the use of each budget fund, so as to ensure the effective application of funds and prevent the waste of resources.

5. Conclusions and Prospects

5.1. Conclusions

- (1) The evaluation method of college financial internal control based on artificial intelligence technology increases with the increase of the evaluation time of key elements, and the evaluation acceleration of this method is faster than that of the references.
- (2) The evaluation effect of the method in this paper on abnormal data is the best, which is closest to the ideal value of 0.01. With the continuous increase of the number of iterations, the proportion of evaluation to target data is getting higher and higher. The method presented in this paper has strong evaluation adaptability and can effectively deal with various large cardinality data. The ideal goal is achieved with a small number of iterations.
- (3) Under the small amount of basic data in the first half, the error detection rate curves of the three methods are relatively stable, indicating that less data will not affect the effectiveness of the algorithm. At this time, all of them can well adapt to the increase of data, and the error detection rate of the proposed method is the lowest.

5.2. Prospects

- (1) In the process of deepening reform in colleges, higher requirements are put forward for financial management. Therefore, it is necessary to correctly understand the overall condition of college internal control, clarify the problems and underlying causes, and put forward corresponding countermeasures.
- (2) The next step is to strengthen the efficiency of budget preparation and college financial management. The training and study of budget preparers should be strengthened to continuously enhance the integrity of budgeting. During budget preparation, we should combine the overall planning and comprehensive ability of the school development. Strengthen supervision in the process of budget implementation, divide the implementation responsibility into various centralized departments. Finally, we should establish a budget evaluation mechanism to analyze and evaluate the problems during budget preparation and using, and constantly improve the level of budget preparation.

- (3) In the information age, science and technology are constantly updated and developed. Under this background, colleges need to give full use play to the opportunities brought by modern technologies and means, integrate school network resources, strengthen accounting information construction, establish a modern financial management information system, provide comprehensive information for stakeholders in time and accurately, ensure the safety of college funds and property, enhance the utilization rate of the college financial funds, and constantly strengthen the information construction.

Data Availability

The author can provide all the original data involved in the research.

Conflicts of Interest

The author declares that there are no conflicts of interest in this study.

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