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Retraction

Retracted: Network Teaching Technology Based on Big Data Mining and Information Fusion

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] Y. Du and T. Zhao, "Network Teaching Technology Based on Big Data Mining and Information Fusion," *Security and Communication Networks*, vol. 2021, Article ID 6629563, 9 pages, 2021.

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Research Article

Network Teaching Technology Based on Big Data Mining and Information Fusion

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With the continuous development of modern multimedia technology, the integration of computer technology into the teaching of various subjects has become a trend of the times. The application of computer media and network technology in mathematics teaching improves the integration of mathematics teaching and the integration of resources. A mathematics teaching network media fusion technology is proposed based on big data mining and information fusion, which combines the characteristics of multimedia and network technology in opening, creativity, subjectivity, and so on, and the database model of mathematics teaching is constructed. The multithread integrated scheduling method is used to design the mathematics teaching database model, the fuzzy control method is used to control the multimedia in mathematics teaching, and the big data association rule mining method is used to realize the information fusion of mathematics teaching resources. The optimization and integration of mathematics teaching resources and adaptive scheduling are realized under the technology of computer media and network, and the level of mathematics teaching is improved. The test results show that using this method to design the computer network media of mathematics teaching has a better ability of integrating and dispatching mathematics teaching resources, and the integration of mathematics teaching resources is stronger, which promotes the improvement of mathematics teaching level.

1. Introduction

With the continuous development of modern multimedia technology, the integration of computer technology into the teaching of various subjects has become a trend of the times, and it plays an irreplaceable role in promoting students' autonomous learning and enriching the creation of classroom situations [1]. The new era requires full cultivation of students' information literacy and innovation ability. In the process of integration of computer technology and mathematics teaching in higher vocational education, we should fully combine the characteristics of multimedia and network technology in openness, creativity, subjectivity, and so on; at the same time, through vivid pictures, high-quality video impact, the convenient and quick way of obtaining information, changing the boring mathematics classroom at present, making the mathematics classroom active, students can more scientifically memorize the mathematics knowledge, give play to their subjective initiative, and finally achieve the purpose of enhancing the teaching effect [2]. The continuous development of modern information technology has greatly changed the way of education and teaching. Mathematics, as a basic education course in colleges and universities, plays an important role in cultivating students' comprehensive quality. The application of computer network technology in mathematics teaching improves the level of intelligent mathematics teaching [3]. It has great significance to study the application of computer media and network technology in mathematics teaching.

The application design of computer media in mathematics teaching is based on the optimization, integration, and mining of mathematics teaching resources. For the media resource scheduling model of computer network in mathematics teaching, the minimum delay data aggregation scheduling problem is adopted, and the minimum delay data aggregation scheduling communication and the minimum

delay data aggregation scheduling for computer network media resources in mathematics teaching are adopted. The key of information quality of service is the analysis engine cache data prefetching and processing algorithms [4]. The frequent big data query in the computer network media resource platform of mathematics teaching results in the pressure of the cache data load in the parsing engine, which requires the design of cache data prefetching [5]. Improve the communication and information service quality of computer network media resources in mathematics teaching. In order to improve the algorithm of mathematics teaching, in literature [6], the authors proposed a weighted fuzzy algorithm model of computer network media resource scheduling, which can improve the ability of multithread fusion and media control of mathematics teaching resources. In order to realize the optimization of cloud scheduling of computer network media resources in mathematics teaching, the classification of class differential attributes is carried out, and the scheduling performance is improved by data fusion. However, the algorithm is influenced by the nonlinearity and inhomogeneity of computer network media resources in mathematics teaching, which leads to poor resource scheduling performance. In [7], a data fusion algorithm based on nodal behavioral mathematics teaching is proposed to extract the autocorrelation features of the information flow of computer network media resources, which realizes the scheduling of computer network media resources in mathematics teaching. Then the algorithm is time-sensitive and unreliable [8].

Aiming at the above problems, a mathematics teaching network media fusion technology is proposed based on big data mining and information fusion, which combines the characteristics of multimedia and network technology in openness, creativity, subjectivity, and so on. The database model of mathematics teaching is constructed, the multithread integrated scheduling method is used to design the mathematics teaching database model, and the fuzzy control method is used to control the multimedia in mathematics teaching [9]. Combined with big data association rule mining method, the information fusion of mathematics teaching resources is realized, and the optimization, integration, and adaptive scheduling of mathematics teaching resources are realized under computer media and network technology, and the level of mathematics teaching is improved [10]. Finally, the performance of this method is verified by simulation experiments, which shows the superiority of this method in improving the ability of mathematics teaching resources fusion.

2. Application of Multimedia and Network Technology and the Characteristics of Mathematics Teaching

All teachers use computer media and network technology in teaching and understand the status of computer media network teaching. Most teachers are still in a relatively basic stage of computer media and network technology [11]. Most teachers are able to use common office software, such as canvas, Word, Excel, and PPT. The degree of mastery of Flash, Authorware, and other technologies is not very high enough, and a large number of teachers are still in a relatively basic stage of mastering Mathematica and computer graphics [12]. The reason for this difference may be the fact that, with the rapid development of information technology, many information technology tools are difficult. The degree is relatively large and not easy to master, and the teacher is not willing to spend time and energy to study, but, for the common office software, it is a modern necessary office skill [13]. It is necessary to make dynamic graphics with a geometric drawing board for the abstract mathematics course. This mastery is more proficient. The teacher's mastery of computer media and network technology is shown in Table 1.

The students in different stages were investigated and the effective questionnaires were analyzed. The results showed that most students were able to accept multimedia teaching and should use multimedia teaching, and they thought it was helpful to the improvement of learning. Some students thought that the capacity of multimedia teaching was too large and accepted [14]. Knowledge is limited. For the knowledge that is not understood in the classroom, a few students will learn the courseware repeatedly in class. Most of the students are willing to communicate and discuss with teachers and students the problems encountered [15]. It is beneficial to interaction between teachers and students. Most students agree that multimedia teaching can mobilize the classroom teaching atmosphere, create a relaxed and harmonious learning environment, and improve the efficiency of the classroom [16]. The survey results are shown in Table 2.

The application of multimedia technology and network technology in mathematics education has the following characteristics:

(i) *Openness*. In terms of information teaching, one of its prominent features is openness. This characteristic gives it an open nature in higher vocational mathematics teaching [17]. For example, in the daily teaching, teachers can get a lot of information from the network and let the students choose the information they are interested in. In addition, teachers can also pass multimedia [18]. The information of the body, the training of the students' thinking ability, and the ability to solve all the problems in the data through a perfect network environment, and the teachers are involved in the identity of an organizer in the whole process, thus arousing the students' interest in acquiring knowledge [19].

(ii) *Subjectivity*. In mathematics teaching, teachers usually integrate information according to teaching needs and transmit it to students. For students, they are the main body of information processing [20]. Only by giving full play to the students' subjectivity can the students take the initiative to construct the knowledge in the process of knowledge construction, so as to find out the learning methods and

Table 1: Survey results of teachers' application ability in computer media teaching.

Specific technology and related applications	Mastery (%)	Basic mastery (%)	Not to use (%)
Word processing electronic text and writing teaching plans	85.2	12.3	2.5
Excel processing of teaching data	80.5	12.4	7.1
PPT making teaching courseware	89.7	7.8	2.5
Baidu and other search engines get teaching information	78.9	12.8	8.3
Geometric sketchpad to present dynamic teaching content	90.2	5.4	4.4
Using flash classroom teaching	85.7	10.5	3.8
Authorware making mathematics teaching courseware	88.4	10.8	0.8
Application of mathematical teaching	92.1	4.8	3.1
A graphic calculator to carry out a mathematical experiment	89.4	9.8	0.8
Flash making teaching animation	83.7	14.7	1.6

Table 2: Survey results of students' acceptance of multimedia teaching.

Specific technology and related applications	Yes (%)	No (%)	Do not know (%)
Multimedia teaching can be accepted	96.3	3.5	0.2
Multimedia teaching helps to learn	76.4	15.6	8.0
Multiteaching content of multimedia teaching	78.9	11.3	9.8
Multimedia teaching is beneficial to the interaction of teachers and students	90.4	5.2	4.4
Multimedia teaching will motivate your learning initiative	88.2	9.2	2.6
Multimedia teaching can mobilize the atmosphere of the classroom	74.5	18.9	6.6
Multimedia teaching has a great impact on your study	81.2	10.6	8.2
Multimedia teaching is suitable for your study	79.6	14.5	5.9
Willing to talk with classmates and discuss the contents in class	92.1	5.1	2.8
Do not understand the knowledge; you will learn the courseware again and again	89.7	7.2	3.1
You will communicate with the teacher if you do not understand the knowledge	90.2	6.6	3.2

information channels suitable for their own style [21].

(iii) *Diagnostic and Interactive Feedback*. Through the function of network, the students who study mathematics can acquire it continuously, and then they can self-examine and test themselves constantly. Through this kind of self-learning, self-summing-up, and so on, we can continuously improve the present learning style, so as to greatly improve our learning level. In addition, a good summary and feedback are also conducive to the success of students [22].

(iv) *Creativity*. In teaching, the purpose of mathematics teaching is not only to make students understand knowledge but also to expand students' vision with the help of network and then to cultivate students' solid basic knowledge and lay a solid foundation for further innovation. Therefore, in the process of making courseware with multimedia, students should know why and how to do it [23].

3. Application Examples of Multimedia and Network Technology

3.1. Authorware Application of Software. At present, Authorware software is a kind of commonly used software in the course of mathematics teaching information. The typical characteristic of Authorware software, which belongs to the course training software of computer specialty, is that it has very intuitionistic animation and strong interactive function [24]. In order to make the original theoretical mathematics curriculum more vivid, students' enthusiasm is better mobilized for learning. For example, in the process of training students' ideas of spatial thinking, in order to make it easier for students to understand "the movement of cut lines," an animated interface was created with Authorware software [25]. Through this interface, the trajectory and trend of the Secant are shown when the tangent of the curve is infinitely approaching from the independent variable X. Through this kind of movement, it also lets the student see the cutting line movement process more intuitively. In mathematics teaching, geometry is expressed intuitively by Authorware software. Figure 1 is a grid ring diagram made by Authorware software. By making this graph, we can express different graphics intuitively, so as to attract students' interest in relevant theoretical knowledge. For teachers, teaching through this vivid way also leads students to explore the graphics or number of items in the process of change, to grasp the essential characteristics of knowledge points [26].

3.2. Multimedia-Assisted Instruction Helps to Understand the Concept. Computer assisted instruction provides a modern teaching method for mathematics teaching. In the past, mathematics concepts, which were not easy to explain clearly, and the appropriate use of teaching courseware might make students understand and improve their teaching effect [27].

For example, the centrifugal angle eve of the ellipse (in Figure 2, for the corner of the final edge) and the angle of the

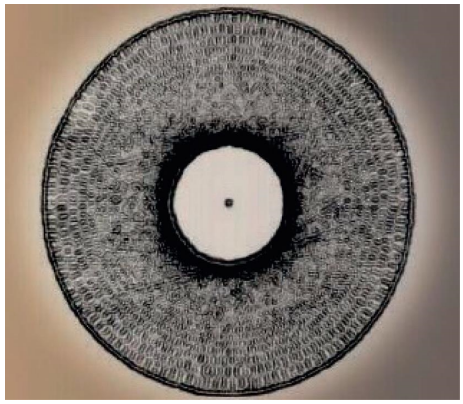

Figure 1: Grid circle graph.

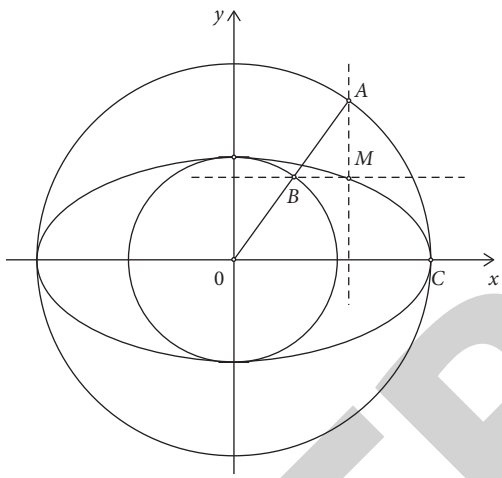

Figure 2: Multimedia courseware drawing.

rotation angle (the radius of the ellipse and the positive half of the axis of the X-axis) are the two concepts that are easily confused by the students, and the relationship between the two angles can be displayed dynamically by the "Geometric Sketchpad." Multimedia courseware drawing is shown in Figure 2.

3.3. Design of Online Mathematics Learning Platform. With the popularity of network teaching, teaching to students through the network has become a trend. These behaviors determine whether they can develop independent learning ability and habits. In the design of online mathematics learning platform, the current mainstream is to develop the system through J2EE Vis02008. For example, in order to speed up the transformation of mathematics teaching mode, a platform for online learning and testing of mathematics is designed by using J2EE technology. In this system, the system is built by J2EE development tools and the current mainstream B/S architecture. The B/S mode is used to build the system, which is easy to visit and has good extensibility and reliability. In this system, the application roles of the system are divided into three parts: teacher, administrator, and student. Three different roles play their own functions, so as to ensure that the system can use different functions according to their respective roles. Based on the above analysis, the structure of mathematics teaching system based on computer media and network technology is obtained, and the structure of mathematics teaching system based on computer media and network technology is shown in Figure 3.

The specific platform function design is shown in Figure 4.

4. Network Structure Model and Algorithm Optimization of Network Media Resource Scheduling in Mathematics Teaching

4.1. Design of Computer Network Platform for Mathematics Teaching. Based on big data mining and information fusion, a mathematics teaching network media fusion technology is proposed. The multithread integrated scheduling method is used to design the mathematics teaching database model, the resource scheduling model is described by ADL and UML, and the central control unit in the system is designed by embedded microprocessor. Multithread integrated scheduling method is used to design mathematical teaching database model. Using fuzzy control method to control multimedia in mathematics teaching, suppose that $X_n(n = 1, 2, ..., N)$ computer network media resources of mathematics teaching are collected in time T; then the design is expressed as follows:

$$\begin{aligned} X &= \{X[1], X[2], ..., X[N]\}, \\ X[1] &= (id_1, n_1), \\ X[N] &= (id_m, n_m), \end{aligned} \tag{1}$$

$x1 \leq = x2 \leq =, ..., \leq = xn$, the total number of available resources in the system is $C0$, and the computer network media resource scheduling model for mathematics teaching is shown in Figure 5.

In the scheduling of computer network media resources in mathematics teaching, the i kind of mathematics teaching resources is classified as $r(r = 1, 2, ..., l)$. The first terminal node is defined as $\delta_{ir} = 1$ at the position of the d dimension, and its particle velocity is defined as $\delta_{ir} = 0$. The cloud storage resource terminal node currently searches for the optimal amount of *Pid*. In order to improve the anti-disturbance performance of the algorithm, the momentum inertia coefficient ω is added to improve the stability of computer network media resource scheduling in mathematics teaching. Consider a limited dataset:

$$X = \{x_1, x_2, \cdots, x_n\} \subset R^s. \tag{2}$$

There are n samples in the dataset, where the characteristic vector of sample $i = 1, 2, \cdots, n$ is

$$SCM_h = \sum_{i=1}^{M} (M_h - CM_h)^2 + \sigma_{jk} w_{jk}. \tag{3}$$

The working state of each server in the computing cluster can be represented by a state parameter vector, described as

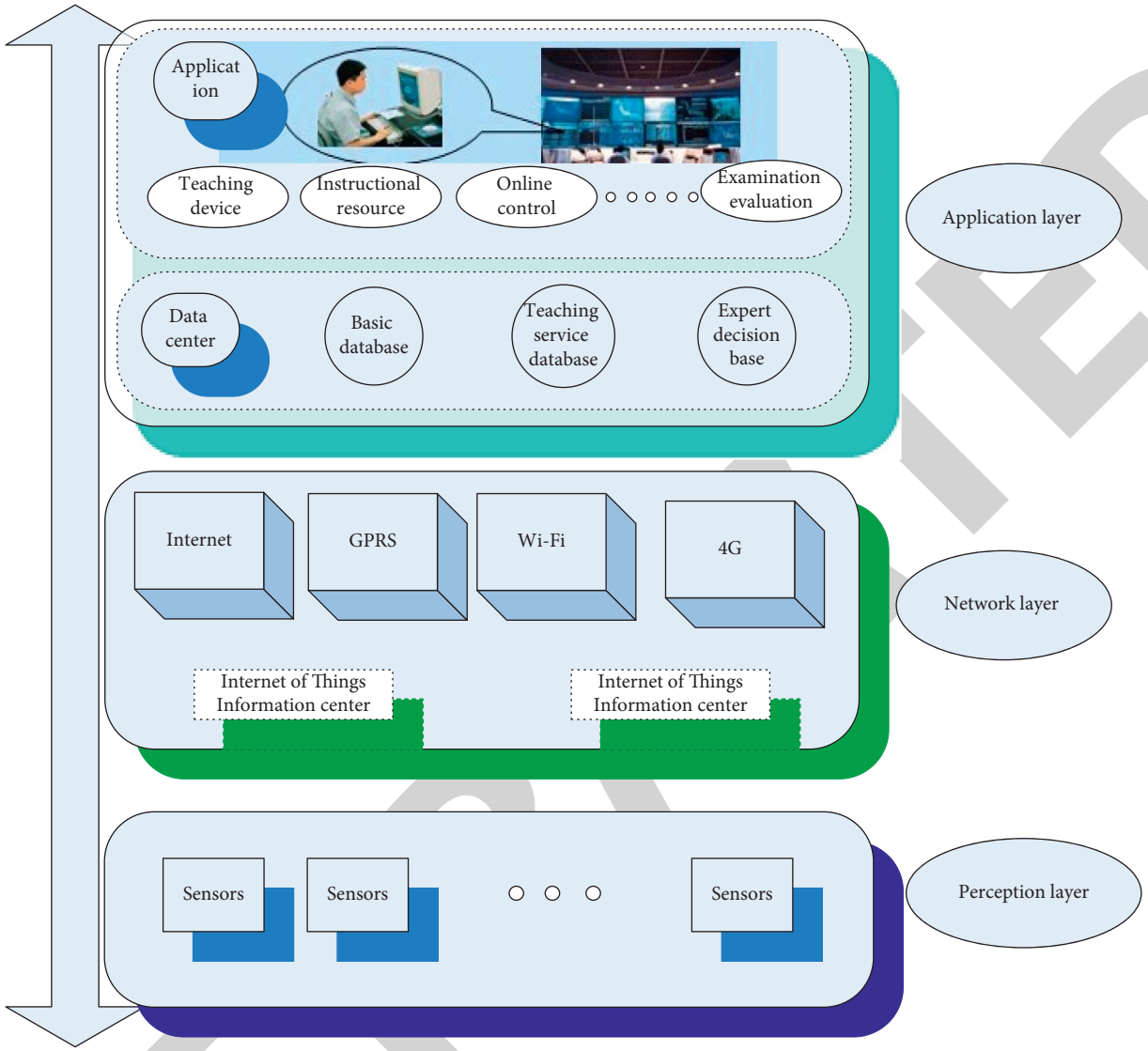

Figure 3: Structure of mathematics teaching system based on computer media and network technology.

$$M_v = w_1 \sum_{i=1}^{m\times n} (H_i - S_i) + M_h w_2 \sum_{i=1}^{m\times n} (S_i - V_i) + w_3 \sum_{i=1}^{m\times n} (V_i - H_i). \quad (4)$$

The direct trust value and indirect trust value of each transmission node in data distribution are calculated, the synthetic trust value is generated according to the synthesis rule, and the mathematical teaching resource scheduling model under multimedia environment is designed.

4.2. Big Data Association Rule Mining and Resource Scheduling Algorithm Design. Combined with big data association rule mining method, the information fusion of mathematics teaching resources is realized, and the optimal integration and adaptive scheduling of mathematics teaching resources are realized under the computer media and network technology. When the network head node receives the beacon information from the front and tail nodes, the network head node receives the beacon information from the front and tail nodes. Frequency domain adaptive algorithm is used, the power spectrum signal of computer network media resource scheduling system in mathematics teaching is designed with variable step size filter, and the filter function is described as

$$X_1(k) = FFT\left[x_1(k), x_1(k+1), \ldots, x_1(k+N-1)\right]^T,$$
$$X_2(k) = FFT\left[x_2(k), x_2(k+1), \ldots, x_2(k+N-1)\right]^T. \quad (5)$$

In the balanced design of mathematical teaching resource scheduling model based on B/S, when the tail node receives the beacon information of the back head node, the iterative expression of the weight vector of the LMS algorithm in frequency domain if the wireless power of the tail node is less than the wireless power of the head node is shown as follows:

$$\hat{H}_{12}(k+1) = \hat{H}_{12}(k) + u_1(k) \cdot e_1(k) \cdot \mathrm{conj}\left(\tilde{X}_1(k)\right). \quad (6)$$

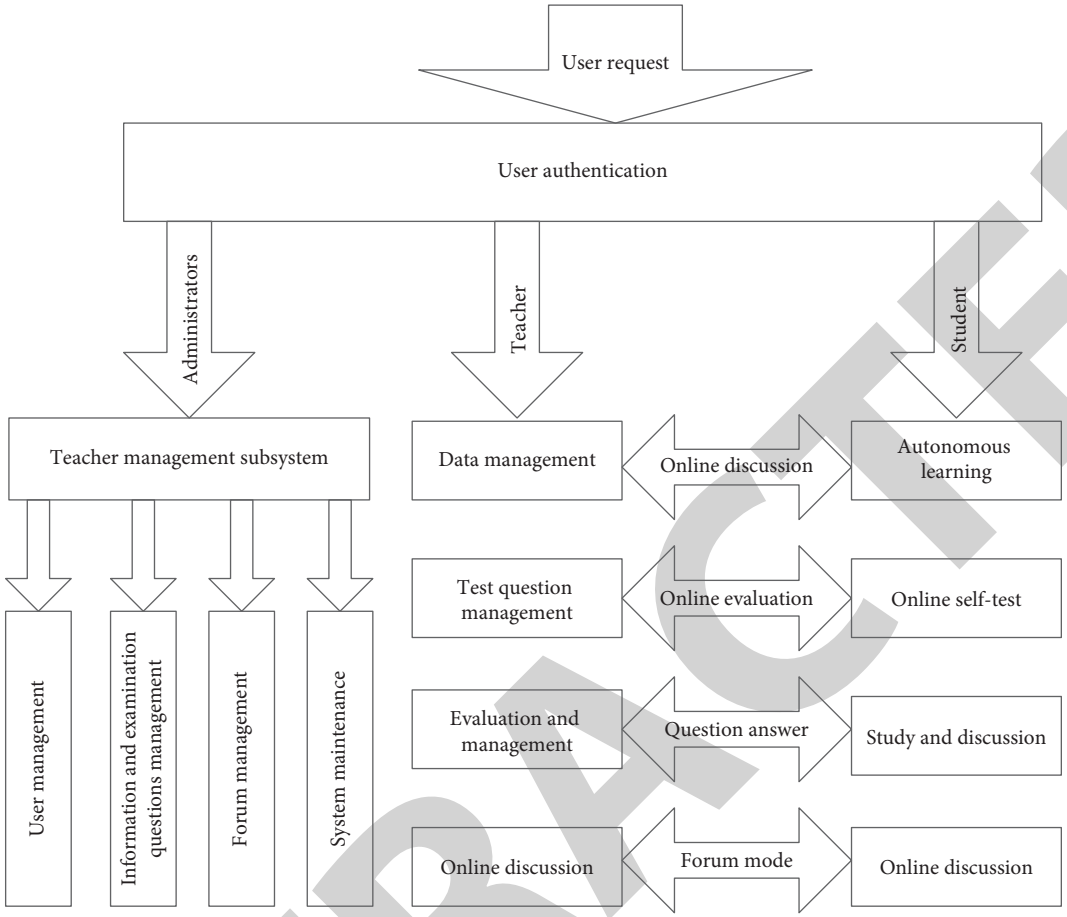

Figure 4: The function of the mathematical online testing platform.

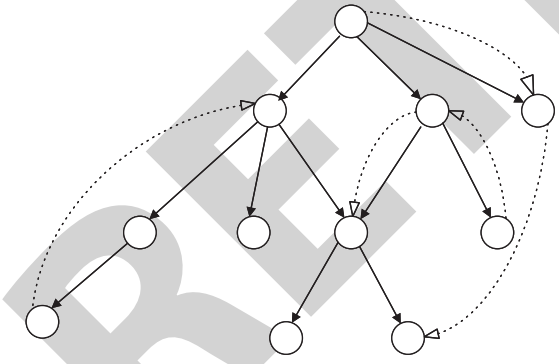

Figure 5: Mathematical teaching resource scheduling model.

After sending the beacon information from the computer network media resource library R_n of mathematics teaching, if the transmission distance reaches $R_{\max}$, the formula is described as follows:

$$\Delta R = k\left(R - R_{\min}\right). \tag{7}$$

The design of network variable step size filter based on B/S model of mathematical teaching resource scheduling is realized, and the anti-interference of computer network media resource scheduling in mathematics teaching is improved.

Based on the principle of maximum benefit, the constraint model of computer network media resource scheduling in mathematics teaching is obtained as follows:

$$\begin{aligned}
&\text{Max}\left\{\sum_{i=1}^{n}\sum_{j=1}^{m} c_{ij}y_{ij} - \sum_{j=1}^{m} d_j x_j\right\},\\
&\text{s.t.}\sum_{j=1}^{m} y_{ij} = a_i, \quad i = 1,2,\ldots,n,\\
&\sum_{i=1}^{n} y_{ij} \le b_j x_j, \quad j = 1,2,\ldots m,\\
&\sum_{i=1}^{n}\sum_{j=1}^{m} y_{ij}\delta_{ir} \le \sum_{j=1}^{m} x_j^r b_j, \quad r = 1,2,\ldots,l,\\
&x_j^{r+1}x_{j+1}^r = 0, \quad j = 1,2,\ldots,m-1,\ r = 1,2,\ldots,l-1,\\
&\sum_{r=1}^{l} x_j^r = x_j, \quad j = 1,2,\ldots,m,\\
&0 \le x_j \le k_j \text{ is integer}, \quad j = 1,2,\ldots,m,\\
&y_{ij} \ge 0 \text{ is integer}, \quad i = 1,2,\ldots,n;\ j = 1,2,\ldots,m.
\end{aligned} \tag{8}$$

Based on the above model, the successful scheduling is realized by collecting the multimedia topology information of the new mathematics teaching resources frequently.

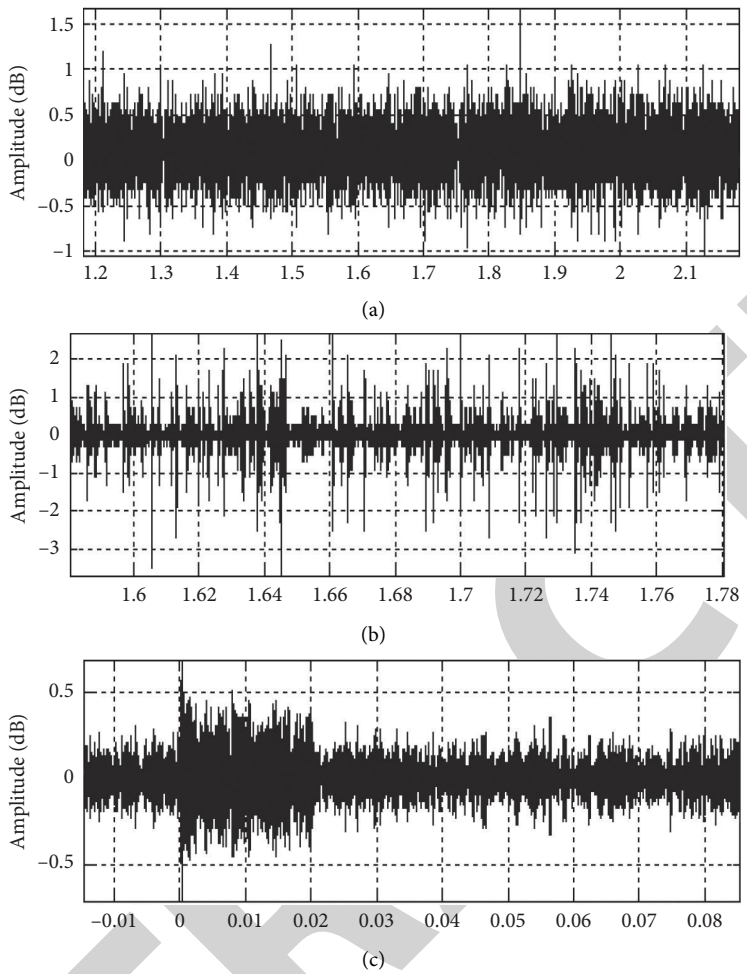

Figure 6: Information flow of computer network media resources in mathematics teaching.

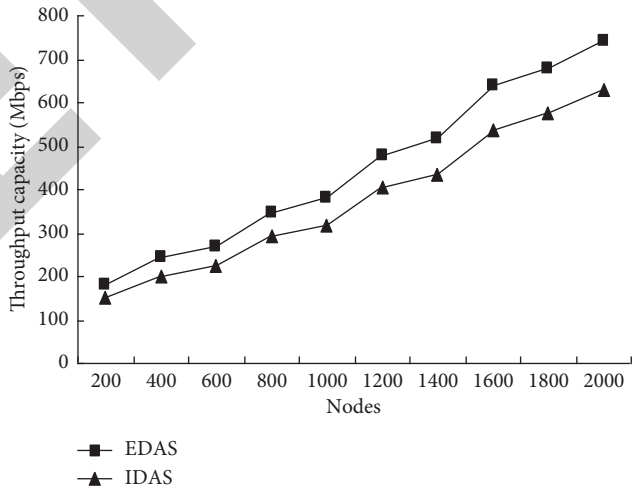

Figure 7: Performance test of throughput capacity.

5. Simulation Experiment and Result Analysis

In order to test the reliability performance of this algorithm in the realization of computer network media resource scheduling in mathematics teaching, a simulation experiment is carried out. The grid resource scheduler in GridSim simulation platform is extended by EFRB, and a set of 100 tasks is constructed. The execution time of each resource scheduling task is 120 s, and the total task is divided into 10 queues. The computer network media resources of

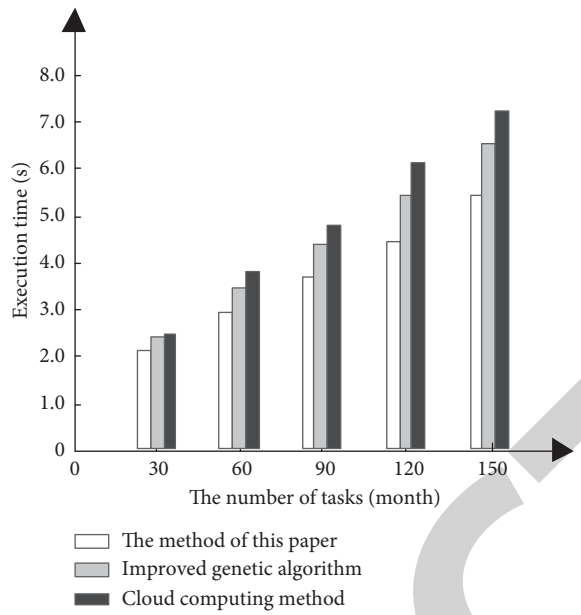

Figure 8: Comparison of task execution time span under different methods.

mathematics teaching are divided into several areas; each region has two LANs on average. The storage capacity of the main site is 300 GB, and the number of nodes varies from 200 to 2000. The information flow of computer network media resources for mathematics teaching is constructed, as shown in Figure 6.

The computer network media information flow of mathematical teaching in Figure 6 is taken as the test set, the optimal allocation of mathematics teaching resources is carried out, and the throughput of the allocation of mathematics teaching resources is obtained as shown in Figure 7.

The simulation results show that the design of computer network media in mathematics teaching by this method is good for the integration of mathematics teaching resources, the integration of mathematics teaching resources is stronger, and the improvement of mathematics teaching level is promoted.

The time span of computer network media resource scheduling task is compared with the three methods in mathematics teaching. In the experiment, the number of computer network media resource scheduling tasks is set from 30 to 150, and the number of computing nodes is 8. The computer network media based on improved genetic algorithm and cloud computing are used, respectively. The source scheduling method is performed 10 times and takes the average value, and the result is shown in Figure 8.

As can be seen from Figure 5, the time of execution of the task scheduling results in this method is shorter than that based on the improved genetic algorithm and the cloud computing method. With the increase of the number of tasks, the gap between the execution time spans of the algorithm is becoming larger and the gap is the largest when the number of tasks is 150. The resource scheduling algorithm based on the improved genetic algorithm only considers the computing power of resources. With the increase of the number of tasks, the load balance of the computer network media resources is the main factor affecting the performance of the algorithm. This method has a better global search ability, making the scheduling result better than the improved genetic algorithm. The global search ability of the algorithm is better than that based on the improved genetic algorithm and the cloud computing based computer network media resource scheduling method, and the performance is optimal.

Data Availability

The data used to support the finding of this study are included in the article.

Conflicts of Interest

The authors declare that they have no known conflicts of interest or personal relationships that could have appeared to influence the work reported in this paper.

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