

Retraction

Retracted: Research on Educational Information Platform Based on Cloud Computing

Security and Communication Networks

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Security and Communication Networks has retracted the article titled “Research on Educational Information Platform Based on Cloud Computing” [1], due to concerns with the authenticity of the data. It was found that previous versions of this submission contained a figure unrelated to the topic of the paper, and this graph was subsequently identified within several other submissions, all with accompanying text claiming to have generated the graph. A number of these submissions were rejected from the journal; however, 6 were published and have now been retracted from *Security and Communication Networks* and *Scientific Programming* [2–6].

The authors responded to explain that an author from one of the identified submissions had provided copy editing for their manuscript and introduced the graph and accompanying text in error.

The authors were unable to provide copies of correspondence to support their claim or the raw data from their study. The authors’ explanation did not satisfy the concerns of the editorial board, and the article is therefore being retracted due to concerns with the reliability of the data.

The authors do not agree to the retraction.

References

- [1] L. Fan, M. Xia, P. Huang, and J. Hu, “Research on Educational Information Platform Based on Cloud Computing,” *Security and Communication Networks*, vol. 2021, Article ID 3109473, 11 pages, 2021.
- [2] L. Huo, “Intelligent Recognition Method of Vehicle Path with Time Window Based on Genetic Algorithm,” *Security and Communication Networks*, vol. 2021, Article ID 3614291, 11 pages, 2021.
- [3] L. Keshun, Z. Xijun, and Z. Xing, “Research on Analysis and Classification of Vulnerability of Electromagnetic Pulse with a

STM32 Single-Chip Microcomputer,” *Scientific Programming*, vol. 2021, Article ID 6836158, 10 pages, 2021.

- [4] L. Zhuang, Y. Qi, and F. Zhang, “Braking Control System of Oilfield Minor Repair Machine Based on Wireless Sensor Network,” *Security and Communication Networks*, vol. 2021, Article ID 6966041, 14 pages, 2021.
- [5] L. Yan, “Research on Crude Oil Trade Procurement Model Based on DEA-Malmquist Algorithm,” *Scientific Programming*, vol. 2021, Article ID 6360439, 10 pages, 2021.
- [6] G. Yin, R. Qi, J. Zhao, X. Zhao, and J. Xu, “Optimization Method of Sports Service Network Node Layout Based on Network Communication,” *Security and Communication Networks*, vol. 2021, Article ID 3013135, 8 pages, 2021.

Research Article

Research on Educational Information Platform Based on Cloud Computing

Ling Fan , Meiyi Xia, Ping Huang, and Jianmin Hu

Qinghai Communications Technical College, Xining 810002, China

Correspondence should be addressed to Ling Fan; xmy@qhctc.edu.cn

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The traditional method only pays attention to hardware construction and ignores the data processing steps, which leads to high redundant resource occupancy rate, untimely resource sharing, and low platform data safety factor. In order to solve this problem, this paper establishes an educational information platform based on cloud computing. The platform gives the overall structure of the education information platform, including the business layer and the support layer. Then the external interface is designed. Based on the MySQL database interface, users are allowed to use custom data formats and storage management modes to ensure flexibility in using data resources and improve the compatibility between smart terminals and virtual machines through the remote desktop terminal architecture. Through the educational data compression and educational resource sharing model, the generation of redundant messages is reduced, thereby realizing the design of the educational information platform. Experimental results show that this method can effectively reduce the occupancy rate of redundant resources, save network bandwidth, and improve the data safety factor of the platform. The resource sharing time is always less than 2.0 s, which verifies the effectiveness of the method

1. Introduction

Judging from the overall level of education informatization in recent years, basic hardware construction has achieved certain results, but software construction has not kept up with the pace of hardware construction. The lack of software has affected the development of education informatization, which in turn led the overall education information applications to be at a low level [1–3]. At present, the educational resources are scattered and the quality is not high. Therefore, the construction of educational resources is the core of educational informatization. Resource construction itself has its particularity, such as large investment, complex resource organization, long construction cycle, and slow effect. Various factors lead to no qualitative change in the construction of educational resources [4, 5]. From the current situation of the development of educational resources, there are many educational resources, good and bad. Therefore, in the construction of academic information resources, the necessary management of the existing educational portal

should also strengthen the integration of educational resources in the existing network. Therefore, exploring the construction of educational resources and improving the application level have become an important mission of educational informatization construction [6–8].

Reference [9] designs an online education course resource sharing platform based on cloud platform, which is composed of cloud infrastructure layer, cloud system service layer, cloud application layer, and cloud client layer. Among them, the business management system in the cloud system service layer implements the business logic of the platform, and the platform divides the user functions into two functional modules, teachers and students, according to the user's authority difference: The teacher function module can manage content such as students, teams, courses, and live broadcasts, edit, generate, and approve test papers, complete creation, assign and count student homework, and upload teaching resources. The student function module is used to realize the functions of downloading teaching resources, online homework, online examination, discussion, and

communication. The platform performance verification results show that the designed platform has a large number of shared resources and comprehensive content, and the shared service effect and platform application performance score rate are both higher than 0.75, indicating that the platform can greatly help enhance the teaching effect and can effectively enhance the fairness of education. Zhang Zhen, Min Hua, and others put forward a cloud computing platform-based personalized physical education system construction analysis, using cloud computing education platform to construct and analyze the teaching system, and obtained good results. However, the occupancy rate of redundant resources in this platform is relatively high, and it will cause stalls when a large number of users log in. Reference [10] designed a massive video teaching resource management system based on a cloud platform. The system adopts HDFS distributed structure. The functional layer contains processing functions such as system transaction logic rules. It can clearly reflect the functions of each relatively independent goal, which is mainly divided into users module, system management module, and teaching video resource management module. Among them, the user module can realize the uploading, downloading, and evaluation of instructional video; the instructional video resource management module is based on the restricted Boltzmann machine recommendation theory and is trained through the training data set and then obtains the user's feedback on the prediction and evaluation of instructional video resources and recommends teaching video resources based on the evaluation results. Application test results show that the designed system can meet the user's various search requirements, and the system resource occupancy rate is low under concurrent application conditions. It is found that the topology of a data communication network plays a role as an important factor in its security robustness against attack. In such networks, the security robustness against intentional attack that aims to bring down network nodes may vary by changing the topology. This bringing down is a kind of destruction and interruption threat that attacks the availability of the network (i.e., attack on network resources and links). However, resource sharing is not timely due to the large amount of processing time consumed in resource sharing. Reference [11] proposed an open platform model for educational resources based on the PaaS structure, combined with technologies such as dynamic geometry, computer algebra, and automatic geometric theorem inference, and adopted a microservice architecture to design and implement a dynamic open platform for teaching resources. The open platform has the characteristics of deep discipline, open resources and ability customization, Hierarchical Authorization, and so forth. OAuth 2.0 technology is used as the main authorization process to provide the third-party applications and users with authentication, authorization, hierarchical and customized dynamic teaching content materials, and capabilities. The characteristics and overall design of the open platform are given. The hierarchical strategy for application and user rights, authentication, and customized open resources and tools are introduced. According to the

performance test results, the platform can be widely used in teaching activities. However, because many users directly access the platform, it is difficult to maintain the security of the platform data.

Human resource planning can be divided into strategic long-term planning, mid-term planning, and operational short-term planning. It can also be divided into two aspects: strategic plan and tactical plan.

1.1. Strategic Plan. The essence of human resource planning is to promote enterprises to achieve their goals. Therefore, it must be strategic, forward-looking, and objective, and it must reflect the development requirements of the organization. At the same time, attention should be paid to the unity of stability and flexibility of strategic planning.

1.2. Tactical Plan. Human resource planning is to transform the business strategy and goals of the company into human needs and analyze and formulate some specific goals and implementation plans of human resource management from the perspective of the overall advancement and quantification of the company. The tactical plan is based on the forecast of the supply and demand of external human resources facing the company in the future, as well as the forecast of the demand for human resources for the company's development. The specific plan is formulated based on the results of the forecast, including recruitment, dismissal, promotion, training, salary, and welfare policies.

Aiming at the problems of traditional methods, such as high occupation rate of redundant resources, untimely resource sharing, and low security coefficient of platform data, an education information platform based on cloud computing is established.

The research contributions of this article include the following:

- (1) This article establishes an educational information platform based on cloud computing.
- (2) Through the educational data compression and educational resource sharing model, the generation of redundant messages is reduced, thereby realizing the design of the educational information platform.
- (3) The method in this paper can effectively reduce the occupancy rate of redundant resources, save network bandwidth, and improve the data safety factor of the platform.

2. Educational Information Platform Construction

Wireless sensor networks (WSNs) consist of numerous sensor nodes constrained in terms of their storage space, battery power, and computational capability. There are plenty of applications currently proposed for WSNs, such as environmental monitoring and medical and military fields. However, since data are transmitted in multiple hops and wirelessly, some serious privacy issues are involved in WSNs.

Data collection is a key operation in wireless sensor networks. In view of the existing data collection schemes' privacy-preserving problem, we utilize a secure and verifiable continuous data collection (SVCDC) algorithm to collect data for the education information platform. Considering the temporal correlation of sensory data, SVCDC reconstructs multiple sensory data in one period, which can effectively decrease data traffic, and then, by encrypting the reconstructed data, SVCDC ensures the privacy of the sensory data [12].

2.1. The Overall Architecture of the Education Information Platform. According to the individualized needs of individualized education, the double-layer virtual network architecture is adopted to build the education information platform: the bottom layer is the support layer, and the real hardware cluster is used as the virtual machine carrier. The upper layer is business layer, which is composed of virtual machine cluster. Connecting with the external network and completing various tasks are all completed by the business layer, and the support layer is only used to carry the business layer, logically isolated from the external network [13]. The overall architecture of the education information platform includes hardware and software, and a virtual machine is also used for control analysis to achieve the effect of platform application. Figure 1 shows the overall architecture of the education information platform. In this paper, we utilize the entropy loss function to build the model for our research problems. It can be defined as follows: $\text{loss}(x, y) = \sum_{i=1}^n -p_i \log(1 - p_i)$, where x and y are represented as the real arts and crafts' score and difficulty and y means the predicted score and difficulty of our proposal. p_i means the probability of them when they are similar. The bigger the value of the loss was, the worse our proposal performed. Our proposal is used to train a model that fits the real and predicted arts and crafts, so that the machine can assist the arts and crafts designed. The overall structure of the braking control system of the oil field minor repair machine based on wireless sensor network is shown in Figure 1.

2.1.1. Business Layer. Virtual machine clusters at the business layer have greater freedom, and open source solutions can be used to be compatible with commercial solutions, while supporting existing systems in other regions to be transplanted to virtual machines on this layer. For the external network, there is no difference between various specific technical solutions, and the education cloud platform as a whole provides services [14]. This virtual business layer has strong compatibility and tolerance for existing systems in various regions, which is conducive to system transplantation and smooth upgrades in the future.

2.1.2. Support Layer. The hardware device group of the support layer is also scalable and flexible. This layer specifically includes PCs, independent servers, blade servers, RAID disk arrays, NAS network storage, and other devices [15]. Since the support layer purely provides computing resources for virtual machines in the business layer and does

not participate in specific business operations, the support layer cannot be seen from the external network, and equipment upgrades in the support layer will not affect the operation of virtual machines in the business layer.

The main features of the support layer are as follows:

- (1) It is logically isolated from the external network and does not directly provide services to the outside world. It only provides various hardware resources for the operation of virtual machines in the business layer.
- (2) It has the compatibility of hardware heterogeneous systems, can support a variety of different hardware devices, and provides hardware resources to virtual machines on the business layer through a unified internal platform interface.
- (3) The ability of fault-tolerant operation is provided through hardware redundancy backup. When the hardware device fails, the virtual machine of the business layer can continue to operate normally. The replacement, expansion, and upgrade of hardware will not affect the normal service of the business layer.

The advantage of this two-layer architecture is that the virtual machine that provides services becomes an independent layer which is separated from the real equipment at the bottom and has strong compatibility. It can use existing equipment and can be seamlessly upgraded to new hardware; the business of the layer is not affected.

Many learning platforms are designed with different skills, such as in [9, 10, 16–18], which use various machine learning methods and new cloud computing technologies to achieve their respective skills. Reference [16] presents a graph-based network that builds connections between different risk nodes. Reference [16] also uses a specific loss structure to keep the similarity of real and predicted crafts design. Reference [17] presents a basic model that requires more computation consumption to obtain the desired performances. However, these methods have their disadvantages respectively. Reference [18] is too slow, [17] is so complicated, and [16] also needs more spaces. All these methods have performed well in recent years and are more popular, so they can be used in different learning platforms. Though they have different shortcomings, compared with these methods, our proposal can work well effectively by using the evolving algorithm that does not utilize the network structure and is not time-consuming. Our proposal can deal with the problems, and we also need a smaller computation space to build our model. However, our model may obtain a relatively lower accuracy than others sometimes, which may make the prediction unstable.

2.2. External Interface Design. In order to collect the data of various regional systems for summary, analysis, and statistics and then form the parameter index of educational resources push and scheduling, and in order to reduce the difficulty of interface implementation, do not use complex and customized interface, but use simple and general

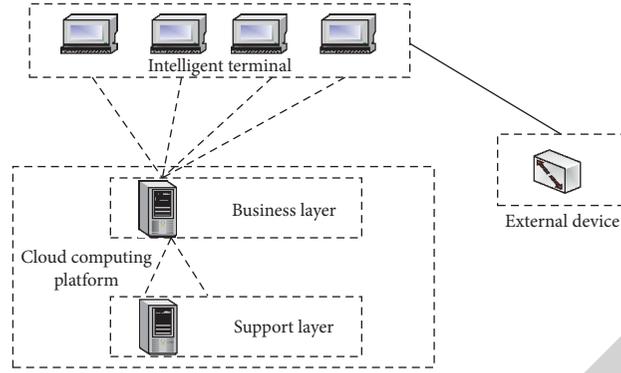


FIGURE 1: Schematic diagram of the overall architecture of the education information platform.

database interface; this paper uses MySQL database interface. On the basis of MySQL database interface, users are allowed to use custom data format and storage management mode to ensure the flexibility of data resource use [19]. The integrity and completeness of external data are guaranteed by external system, while the data integrity of this platform is guaranteed by MySQL database. Figure 2 is the schematic diagram of the external interface circuit.

2.3. Remote Desktop Terminal Architecture. In order to enable learners to access the education cloud remotely through various intelligent terminals, a remote desktop terminal architecture is designed. This process focused on the realization of two technologies: Android terminal accessing Windows virtual machine and Windows terminal accessing Linux virtual machine. Both technologies are implemented based on RDP protocol, which ensures the consistency of the cloud platform system and achieves good compatibility of cross platform intelligent terminal accessing cross platform virtual machine [20].

This solution uses a smart terminal to access a remote desktop and logs in to the virtual machine on the internal cloud platform through a WiFi LAN or external network. The remote desktop terminal architecture is shown in Figure 3.

According to Figure 3, it can be seen that the firewall is connected to the external network, allowing various wired and wireless smart terminals such as tablet computers, large-screen smart phones, notebooks, and desktop computers to remotely log in to the internal cloud platform. The number of connections allowed for remote login depends on the performance of the internal cloud platform. The typical resolution is supported by the remote desktop: $640 \times 480 \times 16$ -bit color or $720 \times 480 \times 16$ -bit color. This setting can also be displayed normally on a large-screen smartphone of 800×480 . If it is a tablet or notebook computer, you can use $1024 \times 768 \times 16$ -bit color or higher resolution [21].

2.4. Educational Resource Processing Technology. According to the overall architecture design of the education information platform, it is not enough to rely on the existing open source software functions to realize the efficient

operation of the entire platform. Now, cloud computing is developing rapidly, and the amount of data is growing at an alarming rate. With the development trend of the information industry, big data has become more and more important [22]. Countless useful information is hidden in big data. How to deal with these big data effectively has become an urgent problem to be solved [23].

2.4.1. Educational Data Compression. It is necessary to store and transmit big educational data in the network environment and also to protect these valuable big data, which is a challenge to information storage and security protection. Data compression is a wise way to save the time and cost of data storage. According to the education data compression format, choose an education data compression format suitable for cloud computing, introduce Spark cloud computing technology, and build a data compression algorithm based on Spark cloud computing. Realize education data compression under cloud computing [24].

Assuming that the original data is a column vector H with dimension K , under the transformation matrix S with dimension $n \times m$, the original data can be expressed as

$$\begin{cases} H = SA, \\ S \in W^{n \times m}, \\ A \in W^m. \end{cases} \quad (1)$$

In the above formula, S represents the coefficient vector of the original data H in the transformation matrix [25].

Under the action of the transformation matrix, the dimension of the coefficient vector S is t . When most of the coefficients in S are 0 and the number of nonzero coefficients is much smaller than the vector dimension m , the norm of S satisfies

$$\|S\| \ll m, \quad (2)$$

and H can realize sparse expression under transformation matrix S . According to whether the column vectors are orthogonal to each other, the transformation matrix S can be divided into two types: a complete library and a redundant dictionary.

After verifying that the original data can be expressed sparsely, the original data H is projected through the sensor

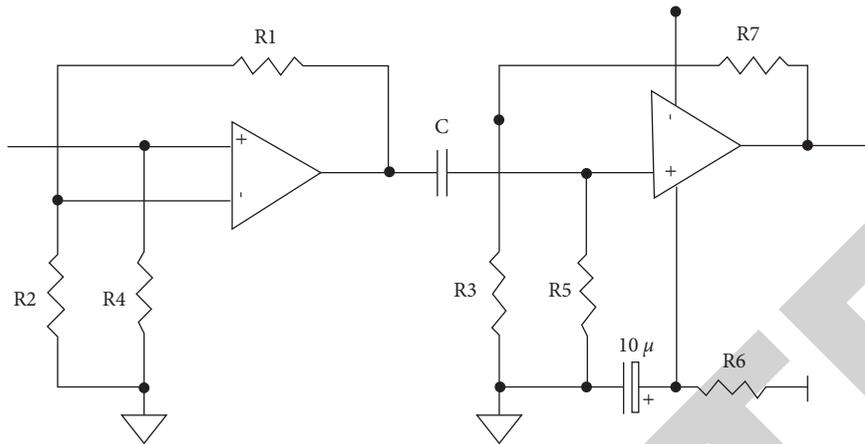


FIGURE 2: External interface circuit diagram.

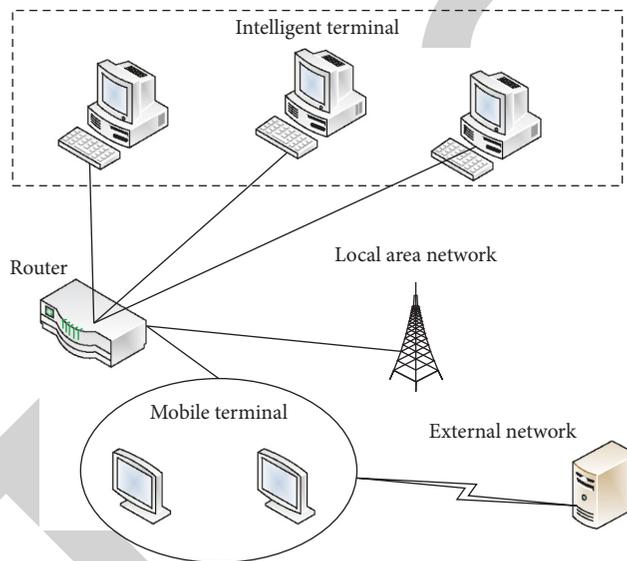


FIGURE 3: Remote desktop terminal architecture.

matrix Q of dimension $a \times b$, and the original data H can be transformed into a lower-dimensional space. The compressed data is denoted as H' , and its dimension is K' .

Since the data dimension after compression is much smaller than the original data dimension, the data length after linear projection is much smaller than the original data length to achieve data compression [26]. In the process of data compression, since the original data is projected from high-dimensional space to low-dimensional space, the loss of information is minimal [27].

Figure 4 shows the educational data compression process under cloud computing.

2.4.2. Educational Resource Sharing Model. The core problem of the construction of educational resources is the problem of resource sharing. Solving the problem of resource sharing will bring about great convenience to the interoperability of resources and solve the current difficulties in resource construction and resource use to a large extent.

In the development process of educational resources, since it is impossible for all parties involved to use a unified technical method, it will bring about difficulties to the interactive use of resource libraries [28, 29]. Therefore, in the process of resource sharing, technology sharing should be considered. The so-called technology sharing does not require all parties to follow a unified technical standard but should establish a unified technical interface on different technologies to realize the interaction between different resource databases. This paper will set up a unified framework for resource description, realize the mutual mapping of different metadata standards, and use xmij syntax to describe resources uniformly in data display to form a shared technical framework [30].

Educational resource sharing is a kind of sharing at different levels, not at a single level. The multilevel sharing model of educational resources is shown in Figure 5.

It can be seen from Figure 5 that the educational resource sharing model is a hierarchical structure, including concept sharing, technology sharing, and content sharing. Among

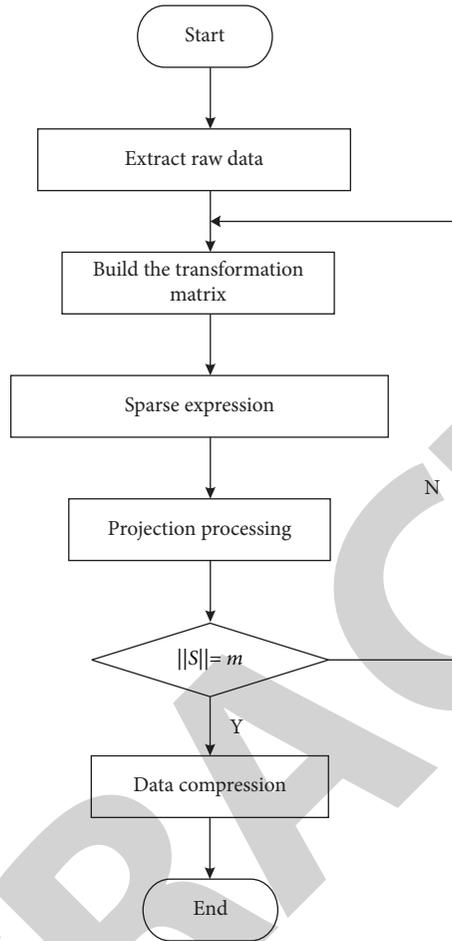


FIGURE 4: Educational data compression process under cloud computing.

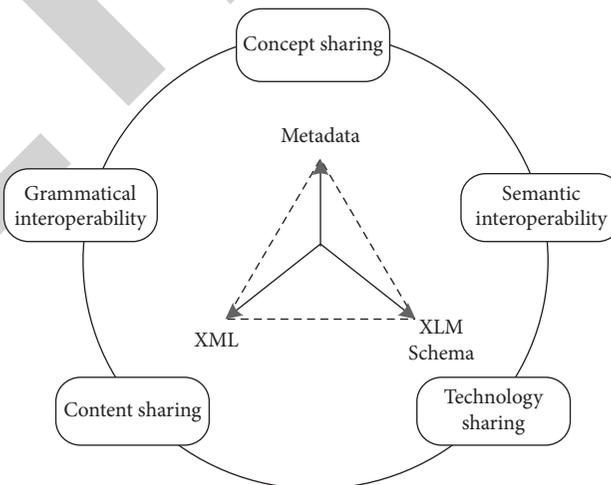


FIGURE 5: Educational resource sharing model.

them, concept sharing is realized by creating an educational resource ontology, while RDF model achieves technology sharing; element data mapping is implemented together with XML [31]. In Figure 5, it can be seen that the RDF and metadata layer have both syntactic and semantic

interoperability functions. The following describes the educational resource metadata sharing process under the RDF framework.

First, suppose that the number of nodes forwarding the query request is P ; that is, the coverage rate $Y = 1$, there are z

edges, the average degree of nodes is \bar{b} , and the number of nodes z can be calculated by a function of the number of nodes P and index e :

$$z = \frac{1}{1 + [(\|x - c\|/\nu)^2]^{\bar{b}}} \times P. \quad (3)$$

In the above formula, x represents the educational resource data set; c represents the invalid node; ν represents the metadata capacity.

In the process of sharing educational resource data, the space vector data is represented by w , and the projection of the data sample is represented by the following formula:

$$y_w = \sum_{i,j=1}^n (\bar{x}_i - \bar{x}_j)^2. \quad (4)$$

In the above formula, \bar{x}_i represents the high-dimensional data in the data set and \bar{x}_j the low-dimensional data in the data set.

Then the cluster center of the data set is expressed as

$$Y_{ij} = \sum_{i,j=1}^n S_{i,j} e^{H_i - H_j}. \quad (5)$$

In the above formula, $S_{i,j}$ represents the total error value of the data sample; Y_{ij} represents the cluster center constructed on the basis of the sample data; H_i and H_j represent the nearest-neighbor clusters of the data samples i and j , respectively.

Under the action of formula (5), the discrete data generated in the process of sharing educational resources can be processed. Specifically, the data divergence problem can be converted into a maximization objective function, and the optimal projection direction of the data can be obtained by solving it. The formula is as follows:

$$\Delta f = Y_{ij} \times \frac{\Delta n \Delta \lambda}{\lambda + \Delta \lambda}. \quad (6)$$

In the above formula, λ represents the positive real number of any data in the database, and its function is to accurately measure the different goals of maximizing and minimizing the divergence of data. According to the above formula, the divergence in the sample data can be minimized.

Although the data divergence can be minimized by formula (6), considering the number of users, the number of data query requests of the education information platform should also be expanded, and the number of original data query requests should be set as

$$a(t) = [s(t) + q(t)]^2. \quad (7)$$

In the above formula, $s(t)$ represents a data group, and $q(t)$ represents a separate data unit.

In the process of data sharing, in order to reduce the response time of users' needs in the later stage, every new node added to the target set is deleted in the next round of query requests [32, 33], and the number of query requests forwarded in the user retrieval process is as follows:

$$\phi(t) = \frac{\arctan(q(t)/s(t))}{a(t)}. \quad (8)$$

Under the condition that the amount of data is at the same scale, as the connectivity of network nodes increases, the generation of redundant messages can be effectively reduced.

3. Experimental Verification

In order to verify the reliability of the method in this paper, simulation experiments are carried out. In order to ensure that the experimental results are in sharp contrast, during the experiment, the same educational data compression access format was selected to ensure the integrity of the educational data. At the same time, in order to improve the accuracy of the experimental data, each experimental result of data is taken as the average of 30 times of the same experiment. For more details, we use the confuse matrix, accuracy, precision, and f1-score to evaluate the model performance; the matrix can be defined as follows:

$$\begin{aligned} \text{accuracy} &= \frac{TP + TN}{TP + TN + FP + FN}, \\ \text{f1-score} &= \frac{2 * \text{precise} * \text{recall}}{\text{precise} + \text{recall}}, \\ \text{precise} &= \frac{TP}{TP + FP}, \\ \text{recall} &= \frac{TP}{TP + FN}. \end{aligned} \quad (9)$$

Real prediction	Positive	Negative
Positive	TP	FN
Negative	FP	TN

3.1. Experimental Platform Construction. The simulation experiment is built on the ISO RFF ++4.5 platform, and the debugger is used for functional debugging to maximize the accuracy of the experimental results. The ISO RFF ++4.5 simulation platform is composed of a display, a controller, a monitoring terminal, a computer, and an antenna. The specific parameters of its hardware configuration are shown in Table 1.

In the experiment, the reader is responsible for collecting experimental data, and the sampling rate of the reader is set to 250 samples/s. The antenna selects 13.56 m external coil connection. During the experiment, the relative position of the reader and the display remained unchanged to prevent other factors from affecting the experimental results. At the same time, the data is collected through the computer. The task of data collection is to collect platform data in real time and use the control terminal to manage the data. The characteristic of data management is to use the overall information frequency, time difference, unit power, and tie line power of the experimental system. The main goal of scheduling decision-making is to improve the quality of experimental control. Through the controller to analyze the

TABLE 1: Experimental platform hardware parameters.

Configuration	Specifications and parameters
CPU	INTEL Xeon E5620 new official version
Motherboard	Supermicro X8DTL-I server motherboard 8G DDR3 ECC server memory
Memory hard drive	SSD solid-state hard disk 2.5-inch hard disk (for system backup) Seagate 2 TB Enterprise 64 (Do RAID 1)
Power supply	Supermicro 2U Standard Case
Heat sink	2U copper tube radiator
Expansion card	Rr2760
Case	Super 4U24-bit standard memory
RAM	4G DDR3 ECC server memory
RAM	8 GB
Sampling frequency	1 Hz

network, the characteristic of the network analysis is to use the experimental system to analyze and make decisions on the experimental content, and the main purpose is to improve the safety of the experiment.

3.2. Experimental Indicators and Methods. Taking redundant resource occupancy rate, resource sharing time, and platform data security coefficient as experimental indicators, the method in this paper is combined with the cloud platform-based online education curriculum resource sharing platform [9] and the cloud platform-based mass video teaching resource management system [10] for comparative experiments.

3.3. Analysis of Experimental Results

3.3.1. Comparison of Redundant Resource Occupancy Rate. Taking the occupancy rate of educational resources in the platform as an experimental indicator, the application effects of different platforms are compared, and the results are shown in Figure 6.

From the experimental results shown in Figure 6, it can be concluded that the redundancy resource occupancy rate of different methods does not have a certain rule under different experimental times, but the redundancy rate is gradually showing an upward trend, and it has an increasing trend. These trends can be used as a reference. Among them, the maximum occupancy rate of redundant resources in the method of [9] is 13.5%, the maximum occupancy rate of redundant resources in the method of [10] is 17.5%, and the maximum occupancy rate of redundant resources in the method in this paper is 4.5%. According to the above results, the redundant resource occupancy rate of the method in this paper is low, indicating that the performance of the educational information platform under the method in this paper is better, which can save a lot of network space and improve the quality of service of the platform.

3.3.2. Resource Sharing Time. Taking the resource sharing time in the platform as an experimental indicator, comparing the application effects of different platforms, the results are shown in Figure 7.

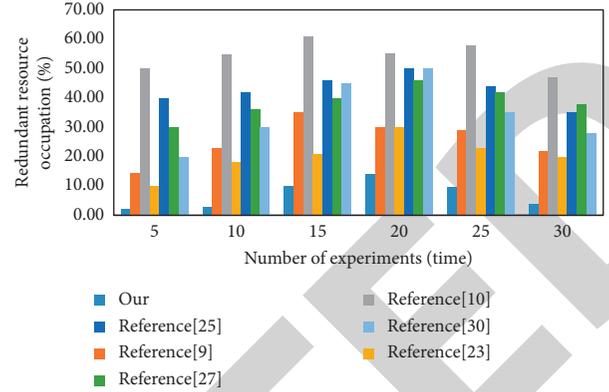


FIGURE 6: Comparison results of redundant resource occupancy rate.

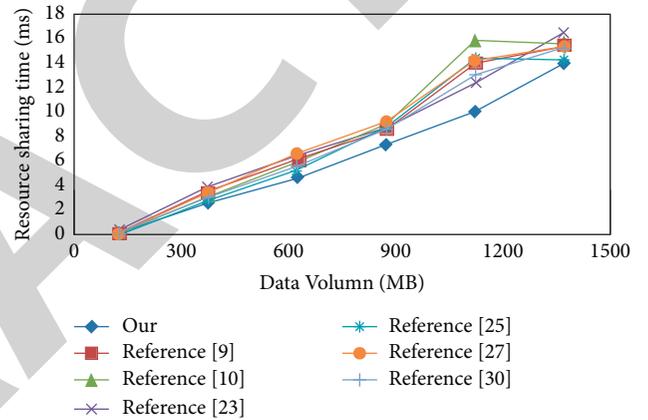


FIGURE 7: Comparison results of resource sharing time.

It can be seen from Figure 7 that the resource sharing time of platforms under different methods is very different. The resource sharing time of the method in this paper is always less than 2.0 s, which has high efficiency for the processing and utilization of educational data. The resource sharing times of the method in [9] method and the method in [10] are significantly higher than that of the method in this paper. The highest values of resource sharing time are 7.0 s and 4.4 s, respectively. Through comparison, it can be seen that the resource sharing ability of the traditional method is significantly lower than that of the designed educational information platform.

3.3.3. Platform Data Security Factor. Taking the platform data security factor as an experimental indicator, the application effects of different platforms are compared, and the results are shown in Table 2. Here, data security refers to the ratio of data leakage, data loss, and data hijacking. These three factors are important factors in cloud computing and are of great significance for protecting users' data and preventing profit loss. The safety factor can be defined as in formula (10), where $Data_i^t$ refers to the total size of original data and the rest of data representing the data accepted is denoted as $Data_i^r$.

TABLE 2: Comparison of platform data security factors.

Number of experiments/ time	Our		Reference [9]		Reference [10]		Reference [34]		Reference [35]		Reference [36]		Reference [37]	
	Data size/ MB	Safety factor												
5	100	0.98	100	0.93	100	0.71	100	0.85	100	0.95	100	0.91	100	0.92
10	300	0.97	300	0.90	300	0.72	300	0.90	300	0.88	300	0.82	300	0.85
15	600	0.95	600	0.83	600	0.82	600	0.90	600	0.83	600	0.92	600	0.87
20	900	0.93	900	0.85	900	0.76	900	0.85	900	0.89	900	0.86	900	0.82
25	1200	0.97	1200	0.82	1200	0.69	1200	0.77	1200	0.77	1200	0.89	1200	0.85
30	1500	0.96	1500	0.74	1500	0.75	1500	0.86	1500	0.79	1500	0.75	1500	0.80

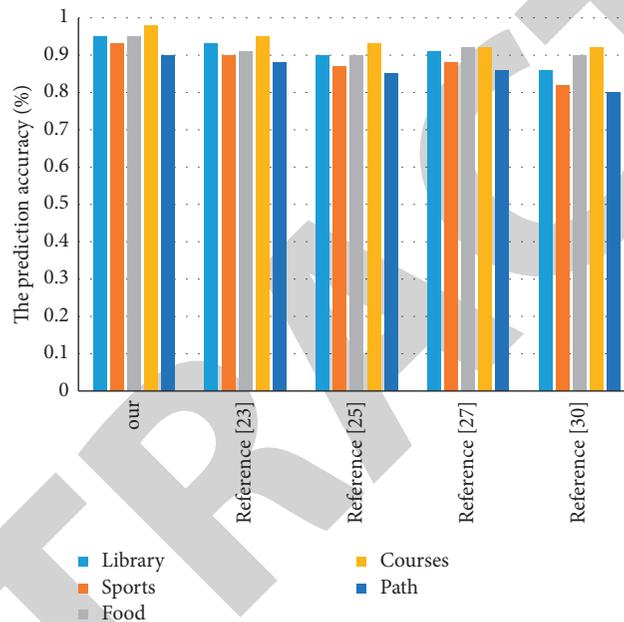


FIGURE 8: The prediction accuracy of different sections on education information platform.

$$\text{safety} = \frac{\text{Data}_i^r}{\text{Data}_i^t} \quad (10)$$

According to the analysis of Table 2, the platform data security coefficient under the method of this paper is between 0.93 and 0.98, the platform data security coefficient under the method of [9] is between 0.74 and 0.93, and the platform data security coefficient under the method of [10] is between 0.69 and 0.82. The comparison shows that the platform data security coefficient of the method in this paper is higher, which shows that it can ensure that users have a higher security coefficient in data query, data sharing, and resource query and can ensure the platform security and user security. Although the method in [37] has weaker data analyze ability, it performs better in data security compared to other methods in [16–18].

In addition to a large amount of data acquisition in our education information platform, we also need to analyze the acquired data and do different follow-up businesses for different modules. The accuracy rates of students' recommendation on food, books, sports, campus path

planning, and curriculum related data analysis are compared, and the results are shown in Figure 8. The results of the method used on this platform are better than those of the other methods. The results are shown in Figure 8: our proposal's values in all modules are better than others significantly. This indicated that our proposal can perform better than the other three methods. In particular, our method performs better than the method in [37] in all points. Courses, library, and food are three strong sources in five sources of students' data.

In our education information platform, we compared different neural networks to train and analyze our data collected by cameras and system which includes structure data and pictures, in addition to a large amount of data acquisition; we also need to analyze the acquired data and do different follow-up businesses for different modules. The accuracy rates of students' recommendation on food, books, sports, campus path planning, and curriculum related data analysis are compared, and the results are shown in Table 3. The results of the method used on this platform are better than those of the other methods. As we can see, the values of our proposal in

TABLE 3: The accuracy of different neural networks on education information platform for different sections.

	Library	Sports	Food	Courses	Paths
Ours	0.98	0.95	0.93	0.95	0.97
CNN	0.66	0.75	0.62	0.77	0.95
RNN	0.68	0.73	0.65	0.86	0.93
LSTM	0.72	0.88	0.68	0.92	0.96
Bi-LSTM	0.80	0.85	0.70	0.92	0.92
GRU	0.88	0.90	0.86	0.93	0.98
Bi-GRU	0.92	0.95	0.88	0.97	0.98

The bold values indicate accuracy.

most modules are better than others significantly like sports, food, and library. However, it may not perform well in paths and courses. But the differences between them and the best ones are as smaller as much. This indicated that our proposal can perform better than other models.

4. Conclusion

In order to solve the problems of high redundant resource occupancy rate, untimely resource sharing, and low platform data security factor in traditional methods, a cloud computing-based educational information platform was established. The following are the main innovations studied in this article:

- (1) According to the theoretical foundation of cloud computing and the special requirements of education cloud, the overall architecture and partial functional details of the cloud platform are independently designed so as to master the basic principles of key technologies.
- (2) In order to reduce the number of redundant messages in the information retrieval process, a unified technical interface is established on different technologies to realize the interaction between different resource libraries.
- (3) Verification by simulation experiments shows that the method in this paper can effectively reduce the occupancy rate of redundant resources and save network bandwidth. The data security coefficient of the platform under this method is between 0.93 and 0.98, and the resource sharing time is always less than 2.0 s, which fully verifies the application value of this method.

At present, only simulation experiments and theoretical analysis have verified the effectiveness of the method, and the strategy has not been applied to a specific educational resource sharing system. Therefore, the next step will be to apply the platform to actual scenarios to improve the comprehensiveness of the method. Due to the limited time of the paper, more research will be needed on the real-time performance of the platform in the future to increase the real-time performance of the platform system. Although our method has achieved good prediction accuracy at present compared with other popular methods, it is still unable to achieve considerable accuracy in the face of complex basketball games environment, and the training time of the

model is long, which cannot meet the purpose of real-time prediction. In the future, we will further optimize the model to improve the training speed while ensuring the accuracy.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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References

- [1] J. Ye, “Modeling of performance evaluation of educational information based on big data deep learning and cloud platform,” *Journal of Intelligent and Fuzzy Systems*, vol. 38, no. 2, pp. 1–11, 2020.
- [2] F. Yao, “Research on campus network cloud storage open platform based on cloud computing and big data technology,” *Journal of Intelligent and Fuzzy Systems*, vol. 38, no. 1, pp. 1–9, 2019.
- [3] Z. Zhang and H. Min, “Analysis on the construction of personalized physical education teaching system based on a cloud computing platform,” *Wireless Communications and Mobile Computing*, vol. 2020, no. 3, 8 pages, Article ID 8854811, 2020.
- [4] D. Xia, F. Ning, and W. He, “Research on parallel adaptive canopy-K-means clustering algorithm for big data mining based on cloud platform,” *Journal of Grid Computing*, vol. 18, no. 2, pp. 263–273, 2020.
- [5] D. Delgado, J. R. Prieto, G. Moltó, and A. Calatrava, “A visual dashboard to track learning analytics for educational cloud computing,” *Sensors*, vol. 19, no. 13, p. 2952, 2019.
- [6] P. Zheng, Z. Wu, J. Sun et al., “A parallel unmixing-based content retrieval system for distributed hyperspectral imagery repository on cloud computing platforms,” *Remote Sensing*, vol. 13, no. 2, p. 176, 2021.
- [7] F. Chen and C. Wang, “Image recognition technology based on cloud computing platform,” *Journal of Intelligent and Fuzzy Systems*, vol. 39, no. 5, pp. 1–11, 2020.

- [8] M. Li, Z. Fang, W. Cao et al., "Residential electricity classification method based on cloud computing platform and random forest," *Computer Systems Science and Engineering*, vol. 38, no. 1, pp. 39–46, 2021.
- [9] Y. Fan and M. Liu, "Design and research of online education course resource sharing based on cloud platform," *Modern Electronics Technique*, vol. 552, no. 1, pp. 183–186, 2020.
- [10] J. Zhang, C. X. Li, and Y. H. Zhu, "Massive video teaching resource management system based on cloud platform," *Modern Electronics Technique*, vol. 572, no. 21, pp. 159–163, 2020.
- [11] H. Guan, X. L. Qin, and Y. S. Rao, "Research and design of dynamic mathematical digital resources open platform," *Journal of Harbin Institute of Technology*, vol. 51, no. 5, pp. 14–22, 2019.
- [12] T. Wang, C. Lv, X. Jin, F. Chen, and C. Wang, "A secure and verifiable continuous data collection algorithm in wireless sensor networks," *Wireless Personal Communications*, vol. 119, no. 3, pp. 2265–2285, 2021.
- [13] L. Lu and J. Zhou, "Research on mining of applied mathematics educational resources based on edge computing and data stream classification," *Mobile Information Systems*, vol. 2021, no. 7, pp. 1–8, 2021.
- [14] J. Maldonado, J. Pineda, R. Garrido, and G. Castro, "A teaching methodology based on an educational experimental platform," *IEEE Latin America Transactions*, vol. 17, no. 8, pp. 1363–1370, 2019.
- [15] B. Ding, W. Chen, and Y. Huang, "The construction of internet data mining model based on cloud computing," *Journal of Intelligent and Fuzzy Systems*, vol. 37, no. 12, pp. 1–9, 2019.
- [16] S. Yang, Z. Gong, K. Ye, Y. Wei, Z. Huang, and Z. Huang, "EdgeRNN: a compact speech recognition network with spatio-temporal features for edge computing," *IEEE Access*, vol. 8, Article ID 81468, 2020.
- [17] J. Zhang and D. Tao, "Empowering things with intelligence: a survey of the progress, challenges, and opportunities in artificial intelligence of things," *IEEE Internet of Things Journal*, vol. 8, no. 10, pp. 7789–7817, 2021.
- [18] M. S. Hossain and G. Muhammad, "An audio-visual emotion recognition system using deep learning fusion for a cognitive wireless framework," *IEEE Wireless Communications*, vol. 26, no. 3, pp. 62–68, 2019.
- [19] D. Magnus, L. Carbonera, L. Pfitscher, D. Bernardon, A. Tavares, and C. Scharlau, "Experimental and educational platform for operation tests and parameterization of power system regulators and stabilizers," *IEEE Latin America Transactions*, vol. 17, no. 1, pp. 54–62, 2019.
- [20] L. Cai, "Japanese teaching quality satisfaction analysis with improved apriori algorithms under cloud computing platform," *Computer Systems Science and Engineering*, vol. 35, no. 3, pp. 183–189, 2020.
- [21] F. Liu and Y. Shi, "A study on artificial intelligence IQ and standard intelligent model," *Computer Science*, vol. 180, no. 20, pp. 118–191, 2015.
- [22] Y.-z. Guo, Y. Zhou, and Y.-s. Liu, "The inequality of educational resources and its countermeasures for rural revitalization in southwest China," *Journal of Mountain Science*, vol. 17, no. 2, pp. 304–315, 2020.
- [23] D. Zhao and J. Sun, "Research on the automatic error correction model combined with artificial intelligence for college English essays," *Advances in Intelligent Systems and Computing, Lecture Notes in Real-Time Intelligent Systems*, vol. 168, no. 8, pp. 162–232, 2016.
- [24] F. Xue, "An LDA based model for semantic annotation of Web English educational resources," *Journal of Intelligent and Fuzzy Systems*, vol. 40, no. 15, pp. 1–10, 2020.
- [25] Y. Tang, L. Guo, and Y. Xie, "Research on STEM interdisciplinary integration model based on educational artificial intelligence," *China Educational Technology*, vol. 86, no. 2, pp. 78–109, 2017.
- [26] X. Y. Qiao, "Optimization of college students' educational resources integration," *Computer Simulation*, vol. 34, no. 8, pp. 239–242, 2017.
- [27] S. Strohmeier and F. Piazza, "Artificial intelligence techniques in human resource management-A conceptual exploration," *Intelligent Techniques in Engineering Management*, vol. 87, no. 3, pp. 149–172, 2015.
- [28] A. Pounds and J. Bostock, "Suitable economic models for Open Educational Resources initiative in aquaculture higher education," *Aquaculture International*, vol. 27, no. 5, pp. 1553–1563, 2019.
- [29] Y. Huang, X. Song, F. Ye, Y. Yang, and X. Li, "Fair and efficient caching algorithms and strategies for peer data sharing in pervasive edge computing environments," *IEEE Transactions on Mobile Computing*, vol. 19, no. 4, pp. 852–864, 2020.
- [30] U. O. A. Usa, "Collected Papers of the Eleventh Annual Research Workshop on: Artificial Intelligence and Emerging Technologies in Accounting, Auditing and Tax," *Amelia A Baldwin*, vol. 89, no. 4, pp. 145–173, 2016.
- [31] Y. Ming and X. Yu, "Efficient privacy-preserving data sharing for fog-assisted vehicular sensor networks," *Sensors*, vol. 20, no. 2, p. 514, 2020.
- [32] K. Bok, Y. Kim, D. Choi, and J. Yoo, "User recommendation for data sharing in social internet of things," *Sensors*, vol. 21, no. 2, p. 462, 2021.
- [33] E. S. Dove, J. Chen, and N. N. Loideain, "Raising standards for global data-sharing," *Science*, vol. 371, no. 6525, pp. 133–134, 2021.
- [34] B. Liu, H. Chen, and H. Junmei, "Research on the platform of online education platform based on cloud computing," in *Proceedings of the 2019 14th International Conference on Computer Science & Education (ICCSE)*, pp. 22–25, IEEE, Toronto, Canada, 19–21 Aug. 2019.
- [35] N. Liang, C. Wang, P. Liu, and Y. Zhang, "Research of college computer laboratory based on cloud computing technology," in *Proceedings of the IEEE International Conference on Information Communication and Software Engineering (ICICSE)*, pp. 1–4, IEEE, Chengdu, China, March 2021.
- [36] H. Guo, Y. Li, F. Liu, and W. Hu, "Machine-Learning based MOOC learning data analysis," in *Proceedings of the 2021 7th IEEE Intl Conference on Big Data Security on Cloud (Big-DataSecurity), IEEE Intl Conference on High Performance and Smart Computing, (HPSC) and IEEE Intl Conference on Intelligent Data and Security (IDS)*, pp. 63–68, Xinxiang, China, May 2021.
- [37] A. P. Achilleos, C. Mettouris, A. Yeratziotis et al., "Sci-Challenge: a social media aware platform for contest-based stem education and motivation of young students," *IEEE Transactions on Learning Technologies*, vol. 12, no. 1, pp. 98–111, 2019.