RESEARCH ON REMOTE CONTROL METHOD OF
ENGLISH MULTIMEDIA ONLINE TEACHING SYSTEM
IN BIG DATA ENVIRONMENT

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Abstract: In order to ensure the effectiveness and security of remote control of the teaching system, the remote control method of English multimedia online teaching system based on large data environment is proposed. Firstly, the remote control module of online teaching system is optimized, configuration parameters are improved, the remote control module is operated effectively, and the remote control rules of multimedia online teaching system are designed, which further ensures the security of remote control. According to the control rules, the remote control steps are simplified, and the optimization of remote control method for English multimedia online teaching system is finally realized. Finally, the experiment proves that the remote control method of English multimedia online teaching system in large data environment is more effective and safe than the traditional method.

1. Introduction
The English multimedia online teaching system under the big data environment is a service platform for the integration of educational information. It has the characteristics of rich knowledge, classroom virtualization, one-stop shop, etc. Compared with the traditional online education platform, it can teach and take examinations online. Under the big data environment, English multimedia online teaching system is a service platform that integrates educational information and teacher-student communication. It can carry out teaching across regions, which promotes students' learning of Desire to become more intense, and also makes the communication between teachers and students closer[1]. Mobile learning under the English multimedia online teaching system under the big data environment enables students to learn English more autonomously, and students can carry out classified learning of English majors according to their own time. However, due to more external interference during the operation of the remote teaching system, it is easy to cause problems such as poor safety, etc. The traditional remote monitoring system is based on the Yi Yun 2.5 system platform, and carries out remote control in combination with the Internet of Things comprehensive control algorithm. The method can be adapted to various Internet of Things application systems for real-time remote control, but its configuration process is relatively long, and interruption is easy to occur in the control process. Now, the overall effect is not good[2]. TeamViewer remote control system automatically assigns a unique ID number and corresponding random password to each computer so as to achieve the goal of safety control teaching system. To ensure that the mission will be achieved and the goal of remote control will be started quickly, however, this method is greatly limited in the process of operation and it is difficult for users to log on in time. In recent years, the remote control method combined with AMT technology has also
been gradually applied in a large number. This technology can effectively complete the wake on lan, shutdown, restart and modify the information of the teaching system, and perform parallel control through the interaction between the network and the control terminal. This method optimizes the limitations of the first two methods to a certain extent, but its security is still difficult to meet the development requirements of the current era[3]. Therefore, it is proposed to study and optimize the remote control method of English multimedia online teaching system under the big data environment.

2. Remote Control Method of Multimedia Online Teaching System

2.1 Optimization of Remote Control Module for English Multimedia Online Teaching

In order to ensure the intranet information security of the English multimedia online teaching system under the big data environment, it is necessary to add a remote intelligent control module to the English multimedia online teaching system to ensure the relatively safe and independent operation of the teaching system and facilitate remote control of the system according to the actual situation[4]. Therefore, the control module is designed by integrating Zig Bee technology in the big data environment. First, the remote control nodes in the system are set up. Using TI's CC2530 chip with RF front-end integration and external connection of multiple sensors, the control information obtained by sensors is transmitted to the sink node through wireless transmission, realizing the unified convergence processing of nodes. The structural optimization of the remote control module is shown in figure 1.

As can be seen from the figure, the configuration of remote control module is mainly composed of terminal sensing module, switch module and client module. Its specific functions are remote control sensing and remote control operation:

Remote control perception: The terminal perception unit designed in the remote control perception module is mainly responsible for the safety control of the teaching system. This part adopts low-power Internet of Things information technology to realize the intelligent transmission of information[5]. There are many kinds of teaching information in the teaching system. In order to ensure that each kind of teaching information can be perceived by the system, different information terminal sensing units need to be designed, as shown in the figure.
Remote control operation: aiming at the design of the remote control switch module of the teaching system, it mainly uses the internet of things server to coordinate information for wireless transmission, and realizes the real-time control and management of each module through the transceiver serial port[6]. The server mainly uses STM32f107VC signal semiconductor chip, which can be used in the complex environment of the internet of things. Its 32-bit instruction core processor can work at a maximum frequency of 50 MHz, fully meeting the requirements of remote control of teaching information.

Since there are many types of information in the teaching platform and there are relatively many nodes receiving different information, the actual control and transmission situation should be fully tested, and the remote control information of the system should be collected, transmitted and detected by combining the above steps to ensure the safety of the whole information transmission and the effectiveness of the control.

2.2 Remote Control Rules for Multimedia Online Teaching System

After optimizing the structure of the remote control module of the multimedia online teaching system, the remote control flow is optimized by combining the data mining algorithm. In the process of remote control of the teaching system, the load trend prediction method is selected to collect relevant English teaching information as auxiliary system control. This method uses the load characteristics to analyze the early warning change trend related to users and users in most systems. The traditional remote control method can only collect and control discrete data, but cannot effectively process data with more attributes. Therefore, the collected information is processed by the threshold segmentation method[7]. Compared with the traditional method, the segmentation method is defined as a system information control rule in attribute selection, and the specific control information control management standards are as follows:

\[
\text{gain\_ratio}(X) = \frac{\text{gain}(X)}{\text{split\_inf}(X)}
\]

The threshold segmentation method is adopted to segment and control the teaching information, which can quickly sort the information attributes, select and check the information attributes according to the sorting results, compare the control application contents to judge the threshold value of the control information, set the teaching information in the high system as set S to be arranged according to the teaching information attributes, and the sequence of the remote control ratio to the teaching information attribute value X is as follows: \( \{Y_1, Y_2, \ldots, Y_n\} \), in which \( n = |X| \). Apply all teaching systems to information \( Y_i \) according to \( Y = (Y_i + Y_i + 1)/2 \). Form to sort with operation queue. Divide the set S
into a controllable subset of information: \( S_1 = \{ y_j | y_j \leq \sigma_y \} \). Calculate the trust degree obtained after division and obtain the maximum value, which is recorded as \( Y_{\text{max}} \). In the gather \( \{Y_1, Y_2, \ldots, Y_n\} \), find the closest control \( Y_{\text{max}} \) of threshold value is controlled for fast segmentation, so as to realize the control security calculation of the teaching information \( x \).

According to the above algorithm, the control rules of the access control subsystem are set, specifically:

After the remote control access user logs in the system platform, the system needs to determine whether the user has the right to access resources according to the credit status of the user. If the user is not authorized, the interface display cannot log in. If the user is authorized, the interface display shows that the login is successful, and the user can access and operate the resources[8]. During the operation, the system will track and monitor the user's behavior in real time and calculate the user's credibility. If the user's credibility cannot meet the requirements, the system will force the user to stop the remote control operation and force him to quit the program. After each operation is completed, the subsystem will make a comprehensive evaluation according to the credibility of the user to determine whether the user has the power to access the next remote control[9]. In order to better control each module in the teaching system remotely, it is necessary to analyze the user's credibility and behavior control. Its identity detection rules are as follows:

• Control Application User Initial Credibility: When a user sends out a remote control application for access for the first time, the system will calculate a credibility based on the user's previous credit records, which is the default initial credibility.

• Reliability weighting of remote control behavior: according to the behavior of users applying for remote control to access data, grading is carried out, different grades of different users accessing systems are judged, the obtained user reliability is taken as a factor, and control behavior reliability weighting is calculated to ensure safe access of user data.

• User operation control time: the operation time interval controlled by the user is to better monitor the user dynamically to ensure the effectiveness and safety of remote control, and the system will calculate the time interval according to the user's operation behavior.

• Credibility of real-time remote operation: when the user performs remote control, the user's remote control operation authority can be regulated through grade division, thus the user's credibility can be modified.

• Final credibility of remote operation users: after each user completes remote operation, the system needs to analyze the credibility of users according to historical records. If it is not a local operation, then the credibility of users needs to be recalculated and recorded to shorten the verification time for the next operation of users.

• User credibility of remote operation: after calculating and verifying the trust threshold value of user operation through the previous algorithm, the user credibility value is calculated by using the access mechanism, and the value and the user's historical behavior are taken as the first criterion for judging whether the user has operation authority.

2.3 Realization of Signal Control Technology in Teaching Control System

In order to ensure the safety of remote control and avoid hacker intrusion, channel congestion, interference and other problems, an early warning module is added in the process optimization process, and early warning levels are respectively set. For example, malicious intrusion is a more serious A-level early warning, environmental interference is recorded as general B and early warning, channel congestion and poor signal are recorded as C and early warning[10]. In this case, optimize the remote control permission audit procedure of the multimedia online teaching system, as shown in the following figure.
It can be seen from the figure that the remote control access user needs to log into the control system to complete the authentication of the user and grade the manager according to the acquired authority. Only managers who meet the threshold range can directly control the signal. Managers who do not meet the control requirements are forced to quit. In the multimedia online teaching system, the regional remote control sub-module controls the credibility of the image file. If it meets the requirements, it controls the signal generated by the image file, initializes the remote control application information, and judges whether the collected information is safe. If it is safe, it will enter the remote control operation silence, and if the password input is correct, it will grant the remote control permission. If the password is entered incorrectly, return to the alarm stage. If it is not safe, it needs to directly send data, thus completing node control. After the administrator logs in to the system, the system will give the administrator new rights and roles, which are mainly used to view the control teaching information, and the control command will be automatically transmitted inside the system. The control system will automatically judge whether the signal meets the control range, and if so, the manager has remote control power. In the process of controlling access by the manager, the system needs to control the manager's behavior and credibility to judge, of which the manager's behavior is the most important behavior in all control sub-modules. In the process of controlling the signal, this behavior will judge the validity and invalidity of the signal. If it is valid, it can be directly controlled. If it is invalid, the manager must be forced to stop the control and restart the control system. The specific implementation process is shown in the following figure.

Fig. 3 examination of control authority of teaching system

Fig. 4 implementation process of remote control of multimedia online teaching system

According to the above process, when the user can log in the system successfully after filling in the
user name and password, the system at this time will give the user new roles and permissions for the control and management of the teaching system, and the command at this time has been issued to each resource core. The system will judge whether the credibility of the user meets the access threshold range. If not, the user will not have the right to carry out remote control. If so, the user will have the right to access. In the process of user operation, the system needs to control user behavior, user credibility and initial credibility at the same time, wherein the user behavior is the behavior in all control sub-modules, which can judge whether the user has malicious behavior in real time. If so, the system can directly force the user to stop the remote control operation and force the user to quit the teaching system login. If it does not exist, the remote control of the teaching system will continue. The calculation sub-module of user's credibility will be synchronized to the user's login interface for real-time query of credibility and dynamic control tracking detection. The effectiveness and duration of remote control are determined by the user's behavior. Calculating the user's real-time credit degree can prevent the unsafe phenomenon that the credibility accumulated in the user's historical operation is intentionally raised. Every time the user credibility sub-module is calculated, a judgment will be made. If the credibility meets the requirements, the operation needs to be continued. If not, the final credibility of the user will be settled and the system will be forced to quit. After users carry out security and access operations on the system, they will obtain the credibility of the end user and grant control operation permissions according to user requirements. This completes the remote control of the English multimedia online teaching system.

3. Analysis of experimental results

In order to verify the effectiveness of the remote control method of the English multimedia online teaching system under the big data environment, simulation experiments were carried out to record and analyze the test results. First of all, the test is carried out on an English multimedia online teaching system, and the test conditions and parameters are set. According to the data in the management information, a threshold method can be used to calculate the credibility of the user control application. According to the change data of network transmission speed, the amount of information in remote management of network information is detected, thus realizing the research of remote management of mobile terminal network information. In order to ensure the accuracy of the experiment, the experimental parameters are set.

| Parameter                     | Experimental value | Response time | Parameter description                     |
|-------------------------------|--------------------|---------------|------------------------------------------|
| Platform information data     | 13000KB/mon        | 2s            | Operating equipment                      |
| Remote control Reliability rate | >95%               | 1.04s         | Check for data loss                      |
| Remote control interference rate | <0.09%            | 1.68s         | Data transmission effect within specified time |
| transmission frequency        | -                  | 0.8-1.0s      | Complete the required transmission speed |

To test the remote control effect of the teaching system under the above experimental environment, first compare the remote control management speed of the English multimedia online teaching system and record it, as shown in the following figure:
Looking at the above figure, it is not difficult to find that the remote control method of English multimedia online teaching system proposed in this paper is relatively faster than the traditional method under the big data environment. Due to the influence of network interference and access control process during remote control, the control speed is easy to slow down. In other words, the research on control speed can effectively reflect the flow and simplicity of remote control. In order to further judge the safety of this method, network intrusion data and channel interference are set up respectively, and the operation effects of the traditional method and this method are compared under the same environment, as follows:

Looking at the above figure, it is not difficult to find that at the beginning of the experiment, the immunity of the traditional method is almost the same as that of the remote control method of English multimedia online teaching system under the big data environment proposed in this paper. Under the condition that the interference value is less than 20%, the immunity of the traditional remote control method is better than that of the method proposed in this paper. However, with the increase of the interference value, the immunity of the traditional remote control method decreases in a cliff-like manner. Although the remote control method proposed in this paper also appears and has a small downward trend, the overall curve area is gentle. In experiments, immunity directly determines the safety of remote control. Therefore, the experiment proves that the security and operation effect of the remote control method of English multimedia online teaching system in the big data environment
proposed in this paper are obviously optimized compared with the traditional method, which meets the research requirements.

4. Concluding remarks
Distance learning has been widely valued by countries all over the world for its advantages such as wide benefits in flour, low cost and satisfying the needs of lifelong learning for laborers. After years of research and practice, the English multimedia online intelligent distance teaching system under the big data environment has been applied in depth. In order to ensure the stable operation of online teaching system and prevent the teaching system from being damaged by invasion, the remote control method of English multimedia online teaching system is studied in combination with big data environment. To ensure the safe and reliable operation of the teaching system.

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