Design of Distance Multimedia Physical Education Teaching Platform Based on Artificial Intelligence Technology

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Abstract. The traditional neural network-based education platform has the problem of slow access to resources, which affects teaching efficiency. To this end, artificial intelligence technology is introduced for the design of distance multimedia sports teaching platforms. Through system hardware and software design, enhance the integration capability of the teaching platform, improve the controllability of the teaching platform, help the physical education platform to obtain more educational resources, accelerate the processing and integration analysis of educational information, and better assist teachers in developing physical education jobs. In order to verify the effectiveness of the method in this paper, the method in this paper is compared with the teaching platform based on neural network, the experimental results show that the platform can obtain resources quickly and has broad application prospects.

Keywords: Artificial intelligence · Remote multimedia · Physical education

1 Introduction

At present, the pace of development of society is getting faster and faster, so saving people’s time and space, and facilitating people’s learning and living has also become the design purpose of scientific and technological researchers. In order to save the school’s education space and optimize the teaching force, a curriculum education platform using Internet technology came into being [1]. In the rapid development of the Internet era, the application of new technologies such as big data and cloud computing is becoming more and more widespread, which not only brings huge changes to people’s lives, work, and entertainment, but also has a profound impact on the development of China’s education [2]. In the context of the era of big data artificial intelligence, the continuous emergence of Internet technology and learning software has led to the rapid development of online education models, and education informatization has become an inevitable trend of the future development of education in China [3].
The original online distance education was based on the postal, radio and television. With the development of multimedia technology and computer technology, the current distance online education is a novel educational model based on Internet technology. As for long-distance physical education, domestic scholars and experts have done little research [4]. However, due to the need to provide a large venue for sports activities, and the classification and borrowing of sports equipment is cumbersome and complicated, the human resources of the school have not been used more reasonably. With the innovative research and development of new technology education products, various education industries are actively constructing education platforms, innovating teaching models, and using traditional education and big data methods to form new teaching models [5].

The platform uses big data storage, processing and processing technology to provide rich teaching resources for school education, and has changed the problems of lack of traditional teaching resources, poor teaching quality, and low learning efficiency. The platform’s teaching model has injected new Vitality is of great significance to the development of education [6]. How to build a long-distance multimedia physical education teaching platform under the background of big data, increase physical education teaching resources and teaching management, improve physical education teachers’ teaching quality and student learning efficiency, and create a professional and personalized intelligent learning environment is an urgent problem for the education industry. In view of these developments, this paper designs and develops a long-distance multimedia sports teaching platform based on artificial intelligence technology.

2 Construction of a Distance Multimedia Sports Teaching Platform

2.1 Overall Platform Architecture

The long-distance multimedia sports teaching platform based on artificial intelligence technology is completed based on big data, artificial intelligence technology and mobile Internet technology. It not only has a large number of rich physical education teaching resources, but also provides students with personalized learning services [7]. Students can operate at any time and place and find physical education teaching content and teaching videos according to their learning needs. This vivid, flexible and convenient learning method effectively stimulates students’ interest in learning. Moreover, students can also communicate with physical education teachers and classmates through this platform, increase the interactivity and autonomy of physical education activities, and effectively stimulate students’ enthusiasm for autonomous learning [8]. The hardware structure of the long-distance multimedia sports teaching platform includes servers, storage, user terminals, network equipment, and so on. The software functions include sports education information deployment and database development. The platform can realize the sharing of educational resources, fully reflects the comprehensive and personalized service system, and lays the foundation for users to provide efficient services. For the construction of physical education teaching platform, a lot of technical support is needed to realize the sharing of resources, data, and information. The application of artificial intelligence technology not only provides rich learning resources, but also saves students’ time. It also plays a long-distance multimedia physical education teaching platform. High-quality performance [9].
The overall architecture design of the platform is shown in Fig. 1.

**Fig. 1.** Overall platform architecture

(1) Physical layer
The physical layer is the core level of the hardware structure of the long-distance multimedia sports teaching platform. The hardware includes servers, servers, and network equipment. Through the mining, storage, analysis, and processing of sports education resource data, the correctness and security of rich information resources are guaranteed [10].

(2) Virtual resource layer
This layer is adjacent to the physical layer. The main hardware facilities include storage resource pools, computer resource pools, data resource pools, and network resource pools. They are responsible for the preservation and operation of platform information resources.

(3) Logical layer
This level is responsible for platform system task management and resource management. It is the core management of the remote multimedia sports teaching platform. It is also responsible for system fault detection and repair to ensure the platform’s safe and stable operation.

(4) Presentation layer
The presentation layer is an intermediate layer. The platform module includes a presentation module, an access module, and a visualization module. It provides services for mobile clients and web portals through three modules. The access module is mainly responsible for authorizing access and configuration, the visualization module is responsible for converting online confidence into data form and performing visual processing, and the display module is to display the visual processing results to the user, and is responsible for personal information management, registration and login, personalization Settings, column content display and management, etc., and responsible for pushing information resources and content search.
(5) Application layer
The application layer also belongs to the middle layer and is the core level of the entire platform. It mainly includes physical education, multimedia learning, intelligent management, intelligent services, and multimedia environments. It provides professional teaching resources for education and services for teacher-student communication. This level contains a wealth of sports information resources, which can meet the full service of sports education and sports learning.

(6) Network layer
A network interface is set inside the network layer to provide users with a main path to access the cloud platform.

(7) User layer
This level is at the top of the hierarchy, and users get relevant information through mobile terminals.

2.2 Hardware Structure Design
The long-distance multimedia physical education teaching platform is based on the Internet of Things hierarchical structure system. First, the overall design of the physical education teaching platform is adopted. The artificial intelligence technology is used to collect the original information of the physical education teaching platform. The information processing module realizes the serial bus control of the physical education platform. The hardware structure of the physical education platform is designed in the Multigen Creator 3.2 development environment. The network module of the physical education teaching platform is based on the IoT architecture. The campus network and local area network are used as the network layer of the smart classroom platform. The Microsoft Visual Studio development component is used to develop the TCP/IP protocol for the

![Fig. 2. Hardware structure](image-url)
physical education teaching platform. The functional modules of the designed physical education teaching platform include power supply module, personnel attendance module, LED display system, asset management system, etc. The TCP/IP protocol and UDP protocol are used for the network design of the physical education teaching platform, and the central centralized controller is used to realize the communication between the physical education platform and the computer network.

Based on the above analysis, the hardware structure is shown in Fig. 2.

According to the hardware structure of Fig. 2, the remote multimedia sports teaching remote automatic control system adopts the local bus control method. The system is modularly designed in the embedded environment, and then the hardware development of the system is performed. The remote multimedia sports is combined with the embedded ARM processor. Integrated design of teaching and computer control. The hardware modules of remote multimedia physical education include sensor module, integrated control module, bus module, interface module and power module. Mesh network architecture method is used for input and output control and integrated processing of various devices in remote multimedia physical education.

3 Platform Development

The introduction of artificial intelligence technology in the distance education platform provides a more vivid teaching environment for teachers and students, and enriches the education model. The distance physical education teaching platform must first understand the characteristics of physical education teaching flexibility, and design the specific teaching method and content of the course based on such teaching characteristics, as well as the design of curriculum assessment. Curriculum design requirements can fully mobilize students’ enthusiasm for learning, and can guide students’ courses, especially the standardized guidance for action classes is clear and thorough.

3.1 Development Environment Description

The multimedia sports teaching platform adopts the intelligent design scheme of remote automatic control and bus integrated control. The designed sports teaching platform is built on the Multigen Creator 3.2 and embedded ARM development environment. It uses artificial intelligence technology to process the intelligent information of the sports teaching platform and integrated information analysis. The multimedia teaching information is transmitted through the integrated information processing terminal for bus transmission and information integration, and intelligent communication design is performed on the host computer module. The technical indicators of the designed sports teaching platform are as follows:

(1) Establish a VIX bus module for integrated scheduling and transmission of control instructions. The main frequency of the sports teaching platform is 24 MHz, the design power of the platform is 5 kW, and the power magnification is 80 dB.
(2) The sampling rate of the bus control is greater than 200 kHz. The D/A resolution for multimedia control of the sports teaching platform is not less than 12 bits.
(3) Design the RFID time and attendance machine. The resolution of RFID for data collection is about 13 dB. It has the function of remote attendance and tag identification. The output static power loss is 20 W.

(4) The UHF RFID card reader is designed for error control, and the output error level is $12 \text{ dB} < \text{SL} < 15 \text{ dB}$. It has high-precision label identification and bus transmission control functions. Combined with the demand analysis and system function analysis of the PE teaching platform, the software development of the PE teaching platform is carried out.

3.2 Functional Design

In the structure of various layers of distance multimedia sports teaching platform based on artificial intelligence technology, sports teaching is the core functional part of the education platform. Physical education teaching resources can provide teachers with a wide variety of teaching material resources to achieve the function of physical education, while physical education teaching resources can meet the needs of students with different content learning resources and achieve the function of physical education. At the same time, the physical education teaching platform can also share, exchange and evaluate information resources, create a good physical education environment and intelligent management, and improve the platform function design.

(1) Optimized processing of web-side framework code

Because there are many common codes in the physical education teaching platform system, which brings difficulties to add, delete, and change, the web framework code is optimized to reduce the tedious workload of the platform system. In the process of JSP interface data interaction and receiving response, based on the Struts configuration file, the Action processing method is used to respond to the received request information and complete the processing of related tasks to play a functional role. After the function is optimized, the efficiency of business logic work can be increased. During business processing, Spring’s IoC container can be used to inject, extract and analyze related data to complete business logic processing. This method of relying on the container components of the buffer pool and transaction processing not only saves time and improves the working efficiency of the platform, but also optimizes and enhances the function of the system. The optimized processing design of the web-side framework code can independently extract various types of public code and encapsulate the code with public classes, which effectively reduces the complexity of the code and ensures the scientificity and correctness of the data processing of the database DAO components.

(2) Scientific design service function

With the support of artificial intelligence technology, the sports teaching platform stores massive data and rich teaching resources. In order to make information resources better serve users, it is necessary to design scientific and reasonable management and control functions. Through the analysis, screening and integration of these large amounts of data information, in order to better screen out valuable information resources, it is beneficial to the application of teaching materials and student learning. In the platform construction design, the scientific and reasonable service
function design of the system authority control should also be carried out. As the sports teaching platform needs to face a large number of users such as relevant leaders, teachers and students in the education sector, it has increased the service difficulties of the platform system.

In order to ensure the normal access and use of different identities and different users, to provide users with effective help in learning and work, scientifically optimized functional design for the system service layer. While optimizing the service functions of the platform system, it is also necessary to carry out security precautions and protection measures for user access. Each user’s access request must be accurately analyzed and judged. This can only be performed when the access user has access rights in the allowed range access. If the access user rights are unreasonable, blocking measures should be taken in time to prevent unreasonable access and ensure a safe, correct, orderly and standardized system workflow. With the support of big data and artificial intelligence technology, a large number of advanced and scientific new knowledge information resources are stored in the database. In order to meet the effective access of teachers and students, the service interface of the database is optimized for service design. Set up functional modules according to the characteristics of the platform system, divide the public data in the module, and use the relevant App-side supply interface to complete different access to database resources such as teaching resource information, assessment and e-books, and to effectively access and transfer educational information resources Function, provides a favorable guarantee for student learning and teacher teaching.

### 3.3 Teaching Mode

Figure 3 is a schematic diagram of the teaching mode of the platform.

As can be seen from the figure, the user sends a request instruction to the server through the browser of the platform. The server responds to the request in a timely manner and gives feedback to the user.

Server-server is hardware that can provide services to clients through the network and has strong computing power. The design and development of this article uses Tomcat web software. Tomcat is a miniaturized web application server with free source code. Its latest version is 6.0.18. Because of its light weight, Tomcat servers are often used in small and medium-sized systems with fewer users.

Database-As we all know, the database system is the support of an information system, which is the core part of the entire information system. The information system designed in this article selects SQL database. Microsoft SQL Server 2003 was developed by Microsoft Corporation and has the advantages of comprehensive functions and stable technology. At the same time, it also has good scalability, whether it is a simple personal database or a large and complex enterprise database or even a global site database, SQL can support.

Electronic whiteboard-Electronic whiteboard is a virtual public area based on B/S structure. In the system designed in this article, it is implemented using Java technology and CSCW technology. In the sports distance education platform, CSCW technology provides a virtual environment for information sharing. In this virtual public environment, teachers and students can conduct interactive learning.
The electronic whiteboard is composed of a client and a server. Information such as images and audio are stored in the server, and users can obtain these data by means of copying. If these data need to be changed, the changed structure will be sent to the server for data update, and the client will also modify the data at any time. Therefore, the electronic whiteboard also has the advantage of real-time performance.

Real-time transmission protocol-The current multimedia data transmission needs to follow the real-time transmission protocol and the real-time control protocol. In the system designed in this paper, the real-time transmission protocol and the real-time control protocol work together. RTP is responsible for the transmission of network data, while RTCP achieves the purpose of data monitoring in the case of expanding data transmission.

4 Experimental Analysis

The above content theoretically proves the validity of the design of this article. In order to verify the practicability of this method, Aimed at the rationality of the design of the long-distance multimedia sports teaching platform based on artificial intelligence technology, an experimental verification analysis is performed. Complete the comparative experiment from the following four aspects: Experimental environment settings, Debugging tools, Courseware Collection, Experimental results and analysis.
4.1 Experimental Environment Settings

The laboratory deploys hardware and software experimental environments on the structure of the remote multimedia sports teaching platform, as shown in Table 1.

| Hardware environment |   |
|-----------------------|---|
| Laptop                | 2个 |
| Server                | 2个 |
| Host processor        | I79700F/206 |

| Software environment  |   |
|-----------------------|---|
| Operating system      | HDFS |
| Compiler Environment  | ECLIPSE-PLUGIN |

The installation and deployment steps are as follows: first set the default parameters, install the JDK, set the default JAVA program, configure SSH, update the HADOOP environment variable, and deploy the distributed file system. Column storage is used to batch process unstructured data.

4.2 Debugging Tools

For platform debugging analysis, you need to use debugging tools and use Java language for development. The debugging tools are shown in Table 2.

| Management project               | Tool name               |
|----------------------------------|-------------------------|
| Development language             | Java                    |
| Network structure                | Topology                |
| Secondary development language   | IDL                     |
| Integrated environment           | WAMP                    |
| Production tools                 | Vector graphics maker   |
| Browser                          | Sogou                   |
4.3 Courseware Collection

Figure 4 shows a schematic diagram of a courseware collection system.

As can be seen from the figure, the collection workstation collects information such as pictures from the teaching end. Then classify and process, then convert the picture information into a video data stream and send it to the main media, and put the file information into a database for storage. This allows users to retrieve course content on the student side and get corresponding feedback information.

4.4 Experimental Results and Analysis

According to the remote multimedia physical education data collected by the above equipment, the data displayed on the communication interface is shown in Table 3.

|     | H1 | H2 | H3 | H4 | H5 |
|-----|----|----|----|----|----|
| L1  | 2D | 05 | 38 | 22 | 85 |
| L2  | 01 | 02 | 55 | 8C | 02 |
| L3  | 15 | 20 | 05 | 01 | 2E |
| L4  | 2D | 3F | 9C | 9D | 7F |
| L5  | 10 | 11 | F4 | 0C | 20 |
| L6  | 79 | 7A | 10 | 04 | 0A |

According to the data shown in Table 3, it can be sorted and analyzed to obtain the platform branch data and sentence data quantity, as shown in Fig. 5.
It can be seen from Fig. 5 that the branch data and sentence data of the two platforms are greatly different. The statistical results of the data volume of the constructed platform are higher, while the statistical results of the data volume of the education platform based on neural network are lower.

Based on this situation, students use 1–10 mobile terminals to log in to the platform for sports learning. Each mobile terminal obtains 500 M learning resources from the server and compares and analyzes them with the neural network-based education platform. The results are shown in Fig. 6.

It can be known from Fig. 6 that the speed of resource acquisition of the education platform based on neural network is quite different from the actual required speed, while the distance multimedia sports teaching platform based on artificial intelligence technology is basically consistent with the actual required speed. When the number of mobile terminals is 7, the resource acquisition speed based on the neural network education platform reaches a maximum of 42 MB/s, and the artificial intelligence technology-based remote multimedia sports teaching platform and the actual required speed reach the highest, in order of 110 MB/s and 108. MB/s. It can be seen that the construction of a long-distance multimedia sports teaching platform based on artificial intelligence technology is reasonable.
5 Conclusion

Distance network education provides a new direction for the development of education, so that future teaching activities are no longer limited to space and time. The distance physical education platform designed in this article has enriched traditional physical education activities, optimized the school’s teaching resources, and has broad application prospects. Through the research and discussion of the educational resource platform’s system architecture, application technology, and environmental deployment, the use of artificial intelligence technology to analyze and mine massive data resources, and to screen and integrate useful information resources suitable for education and learning. Provide good services to schools, teachers, and students.

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