



Digital Teaching Resources of College Physical Education with Cloud Computing

Chen Li^(✉), Mingyuan Zhao, and Yiyuan Yang

School of Physical Education and Health, Zhaoqing University, Zhaoqing 526061, Guangdong, China

Abstract. This paper analyzes the problems faced by the construction of sports information resources in Colleges and universities, probes into the influence of cloud computing on the construction of sports information resources in Colleges and universities and the new opportunities it brings, and puts forward some strategies for the construction of sports information resources in Colleges and Universities under the environment of cloud computing.

Keywords: Cloud computing · Colleges and universities · Sports information resources

1 Introduction

With the development of society, the degree of informatization is higher and higher, people have a new understanding of information resources. University sports information resource is an important part of the information resource database, covering the new direction of the development of sports science at home and abroad, new achievements of sports research, new technology of training and competition and other aspects [1]. In addition, the comprehensive level of college sports is closely related to the collection and management of sports information resources to a certain extent. The rapid development of information technology has brought new opportunities and challenges to the construction of sports information resources in Colleges and universities. The emergence of cloud computing technology has opened up a new way for the management and utilization of sports information resources. With the improvement of cloud computing application, with the help of cloud computing technology, we can use less investment to solve the current problems, further improve the ability of resource construction and information resource service, and enhance the service ability for sports teaching, sports promotion, sports research and other activities. This paper analyzes the current situation of the construction of college sports information resources, and puts forward a new idea of the construction of college sports information resources in the cloud computing environment.

2 Current Situation of Sports Information Resources Construction in Colleges and Universities in China

The construction of information resources mainly refers to the use of modern information technology means to process, transfer, develop and utilize the content of information. At this stage, the focus is on the development and utilization of new resources such as electronic literature, database and network resources. In recent years, colleges and universities attach great importance to the equipment of information network equipment, and continue to increase investment, but they do not pay enough attention to the construction of information resources, so the construction of sports information resources in Colleges and universities has not been well developed, especially weak compared with other disciplines. China is a big sports country, leading the world in sports education, scientific research and sports journals, book publishing, but the development and utilization of sports information resources is far from enough, there is a big gap compared with other countries. Even if some colleges and universities have certain advantages in sports literature resources, they are facing the crisis of aging resources, loss, backward equipment and lack of funds to supplement new resources due to insufficient attention and development. Although colleges and universities such as Beijing Sport University have begun to build some Chinese and foreign books and periodicals database of sports major, generally speaking, the construction of professional sports information resources in Colleges and universities in China is still in its infancy, and there is a big gap compared with foreign universities, Among all the databases, there are no professional sports databases, only 19% of which contain sports information resources. As a professional college, Tianjin Institute of physical education has only one non online professional database besides dissertation database.

3 Intelligent Data Desensitization Technology for Cloud Computing

3.1 Long Term and Short Term Memory Network LSTM

LSTM (long short term memory) network is a variant of RNN [2]. By adding gate control, LSTM network can fuse long-term and short-term memory, which solves the problem of only short-term memory due to RNN gradient disappearance to a certain extent. LSTM uses a “Gates” network structure: a method to let information selectively pass through, including SIGMOD function and dot multiplication operation. The “gate” structure can be used to add and delete information to the cell state. The calculation formula is as follows:

$$f_t = \sigma(W_f[h_{t-1}, x_t] + b_f) \quad (1)$$

The input gate first defines which information can be stored, and then creates a new candidate value vector based on tanh function. The calculation formula is as follows:

$$i_t = \sigma(W_i[h_{t-1}, x_t] + b_i) \quad (2)$$

$$\hat{C}_t = \tanh(W_C[h_{t-1}, x_t] + b_C) \quad (3)$$

The output gate determines which part of the cell state will be output based on the cell state information, and then multiplies the output of the output layer through the tanh layer [3].

According to the current research and application of cloud computing, cloud computing has four main characteristics: network centric, dynamic resource allocation, demand service self-service, resource pooling and transparency. Cloud computing architecture is divided into three layers: user access interface, core services and service management. The core services of cloud computing include software as a service, platform as a service and infrastructure as a service, as shown in Fig. 1. All kinds of services in the core service layer can meet the diverse needs of users. The user access interface layer provides the interface for cloud users to access the services of the core service layer, and the service management layer provides support for the core service layer, which provides a favorable guarantee for the security, reliability and availability of the core service layer (see Figs. 1 and 2).

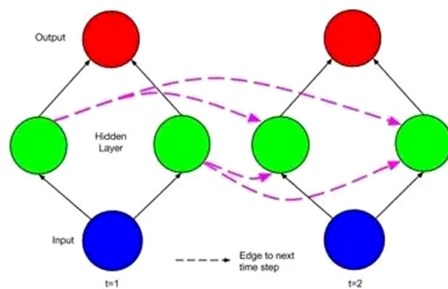


Fig. 1. LSTM structure

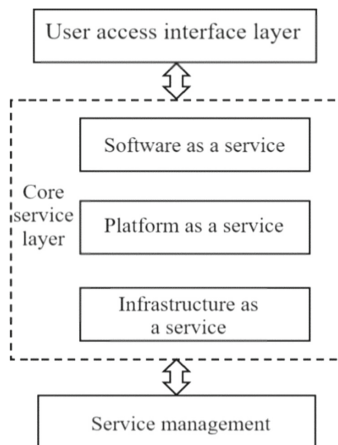


Fig. 2. Cloud computing architecture

4 Construction Strategy of College Sports Information Resources Under Cloud Computing Environment

4.1 Strengthen the Collection and Digitization of Sports Books and Periodicals

University libraries should give full play to their ability to collect various forms of sports information as much as possible, including primary literature and secondary literature, including various sports joint index, encyclopedia, national sports dictionary, Yearbook, etc. The collation of sports materials should not be limited to the surface text, but should be deeply integrated. At the same time, we should also establish some special sports information resource databases, such as the “National Traditional Sports bibliographic database” compiled by the library of Shanghai Institute of physical education and the “table tennis special database” compiled by the library of Beijing Sport University [4].

4.2 Strengthen the Construction of Sports Characteristic Database

The State General Administration of sports has built a variety of databases, including competitive training, management, industry and other aspects [5]. On the one hand, university libraries can make full use of these databases, on the other hand, they need to develop their own databases. They can develop characteristic sports information resource databases based on the existing cloud technology service platform, such as teaching video database, self-study self-evaluation database, exercise prescription database, etc., which are closely related to students’ physical education [6]. On this basis, we can establish the evaluation system of students’ and teachers’ self exercise fitness effect, which not only enables students and teachers to learn the theory and method of physical fitness in the information data, but also can directly test the actual effect of learning and exercise in the database, and more intuitively feed back the problems existing in the process of learning and exercise, It plays a very good role in promoting the improvement of learning and exercise methods in the next step. At the same time, the development of sports characteristic database in Colleges and universities should fully consider the characteristics of local sports, leisure sports, local stadiums and other aspects. Through the construction

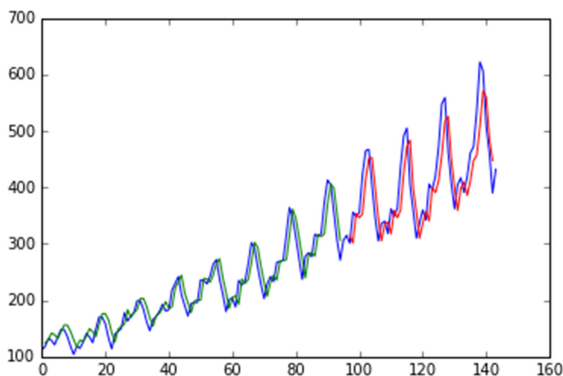


Fig. 3. Simulation for sports characteristic database

of characteristic database, not only can our information resources be expanded, but also colleges and universities have accumulated certain resources to enhance their software strength, which is convenient for teachers and students to quickly inquire the information they need, and then enjoy the teaching resources well (see Fig. 3).

5 The Design of “Physical Education Cloud”

5.1 The Basic Framework of “Physical Education Cloud”

Because the users of “physical education cloud” are only for the students in Colleges and universities for the time being, using the large capacity storage device in the university computer room as the server or renting a small network server can meet the hardware requirements of “physical education cloud” [7]. The software runs the system by several modules. The first is the database management software to manage the data of students and teachers, which is embedded in the server terminal; the second is the client authorized to teachers, which gives teachers corresponding operation authority; the last is the client authorized to students, which also gives corresponding operation authority. Customer end includes mobile software client, tablet software client, web client and computer software client. Students and teachers only need to download the system software on the corresponding intelligent devices, and can log in to the system with the given user name and password. The survey shows that among the 500 college students who fill in the questionnaire, the popularity rate of smart phones has reached 100%, and 93% of them are willing to app the teaching management system [8].

5.2 Operation Mode Design of “Physical Education Cloud”

After the enrollment of new students, the information of each new student will be entered into the database, including the basic information of enrollment, such as name, student number, etc. [9]. After the beginning of the school, the freshmen are given a complete physique test. The content of the physique test is in accordance with the “College Students’ physique test standard” issued by the state. After the test, the teacher checks the students’ scores and enters them into the database as the “basic data” of the students. After the teacher enters the data, the system will automatically group the students according to their test scores, so as to ensure that the students with similar physical fitness are in a group. Physical education will be carried out according to the groups, and different teaching contents and load and intensity of physical education will be arranged for different groups of students. Students can view and check their basic data through the student’s client. If they find any problems with the data, they can contact the teacher for review and modification [10].

5.3 Curriculum Model

At the beginning of the semester, according to the grouping of students by the system and the number of students in each group, the course selection questionnaire is issued to the students in each group. The questionnaire includes all the elective courses pre opened by

the school, as well as the skill level of the relevant courses that the students already have [11, 12]. The system analyzes and arranges the required courses and elective courses for each group according to the big data of the questionnaire results. Students can log in to the system to select elective courses in their respective groups [13]. After the completion of course selection, the cloud system automatically generates classes and publicizes them to teachers and students. Students can query their class time, place and teachers through the system; meanwhile, teachers can obtain the data permissions of students in their class. Each class automatically forms a class group, in which teachers can release course information, homework and emergency notice to students. The information released by teachers will be quickly transmitted to students by mobile client push. Students can also leave messages and ask questions to teachers through the system. In the process of class, the smart mobile terminal (including smart phones and tablets) installed in the teacher's hand can replace the roster for attendance, record and score. The situation of students in the classroom can be synchronized with the cloud at any time through the teacher's client and entered into the database [14].

In terms of extracurricular activities, the cloud system will assign different exercise tasks to students according to their basic data, mainly to strengthen the weaknesses of each student in the basic data. The task of extracurricular activities will be completed within the specified time of extracurricular activities, which will be supervised and confirmed by the teachers on duty and entered into the database. For example, some students in group C who are lack of aerobic exercise ability in the previous article will have more than 20 min of fast walking, jogging, riding, swimming and other sports that are of great help to aerobic ability. If conditions permit, the monitoring of extracurricular activities can be separated from the real-time monitoring of teachers under the "physical education cloud" platform [15]. The monitoring means are the GPS data uploaded by the intelligent terminal in the hands of students and the corresponding heart rate (the heart rate can be accurately measured by the camera and flash of mobile phone). The two indicators are combined to determine whether the task of extracurricular activities of students is completed. Reduce the workload of physical education teachers at the same time, the students' extracurricular activities time, intensity and amount of data. This will enable teachers to evaluate students' extracurricular activities more accurately.

5.4 Inter School League

Many foreign college sports associations and inter school leagues have made great achievements. For example, Stanford University in California holds a rugby match with Berkeley University before Thanksgiving every year [16]. This traditional game, which started in 1892, has a very loud name big game, which means the "gratitude and resentment" between the two universities spanning a generation, We have to fight each other through such an annual rugby match. A month before the competition, the students began to publicize. On the day of the competition, most local residents were attracted to watch the competition. The results after the competition will be talked about by local residents and students for about a week. This kind of competition between two famous universities, from Harvard University and Yale University on the east coast of the United States to Oxford University and Cambridge University in the United Kingdom, is the same. The football match between Stanford and Berkeley is not only a sports competition, but

also a competition in spirit between the two schools, which promotes the development of both sides in academic and scientific research [17].

Various associations and departments can carry out inter school league matches on some popular competitive sports. The league matches are organized and operated by the association president or the sports minister (student) of each department. A relevant special sports teacher is invited to control and supervise as the referee president, and train the student referees. Leagues can be launched through cloud computing platform, and more than a certain number of teams can respond to it. Leagues can also be launched in the name of a challenge from one community or department to another, and the other party can respond to it. In the process of the league, the outstanding athletes, referees and competition organization staff will be nominated by the referee of the league and uploaded to the cloud, which is also one of the evaluation criteria of physical education performance. In addition, the winning League Association or department will receive a series of honors and awards. For example, the first League Association can add a star on the community badge of the cloud platform (refer to the world cup). While inheriting the honor, it can attract more students to join, and encourage other associations to promote the sense of competition in sports competitions and form a virtuous circle of catching up.

6 Comparative Analysis of “Physical Education Cloud” and Traditional Mode

6.1 Sports Cognition

Under the traditional sports mode, students can not easily learn the theoretical knowledge of sports science and lack of awareness of sports participation [18]. In the current college physical education system, because the communication channel between teachers and students is not perfect, there is no good feedback channel, teachers do not fully understand the students, and the feedback is only the feedback of classroom teaching content. Students' interest in sports, students' sports habits, students' specific physical quality can not be well and effectively fed back to PE teachers. Therefore, physical education teachers can not teach students in accordance with their aptitude, only according to the appropriate subjects. At the same time, the traditional physical education curriculum largely ignores the students' Physical Education cognitive education, which can not well stimulate the students' exercise motivation, nor can it teach the students some basic sports science knowledge similar to the basic sports physiology and sports injury prevention and timely treatment. “Physical education cloud” provides an efficient and fast feedback channel between teachers and students. Teachers can understand students' physical condition through students' data, and students can also understand teachers' professional fields through the system. Cloud system provides instant messaging function for communication between teachers and students, so that teachers can adjust the teaching content and methods according to the status of students at any time, and improve the pertinence of teaching. On the other hand, teachers can instill advanced physical education concepts and exercise methods into students through “physical education cloud”,

improve students' cognition of physical education, stimulate students' internal motivation to participate in physical exercise, and improve students' sports scientific literacy and appreciation level.

6.2 Physical Education Curriculum Management

Teaching students in accordance with their aptitude is one of the principles of pedagogy, but in the current implementation of physical education, in order to facilitate the unified management, colleges and universities generally use administrative classes for teaching, or in the form of elective courses for teaching. From the perspective of teaching, this kind of teaching division ignores the difference of students' physical quality, resulting in the situation that some students can easily complete the learning tasks assigned by teachers, while some students can't, so it's difficult to achieve very ideal teaching effect. "Physical education cloud" carries out class grouping teaching for students according to their physical quality, implements the principle of differential treatment in physical education, and divides students with similar physical quality into a class for teaching, which can facilitate teachers to arrange teaching content and load intensity, strengthen classroom pertinence and improve the efficiency of Physical Education under the condition of constant workload of physical education teachers.

6.3 Extracurricular Activities

"Like physical education, do not like physical education" is a common phenomenon among college students, as physical education workers, it is very worthy of our reflection. At present, the physical education curriculum in Colleges and universities is mainly based on the classroom, in addition to the classroom, there is little communication between teachers and students. Extracurricular sports activities are also organized by students spontaneously, and are not well combined with the classroom. Therefore, students who love sports will consciously participate in extracurricular activities, while students who do not like sports activities will no longer do extracurricular exercises after completing the tasks in the physical education class. The mobilization of students' subjective initiative in the physical education class is not enough to stimulate students' awareness of sports participation, It is not enough to cultivate the awareness of lifelong physical education. "Physical education cloud" will also incorporate extracurricular sports activities into the content of physical education curriculum and serve as a reference for the results of physical education, which can make extracurricular activities closely linked with the classroom, stimulate students' awareness of sports participation, and cultivate students' sports habits. Students can register teams through the system for sports league matches to activate the school sports atmosphere; they can also establish sports interest groups to exercise in extracurricular sports activities and obtain pleasant emotional experience at the same time.

7 Conclusion

As today's hot it technology, cloud computing can process massive amounts of information in an instant and achieve the same powerful performance as supercomputers. At the

same time, users can flexibly use these resources and services on demand, so as to realize the dream of providing computing as a public facility. At present, the application of cloud computing in the construction of information resources is still in the primary stage, there are still many problems, but with the maturity of cloud computing technology, the unique advantages of cloud computing can make the construction of sports information resources in a wider range of cooperation, co construction and sharing, so as to provide better services for users. Colleges and universities can hand over the complicated and tedious work to the cloud computing service providers, which can save a lot of money and human resources, and put more energy on improving the quality of teaching. As an effective way to integrate educational information resources, cloud computing has its unique advantages. Colleges and universities should fully tap its advantages and apply it to teaching and scientific research. Cloud computing will have a broader development space in Colleges and universities and education network.

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