Application Analysis of Physical Fitness Test Performance Management Based on Improved Ant Colony Algorithm

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Objectives: With the continuous development of quality education in China, higher education pays more and more attention to the development of physical education. However, in the process of China's development, there is a lack of corresponding evaluation system for physical fitness test results. Methods: Therefore, this paper proposes the analysis and research application of fitness test performance management based on ant colony algorithm. Firstly, it expounds the development status of physical education performance management. Results: Then, aiming at the corresponding shortcomings, this paper puts forward the application analysis of the fitness test performance management platform based on the mixed mode of cloud theory, and carries out a series of comprehensive tests on the system. Conclusion: According to the performance test of all aspects of the database, the test results show that the system is feasible.

The cultivation of the talent requires the correct guidance of education, the level of education directly determines the quality of the talent [1]. With the development of quality education in China, colleges and universities not only aim at students' cultural class level, but to pay more attention to the comprehensive physical education [2]. The continuous reform of the physical education makes that the traditional physical fitness test performance can't correctly meet the needs of the development of colleges and universities [3]. Coupled with the arrival of the Internet era, students' physical fitness test performances should combine with the Internet technology, so as to avoid the tedious nature brought by manpower [4].

The theory of mixed model provides a good theoretical basis for constructing a reasonable physical fitness test performance management platform [5]. Physical fitness test performance management is no longer blind, but more targeted and accurate [6]. A person's physical condition directly determines the height of his development. Without a good physical fitness, even the excellent results can only be empty talk, so it is necessary to carry out physical education, and this is also the foundation of improving students' physical quality [7]. Then, it is not difficult to find that there is a great hysteresis in the traditional physical fitness test performance management, meanwhile, there is also the evaluation irrationality in the new project, which seriously affects the participation enthusiasm of students. Using the cultural class evaluation methods to guide the physical education will only achieve the opposite effect [8]. The perfect development of the test system requires rationally using the relevant theories of the computer to give students the right guidance, so as to make them generate a strong interest in learning sports, rather than forcing them to carry out the necessary physical exercise. Therefore, the

1991

humanized physical fitness test performance management platform will be the future trend [9].

The construction of the teaching evaluation system needs the corresponding theoretical system. And then, the construction of the system in this paper mainly uses the mixed mode theory. The computer has a wealth of database functions, which can carry out correct test according to the student's physical fitness and development, rather than the forced uniform standards [10]. According to the study, it is found that this physical fitness test performance management system had appeared in the United States as early as 80s of the last century [11]. At that time, because the United States was to pursue a comprehensive development, a relatively reasonable overall physical fitness test performance management system was formulated according to the content of physical education, which had a very far-reaching impact on all colleges and universities in the US, so that the importance degree on the sports was constantly improved [12]. China's overall physical education started late. However, after the reform and opening up, China's physical fitness test performance management has made considerable progress. This progress is mainly reflected in that a set of relatively common standards is developed for the physical education, thus the evaluation system is no longer blank [13]. After years of continuous complement and optimization, the entire physical fitness test performance management platform has become increasingly clear.

The evaluation research of the physical education in China is mainly concentrated in the 21st century. Among them, there are a large number of scholars who carry out the research, and these studies enrich the physical fitness test performance management system in China. In later studies, China's physical fitness test performance management continued to reform. However, because it is difficult to break through the traditional physical fitness performance test management system, the management limitation is caused [14]. Therefore, this paper presents an application system of the physical fitness test performance management platform construction research based on the mixed model [15].

METHODS

3.1 The system demand analysis

In China, a large number of students need the corresponding test. In order to make the results of the test objects more rational, in view of different age structures, different test evaluation methods are constructed. The first is the basic process of the software, and its specific implementation procedures are shown as follows: issuing a notice, receiving a notice, counting the number of units according to the age. After dividing the group, each person's test and the major categories in each option are done well, then, the summary and report of the test department are made, and a good job is done. The workload of a single data table is very large. The above is the preparation before the test. It is necessary to inform everyone that it is necessary to follow each person, verify his age group (because the test time passes through the birthday group and the overall change of the project) and the test items. In order to carry out the evaluation, the department carries out the unified arrangements, then, the test time is distributed and the on-site scheduling classification is made. Then, each item can't be measured every day if there is no preparation. After the above preparation, students go to the scene to check every item, the form is made, and then to continue to the subsequent search list. The school verifies the name and school number of the age group and test item, and fills in the data sheet that should be tested. For the project, the results are input, and then, the student's personal score and total scores are calculated. The overall information collection data is shown in the table below:

Table 1
Gathering and Summarizing Stages of Information

Project	Full name	Full name	Total score
Student 1	A	1	90
Student 2	B	2	87
Student 3	C	3	97
School audit	Correct	Correct	Correct

In the whole design, as shown in the figure: A mechanism system that makes a reasonable evaluation on the test results is constructed. Therefore, firstly, starting from the information collection stage, the information collection stage mainly includes two parts: the first is various performances of the physical fitness test, and the second is the corresponding normative results of physical fitness test. Rules and others are entered into the corresponding database. Because the database covers a large amount of data, the data loss may occur at any time, and the focus is put on how to solve the data error. Once the data error appears, it means that the management system is in a paralyzed state. Then, various parts of the physical fitness test form an orderly node arrangement, thus, if a link's database is damaged, it can be repaired in the first time. The accuracy of the data provided is a basis for stipulating the accurate technology, and the accuracy in the information entry phase must be ensured. The next stage is the information processing phase. In this stage, the first is the preprocessing of information, that is, the information collected initially is simply induced and summed up, then, a certain degree of rationality is generalized, and there may be the information similarity, which is also the process of the initial inspection and induction. The inspection mainly contains three parts: the first is the repair of the data error information. If the node does not match, then the preprocessing function can make some repair; the second is the missing data repair, so as to prevent the blank of the evaluation scores; after completing the preprocessing, and then is the corresponding data separation phase, as shown in the figure:

Figure 1
Design of Related Process
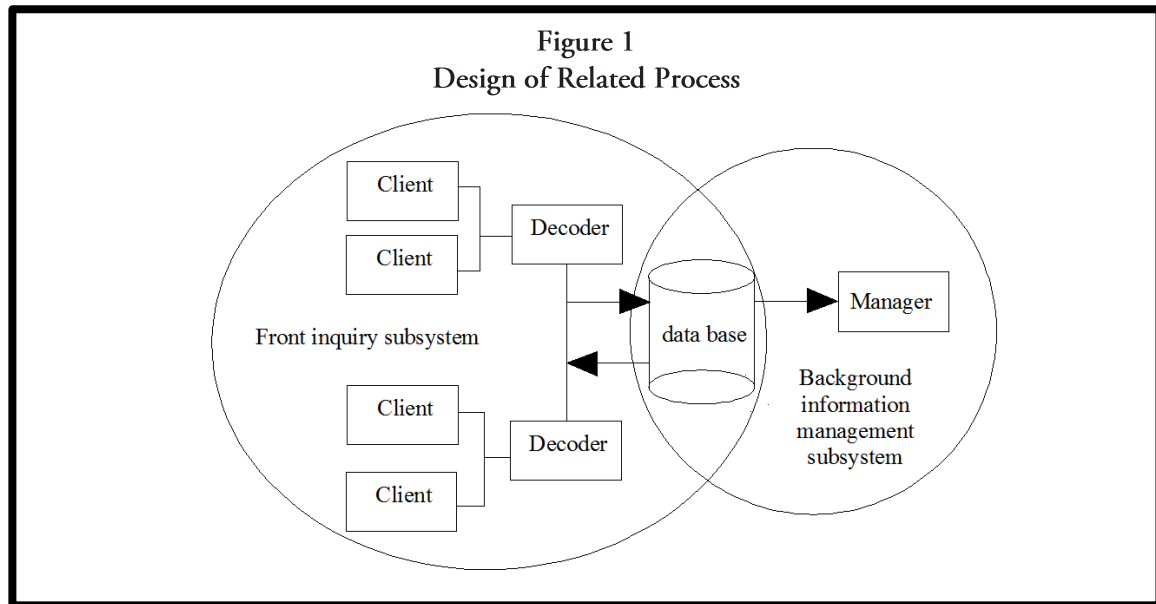
3.2 Performance test management system of the physical fitness test based on mixed model

Firstly, a data acquisition port is established, the main role of this port is to enter the majors, jobs, employment years and other information of the participating students into the system, including the jobs engaged, majors, comprehensive physical training efficiency and so on. For each student, a dedicated file is established, and the advantages and disadvantages of the student are obtained through the artificial intelligence analysis and processing. Then, the basic data can be obtained by using Equation 1:

$$\sigma_p = \sqrt{\sum_{j=1}^{m}\sum_{k=1}^{m} A_j A_K \sigma_{jk}} \qquad (1)$$

After the integrated processing, different performance feedback mechanisms are generated according to the characteristics of different students. For example: a student's specialty is sports management, he shows an excellent ability in the physical fitness test and makes progress in the performance. According to the formula 2, the corresponding forecast processing is made:

$$\sigma_{jk} = r_{jk} \times \sigma_j \times \sigma_k \qquad (2)$$

Then, the overall correlation coefficient formula is used to test the accuracy of the information:

$$相关系数\ (\mathrm{r}) = \frac{\sum_{i=1}^{n}\left[(X_i - X) \times (y_i - y)\right]}{\sqrt{\sum_{i=1}^{n}(X_i - X)^2} \times \sqrt{\sum_{I=1}^{N}(y_i - y)^2}} \qquad (3)$$

According to the basic information of all entry systems, the system will analyze the optimization that is appropriate for the physical fitness test performance and use all results of the test as the reference. Then, the physical fitness test grade evaluation management system adopts C / S model to carry out the development, the advantage of the C/S model is that it gives full play to the advantages of the client and server hardware environment, and rationally allocates the work to the client and server side to complete, so that the transmission costs of the software system are greatly reduced. Here, the client is mainly responsible for entering the basic information of students, importing the test items and test scores, submitting the above information to the server, displaying the rating level, generating the test schedule, searching, querying and counting the rating level and so on. The server is mainly responsible for managing user rights, managing the test project information, setting the the group and the measured items, setting the assessment mechanism and so on. In

1994

addition, a data manager is created to manage and arrange multiple kinds of information in the database. The overall structure of the system is shown in the figure. The client in the figure is provided to the local police station, which is mainly used to provide login and query interface, import the personnel information and test information, enter test scores, provide query and search function, and carry out the online printing of test forms, etc. And the server side is provided to the relevant departments, which is mainly used for the rating assessment criteria, personnel basic information items addition, modification and deletion, editing of group and project to be tested, information statistics and calculation, etc. The manager is mainly used to manage relevant information, such as system permissions settings, data import and backup and so on.

Figure 2
Optimization Design Related Route
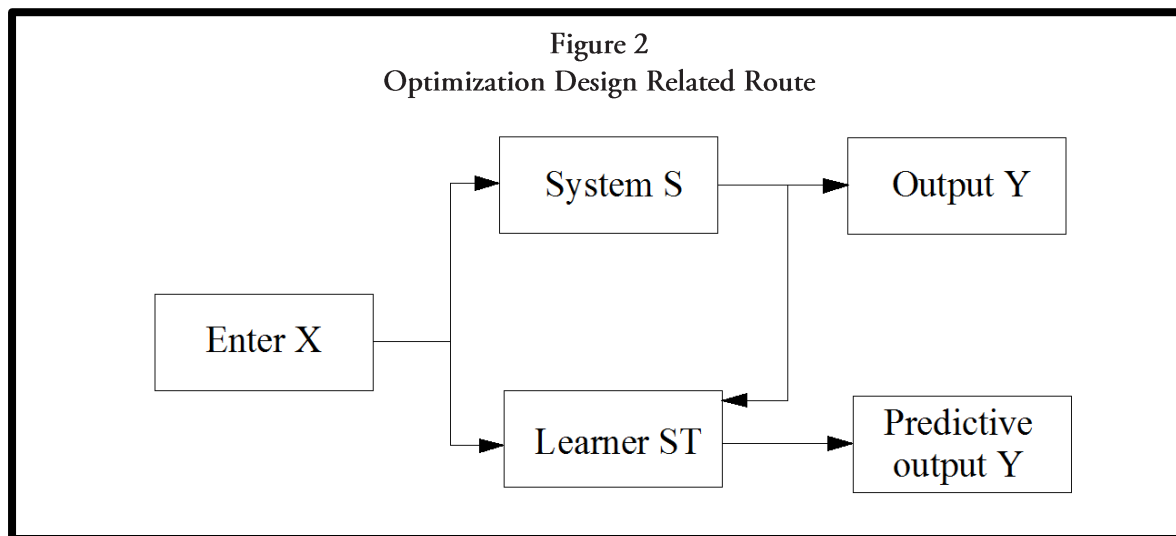
At the aspect of the system display configuration, the whole system considers the huge amount of data and the rapid accuracy of the data analysis. Therefore, this article uses the C ++ language development system, and then, the details for the system imaging processing is also more refined. No matter it is based on which operating system of Windows, the system can adapt it easily, which has a superior compatibility. The overall requirements on the hardware facilities are not high, and the development environment can be above VC6.0. Moreover, the requirements of the entire system on the CPU performance are not significant, which will not occupy too much CPU in the operation process. Finally is the consideration of the whole design based on design principles. In the design principle, a good sports performance management system is evaluated comprehensively from many aspects. The first is the functional principle, in the design of the sports teaching swimming skills and tactics system based on data mining clustering technology, physical education, the functional requirements must be met, including the requirements that are in line with the overall physical of the athletes, the promotion role on various body functions of an athlete and other corresponding standards. In addition, the entire design system must also meet the practical function, after using the data mining technology to develop different physical fitness performance evaluation methods for different students, a more comprehensive study should be carried out to various body functions of the athletes. The role at the computer aided technical and tactical aspects is very large, and the computer can clearly draw up the image segmentation and accumulation process, deepen the understanding and mastery of students on the concept and nature of each action in the physical fitness test process.

RESULTS

After completing the system design, whether a platform can run well can be verified through the

continuous testing. Then, the performance and functionality of the platform are tested. Through the platform performance test, it can be found that this test uses the Apahce JMeter as a performance testing tool and adopts the IBM Nmon as a server resource monitoring and analysis tool. According to the topology of the test environment, the test environment configuration steps are shown as follows: Each installation: UBUNTU 10.04, JDK 1.6.0 configuration: system network configuration, including the SSH installation, static IP configuration, host name configuration, host name configuration and IP mapping, SSH no password open authentication login configuration; configuration: HBase cluster, including Hadoop installation and configuration, zookeper installation and configuration, HBase installation and configuration and HBase raw data table creation; installation and configuration: SNG and installing MYSQL database; configuration: WEBAPP, installing TOMCAT. And then, WEB program is put into apache-tomcat / wehapps directory. WEB program is divided into two parts: WEB website and access agent. The access agent needs to be exported as JAR package operation. After completing the installation and configuration, then is to start the Hadoop cluster and HBase database and run the GM, Collector and SNA. Firstly, in view of the number of users of the system, the corresponding network fluctuation is measured.

Table 2
**Relative Performance Parameters of the System**

Frequency	Based on SOAP protocol	Based on TCP protocol	Extra cost ratio
1 (READ)	33.9ms	31ms	9.4%
2 (GET)	34.3ms	32.2ms	6.5%
3 (UPLOAD)	35.2ms	33ms	6.7%
4 (UPLOAD)	35.2ms	32ms	10%
5 (READ)	33.5ms	32ms	4.7%

Six cases were drawn up, such as 200, 400, 600, 800, 1000, 1200 and 1400. And then, when the number of tasks was 200 to 1400, the change trend of the fluctuation number and the server response time of the whole system after optimization were calculated respectively. In the case of that these tasks were connected, the response time for completing the entire performance management was tested. When the connection number of the task access request was not too many, the traditional performance information input and the overall response time optimization were basically the same. The number of fluctuations in the overall time range was not significant, and the main reason was that the burden of the whole server caused by a small amount of numerical calculation, writing and reading and distribution was not heavy. However, as the number of input scores and the number of tasks continued to increase, it is found that the overall response time was increasing due to the excessive load of the response time of the server that didn't add the optimization program. In contrast, because the optimized management process added corresponding nodes, although the additional task expense was caused, and a certain amount of resources was consumed, the corresponding time of the entire performance management wasn't greatly affected. As the number of current user access requests increased constantly, its performance was significantly better than traditional node management. Through the

following Figure 3, the reading node number was more in the case of that the time period from T to T1 was the same. The average waiting time of the user access requests was significantly less than a large number of waiting, and the entire performance management technology was significantly improved. The whole comparison chart is shown as follows:

Figure 3
Optimization Design Related Route
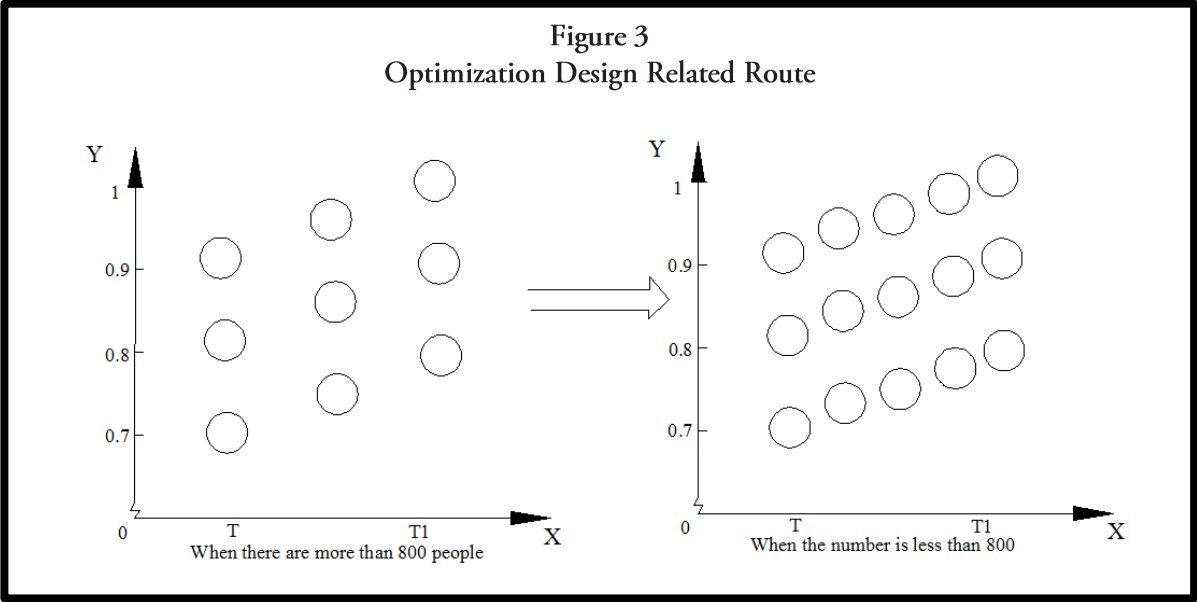
In addition to that the management server response time was involved, and then, the number and amplitude of fluctuations were also counted with the increase of the number of tasks. The whole frequency was divided into three cases. As shown in the figure, it is easy to see that within 400 tasks, the overall fluctuation frequency and frequency number did not change much. However, as the number of tasks increased, when the number of tasks reached 400-800, the fluctuation frequency and amplitude increased to a certain extent. When the task was greater than 800, the whole fluctuation was more frequent, and the corresponding amplitude was also more intense. It can be seen that there was still a long distance from the fluctuation warning value set by the system. In view of that the number of tasks has been assumed to be the maximum task volume that the system can accommodate. Although the amplitude of the whole system increases with the increase in the number of tasks, there is no corresponding interference to the system. Therefore, the stability of the system is worthy of being promoted.

Figure 4
Fluctuation Test Result of System
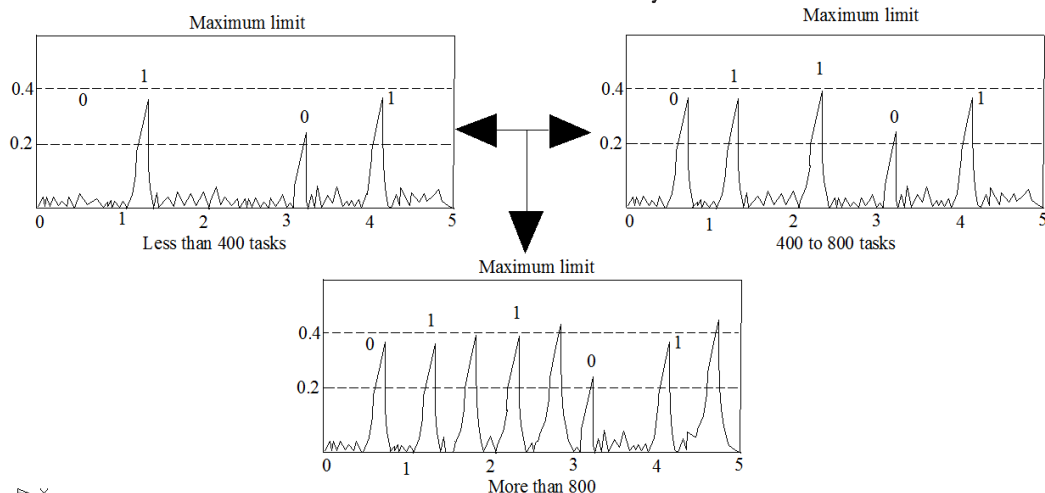
With the continuous development of computer technology, its data processing capacity is no longer the same. After clarifying the design and principles of the whole design, it is necessary to combine the corresponding test to improve the performance model. In the context of the continuous innovation of the computer aided mathematics teaching mode, the role of computer is more and more obvious. The initial computer aided instruction is only to explain and demonstrate knowledge points, and regularly display the knowledge points to the students. After that, the computer aided data mining technology model is variable. Data information is mainly applied to the Internet and the student's physical fitness test input. Then, the construction of three-dimensional information technology requires professional graphics processing technology to form a basic block diagram, finally, to combine with the information input source to review the information and timely adjust the shortcomings of the ideas, thus improving the teaching program design. The system should reduce the cumbersome design as much as possible, and try to adopt the new program that interests users. In addition, the platform's performance indicators also show the superior performance of the platform. The platform will be tracked and investigated constantly. Once the

problems of platform collapse or the platform fluency is not high are found, they will be processed immediately, so as to try to do not affect the use requirements of users.

DISCUSSION

The continuous reform of the physical education has made that the traditional physical fitness test performance has been unable to correctly meet the needs of the development of colleges and universities. Coupled with the arrival of the Internet era, students' physical fitness test performances should combine with the Internet technology, so as to avoid the tedious nature brought by manpower. Therefore, this paper proposed a research on the physical fitness test performance management platform system construction based on the mixed model. According to analyze various elements of the system, a set of reasonable system for the physical fitness training performance management was formulated. In the performance test of the system, the change of the number of task requests was mainly considered. Therefore, in view of the response number and the fluctuation frequency of the system server, although the system's anti-jamming capability needs to be further improved, the overall stability and efficiency meet the design requirements. The platform will be tracked and

1998

investigated constantly. Once the problems of platform collapse or the platform fluency is not high are found, they will be processed immediately, so as to try to do not affect the use requirements of users.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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