The development and popularisation of network platform of college sports venues in intelligent manufacturing

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Abstract: With the promotion of the national fitness campaign, the number of physical exercise shows explosive growth in China. The question that block the development of sports exposed which is a lack of public sports venues. This paper focuses on building a network platform of all college sports venues resources which can reach the goal to serve national fitness and proposes an improved parallel heuristic map reduce algorithm. The experimental results show the stability, concurrency and feasibility of the network platform of college sports venues in big data era.

Keywords: intelligent manufacturing; college sports venues; national fitness; improved parallel heuristic map reduce algorithm; stability; concurrency.


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1 Introduction

21st Century is the information age, the daily data of thousands of times the growth, leading to the world ushered in the era of big data (Yunxia and Fan, 2009). The national fitness campaign has been practiced for many years, Chinese sports population has shown a growth trend, the lack of new problems of physical exercise excessive growth of population is brought about by the masses sports exercise place. Because affected by many objective factors, in Chinese rapidly building a number of sports venues is not realistic, so how to utilise existing resources to solve the increase in the population of sports venues lack of exercise, which is an important problem in the development of mass sports in Chinese. In recent years, China’s higher education in the economic development of the environment, showing a flourishing state (Jianxin and Wei, 2007). Therefore, how to speed up the reform, planning, construction and management of the university stadium is especially important and urgent.

In the context of the beautiful China and healthy China, as the guarantee of college student’s fitness, fitness of the stadium also ushered in the stage of rapid development (Jiujiu, 2005). However, in the transition period of college stadiums will also face more tasks: not only to carry on teaching, scientific research and training to ensure the development of the teachers and students have to bear; leisure, exercise and game task; while for the high level sports team in school training and competition to provide security guarantee basis; facilities to enrich the cultural life of the campus. In the era of big data, how to use information technology to build a network platform for the development and promotion of college sports venues and it is important.

With the population of higher educations, the number of sports venues in colleges and universities is increasing. But the situations are existing, for instance, low utilisation, singleness of usage form and disordered management (Qi and Wei, 2003; Youming, 2009). This paper combines the latest technology and research results of big data, using the Internet and mobile network platform, through JSP technology and Oracle database, develop and promote a set of network platform based on university stadium. The intelligent management system is a combination of all successful management experience, intelligent management platform in all the needs of the
operation interface is simple, even if do not understand computer personnel just a little error, can be easy. The system enables managers to manage, track and analyse all aspects of the venues, thereby completing all daily operations at low cost and high efficiency. The system is a large set of Oracle database for the background, the realisation of all subsystems consumption data is highly unified, the final summary of statistics to show all kinds of statements information and can be exported to various standards such as EXCEL. The experimental results show the stability, concurrency and feasibility of the network platform of college sports venues in big data era.

The rest of this paper is outlined as follows. In Section 2, an overview of related works are presented. Section 3 describes the big data and network promotion. In Section 4, the performance and features of the proposed algorithm are analysed. Finally, conclusions are presented in Section 5.

2 Related works
This section mainly introduces the development and popularisation of the network platform of college sports venues in recent years, especially the development of Jiangxi province in china.

In recent years, colleges and universities in order to meet the needs of the development of society, a considerable part of the university to adjust the merger as well as large-scale enrolment (Culin and Jianjun, 2006). This way makes the number of teachers and students in Colleges and universities increased significantly, while the stadium is relatively limited (Kaicheng and Jie, 2005). These limited venues, especially the relatively good functions of the venues, are basically concentrated in the major cities of the university campus; a considerable part of the university does not have its own stadium. This situation will have a certain adverse effect on the normal physical education and extracurricular sports activities in colleges and universities.

Now many of the sports stadiums in China are basically established in the 70 and 80s of the last century. Because of building materials and construction of the building was however hard, in addition to the lack of attention, lack of funds and disrepair, so a considerable part of the stadium is dilapidated, low utilisation rate (Ying, 2003). At present, most of the capital investment in colleges and universities is difficult to meet the construction and maintenance of the stadium (Bing and Shuangya, 2009). Compared with developed countries, the level of investment in China’s colleges and universities is still to be improved. In the 2008 Beijing Olympic Games, the 2010 Guangzhou Asian Games held to accelerate the pace of construction of China stadium, which makes the study of college sports venues service management mode has become a hot issue of widespread concern.

It is very difficult to obtain the investment of other universities in the course of operation and compared with the developed countries, China’s education sector investment in the construction of the stadium is obviously inadequate, which led to a lot of college sports is not enough. The concept behind the stadium management personnel are leading to the stadium cannot form a model of opening to the outside world. Lack of funds maintains a certain degree of impact on the stadium. In the mode of management, the use of independent management rights, the stadium cannot attract foreign investment. In the performance assessment, salary payment is still a continuation of the traditional model, is not conducive to the enthusiasm of the staff to play. Managers are more than the establishment of logistics personnel and professional, with management experience is very little, management efficiency is low. Because the relevant standards are not perfect and there are differences between colleges and universities, so that the lack of management standards for the stadium in the development of industry management. The status of the university gymnasium in the society needs to be further promoted and the construction of the management standard system is still an important way to manage the stadium.

Chinese colleges and universities have a considerable part of the sports venues are relatively simple structure of the old venues. These single venues because of the functional structure or geographical planning and other issues, most of the use of a few years will face demolition fate, not only did not fundamentally solve the problem, but caused a waste of resources (Fan and Chongde, 2009). And with the reform of sports teaching, sports venues are not only a single, traditional teaching place, it is more to a series of new projects, such as fitness, fitness, yoga, etc.

In universities, sports and sports teaching units in general logistics personnel or temporary workers to manage and this part of the people’s congress has not been specialised training, lack of knowledge of the management of sports venues. At the same time, a lot of colleges and universities in the venue of the opening hours, service content and management methods are not unified, so that the management of the school stadium is in a state of disorder and disorder. This situation led to the school sports facilities management and operation mode is not scientific, it is difficult to attract social sports consumption, resulting in idle and waste venues.

With the rapid development of the market economy, the university gymnasium should also be in the market economy. Management should break the traditional concept of management, starting from the market development and combined with the actual situation of colleges and universities, to develop practical management program (Dongmei, 2005). At present, the way to the library in the stadium management has a wide range of applications. The so-called museum is to raise the stadium in the stadium to establish the management mechanism of enterprise standards, the staff of the museum. Relative to the stadium, college students are the main users of university will most of the energy used in the sports course teaching. Therefore, for maintenance of sports facilities is less energy, how to balance the relationship between the two, is the efficiency
of this management model to maximise the sports venue management personnel should consider the problem. Therefore, some universities adopt the mode of outsourcing, to a certain extent, reduce the management pressure and achieved certain results. On the basis of the model, the management of sports facilities is more orderly, but the professional talent recruitment and cost expenditure are the problems that this model should consider.

In China’s Jiangxi province, the new campus of colleges and universities are mostly located in the surrounding areas of the city, the lack of large-scale community, the mass sports population base is relatively low. Secondly, due to the complexity of the surrounding environment, the university management department for many reasons, most of the internal facilities for students and staff to open, restricted the utilisation of the venues. In addition the leisure time is not fixed, many places of residence are far away from sports fans cannot come to exercise regularly and therefore cannot train a fixed consumer groups. It can be seen that the geographical location of the remote is caused by the low utilisation of college sports venues on the one hand.

In the stadium development process, to develop a sound and reasonable charging standards, on the one hand to ensure reasonable prices, access to students and teachers recognition, on the one hand to raise funds for the development of the stadium. According to the needs of sports with relevant hardware facilities to ensure the smooth movement of the project, take the membership system, regularly for sports loving students and teachers to provide preferential activities, so that students get vested interests and improve their physical fitness, thereby stimulating more people love sports. In order to improve the comprehensive quality of college students, colleges and universities should make full use of sports field resources, to adopt professional maintenance and management measures to promote the sustainable development and operation of stadiums and promote the improvement of management efficiency. At the same time, managers should have advanced management awareness, the use of advanced management technology, so that the stable operation of the stadium.

To sum up, the domestic and foreign universities in the sports venues generally have the following problems:

1. the overall number of college sports venues is less, is not conducive to the normal physical education
2. some of the venues are poorly aged, with less funding for new and maintenance facilities
3. it is difficult to meet the new needs of the sports in universities and colleges
4. the service and management of sports venues.

3 Big data and network promotion

The rise of fast data analysis and real-time processing may bring some changes to the big data pipeline. In terms of the speed of data processing, it is relatively simple. Enterprises need to quickly deal with data, speed is the main reason for the enterprise to produce a wide range of interest in large data pipelines, companies need to change from batch processing to real-time data processing and real-time data analysis. The use of containers and micro services in the big data architecture is becoming increasingly common. Blue data recently added to its EPIC platform for the management of the application of Docker containers, these containers for the creation of Hadoop and spark clusters. Map/Reduce programming architecture is a pioneer in the application of micro service technology in the flow and real-time analysis of application architecture. Pachyderm constructs a container processing engine.

\[ F_i = \sqrt{\sum_{l_k} \left( \frac{N_k |h_{l_k}^i|^2 + \sigma_l^2}{|h_{l_k}^i|^2} \right) + 1} \]

The system uses the cache technology to reduce the load of the database and in view of the requirements of large data loading the database design is optimised to ensure that the query response time is optimal. System content to join the multi-level security mechanism, the use of OOP and MVC to make the business layer and the logic layer separation, the file read and write files completely separate, strengthen the security. The program uses a single entrance, input validation, output filter. Security operations by role based access and access control. Local end ETS products seamless internet, abandon the original VPN technology, the success of the leap to achieve a breakthrough, truly consumer through, service through, data through. The system uses advanced OPP (object oriented) development concept for a new framework design, modular development and use of more powerful. Figure1 shows the system function model.

Information management is the fundamental way to improve the efficiency of management of the university gymnasium, in the traditional management of management personnel is difficult to get timely information and the use of computers and other modern equipment, the management personnel to obtain a more abundant and accurate information. Through the management software can reduce the working pressure of the management staff, the development of special sports POS machine system, to ensure the stability of the charging system.

\[ Z_l = \sum_{l_k \in l_k} \frac{Z_l^k \sigma_k c_k}{\sum_{l_k \in l_k} Z_l^k \sigma_k} + \int x^2 P(x)dx \]
For the service operation development of stadiums, platform construction system for the majority of users of public information platform, advertising system, training management system; for the daily management of the venue, the platform set up financial management system, state-owned assets management system, member management system, etc. Through the network platform for the promotion of the construction, the original scattered all speak functional units of interrelated, integrated, unified under venues network information platform, the whole stadium group work more standardised and efficient service management.

$$\sqrt{z} = \frac{\sigma P_x \sum_{m=1}^{M} |h_{m}|^2 \sqrt{N}}{P_x |h_{0}|^2 - \sigma^2 (\lambda_0 - 1) + P_x \sum_{m=1}^{M} |h_{m}|^2} + e^{-\lambda_0} \quad (3)$$

4 The performance test and results analysis

Today, the majority of consumers of the increasingly demanding product, so only provide the basic situation of the product cannot meet the requirements of consumers; the use of sports venues is the same. Without losing the venue provider service standards and material resources, based on this can effectively reduce the consumer’s time, physical strength, capital and other costs.

In order to effectively solve the stability and security of the system, improve the system’s concurrent access, this paper proposes an improved parallel heuristic map-reduce algorithm (IPHMR) and the proposed algorithm is applied to the Chinese college stadiums in big data environment. Figure 2 shows the concurrent access capability of the system, Figure 3 shows the system response time, Figure 4 shows the population diversity of the proposed algorithm, Figure 5 shows the convergence and stability of the algorithm, Figure 6 shows the system monthly energy consumption in big data environments.
5 Conclusions

With the advent of big data era, big data also attracted more and more attention. Sports stadiums in the management of the existing problems restrict their own development. Based on the important role of the establishment of efficient gymnasium, colleges and universities should take necessary management measures to ensure the improvement of management efficiency. The development and popularisation of network platform of university sports venues will make the service management of university sports venues more scientific, efficient, standardised, transparent, so as to promote the construction of college sports venues information in China. The wide application of computer and the popularisation of the network have penetrated every corner of our daily life, the combination of sports and network is also the future development trend.
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References