Research and Construction of University Sports Decision Support System Based on Extraction Algorithm and Big Data Analysis Technology

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Abstract. The era of big data puts forward intelligent requirements for university sports decision support system. The characteristics of big data and its function and influence on University intelligent decision support system are analyzed; This paper analyzes the process of university sports intelligent decision support system based on big data intelligence analysis. On this basis, the big data technology and artificial intelligence technology are integrated into the construction of university sports decision support system, and the system framework and its composition structure are put forward. Finally, the related key technologies are analyzed, which can provide reference for the construction of this kind of system.

Keywords: Big data analysis · College physical education · Decision support system

1 Introduction

Decision support system (DDS) is an application system based on management science, operations research, control and behavior science, with computer technology, simulation technology and information technology as means to assist command and decision-making in the form of human-computer interaction. Since Scott Morton, an American management scientist, first put forward the concept of decision support system in management decision system in the 1970s, decision support system has been widely used in many fields such as business administration, finance, health care and government departments, and has achieved extensive application results. Decision making refers to making decisions on future actions after analyzing, calculating, judging and selecting the best factors affecting the realization of objectives based on objective possibility, certain information and experience and with the help of certain tools, skills and methods, including "decision" and "policy". Decision making is a common behavior in politics, economy, technology and daily life. It is an activity that often occurs in management.

With the advent of the era of big data, the existing decision support systems based on the idea of small data, including decision support systems based on abstract mathematical models, expert knowledge in application fields and local sampling data, have

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the following shortcomings: (1) they can not effectively process big data, especially rheological unstructured big data (2) The decision object is required to be fixed (3) Mostly offline decision-making (4) It is often a single objective decision (5) The depth of data intelligence mining is insufficient.

It is also an urgent problem to be solved in college physical education. In the process of deepening the development of the new curriculum reform, although the physical education reform in Colleges and universities has made some achievements, the teaching thought has not changed, and the serious separation between theory and practice always exists [1]. In addition, limited by the teaching environment and conditions, the actual teaching environment has been affected, so that college physical education has always been the weakness of higher education. Therefore, with the advent of the era of big data, there is an urgent need to build a university sports decision support system based on big data information analysis and processing based on new design concepts, so as to realize the university sports intelligent decision support system of “from data to decision”.

2 Big Data and Its Characteristics

2.1 Concept and Connotation of Big Data

Big data is a new concept with the rapid popularization of the Internet. The original meaning of data is known, can be understood as facts, and represents an objective description of something or phenomenon. Ancient Greek philosopher Pythagoras believed that number is the origin of all things. Big data is a huge amount of data, or massive data. According to Wikipedia’s definition of big data, big data refers to the huge amount of data involved, which can not be intercepted, managed and processed in a reasonable time through conventional labor and technology, and sort out the information that can be interpreted by adults. The huge number is only a representation of big data. In essence, the value of big data lies in that it implies information at all levels of the world system, organization, movement and state, and provides a way to understand, discover and insight into the world. Its strategic significance lies not in mastering huge data, but in deepening cognition. Through specialized storage and processing of a large number of data, mining and extracting required knowledge and information, discovering higher-level laws and deepening understanding of the world. In other words, if big data is compared to an industry, the key to the profitability of this industry is to improve the multi-dimensional and multi angle analysis and processing ability of data, and realize the value and value-added of data through analysis, processing and application. Therefore, big data not only refers to the large amount of data, but also refers to the high speed and excellent quality of data processing. Big data does not use random analysis sampling survey to process all data [2]. Therefore, the famous big data research institute Gartner defines big data as a massive, high growth rate and diversified information asset that requires a new processing mode to have stronger decision-making power, insight and discovery power and process optimization ability.

2.2 Big Data Features

To sum up, big data has multiple and multi angle values. It is a massive complex data set (commonly used 4V description in the industry) that cannot be extracted, stored, searched, shared, analyzed and processed by classical localization methods. It is an objective and true reflection of things, phenomena and laws. It has the characteristics of integrity, holography, dynamics and growth.

(1) Integrity: big data refers to all data across multiple domains. The units of volume range from Pb, EB and ZB to Nb and DB. For example, in 2016, the total amount of global digital content reached 16.1 ZB. Although the scale is huge, due to the universal connection of the objective world, the seemingly mixed big data in different fields and levels are interrelated and are a whole, so it is holistic. Therefore, big data has overall application advantages.
(2) Holography: the term holography comes from the concept of holography in laser physics. Big data is a reflection of the real world. Big data contains all the knowledge and structure of the world. If it is considered that big data is equivalent to holographic recording of the world, then big data analysis is equivalent to holographic reconstruction of the world, which has the holographic nature of reflecting the essence and phenomenon of the world. ① Big data as a whole truly reflects the essence and phenomena of the world from different perspectives and levels; ② Each part of big data reflects the essence and phenomenon of the world from different attributes and aspects, and the contents reflected and reflected by the whole and part are interconnected, complementary and mutually confirmed.
(3) Dynamic: ① the amount of large data is constantly changing. With the extensive deepening of human activities and the application and development of high and new technology, the amount of big data increases exponentially with time. According to IDC, the new data increases at a rate of more than 50% every year, doubles every less than two years, and the data scale is constantly refreshed. At present, the magnitude of big data has developed from massive TB to huge Pb, and even ZB. ② The type, attribute, content and proportion of data change with the movement of the real world. Compared with the traditional relational data based on text, the semi-structured and unstructured information data such as sensor information, audio, video, pictures, text, XML, HTML, web log and geographical location generated by natural and human social activities are growing explosively. These types of semi-structured and unstructured data from a wide range of sources and multimedia unstructured fast flowing data account for an increasing proportion and are dominant.

3 Role and Impact of Big Data on Combat Intelligent Decision Support System

Traditional decision support systems make decisions based on small data world models, knowledge and data, that is, they rely on existing knowledge, abstract models and sample data for limited deduction and decision-making. They can be divided into model-based, knowledge-based and data-based, including collecting necessary information and processing and analyzing the collected information. There is no doubt that the comprehensiveness and integrity of the collected information will directly affect the scientificity and accuracy of decision-making.

As we all know, college physical education does not simply cultivate students' physical quality and skill exercise, but still needs to be continuously expanded and extended to effectively cultivate students' social adaptability and psychological quality, so as to realize the comprehensive expansion of the connotation of physical education. In physical education classroom teaching, we should appropriately introduce localized content, always run through health ideological education, skillfully master physical health knowledge and sports technology, and cultivate students' most basic physical quality and skills, so as to lay a solid foundation for fitness.

Big data is a massive complex data set with multiple and multi angle values that cannot be extracted, stored, searched, shared, analyzed and processed by classical localization methods. It is a vivid representation and embodiment of nature and human society. Big data is not random samples, but all data; Not precise, but mixed; Not causality, but correlation. Big data hides the knowledge and laws of the world and pays attention to related relationships. Big data from different perspectives and dimensions will help to grasp problems more systematically, comprehensively and deeply, reveal knowledge, and provide new ideas for combat intelligent decision support.

In the big data environment, in addition to the static historical big data, University Sports decision-making is faced with a large amount of real-time intelligence, information and data. The emergence of big data has changed the thinking mode and decision-making driving mode of the small world in the past, and has played a significant role and impact on the decision-making basis, knowledge source, decision-making mode and driving mode of decision support system. Big data has transformed the traditional linear, top-down and reason based decision-making model into a nonlinear, uncertainty oriented and bottom-up decision-making model. The decision-making driving mode has changed from model experience driven to big data driven, and the decision-making process has changed from post decision-making to ex ante prediction [3]. It really enables decision-makers to predict in advance, perceive in the process and feedback after the event, which greatly enhances the foresight and effectiveness of decision-making. In application, it is necessary to integrate causality into human correlation, and find hidden knowledge and laws through correlation analysis, so as to make the data "speak".

4 Design of Combat Intelligent Decision Support System Based on Big Data Analysis

4.1 System Design Requirements

College physical education is also full of uncertainty. The physical condition and training information of each student have increased sharply in physical education teaching, and the multi-source, complexity and real-time of data have been greatly enhanced. The university sports intelligent decision support system based on big data intelligence analysis (hereinafter referred to as intelligent decision support) should be able to timely provide the required knowledge at all stages of big data collection, access, processing, analysis and application, and deepen the training situation awareness, Integrate the intelligent cognition of physical education teaching situation, provide big data university physical education intelligent decision support guarantee including the whole process of intelligent decision-making such as the formulation, implementation and evaluation of university physical education decision-making, and realize decision support driven by big data. Specific requirements are as follows:

(1) It can not only process historical big data, but also process rheological big data online and in real time;
(2) It can not only provide global decision support, but also provide decision support for the whole process;
(3) It can not only provide multi task decision support, but also flexibly provide ex ante and ex post decision support according to the changes of decision tasks and environment;
(4) It can be applied not only to the decision support for the static target object, but also to the dynamic university sports decision support.

4.2 Intelligent Decision Support Process

Information and cognition are the basis of intelligent decision-making. The essence of intelligent decision support is the process of analyzing, absorbing knowledge and acquiring wisdom from big data. The process of decision support system refers to the systematic analysis of decision objectives and training situation prediction, putting forward countermeasures and schemes for decision makers to optimize schemes, and finally put them into action [4]. Intelligent decision support refers to the decision analysis of big data intelligence by using appropriate data analysis technology in the whole battle decision-making process through model, knowledge and learning, so as to obtain ideal scheme optimization results and present them to decision makers for selection in an appropriate way. The system decision-making process is shown in Fig. 1.

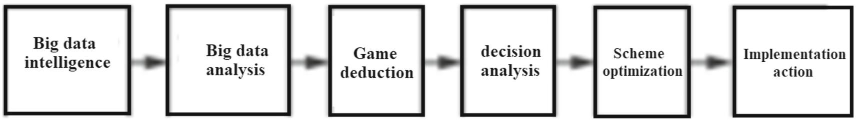

Fig. 1. System decision process

4.3 Composition

The traditional decision support system has continued the n-base structure and three system functional system in terms of composition and functional structure. It can not fully and effectively analyze and process big data, especially real-time rheological big data, and can not meet the requirements of system intelligence. It needs to change the structure, content and form. The decision support system of n-base structure and three system function system is shown in Fig. 2 respectively. In terms of architecture, it is necessary to develop and discard the n-base structure and knowledge-based functional system.

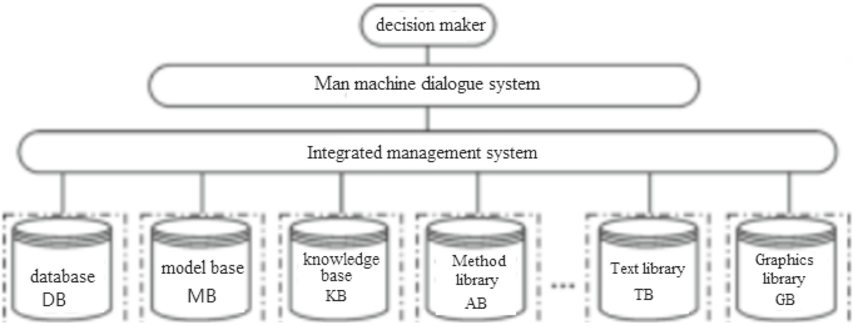

Fig. 2. Decision support system with n-base structure

Based on big data intelligence analysis, the system adopts MapReduce parallel computing and storm stream computing dual-mode cloud computing platform architecture to process static historical big data and real-time rheological big data in time. At the same time, the parallel simulation deduction system is embedded in the intelligent decision support system to form a multi-module and multi-functional hierarchical structure in the cloud computing environment. The top level is the physical training task given by the superior leaders. Physical education teachers form decision-making through the centralized selection of winning schemes provided by the system through the human-computer interaction system (Human-Computer Interface). Matched with it is the problem consultation and interpretation system, which includes intelligence database, expert system and knowledge base, and provides the functions of consultation, interpretation and problem reservation description of the mission, task and implementation scheme of the interactive parties.

5 Conclusion

Aiming at the current demand of intelligent development, this paper puts forward the university sports intelligent decision support system based on the big data analysis technology of extraction algorithm, introduces the big data analysis of extraction algorithm, embeds the parallel simulation deduction system into the university sports intelligent decision support system, and organizes an intelligent decision network for real-time mission and task requirements on this basis, Then an intelligent decision support system for physical education teaching based on big data information analysis is formed. Each intelligent decision support system has different intelligence levels, relatively different application requirements and interactive environment. Therefore, in the construction of specific system, it is necessary to conduct in-depth research on specific scenarios, algorithm design and software application.

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