The Concept and Development Application Prospect of Intelligent Sports in China

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Abstract. The concept of intelligent sports is along with the Internet, big data, cloud computing, VR, AR, 5G communications, artificial intelligence and this new concepts in the field of sports have been put forward with the development of science and technology. Under the background of China's policy of invigorating sports by science and technology, promoting sports industry in an all-round way and building a strong sports country, this paper takes intelligent sports as the research object. By using the methods of documentation, case study, interview and investigation, and mathematical statistics, the paper puts forward the concept of smart sports, produces the background and changes of intelligent sports, the future development, research field, application field and future prospect of sports. Finally, the countermeasures and suggestions for the development of wisdom sports are put forward in order to provide theoretical reference for the development and construction of sports science and technology and intelligent sports in China.

1. Introduction

In November 2008, IBM put forward the concept of “smart earth”, which refers to the integration of human society and physical systems through the integration of the internet of things and the internet, that is, digitalization, networking and intellectualization of human life. In January 2009, President Barack Obama publicly affirmed the idea of IBM's “smart earth”. In August of the same year, IBM issued the “smart earth wins in China” plan, aiming at creating six smart solutions for our country: “smart power”, “smart medical”, “smart transport”, “smart bank”, “intelligent supply chain” and “intelligent city”. In the same period, IBM's “smart earth” strategy has been widely recognized by the developed countries and regions of science and technology such as the United States, the European Union, Japan and South Korea, and many countries have launched their own development strategies. Since then, the term “intelligent sports” has emerged as the times require. It represents a new field of practice and theoretical research of sports artificial intelligence in the Internet era. Although the predecessors derived “intelligent sports” from the concept of “intelligent earth”, at present, the sports circles have not reached a unified view on its essence and concept, and there are few related research materials at home and abroad, so the exploration of “intelligent sports” is still in the initial stage.

2. Intelligent Sports Change the Future of Sports in the world

Intelligent sports will change the future of world sports in the following aspects (1) Change the watching of events and competitive training. Virtual reality technology solves the problem of viewing and training reality at low cost. Provide immersion feeling similar to the scene, improve the long-distance watching experience, achieve a more realistic training environment, solve the problem of competitive sports watching, to reduce training costs, to enhance training simulation. (2) Change the
experience of watching games. The first angle of view of sports, as if in the first angle of view broadcast the game, really in the game leisure place, to see the ordinary people could not reach the perspective. (3) Change the way of watching sports events and data analysis. Competitive big data make the tournament more accurate statistics, more abundant and intuitive data display, make the tournament more interesting and show the back of the tournament. (4) Change the way of organizing events. The Internet realizes the fundamental change of competition organization by gathering mass forces, realizes online competition organization by using intelligent hardware, changes the way of financing, breaks through the restriction of competition venue, realizes more people to participate, reduces the threshold of competition and realizes customized competition. (5) Change amateur competitions and training. Intelligent stadium enables ordinary people to experience the sensation of stars, obtain rich data experience star-like sports video service, obtain real training data, provide event image commemoration and sharing, and establish a training system based on data. (6) Changing the Management and Management of Stadiums and Gymnasiums. Stadium information aggregation, pricing and reservation information aggregation and evaluation, stadium demand statistics, convenient selection, reserved venues, convenient venue pricing and demand matching. (7) Change the sports equipment. Intelligent sports hardware provides more accurate sports data monitoring for the wings of data insertion in sports, realizes stronger sports functions, realizes data-based sports training, facilitates social sharing, and intelligently adjusts equipment according to athletes' status. (8) Change sports teaching. Sport sensation technology provides interactive support for online teaching, realizes real-time feedback of training actions, obtains real training data, provides event image commemoration and sharing, and establishes training system based on data. (9) Change the motion planning. According to the data customization and online generation and tracking of training/diet plan, according to the training program formulated by intelligent hardware feedback, according to the physical data formulation of healthy meal plan, training program is more accurate and personalized, healthy meal collocation is more convenient and scientific. (10) Change exercise to relax. Through the Internet call-and-go sports care, sports care services anytime and anywhere, online personal injury data accumulation, is now the relaxation of sports venues, sports care more targeted.

3. Research on the Concept, Application and Framework of Intelligent Sports

3.1. The Concept of Intelligent Sports

The intelligent sports are “marginal sciences”. It is a modern sports industry that applies the new generation of information technology, sports technology and high intelligence technology to provide intelligent products and services for sports, fitness for all, leisure sports, stadiums and facilities, and to help transform and upgrade. It is also a science and technology industry, cultural industry and transmission. It integrates sports industry, media industry, biomedicine industry and tourism industry. From upstream technology research and development (smart chip, virtual reality, motion capture, holographic display, internet, internet of things, biotechnology, gene detection technology, wearing equipment, etc.), to related sports, fitness, sports entertainment, sports tourism services, as well as downstream hardware equipment manufacturing, software content. Design and production, cloud information big data management and other fields of multi-level industrial chain coordinated development. It is the development of AI and big data technology that promotes the formation of modern “marginal sciences” such as kinematics, pedagogy, psychology, materials science and brain-like information science.

3.2. The Research Field of Intelligent Sports

Firstly, the application of intelligent sports in the development of AI wearing equipment: such as APP watches, APP bracelets, smart watches, smart insoles, smart sports hats. Secondly, the application of intelligent sports in the development of motion capture and analysis system, such as precise analysis of video punctuation technology, motion track analysis, rotation speed and circle number analysis, cause analysis of movement errors, motion success model production, analysis of change track of whole
field formation and track capture of athletes in collective sports teams; initial rise. Motion capture and analysis system (which brings convenience for parents to personally train their children and analyze technology, but the real guidance is still inseparable from sports teachers), video judges (24 cameras) are added to the national track and field championships in 2019 in China; parents of students’ sports performance in some schools in Shenzhen city in China can be determined through mobile phone APP system for Children words and deeds at school, etc. Thirdly, the development of intelligent sports management system for school stadiums and gymnasiums: the management of school stadiums and gymnasiums can be managed visually; specific school stadiums and their instructors, and even opponents can make appointments or reservations through mobile APP; the exercise effect can be diagnosed through the intelligent monitoring system of the stadiums and gymnasiums...

3.3. Application Field of Intelligent Sports in China

Intelligent sports refers to the application of modern information technology such as mobile Internet in traditional sports management and public sports implementation, and in practice, through the deep application of mobile Internet technology in the process of sports reform, in order to comprehensively improve the quality of public sports service, promote the upgrading and development of sports industry, and improve sports governance. The level of physical modernization can better satisfy people individualized and diversified sports needs and realize the intelligent operation system with the goal of sustainable development of sports. The application field of intelligent sports in China is shown in Figure 1.

![Figure 1 The application field of intelligent sports in China](image)

3.4. The Framework of Intelligent Sports

In general, intelligent sports can adopt a five-tier structure, which is composed of people's behavior in sports, Internet of Things, sports database, cloud computing service platform and decision-making system. In the intelligent sports architecture system, people's behavior in sports is perceived through the Internet of Things (mainly including competitive competition sensors, gymnasium sensors, sports fitness sensors, etc.), and then transmitted to the special database of sports (mainly including athletes' database, sports performance through the communication network. Database, sports facilities database, etc) professional analysis, the next step through heterogeneous integration of data into the cloud computing service platform, and then through data mining and analysis to provide intelligent sports decision-making services. The framework of intelligent sports in China is shown in Figure 2.
4. The Specific Application of Intelligent Sports in China

The support of the Chinese government and market access for intelligent sports is the key. Government support: China Wearable Alliance Standards has been issued. In March 2015, China Wearable Alliance organized a closed-door Workshop on China Wearable Alliance Standards. The Alliance initiated the Ministry of Industry and Information Technology to explore the wearable standard system and promote the establishment of industry standards. As a portable wearable product, the guarantee of safety and quality is the most basic requirement. To a certain extent, it affects the development prospects and industry standards of wearable intelligent sports equipment in the future market. Sports market: big data makes sports fitness more scientific. Under the trend of "Internet +", running fitness is endowed with new meaning. Whether it is all kinds of running software or popular running groups in China, it reflects the high fitness enthusiasm of people in the era of big data, and the accompanying data have infiltrated into sports. New values and business models are emerging in the industrial chain. Scientific and technological thinking leads to healthy fashion. Wearable intelligent sports equipment integrates scientific fitness with individual fashion skillfully. Human health data are obtained based on intelligent sensing technology, data processing technology and intelligent interactive technology. Physical movement is characterized by Internet of Things attributes. User data interactive sports mode and living habits are trained. When "science and technology wear clothes", people not only know their health status in real time, but also experience a rich sense of fashion and technology, leading the new trend of health.

4.1. New Business Model of Intelligent Fitness

“Intelligence +” has become a major development focus in the field of fitness. Intelligent hardware and software integration of advanced scientific and technological means such as big data processing, cloud computing, sensor technology can make fitness more planned, targeted and scientific. Especially in the absence of professional coaches to guide family fitness, intelligent fitness equipment and other guidance can achieve the maximum fitness effect. Intelligent Fitness has created a new business model for the fitness industry. Intelligent Fitness Program improves the user experience of the gym through the platform and data capabilities of the Internet. Customers' fitness data will automatically match their identity. In the corresponding APP, users can log in to view their exercise data reports. And the big data background of intelligent fitness will also give scientific fitness suggestions and programs according to the exercise data of users. Apart from the digitalization of the whole process of fitness, all the services of intelligent fitness can be completed online. In the corresponding APP, customers can also purchase the monthly card, annual card or sub-card of the smart gym without filling in a pile of paper materials. Customers can also view online courses directly in the corresponding APP Rio classes.

4.2. Intelligent Sports Industry

In recent years, the national fitness campaign has been widely promoted in the north and south of the Yangtze River. Chinese people's willingness to exercise, recreational awareness of physical fitness and sports consumption ability has been increasing. In addition, the national level has paid great attention
to the development of sports industry. More and more social capital has been invested in sports industry, especially a large number of Internet enterprises. Sports and big health industry, the application of mobile Internet technology to public health services and competition performance services has become a general trend. According to reports, including “Le Ke Sports” and other fitness chain brands will also cooperate with word of mouth wisdom gym. In 2019, word of mouth will upgrade 1000 intelligent gyms in 12 cities such as Beijing. In 2018, the size of the fitness industry in North America reached 32.5 billion US dollars. Among them, in the United States, more than 300 million people have about 60 million paid fitness members, accounting for up to 20%. In China, 18 million members paid for physical exercise in 2017, with a penetration rate of only 1.5%. It shows that the space of fitness industry in China has been greatly improved, and the user experience is constantly testing the retention of the gym.

4.3. Construction of School Intelligence Stadium
The mission of the campus of wise universities is to cultivate double wisdom, that is, humanistic wisdom and IT wisdom. At the same time, we aim to cultivate intelligent and meticulous managerial talents for the construction of wise cities. It is related to the construction of some laboratories and smart cities. At the same time, the school invests a lot of money in the construction of laboratories to build a virtual simulation platform for smart cities, a multi-module integrated experimental platform for smart wear, smart pasture and smart home, a full-functional platform and front-end display platform for the Internet of Things, and mobile application development. Innovative experimental platform; also need the experimental platform of multi-robot cooperative work based on mobile network and so on. When students enter the laboratory, they will understand the application of intelligence and wisdom in urban construction from a macro perspective, then enter the professional courses, learn their own professional knowledge from the shallow to the deep, and finally master a comprehensive application of their specialty in the construction of intelligent city.

5. Conclusions
This paper aims to analyze the concept and development application prospect of intelligent sports in China and the conclusions are as follows:

5.1. Deficiencies
With the rapid development of AI industry, many problems have been exposed. There is still a big gap between China and developed countries in the basic research field of AI. For example, the existence of data islands is still a key factor restricting the development of AI technology industry. Whether in the development of science and technology finance, intelligent medicine or manufacturing industry, data opening and the formation of data ecological advantages are the premise and foundation of the development of artificial intelligence. How to promote the research and development of AI core technology, the further opening of application scenarios, the improvement of data ecological advantages, the innovation of technology platform system, the benign interaction between core industry departments and convergent industry departments, and the formation of talent training mechanism in universities are the keys to the sustainable development of AI science and technology industry in the future.

5.2. Future Prospects
Intelligent sports mainly reflect the wisdom of intelligent sports through three-dimensional perception, management coordination, convenient service and other sports departments. This can continuously promote the development of China's sports industry, improve the physical health of our country, and realize the intellectualization, convenience and security of China's sports industry. This is the only way for the innovation and development of sports in the future. It can also provide support and guarantee for the development of national fitness and the sustainable development of sports in China. In the near future, wisdom sports will be applied to sports in an all-round way, and will eventually enter millions
of households! So let us carry on the heart of exploration, give full play to the wisdom of our sportsmen, help the research and development of intelligent sports by artificial intelligence, and contribute to the development of intelligent sports in our country.

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