Application of Big Data in Sports Science and Reflections

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Abstract. Big data is widely applied in the economic sector, the literary field and scientific research, which indicates that it is a new technology of the times and an effective technical means of information integration, especially for the field of sports science. Its importance in sports is incomparable. This paper discusses the effective application of big data in sports science and sheds a light on the significance of big data to sports scientific research.

1. Introduction

Big data is mainly about the use of computer information technology in carrying out a series of information processing work, and focus of the work is not simple mathematical operation or data counting, but challenging and daunting technical and information tasks. Such a difficult work is beyond the limits of human brain which is unable to the produce an accurate outcome. In addition, through the continuous development of computer systems research, big data has gradually created a new data collation technology, and with the popularization of information, it has been transformed into a large-scale technology industry. Therefore, big data technology not only affects our living habits, but also transforms the social asset development model.

2. Necessity of the Application of Big Data in Sports Science

2.1. Characteristics of Big Data

From the perspective of structure, big data is the combination of several technical components, including information type, data sample, the research object, and result analysis. It emphasizes the relationship between the information and the research object or the impact of data changes on the sample results. In this way, it could be found that big data features apparent integrity and relevance, which means it reflects the variable relationship among data information only when an environment of strong correlation is built. Through the application of big data technology, the traditional workflow and procedures are significantly simplified, making the technology quickly recognized by people and widely applied. In addition, the application mode of big data is unlimited [1].

Specifically, big data is able to provide considerable reliable information for weather forecast, help humans get more knowledge of the weather, and thus make better adjustments to their lives. Agriculture, for example, is the most sensitive to changes in weather, as precipitation and light have a directly influence on harvests. As a result, various large-scale agricultural banks have established advanced data base to collect information, thereby reducing the impact of natural disasters on crops. One thing to be reckoned with is that the application of big data is unpredictable, and the technology has played an indispensable role in information monitoring in sports science. Therefore, a deep understanding of big data characteristics is a must when it comes to the judicious application of this technology in the sports science [2].
2.2. Status Quo of the Development of Sports Science in China

As the data area is developing by leaps and bounds, a lot of sports science researchers have adopted computer data technologies in their own competitions, which helps provide more accurate data for athletes, leading to better efficiency as they find an accurate trajectory of action in the course of training. To be more specific, nothing matters more than the athlete’s own quality during sports training. With good physical quality, an athlete wins more possibilities in competitions, and big data not only pays attention to the technical difficulties of the sport, but also shows the field range, thus providing people with accurate digital information to create a highly simulated game scene[3].

Besides, the information provided by big data is of greater reference value to athletes who focus on technical capabilities, as it reduces the risk and uncertainty of manual calculating. Thanks to the inability of sports researchers to conduct information measurements and environmental simulations of athletes simultaneously, it leads to a quite large confusion as athletes frequently demonstrate a less satisfactory performance during actual competitions than everyday training. Today, big data has been extensively used in sports science and other fields, showing tremendous development prospects and opportunities of the technology [4].

3. Effective Application of Big Data in Sports Science

3.1. The Application of Big Data in the Health Industry

Since the initial establishment of the quality inspection system in China, people have put forward different degrees of requirements for their own health status. For example, people regularly carry out nutritional tests or blood tests, and then they can understand their own physical condition according to the data outcome, so as to carry out the corresponding drug consumption or daily exercise. During this process, the traditional information inspection system has been unable to meet people’s needs in data mastering. They need to establish a relationship with health care on the basis of sample information, so that they can receive early treatment before their body sends a disease signal, thus greatly improving the national health level and finding the right treatment [5].

In addition, when the computer provides physique data, an information connection can be found between the data and the person. This kind of information connection can be divided into three categories. The first is the comprehensive effect of sports data. In fact, it refers that the physical fitness of athletes can be effectively reflected in the actual competition, thus reducing the rate of failure of the game. The second is the uncertainty provided by the data, which does not refer to uncertainty due to unexpected situations, but rather to the possibility that an athlete or other person can perform better under the stimulation of the outside environment or a particular atmosphere. Finally, it’s about the data system calibration function. For example, when people are under an uncertain environment, they tend to make speculation according to the behavior of the subject. However the content and outcome of speculation are often unscientific, resulting in the rise of data risk. Therefore, when applying big data technology in sports science, attention should be paid to the corresponding details, thus making it play a better role in people's daily activities [6].

3.2. The Application of Big Data in Sports Arena

As mentioned above, big data can provide accurate measurement data, and the sports arena can use this technology to create a fair and open playing environment for the participants. Doping is an example. Once the Sydney Olympics, American sprinter Marion Jones was the most dazzling star in the women's sprint at the beginning of the late 90s, having won many important international medals, and people fully recognized her ability and level. She had been a household name sports star for a time. However, with the continuous development of big data technology, the International Olympic Center had gradually strengthened doping testing. As a result, Marion was finally caught in the doping scandal after her urine tested positive. After the reporting of the news, the International Center immediately confiscated her medal and imposed a ban. Through the analysis of the above cases, it could be found that the detection technology of big data is indisputable, and people are also using big data to conduct corresponding analysis and make events and competitions judgments [7].
Furthermore, big data is also frequently introduced in our daily lives. Logistics delivery companies are an example, where they summarize the data and obtain valuable content based on the order information in different provinces, and then draw up customized delivery procedures according to the characteristics of different regions. By so doing, the express companies are able to save more logistics resources in the delivery process while presenting better efficiency. This is a perfect reflection of the advanced essence of big data technology [8].

3.3. Big Data has Innovated the Communication Mode of Sports Science
The network information technology provided by Big Data has promoted the speed of information dissemination to a great extent, and even directly affected the development direction of the news industry. On the one hand, today's sports news is increasingly towards internationalization, and sports figures have gradually turned into sports stars. During the Rio Olympics, many sports figures went viral across the entire network media, and netizens intercepted the live broadcast of the event and the interaction between the participants and the audience and sent the pictures to social media. Thanks to the big data technology, the pictures were quickly disseminated, making the athletes popular across the world. The most obvious thing is that their Weibo fans are no less than the most popular stars, which has brought them a variety of commercial offers. In this process, the mode of sports communication has undergone great changes, and the traditional paper media represented by newspapers has gradually withdrawn from the historical stage, replaced by data technology with new media as the representative. That indicates the information exchange channel of traditional sports science has been disrupted by network integration technologies. There is also a clear awareness of the conveniences and effective technical means brought about by the big data broadcast model [9].

What’s more, big data technology establishes a two-way interactive communication mode for the humankind, abandoning the traditional one-way information feedback model. To be clearer, when people get some information online, they could publish their ideas and opinions on the website platform while collecting information according to their own needs. Meanwhile, the network operators or information publishers are able to get a clear idea of the focus and needs of people through netizens’ feedback and information collection. For example, many news outlets and media have created their own WeChat (Chinese Facebook-like app) public number or Weibo account (China’s twitter-like platform), and people could get what news they want through following those platforms. It reflects that big data technology is both conducive to the innovative development of news spreading and the expanding of people's communication [10].

3.4. Big Data Optimizes Material Selection
In the sports arena, athletes’ achievements are actually very close, with some even showing a difference of a few seconds, which also demonstrates that the overall quality of athletes is in the improvement, and their training levels are also comparable. And why some athletes are able to achieve great success is in part because of their innate attributes. We cannot deny the role of talent, although some athletes have reached a high level through hard work, but they still show a lack of flexibility in some details, which means when the game is in progress, gifted athletes will produce a good performance unconsciously. As this series of behavioral directives are not directed by anyone, so they can burst out great potential during critical moments. Some people may ask: how do you know if an athlete meets the technical requirements of the project? Big data technology will conduct physical analysis of the athletes, and then effectively applied in the course of the sports project based on the characteristics of the project and other external factors. Finally, we will screen out the athletes to carry out scientific samples and establish a mature training program, fully develop the potential of athletes, and stimulate their motor energy to the maximum, thus improving the overall quality of athletes [11].

4. Significance of Big Data to Sports Science Research

4.1. Helps Data Value to Play Its Role
With the popularization of data technology, people pay more and more attention to the information trend of all walks of life, and the holders of data information are constantly refining the expression
models of information content, in order to provide people with more accurate and convenient network environment, so as to improve their value in the era of big data and make people clearly aware of the value and unique role of data. For example, ball games involve hit rates, assists, rebounds and fouls, and normally people focus only on the number of goals and the frequency of fouls, and relatively little attention is paid to athletes who assist or second pass.

Through the comprehensive monitoring of the competition site and multi-angle shooting, big data makes an overall analysis on the athletes. The hidden foul action is also under intensive monitoring, which greatly improve the quality of the game. Back to our normal life, some people who have higher physical requirements for them choose running or other ways for self-management. Those people generally install a data software to record their usual amount of exercise and monitor their diet, and then through the software's calculation method to obtain their own standards of exercise. During this process, it could be found that the scope of application of big data technology is unrestricted. Therefore, people need the right data technology to assist their real life[12].

4.2. Helps to Master Key Information
Before implementing a targeted strategy, people typically analyze specific objects, record various data, and finally implement a series of task plans. However, the results shown in the data includes both important and less important information. That doesn’t mean less important content can be directly ignored, but we can carry out practical activities with the focus on key points.

Specifically, importance should be attached to the data connection that appears in the process, and then focus should be given to the deepening of the connection between the important and less important content, so that the data technology is fully applied in the practical work, thus creating a good data environment for the future information transmission. For example, table tennis, in addition to the need for excellent technology, but also tests the athlete's physical coordination ability, such as footsteps movement, waist and arm strength and serve posture. All of them need to be carefully analyzed. If athletes have good physical coordination skills, they can greatly reduce the energy they consume in the competition, thus helping them to save physical strength. Therefore, we need to grasp the key information provided by big data technology and truly improve the role of sports science in society[13].

5. Conclusion
From the social point of view, the advent of the era of big data is not only an inevitable trend of social development, but also an effective way to meet people's material needs. Big data technology brings us not only the change of living conditions, but also the shift of information communication mode, and it even directly affects the trend of social development. Therefore, it requires further improvement for the work of data technology in the field of sports science in China, thus making sports competition fully integrated with information technology, and comprehensively promoting the development of China's sports cause.

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