

Research on the Applications of Big Data in Modern Football

Zhehan Yang^{1, 2,a, *}

¹ Southwest Petroleum University, China

² Southwest Petroleum University, Nanchong, Sichuan, China

^a236599928@qq.com

*Corresponding Author

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Abstract. Under the background of the prevailing data, the close combination of sports and big data adds wings to the development of sports industry, and the football industry rises rapidly in the sports industry. With the development of technology, football has been surrounded by data, and there are plenty of means to interpret the data. Although the data analysis may not be able to change the competition result, but it is undoubted that the era of football big data has arrived. This paper analyzes the role of big data in the development of modern football, big data promotes the development of football competitive level, expands the football training methods, and sums up the application of big data in the tactical analysis, sports equipment and the athlete selection.

Introduction

The arrival of big data era has profoundly influenced the transformation of human society and culture. The application of big data technology promotes the expansion of modern football training methods and competition practice, improves the innovation of football scientific research methods, and transforms the research paradigm from "metrology paradigm" to "computing paradigm". It also promotes the reform of the communication mode, the communication form and the communication mode present the pluralistic development trend. Big data is gradually affecting the competition on the green field [1]. In the past, the era of confrontation based solely on coach experience and the instinctive reaction of players has become increasingly distant, and the future green field will be closely related to data capture and big data analysis [2]. At present, A large number of athlete data is being collected through sensors and 3D radar, and the extensive application of data analysis is also causing great disruptive changes in the football industry.

The Importance of Big Data in the Development of the Modern Football

Big Data Promotes the Development of Modern Football Competitive Level. All the time, competitive sports refer to the comparison and the tit-for-tat. The reason why the wonderful competition can attract the audience is that both sides of the competition can be well-matched in strength. Football is one of the most concerned sports in the world, and its appreciation is determined by the strength level of the competitive teams of both sides. With the arrival of big data era, every team in the football league can accurately and comprehensively understand the strengths and weaknesses of its opponents and its own players. In such an environment, each team's players can get the most scientific and effective training [3]. At the same time, the offensive means of both sides of the competition will also be more targeted, the intensity of the competition will be naturally aggravated and the competitive level will also be significantly improved. With the continuation of this competitive state, players' physical fitness and skills will be greatly exercised and their competitive level will be improved greatly based on their original level.

The Application of Big Data Technique Promotes the Development of Training Method and Competition Practice of Modern Football. With the emergence of big data operation and the improvement of the ability and means of obtaining data, the establishment of the correlation between the two things has become relatively convenient. A large number of data collection and technical application also help people predict the development law of things effectively. The

infiltration of big data method and technology in the field of football has become inevitable, and the data sensing technology begins to be used in the United States football league.

Big Data will Push Forward the Innovation of Scientific Research Methods of Football. Being influenced by big data, the data collection and the sampling method of the sports quantitative research will firstly make changes. Because of the limitation of data analysis tools, most of the investigation and empirical research in the traditional field of sports education can only be established based on small samples and in a sampling manner [4]. Although the research of random sampling has made great success in the field of sports research in the past and it is also scientific, there are still some limitations in the study of sampling as a whole. With the arrival of the big data era, the determination of the traditional random samples will gradually be replaced by the integral calculation of big data, which will introduce new methods and theories in the field of computational sociology into the field of football science and create new research methods.

The Application of Big Data in the Modern Football

The Application of Big Data in the Analysis of Football Techniques and Tactics. The research on the football techniques and tactics has always been a hot spot in the field of football training. The traditional research methods are mainly on-the-spot statistical method and video observation method, and the selection of technical and tactical indicators is different in different studies, which counts the data manually [5]. The common characteristic is to use descriptive statistical indexes such as score rate, error rate, average, and standard deviation. However, there is little information reflected by the statistical indexes in the traditional research, and the statistical indexes are independent and abstract from each other, which is not conducive for coaches to judging the problems in the training objectively and deeply. The application of big data in football techniques and tactics effectively avoids the above problems and will collect and analyze the data produced in the competition immediately and in time, respond and feed back quickly through the new transmission technology and related data analysis software, which can provide full and convenient scientific research service for coaches and athletes. The main data analysis includes attack situation, shooting situation, defensive situation, the application of defensive techniques, defensive errors, athletes' performance and other aspects of analysis. Through the analysis of big data, it can be concluded the contribution rate of the players in different positions of the team, understand the advantages and disadvantages of the team, and provide some guidance for the follow-up training of the team and the reasonable arrangement of tactics by the coaches [6].

Taking Premier League as an example, all of its football fields are equipped with a set of digital cameras to track every player on the pitch. The 10 data points are collected every second of the 22 players, and there will generate 1.4 million points in the whole game. The analysis software of ProZone, a famous British sports data analysis company, identifies these data as breaking, shooting and passing, making it easier for team managers, coaches and scouts to get real-time analysis results, and know what's going on on the pitch. In training, players are also wearing a device with a GPS tracker, an acceleration sensor, and a heart rate monitor to analyze the performance of their training. Some teams even begin to integrate training and game data with life data, such as diet and sleep habits, to help the team gain more insights from the data and gain a competitive advantage.

The Application of Big Data in Football Sports Equipment. Football big data can be collected by smart shoes, intelligent football, sports vests and other equipment. These devices can also interact with GPS, field-mounted sensors, cameras and other devices. Adidas, for example, introduced smart soccer shoes in 2011 [7]. It can record performance data including instantaneous speed, maximum speed, sprint times, step frequency, moving distance, and running time. Soccer shoes are equipped with special grooves on the soles to assemble speed sensors. The speed sensor can capture 360 ° motion and record the instantaneous velocity, the average speed (recorded every second), the fastest speed (recorded every 5 seconds), number of sprints, distance of movement, distance of movement at high intensity level and step rate. During a game or training, it can store up to 7 hours of motion data and connected with personal computers through wireless. In 2014, Adidas introduced a smart football following smart shoes, using a "6-axis MEMS accelerometer" to

measure the impact, rotation, force points of the ball and providing visual flight trajectory. The sensor, located in the soccer ball, can continuously measure the ball's motion and force and send data back to a smart phone or tablet in real time. The football can be connected to a smart phone application via bluetooth LE technology. The smart football is equipped with a 160mAh lithium battery that needs to be charged with a wireless charging bracket. One charge can be used for a week, or 2000 kicks. Previously, coaches and players could only analyze by visual inspection. After obtaining these data, the coach can train the players scientifically and make targeted adjustment of the players' skills [8]. Even non-professional athletes can use the football to understand their abilities and make improvements. Adidas's application is also equipped with tutorials to help coach and players better understand their skills.

The Application of Big Data in the Football Payers Selection. According to the selection mode of football players based on big data, this paper puts forward the structure of "three blocks and two stores" based on "big data" mode of football player selection. The three blocks refer to the information collection module of big data material selection, analysis module of big data material selection and the index tracking module of big data material selection. Two stores refers to the football player information base and the outstanding campus football player information base.

According to the requirements of the target system, "three blocks and two stores" is built based on the function. The three blocks is the core structure of the football player selection mode based on big data, and it is responsible for using big data to collect, analyze and track the developing and changing information of football players, and make selection judgment. Among them, the information collection module of big data material selection is responsible for the collection of football players' information [9]. According to the different sources of information, these information can be classified, and then summarized by different data interfaces. The analysis module of big data material selection is responsible for the selection judgement of football players, taking the collected index data as the material for data analysis, so as to get the results. The index tracking module of big data material selection is responsible for tracking the development and change of the selected elite football players' selection indexes, so as to analyze the changing rules and conditions. It acts as the correction factor for big data selection analysis module, adjusts and modifies the material selection decision model. In the process of selecting football players, the two stores are based on a large amount of information data to build a database with asset-value information [10]. Among them, the football player information base is responsible for storing all the basic information collected in the process of selecting football players for further selection analysis and other fields such as football teaching, training, and matches; The information database of elite football players is responsible for storing the development information of the selected elite football players and applying this information to the continuous adjustment of the selection mode.

Summary

The arrival of the big data era has made the development of all fields more efficient, and it also makes the information transmission, competitive level and the development of the human environment of modern footballs more rapidly. The greatest charm of the competitive sport is its uncertainty, but the rational "material" of big data seems to add more fun and possibilities to a passionate football match. The influence of modern football makes a new world outside the course based on big data. The data collection and analysis technology of the football match will be widely used in the football league and the youth training at all levels, and provide the data support and scientific help for players' daily life, training and competition, so as to improve the viewing and competitive level of football matches and promote the development of the sport.

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