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Research on Application of Virtual Reality Technology in Competitive Sports

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Abstract

Virtual reality technology is becoming perfecter and perfecter with the aid of computer hardware, software and virtual world integration technology, which can simulate the real world dynamically. The dynamical circumstance can make reaction according to people's form, language and so on immediately, by which a real time communication is formed between people and virtual world. Therefore virtual reality technology has been applied in sports training, competitive sports, etc. and is playing a significant role in competitive sports development. This paper resorts documentation method, professor interview and mathematical statistics to research the application of virtual reality technology in competitive sports concluding analyzing its importance and future development. Its aim is to make scientific breakthrough in virtual reality technology application in competitive sports, which can advance competitive sports development, to advance our country to be sports power and to force people to challenge themselves.

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1. Introduction

The Olympic motto "Faster, higher and stronger" has been encouraging people to challenge themselves. At the first several Olympic Games professors thought that ten seconds is the extreme limit of 100-metre race, but Owens's appearance broke the saying. Smith made the record of 9.93 seconds in 1983, Lewis set a new record of 9.86 seconds on World Athletics Championships held by Japan in 1991 and Bolte—Jamacian flier, broke the record by 9.58 seconds on World Athletics Championship in 2009. With

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the renewal of training methods, more scientific elements are added, which expands people's limit. This paper is to analyze and research the application and function of virtual reality technology in sports, as virtual reality technology is widely applied in many areas including physical area with its important function.

2. Virtual Reality Technologies

VR, short for virtual reality technology, is also called lingjing technology, which is high human-computer interface with its following essential characters: immersion, interactivity and visualization. So how does VR work? It makes use of computer graphics, emulation technique, multimedia technology, artificial intelligence, network technology, parallel processing and multi-parameter environmental sensing technique to simulate people's vision, auditory sense, sense of touch and other sense organ, which makes people immersed themselves in virtual world. Besides the instant interact through language and gesture creates multi dimensional data space for people with wide application future.

VR consists of three essential characters, which are immersion, interactivity and visualization. Immersion means users can interact with computer naturally in the created virtual world like in the real world but not the traditional computer interface. Interactivity is the feature that makes a distinction between VRT system and traditional three-dimensional cartoon. By interactivity users can not receive computer data passively but can operate virtual objects so as to change the world. Visualization makes users get perceptual and rational recognition from combined circumstance of qualitative diagnosis and ration to deepen conception and bourgeois sense. VRT system is composed by professional picture disposal computer, utility software system, input unit and demonstration equipment. Input equipment is mainly composed by helmet indicator, solid earphone, tail after head system and data glove. Virtual circumstance as well as its software is used to describe dynamic characteristics, organization and interactivity rules in detail. Computer system and picture-sound equipment are outer equipment.

With the rapid development of VRT, it is widely applied in many areas such as CAD, simulation modeling, visual computing, telerobot, computer art, advanced technology and conception demonstration, education and training, visual data and model, entertainment and art, design and plan, remote manipulation, and so on. Recently every country especially our country gives many emphases and invests a lot. VRT as a must of sports has been integrated into big sports events such as Olympic Games, and competition stages.

3. Application of VRT in Competitive Sports

3.1 To Build Various Training Circumstance

With the development and increasing appreciation of competitive sports, competition circumstance becomes the decisive element of success. In order to improve sports men's technique many coaches are thinking about how to create a training circumstance which likes the real competition. It is VRT that solves the problem. It can achieve the interactivity of real and virtual circumstance and the real competition circumstance or other training circumstance for example relaxed training circumstance, tight training circumstance and noisy training circumstance. This training method changes the traditional training way and forms interactivity of sportsman and virtual circumstance, which needs techniques, tactics and stamina. The training becomes more real with low hurting rate in warm-up competition and the investment decreases.

3.2 To Create Virtual Opponents

Another characteristic of VRT is creating virtual opponents whose style and technique are all the same like the real opponents through analyzing the opponents' videos and other data. Sportsmen enter virtual circumstance to compete with opponents through three-dimensional solid helmet, data clothes and other peripheral equipment. Here is an example about boxing, in which sportsman can see a boxer fighting in front of him, dodge and fight back involuntarily by a three-dimensional solid helmet. If the sportsman hit the virtual opponent, pressure pickup transmits the force to the sportsman. In this way sportsman can fight with the strongest virtual opponent like in the real boxing ring. It is beneficial for sportsman to get technical, tactics, psychological and physical training and higher winning probability by the combination of VRT and physical training with efficient training effect. Besides sportsman can plan exercise and change their technique according to opponents' characteristics and weakness.

3.3 To Collect Physiology and Biochemistry Index

Physiology and biochemistry index is an important symbol to reflect sportsmen's competitiveness and the base for coaches to master training condition and carry out the next training. Finger finger method is used to collect physiology and biochemistry index, which costs much manpower and time. But the application of VRT solves the problem with the aid of various sense equipment or instrument collecting the index and analyzing the data. By VRT coaches can get a more direct and exact analysis of sportsmen's athletics condition, which ensures proper training or pertinency training.

3.4 To Get Three-dimensional Sports Information

In sports there are lots of invisible, untouchable and dangerous events or action which can only be observed and analyzed from two-dimensional angle by traditional multimedia technology. But the action changes and theories can not be known well from the two-dimensional angle. So we should get people's three-dimensional sports information which can be caught by VRT. People's three-dimensional sports information is action information of every joint's three-dimensional coordinate and angle, which is the key and foundation to analyze people's three-dimensional sports. People's three-dimensional sports information is got through the capture and analysis of sportsmen's technique. Sportsmen's three-dimensional sports information is shown by VRT to seize the point and feature of skill action. Besides we can create new skilled movement by the combination of three-dimensional sports information and sportsmen's characteristics e.g. diving event in China. How can Chinese diving event be the front in the world? Action difficulty and creation is an important reason, for which Chinese diving event has not been caught up with.

3.5 Evaluation of Training Effect

Evaluation of training effect is a significant element for coaches to change training plan immediately and judge sportsmen's endeavor. After collecting daily training information we can simulate the training action on computer by sports simulation system. Then training effect is evaluated objectively to find out his or her progress, weakness and the distance with others by comparing the training simulation with standard simulation, the past training action and the superior's action. Based on the evaluation of training effect and sportsmen's personal characteristics it is possible to make a deep analysis of sportsmen's action and put forward better action plan for the next period training.

3.6 Scientific Material Selection

Selecting talent in support is the basic segment of competitive sports and the key for being the sports power. So every country invests a lot of capital and human resource on scientific material selection. It is scientific material selection including VRT that replaces traditional material selection as it is based on experience and has been out of stage. Various index of every chosen youth and child is tested and the entire data even genetic gene index is inputted to create virtual body which is trained in virtual world and grows with various supposed indices. Then by the research on the index after the action, future body engineering level and kinetism can be evaluated, which tell us the prospect. In the past lots of sports talents were skipped by experience selection in our country, which causes talent waste. We can see the important guidance of VRT on Chinese sports.

4. The Prospect of VRT in Competitive Sports

The prospect of VRT is very wide especially its combination with internet network communication which becomes a forceful advantage. In certain sense VRT as a developing and new technology with wide application will change people's thinking method or even their world, individual and time attitude. Because of VRT it is possible to build pure teleclasses where friends from everywhere can study, discuss and play games together like in reality. Our work, life and entertainment will be more interesting with application of network computer and related three-dimensional equipment.

VRT is being used in competitive sports with great achievement. As VRT is making progress, its scope of application in competitive sports will be wider and deeper, which refers to every sports event and level. It not only has evident influence but also changes people's thinking way of present competitive sports which is tending to be scientific and digital. At the same time VRT is of positive influence on people's unlimite challenge.

5. Conclusions

VRT as a high tech is widely used in competitive sports with evident influence on collecting various physiology and biochemistry indices, getting sports information, building training circumstance, training effect evaluation and scientific selection. So it is becoming more and more important to tackle scientific research on increasing VRT application in sports, which is of great reality importance for Chinese competitive sports development.

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