Summary of Application of Virtual Reality in Sports Simulation

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Abstract. This article uses the literature material method and comprehensive analysis, the present situation of using virtual reality technology in sports are studied, analyzed the role of virtual reality technology in sports, and the necessity of its application in sports. Virtual reality technology as a new type of experimental technology, will be widely used in the field of sports and play its important role.

Introduction

Modern athletic sports are high, difficult, precise, rapid development, this makes the training more with the aid of modern means of science and technology in order to maximize the excavate the potential of people, science and technology of modern sports need to constantly intervention which requires comprehensive use of sports science related discipline knowledge, and using system science, such as system simulation study method to study the inherent law of sports sports system simulation is an experimental science and technology, it is through the computer simulation technology to reproduce the teaching experience of physical education teachers, coaches, training purpose, management organization scheme and the athlete's training process, so as to achieve the interpretation of the sports system [1], analysis, prediction, organization and evaluation of an experimental technology science in recent years, the research focus in the simulation with the object-oriented simulation method, qualitative simulation, distributed interactive simulation (dis), visual simulation, the multimedia simulation, based on the simulation and the simulation of intelligent and object-oriented simulation method, the qualitative simulation, distributed interactive simulation, visual simulation and multimedia simulation methods, based on the simulation of emphasis on a variety of perception, interactive and immersive, etc., and a variety of feeling of many sports training on the need to athletes, such as sight, hearing, touch and smell, etc.) Of participation, therefore, with the further development of technology, the simulation based on virtual reality will be widely used in the field of sports [1].

Virtual reality technology

Virtual reality technology, the image has been called the "spiritual environment", is the use of three-dimensional computer technology to simulate the real environment generated in the space, and by allowing the user a variety of sensing devices "immersion" into the virtual environment, to achieve the user and environmental technology directly interact. As a rising star, VR gradually is superiority and scalability. The virtual reality technology is introduced into the sports field utilization, so that exercise training reflects a more scientific, systematic, innovation [2]. And these three features with many aspects of sports training and competitions at both fit.

a. Immersion: the essence of VR technology is immersed mainly refers to the user feel completely immersed in the simulated environment. As an advanced virtual reality interactive system, is about human interface technology, giving it generates a variety of sensory stimulating environment, let the users to have a "virtual reality" feeling, you must first meet 94 % of visual and auditory [2]. Scream as a simulated environment in football training, through 3D simulation training field scene graph and image library, including background, geography, weather, sports equipment and related personnel, as well as a variety of sound simulation formal arena audio library, such as the audience sound, the sound of the referee whistle, athletes voices, wind, etc., so as to create a realistic arena athlete

environment in which to master pre-configured simulation training standards programs to improve sports skills.

b. Interactivity: refers to the degree of user control carried out in a simulated environment and receive feedback from simulation training degree of synchronization. Produce such human-computer interaction, mainly by means of various specialized 3D interactive device, as in football simulation training, athletes wearing light clothes data, using stereoscopic glasses, the operation sensing gloves, athletes assigned various virtual equipment operation instruction, and these devices can make real-time feedback response [2]. Natural man - machine and human - human interaction is a distinctive feature of the VR system, so you can "exchange" user with virtual systems.

c. Imagine: the VR system reflects the scalability, virtual environment by human imagination constructed by means of a computer, while people immersed in this virtual environment for learning, training, testing, access to knowledge, tactics, effectively improve exercise capacity [2]. In football simulation training, through simulation and virtual training environment sensing equipment and operations, improve the stadium environment, the ball and the opponent's awareness and proficiency to obtain a successful experience, lessons learned from the simulation training, and to improve the actual combat skills.
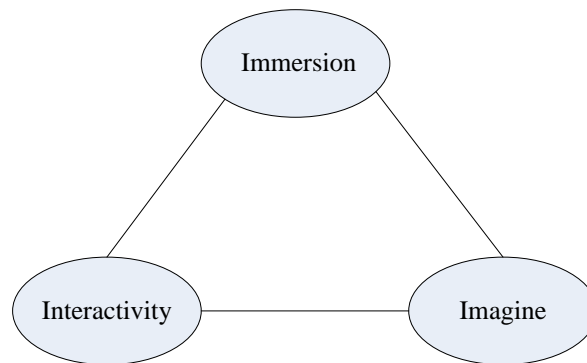

Fig.1 Virtual reality technology

Virtual Reality Physical Simulation System

VR technology has good application prospect in the physical simulation, which is determined by the characteristics of VR technology, VR technology can provide effective for sports workers and athletes, the training of the new method, enlarge the range of application of system simulation, can also promote the development of technology based on physical simulation is the application of VR technology in sports simulation system [3].

Many of the existing virtual environment of the target is to train students in certain circumstances of decision-making strategy, such as the hostage negotiations, earthquake, parachuting, and put out the fire case research on the virtual game developers and various training using a driving simulator study more VR virtual yacht navigation simulator to evaluate the performance of the yacht sailing against the wind, and aircraft maneuvering flight training system is designed and developed, the training system uses tiny accurate model [3], so that the coach can help trainees in performance air maneuvering flight "know where the" coach can use simulation model test of their latest theory, and the trainee to the first new maneuvering flight experience in virtual environment, of course, this virtual spacecraft allowed error, will not bring the risk of injury at present, a virtual environment in terms of fitness and athletic sports training of applied research is less, this is mainly because of competitive sports training and fitness of each performance index of the system requires higher than virtual games, such as the requirement for user friendly interactive, real-time, high precision and strong immersive VR hardware and software technology restrictions also exclusive interactive devices (such as the relatively expensive, existing interaction is not enough flexibility, system real-time performance and precision are needs to improve), these constraints limit the popularization and application in the field of technology in sports simulation technology can be sure that as technology advances, in the near future there will be more and more innovative applications [4].

System composition [3]. A physical simulation system based on VR can be classified into immersion and non immersion sports simulation system immersion simulation system need a low three-dimensional display, stereo glasses, data glove and stereo headphones, graphics workstations and high performance computer equipment, such as allowing users to feel more real stereo vision and stereo audio, natural interactions with the virtual environment (shown in Fig2), can be totally immersed in the virtual environment, like, this kind of system is characterized by expensive equipment, strong immersive. The immersion sports simulation system relies mainly on the software technology to establish virtual world with rich visual and auditory information, its characteristic is economic and convenient.
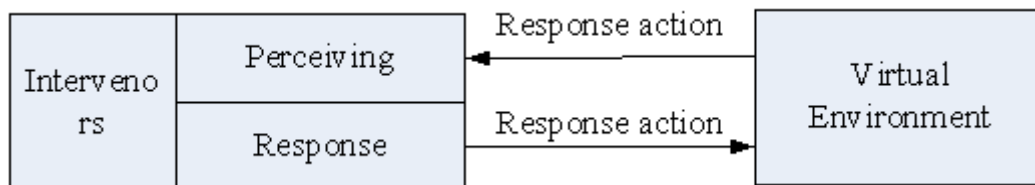
Interveno rs	Perceiving	Response action	Virtual Environment
	Response	Response action	

Fig.2 virtual environment simulation system

Present situation of using virtual reality technology in sports analysis

Application in football teaching. The traditional football teaching mainly through teacher's explanation and demonstration, along with the progress of science and technology of virtual reality technology is applied to the basketball teaching courseware, and in classroom teaching. This not only can complete knowledge of the professor, and professor of to make the action and skills [4].

In the teaching, students can also choose according to their wishes technique to simulate practice, can also according to the requirements of the virtual person model repository technology body language communication. Increasing interest in learning, improve the quality of learning and teaching effect.

The application of backward slide of shot put teaching. Traditional track and field teaching cannot be applied multimedia computer input devices (keyboard, mouse, etc.) to control media images in the "world", the "world" here includes: inside the picture lights, athletes can see everything from the media images, which cannot be achieved at the time of 3 d interaction [4].

Virtual reality technology in the slide of shot put teaching, to be able to demonstrate their technical moves to the life, also can use 3 d interactive 3 d presentation media action movies instead of the traditional technology, respectively presents the complete technology of backward slide of shot put and various technical link and the auxiliary teaching means in the process of technique application, in addition to the implementation technology commonly used interactive function of the film (such as play, stop, pause, fast, slow, fast forward, fast rewind), also can carry on the control model of camera and the player is similar to the 3 d interactive function of the game.

Application in volleyball teaching. The traditional volleyball teaching process mainly through demonstration to the interpretation of teachers, students grasp of the technology under the influence of many factors [5]. And virtual reality technology can provide a new environment for the whole teaching process, such as in the interpretation of the frontal overhand technology, students can make use of virtual reality technology can observe virtual situation, the technique of edge and the virtual human body language communication, feel the power of strength of the body, and order as well as the magnitude of the movement and generate empathy. After such a repeatedly immersive experience, students mastery of techniques will be faster and more accurate [5].

Application in aerobics teaching. Aerobics gymnastics, dance, and musicwhich integrates the pursuit of human health and beauty sports, with high artistic quality. Aerobics teaching, make students not only get the movement coordination and flexibility training, but also to cultivate and develop students' thinking ability. In the traditional teaching, some content is the teacher and students to understand and difficult to describe must master the content. The application of multimedia technology and virtual reality can put the basic action into video information, with a comment, then according to the teaching need feedback action replay [5,6], interpretation, and correct demonstration of the teacher, students of the brain immediately form clear and complete technical movements, the

behavioral essentials can be intuitive understanding, mastering movement is faster, and practice will be more stronger and more active. The discovery of the error and be able to timely, discuss the causes of error action, suit the remedy to the case, to correct.

For boxing, taekwondo and other highly confrontational student favorite sports, in teaching is difficult to avoid the occurrence of injuries, many schools simply do not offer courses. Using virtual reality technology virtual practice is exempt from such concerns [6]. Students in a virtual reality environment, you can safely go and fight virtual opponents, but do not worry about any danger. At the same time it will make the evaluation of the student's actions, pointing out deficiencies, improve training efficiency.

Application of outdoor. Virtual reality technology to expand in the outdoor sports, make the practitioners through the hands of the input device (mouse, keyboard) for human-computer interaction, virtual control, the role of practitioners in marking time [6], displays the virtual characters follow practitioners do marking time, attend the learners to stop, a virtual character also stop, turn to learners direction, a virtual character is turning direction, make the practitioners feel a sense of reality, immersed in the outdoor activity, thus promoting the understanding to practitioners of outdoor activity and learning.

Conclusion

Relying on the advantages of virtual reality technology and scalable for sports simulation training, is not only physical skills training, but also psychological quality, cooperate with the training of comprehensive ability, good psychological quality, skilled technology and tactics in the reality with ease. With the use of virtual reality technology promotion, our country also recognizes the VR technology for the advantage of sport has huge potential, gradually increasing investment. Therefore, by virtual reality technology in football simulation training of feasibility analysis, understanding of VR technology in the field of sports especially the latest application and developing trend in the field of competitive sports, for research to provide certain reference to our virtual training system, and better promote the development of VR technology in China.

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