On the Intervention of Virtual Reality Technology in Sports for the Disabled

Liying Duan[1], Shengtao Wang[2], Zhongyuan Yin[1] and Zhu Li[1]

[1.]Yunnan Minzu University,sport college, Yunnan, Kunming, 650500, China

[2.]Kunming Medical University, Sports Department ,Yunnan, 650500, China

wst020728@126.com

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Abstract: Virtual Reality (VR) technology is a computer "simulated" system that creates and experiences virtual worlds. It is a kind of "fictitious" simulated environment generated by computer. It is also a three-dimensional dynamic scene that uses multi-source information fusion and corresponding interaction, and a kind of simulated system which combines with entity behavior. In the specific application process, users can be immersed in the "relatively real" environment. VR technology has been widely used in the fields of medical treatment, engineering construction, and interior decoration, but it is only conducting small-scale research and trial use in the field of sports. The author explores the possibility and importance of VR technology in the intervention in the sports for the disabled to provide some intellectual support for the development of the sports for the disabled in the future.

1. Introduction

Virtual reality technology, referred to as VR technology, is an abbreviation of Virtual Reality, which is also commonly referred to as Virtual Reality or Spiritual Technology. VR technology is a virtual computer simulated system that can be created and experienced. It is also a kind of simulated system which utilizes traditional and modern multi-source information fusion, interactive, three-dimensional dynamic scene and entity application behavior, which has relative "authenticity". It is a " fictitious simulated environment" that is specifically utilized and relies on computers. The application of VR technology can make users fully immerse in the "real" environment.

VR technology is a new and challenging interdisciplinary and research field. It is mainly composed of simulated environment, perception, natural skills and sensor equipment. It is a combination of simulated technology and computer graphics technology, man-machine interface technology, multimedia technology, sensor technology, and network technology.

2. Characteristics of VR technology

2.1 Reality of simulated environment

The simulated environment refers to the real-time and dynamic three-dimensional realistic image generated by computer. Ideal simulated environments often produce "real" scenes that are difficult to distinguish between true and false.

2.2 The coexistence of multiple perceptions

The perception of ideal VR refers to all perceptions human beings feel. It is also commonly referred to as multi-perception. In addition to the visual perception generated by computer graphics technology, there are also a variety of perceptions such as hearing, touch, force sense, motion sense, as well as smell and taste.

2.3 Interaction of natures

It is mainly give the user the degree of operability of the objects in the simulated environment and the natural degree of feedback from the environment. Specific components include head rotation, e s, gestures, or other human actions. The computer has various instructions to process and execute the actions of the participants, and makes real-time or timely response according to the action or instructions input by the user, and then are fed back to the user's senses.

2.4 Autonomy

It refers to objects in virtual environment correspond to the laws of physical motion in the real world.

3. Feasibility of applying VR technology to sports for the disabled

3.1 To perform sports appreciation

Since most disabled people have a lot of inconveniences in participating in sports, such as communication with the outside world, activities, and even security issues. Therefore, the use of VR technology and the combination of the links of the Internet can watch and enjoy the live broadcast of sports events, and learn all kinds of sports related knowledge including sports culture and history. The use of virtual environment for a variety of sports appreciation can solve the dilemma that some disabled people have action inconvenience. In addition, the disabled can also learn more about sports through VR technology and "touch" the wonderful world outside.

3.2 To ensure the safety of teaching and training

The purpose of conducting research of VR technology is to protect the safety of participants by minimizing the number of injury accidents in teaching and training through VR technology. Students with disabilities can be immersed in a virtual environment and practice simple gestures with voice prompts. During the practice, the virtual reality teaching system can process the mechanical data of their exercises and correct the students' wrong actions through voice prompts to complete the teaching. Because the teaching is completed in a virtual environment, many risk factors will be reduced, and the safety of disabled students and athletes in the sports process will be ensured while reducing the occurrence of injury accidents.

3.3 To simulate physical education teaching and training environment effectively

3.3.1 To facilitate future simulation teaching and training

VR technology is to create and simulate various "real" scenario environments in reality by connecting computers and networks to meet the needs of people's reality. For example, in the process of learning physical education courses, students with disabilities are easily injured due to the different equipment, venues, equipment and environments in different schools. And some students will have some ideological concerns about the learning content they will participate in in in the learning process, and even fear to participate in sports. However, if we simulate the virtual

reality environment and use the virtual "real" scene to conduct appropriate exercises, it can not only avoid students being injured during practice, but also improve teaching equipment, enrich the teaching equipment, and improve the teaching environment and teaching.

3.3.2 To conduct multi-type sports teaching

Physical education for the disabled has a high demand for sports venues, equipment and environment. If it is restricted by one of them, these courses can not be carried out, which will lead to unsatisfactory development of diversification of physical education teaching. For the sake of the safety of the disabled, these external factors and the embarrassment of inability to open courses due to some external factors can be solved by VR technology. Therefore, students' practicing in virtual reality environment can not only achieve the purpose of physical education, but also protect students' personal safety and avoid students being injured again.

3.4 Simulation and pertinence

The virtual environment of VR technology is built and created based on the actual training and exercise environment. Its operating rules are also based on the actual operating specifications in the real environment. Moreover, the virtual reality technology environment has the greatest advantage over the real exercise in reality, that is, it can simulate any training project conveniently, and carry out sports appreciation and watching competitions. With VR technology, athletes participating in the training can place themselves in a variety of complex and unexpected environments. It also provides targeted and specialized training for the athlete's weakest technical movements and fears to enhance the athlete's own psychological quality, their skills and abilities to develop relevant problems.

4. The technical support required by VR technology

VR technology has its own unique sense of presence and interactivity. It mainly simulates human visual, auditory, tactile perceptions through various data such as graphic image technology, multimedia technology and real-world simulation technology. Participants can use simple passwords and relatively professional command and instructions in the illusory world building by virtual reality technology to communicate and interact with real-life communication methods in real time.

4.1 VR scene generation system

It is responsible for simulating the generation of virtual reality scenes so that learners can get intuitive and vivid teaching demonstrations after wearing specific equipment.

4.2 Signal processing system

It is responsible for the collection and output of the instructions and mechanics data of the practitioner in the VR scene.

4.3 Communication system

It is responsible for collecting and processing the uplink and downlink communication of data to ensure the accuracy and real-time of communication.

4.4 Monitoring system

It implements anomaly monitoring of simulator, sensor, communication system, signal

processing system, control system and VR scene generation system.

4.5 Controlling system

It is the master control switch of the virtual teaching system, which is responsible for the operation of each subsystem. Firstly, the VR scene generation system is controlled, and the correct action demonstration and voice explanation data are output from its database to the VR scene generation system. Secondly, the digital signals from the signal processing system are processed and compared with the standard action data in the database, and then the results of the comparison are output to the signal processing system and transformed into voice, which is output to the practitioner. Thirdly, it is the up and down control of the data in the communication system.

Conclusion

With the gradual development and progress of VR technology, its application has begun to transform from high-end to civilian, and is widely used in various fields of current society. Many technology companies have begun to develop and conceive VR products in the field of education. Some universities in China also have some laboratories for the development of VR technology. In the field of education, VR technology has sprung up and gradually formed the standard of teaching. The major domestic technology companies and the VR technology laboratories of universities begin to consider the compatibility of VR technology in the market, which will gradually improve the compatibility of VR products, and enable the VR technology to more adapt to the teaching requirements.

Even though VR technology has been widely used in various fields, the development and utilization of sports in the field of the disabled is still rare. At present, only a few research institutions combine VR technology with sports for the disabled, aiming at solving the problems of teaching, training and rehabilitation of sports movements with difficult motion, complex structure and high risk coefficient. In addition, there are a few examples of the spread of sports appreciation through VR technology. Therefore, it is feasible to apply VR technology to the spread, appreciation, and experience of sports culture for the disabled, and it also has practical research value.

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