The computer virtual reality technology in the application of sports training

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Abstract—**Virtual reality technology with the help of computer hardware and software resources to create and experience the virtual world integration technology can realize the dynamic simulation of the real world,and the dynamic environment to the user's attitude and language command could make a real-time response, making the user and the simulation environment to build up a real-time interactive relationship. With the Key parameters' acquisition from sports technology and the quantification of technology action , we puts forward the application methods of virtual reality technology in the diagnosis the steps of Virtual reality technology :Calibration system posting signs to the tester Motion track's capture the analysis of Collection of data.**

Keywords-computer;virtual reality;sports traniing;

I. INTRODUCTION

Virtual reality is a kind of the computer system which can create and experience the virtual world

It not only can be a real world reproduction it also can be a purely conception of the world.

The operator can use visual, auditory and tactile and interact with it,then, producing " be personally on the scene " scene, so virtual reality technology provides a new interactive media for human-computer interaction .Long-term since, our country competitive sports training technology level is relatively low, has been based on subjective and experience is given priority to teaching and training method, the coach guide them with the naked eye and experience on the athletes' technical movement and athletes master Technical essentials only through many repetitive practice , these are seriously affected our country competitive sports level to the further improve [1]. Therefore, bringing the virtual reality technology in the sports can help athletes control action the technical essentials as soon as possible in training process, reducing blind repeat, greatly improving training efficiency and reducing the possibility of injury, so as to achieve the best training effect.

Human motion analysis is a necessary work of physical education and sports training , a complete technical analysis process is made of observation-analysis-Comprehensive decision.The purpose of human motion analysis is , to get human attributes such as space position, posture and movement speed and three dimensional structure of restoring object in the time-varying image sequence, then make the corresponding interpretation and analysis to the scene in a high level. Human biomechanics research Members of kinematics between quantity and amount of dynamics in the process of human movement ,then design.manufacture and bionic the human body Motion model. Because the human body movement of all action is proceeding in a certain time and space, in order to obtain various data about the human body in athletic process as well as in man-machine work environment , we must use the corresponding test system to capture video sequence image segmentation and to segment the moving target of image and analyse interested target even some Joint movements,then establish the geometric model of human body,and part of the joint motion curves [2] .

II. STUCTURE

A. Functional requirements

- Constructing virtual training scene . According to the specific sports scene to training ,it has specific requirements.
- Motion capture data.Through the sensor tracking equipment directly , we can record the movement of sports entity data and its generation calculation and animation. The biggest advantage of this method is able to capture the athletes (including training instrument) real motion data, thus the effect is very clear, and the scientific training can be guaranteed.
- Physiological and psychological date acquisition. Physiological and psychological indicators are the important athletes' state reaction. According to the different sports ,we can gather the data of the athletes' physiological and biochemical data acquisition through the various sensors and intelligent instrument.
- Action again is the important requirement of the sports system simulation, the traditional camera means can not work smoothly in some conditions.
- Graphic change training effect analysis. It can show the error analysis result error evaluation method through the graphic, and it usually is divided into online and offline type evaluation methods.

B. System composition

Sports virtual reality system can be divided into the immersion and the submerged body simulation system, the former needs effect three-dimensional display, eyewear, data glove, stereo other equipments, the user can feel more realistic stereo vision, hearing, then is able to interact with virtual environment naturally .As a result, the user can completely immersed in the virtual environment. This kind of system characteristic is expensive, the immersive of which is strong; While the latter mainly depends on the software technology to establish a team with rich visual and

auditory information of the virtual world, Its characteristic is economic, convenient and so on.

C. Key technology

- Based on the physical characteristics and physiological feature, we can make models.
  Here, the human body physical characteristics is to point to a human form, structure, quality, and so on; Physiological characteristics contain pulse, blood pressure, lung capacity , the metabolism of indicators , the organs and the system function index.
- Virtual human animation.
  The motion capture technology has the characteristics of high efficiency, sense of reality, and it gets the human body animation researchers attach great importance.
- Motion capture data.
  Motion capture data uses the sensor with three dimensional form record real into body movement, then the computer with the recorded data driven screen virtual human. the biggest advantage of the method is able to capture the true human motion data,. Due to the movement of the formation is basically subject people movement of the reproductions, the effect is very clear, and can generate many complicated movement.
- Real time rendering and interactive.
  With virtual human in virtual physical simulation environment, the real-time rendering and interaction is very important .It mainly refers to the user through the interactive concept of virtual reality interactive devices and system interaction.

III. EASE OF USE

Technology innovation is a lifeline to perform difficult and beautiful competition,however,in technology innovation, if making directly people do the experiment, It would be faced with huge risk of damage. Then, the virtual reality research has special practical significance. The basic train of thought for the following three step procedure: first of all, completing 3D body movement simulation with the aid of Lagrange dynamics equation,with the aid of simulation,coaches teach a new action to make virtual athletes prior attempt to complete the new action, thus maximize reduce the rate of injury when athletes are in the training ; Moreover, proceeding smooth calculation through the neural network learning function, from the perspective of procedural and theorization of the complete computer aided action arrangement and selection [3]; The last, achieving athletes in training and competition video in the true technology, with the aid of video processing software for the simulation of athletes and the actual action action with screen split screen display contrast, this method helps to coaches and athletes hair view technology action of small defects.

In the physical training,computer vision and modern biomechanics are available to construct virtual environment. For example VFW SDK and digital image technology as well as other technology can be used in the gunnery training

to construct a virtual environment where as long as the athletes training according to the usual do shooting action, the computer can determine the aiming point position of each action image exactly with the multithreading technology projection method and the horizontal-interlace technique. What's important is that the virtual environment can make technical analysis. Another successful example of the virtual environment is the 3D human body motion system which was officially put into used in Chinese trampoline team that construct high precision motion capture and analysis through computer virtual environment [4]. And the balance training in virtual environment has been constructed successfully in the State Sport General Administration of sports simulation laboratory. In this environment athletes was trained accompanied with virtual athletes. Virtual athletes do the standard actions. Then their video display on the same screen, and it analyse the movement parameters of virtual athletes and real athletes automatically. So that we can compare the Standard actions from virtual athletes with the recording actions from real athletes visually carefully scientificlly and accurately, and find their difference, record it. Then the athletes can make an improvement from the figures. Especially in the event of 100 meters bar and swimming. During the 2004 Athens Olympic Games,Chinese 110 meter hurdles athlete Liu Xiang armed with a four motion capture technology group. They purchased a motion capture system nearly a million from Germany. In order to record Liu Xiang's daily training and competition, and his main rival Alan Johnson's technical characteristics. Then make image processing digitally, calculate the hurdles time of Liu Xiang, and compared with his rivals' data then will the results and the advice to prove the training back to the coach which made a great contribution to Liu Xiang's success. Because of the virtual environment, they made a great breakthrough.

IV. ASSISTANT TRAINING SYSTEM CONSTRUCTION

Assistant training system construction ,which refers to the integration of the human body biology, human engineering, human physics and light mechanical and electrical integration intelligent testing technology, video processing technology, computer graphics technology, network technology, database, data mining, as well as information technology , gradually research and develop in various sports training system [5]. The most important function of the system is a decision - making function. It can provide valuable information and virtual learning environment for coaches and athletes. And it can also provide a powerful means and guarantee for the sports training process control . Shandong Province rowers training on the use of such a system.Not only do the coaches provide scientific guidance for reference,but also reduced training decision-making blindness. The current state of windsurfing team uses a set of windsurfing talent database and windsurfing pumping training expert system. The system through the Delphi object oriented programming language, the SQL database system, such as potoshoop image processing technology on national windsurfing team and international yachting developed training the training targets, athlete's physical ability, basic technique index contrast to

provide a scientific reference for coaches and athletes. Sheffieik Haiiam university sports scientific research personnel to realize a virtual gymnastics athlete system, this system can guide the real gymnastics athletes improve performance and as far as possible to avoid the hurt. Through to the real gymnastics modeling, the virtual gymnastics athletes accurately reproduce gymnastics athletes of gymnastics, gymnastics athletes help improving technological movements, improve the level of technology. Gymnastics athletes can also be invited to virtual gymnasium in the virtual instrument, see virtual human contact gymnastics equipment is how to change the shape.

V. CONCLUSION

In order to improve the athlete's training effect and athletic achievements, by using the computer simulation system, is the technology of athletes action link detection and tracking of a frontier subject.Computer virtual reality sports simulation has a variety of perceptual ability, thus to enhance the trainees with physical simulation system capable of interacting, improve physical simulation training effect.

Computer virtual reality technology in the sports training simulation application can improve the scientific training level of athletes and sports level, and helps to develop nationwide fitness campaign. The application of computer virtual reality technology can realize the virtual events, to match all the preparatory work of high-tech, computer virtual reality technology in sports training will play an increasingly important role.

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