Research on the Application of Computer Virtual Reality Technology in College Physical Education Teaching

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Abstract. Virtual reality technology is an emerging discipline in computer simulation, and it has been successfully applied in all fields. There is no doubt that the use of this advanced computer virtual technology in university sports will undoubtedly bring huge changes to classroom teaching. This article mainly uses 3D image modeling technology, model drive technology, visual tracking and viewpoint sensing technology and the construction of stereo synthesis technology used on the basis of the new model of physical education teaching of virtual reality technology, so as to supply a secure basis for the improvement of the quality of physical education. Virtual reality technology as a new field of science and technology is the intersection and penetration of many disciplines, set computer graphics, mechanical mechanics, materials, sensing and many other disciplines as a whole, while virtual reality technology has a powerful ability to influence the education model of colleges and universities, it can be said that it has become the most applicable and future hot technology. The model of physical education is very important in college physical education. The traditional teaching model has seriously hindered the progress of college physical education. It is very necessary to find a new model of physical education to solve the disadvantages of the early teaching model, and focus on solving the key and hard question in training.

Keywords: Virtual Reality Technology, Physical Training, 3D Graphics Modeling Technology

1. The necessity of applying advanced technology of virtual reality in daily physical education.

1.1. Avoid the sports damage of high-difficult movements.

In recent years, the technical difficulties in various antagonistic sports are getting bigger and bigger, and athletes are easily injured in the training process because of the high difficulty. In order to avoid this situation, this kind of virtual reality technology is very suitable for university physical education practice, the traditional teaching mode can be changed, virtual action experiments can be carried out
by using virtual reality technology, and students can be shown, so that students can not only comprehensive the difficult or complex scientific actions, but also avoid their own injuries in sports. [1]

1.2. Avoid accidents in sports training.

For boxing, taekwondo and other highly confrontational sports, athletes in training will inevitably suffer some accidental injuries. However, if the computer virtual reality technology is applied to the physical education classroom in colleges and universities, students can avoid the accident and accident in physical education well. Computer virtual reality technology provides a virtual simulation scenario that allows students to release their hands and feet while they train and fully demonstrate action technology without having to worry about accidental injuries. In addition, the more powerful function of virtual reality technology is its ability to measure students' movements, and it is easier than the actual physical education teachers to find out the shortcomings in students' movement skills and correct them, thereby improving the quality and efficiency of athletes' training.

2. The system composition of virtual reality technology.

Virtual reality combines computer graphics, intelligent technology, various image processing technologies and multiple modes, sensor technology and other disciplines, using it can create a immersive, interactive experience with the environment virtual world. [2] Traditional simulation technology cannot simulate human perception of the outside environment, and the new virtual reality to achieve a new concept and new method of human-computer interaction, which means that the external environment of human sensory stimulation has been able to be possible through the computer. (As shown in Figure 1)

![Figure 1. Basic frame graphics of virtual reality technology system](image)

The VR system consists of five modules: a detection module, a feedback module, a sensor module, a modelling module, and a control module. [3]

(1) Detection module: mainly responsible for the user's operating command stoic, and then act on the virtual environment through sensors.
(2) Feedback module: to provide users with real-time feedback, feedback information mainly from the sensor module.

(3) Sensor module: receive the detection module of the user operation command, acting on the virtual environment, and then in the form of various feedback will produce results to the user.

(4) Control module: responsible for controlling the sensor, so that it has an effect on the user, the real world, the virtual environment.

(5) Modeling module: to obtain the real-world components of the three-dimensional representation, the use of 3D graphics modeling technology to form the corresponding virtual environment.

3. The design of virtual technology applied in physical education.

With the rapid development of modern education technology, the formulaic and single traditional teaching mode cannot meet the personalized needs of college students, and will be replaced by the new teaching mode with greater interactivity and visibility. Due to its advanced nature, computer virtual reality technology can simulate real-world behaviours, create a virtual realistic world for users, and use some interactive devices to make it interact with the objects in the virtual environment, so that they can establish real-time interaction between them, what’s even more amazing is how users feel in a virtual environment, touch and experience in the real environment similar, the effect is extremely realistic. Applying virtual reality technology to college physical education, we can provide students with intuitive motion effect through the scientific simulation virtual teaching environment, so that students can grasp the technology and techniques of various sports in a comprehensive way. The simulated virtual physical education environment needs a variety of related technologies, most of which map the multi-dimensional information of the world we live in to computers, and then act on the virtual environment. For users, these technologies can enable them to expand their hands and feet in the simulated virtual environment, any object in the operating environment, breaking through various limitations in the physical sense to achieve "surreal" virtuality.\[4\]

3.1. 3D graphics modelling technology.

The 3D graphics’ modelling process is the foundation in the process of constructing the virtual environment, the 3D graphics modelling technology is mainly to reconstruct the real-world object objects in the corresponding three-dimensional digital space, and different virtual reality systems should have various modelling requirements. For instance, in virtual sports venues, different events can have different requirements for the venue, at this time the modelling data is different. Various weather conditions in the virtual environment are modelled with different meteorological data.\[5\]

In this article, the modelling of virtual athletes is based on the method of hierarchical representation, which is mainly composed of cutis, skeleton and muscularis. VRML and MPEG-4 are two significant standards of human bone structure, and both are representations of virtual human bodies. There is a sub-standard in VRML-H-Anim, which is used to describe virtual human body model . Virtual human representation of the tree. The tree should be the barycentre of gravity of the body as a root node, the child node is a joint, the bone connecting line. If you want to form a complete virtual human model, you need to attach the geometric model of each limb to the corresponding bones. In addition, MPEG-4
is also helpful for virtual human objects, defining face motion parameters FAP and face model definition parameters FDP. Figure 2 shows a hierarchical model of a human tree. Figure 2 shows the skeletal structure of the virtual human body, which mainly uses simple 3D rigid body to represent the bones of the virtual human body, the connection between each other is achieved by joint, it is worth noting that in the bone layer between the parent node and child node does not occur relative movement, only rotation occurs. Figure 3 shows a virtual mannequin that binds bone skin, which is formed by binding the bone layer to the skin layer using the modelling software 3dmax. If you want to make virtual mannequins more realistic, you can borrow Maya software to use its powerful simulation technology to design various parts of the virtual human body, and the lace colour of the garment can be easily realized through the UV coordinates of the garment. (As shown in Figure 2 and Figure 3)

![Figure 2. Virtual human body model after bone skin binding](image)

![Figure 3. Virtual human colour model](image)

3.2. Model driven technology

The model-driven software mostly supplies a page for viewing the 3D model. At the same time, it realizes the control of the 3D model by calling the interface, and completes various functions, including the detection of virtual human force, the matching of the terrain, the adjustment of angle and display effects. In this way, the virtual sports scene under the integration of various input information can really play a role and transmit various real-time information to users.

3.3. Visual tracking and sensing technology viewpoint.

Using the image array from the camera to the plane array, the projection of light at different times and
positions in the image plane is used to calculate the direction and position of the tracked object. Among them, viewpoint sensing and display technology must be combined, and then using different positioning methods to confirm the line of sight of the user at a particular time. The positioning methods are more common in remote vision technology, helmet display and eye mask positioning.[6]

3.4. Teacher-student interaction, inquiry into doubt.

This link should choose the question of inquiry value, organize students to explore interactively. Teachers should give full play to their dominant position, pay attention to all students, pay attention to teaching on merit, hierarchical guidance, respect the personality of students, encourage bold questioning, and create a democratic, equal and harmonious atmosphere of inquiry.

3.5. Stereo synthesis technology

Stereo synthesis technology is mainly to let users experience realistic hearing experience, the user's location changes, the effect produced by the technology is not the same, so that users can experience the atmosphere of the real game.

4. Conclusion

Virtual reality technology is widely used in sports in major universities and colleges, and it basically uses this technology to build interactive and visual learning situations. In this case, sports athletes can get a nearly real experience, And can learn sports knowledge and skills faster and more intuitively, so the quality of training and sports skills can be guaranteed.

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