

Research on Reform and Practice of College Football Teaching Mode Based on VR Technology

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Abstract: This article uses literature method, experiment method, expert interview method and other research methods to analyze the problems existing in the traditional college football teaching model. The research finds that the traditional college football teaching model is limited by time and venue; Students learn passively and lack motivation; Problems such as insufficient integration of teaching media and practical teaching. And on this basis, it analyzes the necessity, feasibility, effectiveness and functional advantages of introducing VR technology into the reform of college football teaching mode, and puts forward a plan to apply "Internet + VR" to reform football practice teaching, and try to implement VR football The development and construction of the experimental teaching project system and the simulation football teaching and training visualization system are hoped to provide new construction ideas for the reform of the football teaching mode in my country's colleges and universities at the theoretical and practical levels.

1.Introduction

In 2018, the General Secretary proposed at the National Conference on Education Work that we should persist in deepening education reform and innovation. In order to promote the development of higher education, the Ministry of Education proposed that the national virtual simulation experiment teaching project should be student-centered. The Ministry of Education has also made it clear that it will identify about 1,500 first-class courses of virtual simulation experiment teaching in the country within three years^[1]. The state's attention and support promote the construction and development of virtual simulation experimental environment in our country. With the more and more extensive application of virtual reality technology, it has developed into a comprehensive interdisciplinary subject^[2]. The introduction of VR technology in college football classroom can establish tactical training scenes, improve learning efficiency, form a multi-dimensional interactive information learning environment, and promote the development of college football teaching reform.

2.Overview and Application of VR Technology

2.1. Overview of VR Technology

Virtual simulation builds a virtual world through a computer system, and users can interact with it using a

variety of sensing devices to create a sense of immersion^[3].

2.2. Application of VR Technology in Various Industries

The progress of society and technology has promoted the development of virtual tourism. Vanto, for example, uses the Internet and VR technology to create an immersive travel experience through on-site measurement and on-site photography^[4]. Some large enterprises have also applied virtual reality technology to promote the development of enterprises^[5].3D simulation, digitization, information technology and network technology have been integrated into every aspect of campus life. In addition, VR technology is also applied to education fields such as aerospace, machinery, medicine, art, and sports^[6].

3. Problems in the traditional college football teaching model

The traditional college football classroom teaching has problems such as limited venue resources, constraints by time and other factors, low per capita utilization of teaching resources by students, and inability to meet students' practice and review needs, which reduces students' learning enthusiasm and also restricts the improvement of teaching quality and effect^[7].

Traditional teaching makes students learn passively, with poor results. Introducing VR technology into college football classroom teaching can enhance students' sense of interaction and experience, effectively stimulate students'

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active and initiative in learning, and establish a new teaching model that changes from "passive" to "active" and "student-centered" [8].

Multimedia teaching is integrated into college football course teaching, but the teaching method is single, the interactivity is low, it does not cover the entire teaching process, and the integration of teaching, teaching tools, practice space, and practical teaching is poor. Planar teaching aids are difficult to reflect the complexity and competitiveness of football, and teachers need to actively guide and match VR and other multimedia teaching resources in practical teaching. [9]

4. Analysis of the Reform of the College Football Teaching Model with the Introduction of VR Technology

Under the guidance of teachers, students learn knowledge concepts and action elements through visual three-dimensional models and interactive experiences, improve students' communication and cooperation ability and professional competitiveness, and meet the development needs of the industry and society [8].

5. The reform and practice of college football teaching mode using VR technology

5.1. Application of "Internet +VR" reform practice teaching

The VR experimental course of football teaching, training and awareness cultivation will be developed based on the Unity3D engine, and will be adapted to mainstream VR and AR wearable devices. This course is designed and implemented around three parts of football passing, technique and tactics, which can improve students' passing awareness, decision-making ability and overall coordination ability. After the experiment, the system will give a comprehensive assessment of the students' performance. The construction of the course network facilitates the use of students and teachers.

5.2. The overall architecture of the VR football experimental teaching project system

VR football experimental teaching relies on multimedia, network, and computer simulation technologies to construct a virtual simulation teaching and experimental platform with functions such as physical simulation, innovative design, and intelligent guidance. Figure 1 shows the overall architecture of VR football experimental teaching system and the project operation architecture is divided into five levels, with the lower level providing services for the upper level [10].

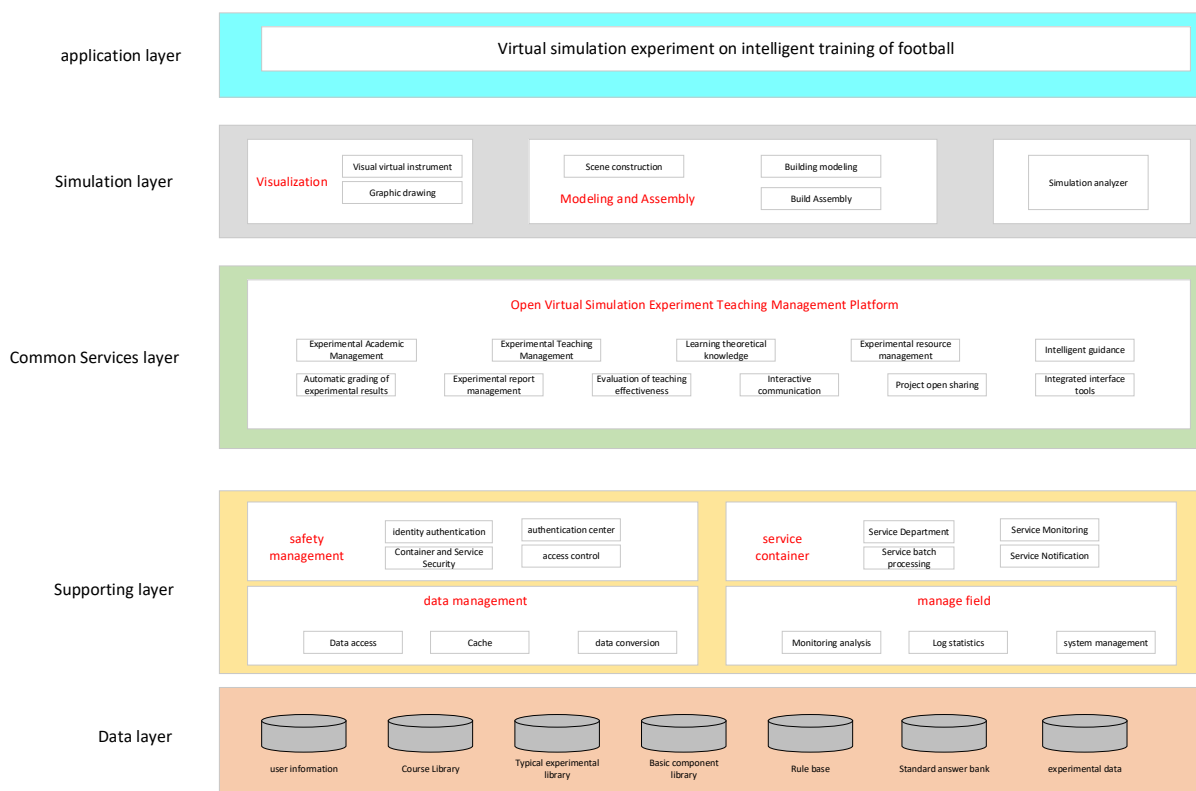


Figure 1 Virtual football VR experiment teaching system overall architecture

5.3. Construction of the Visualization System for Simulation Football Teaching and Training

5.3.1. Construction of the Visual Simulation Module

5.3.1.1. Construction of the Virtual Football Field

Figure 2 shows that the construction of the virtual visual simulation module of the football field is completed by using physical hardware and software such as 3DMax



Figure 2 Virtual football field

5.3.1.2. Construction of Human Dynamic Model

Using 3DMax, digital human and other technologies to construct human dynamic models, digitizing the human body structure and presenting it on the computer screen, digitizing the results of human functional research, and

assigning it to the virtual human form framework. By intersecting and integrating virtual reality technology and the operator's control, the "virtual human" mimics real human movements in the football field, and sets up feedback devices that provide real-time perception of vision, hearing, touch, etc.^[11]. As shown in Figure 3.

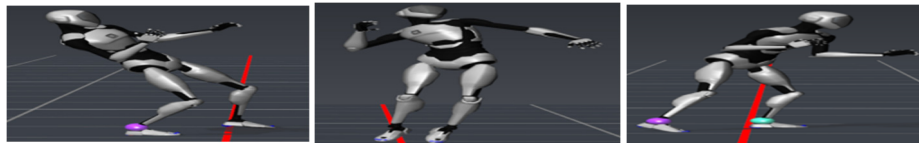


Figure 3 Human Dynamic Model

5.3.2. Construction of the Motion Control Module

5.3.2.1 Human Collision Detection

Enable the Unity application. In order to prevent objects from penetrating each other, collision body properties need to be added to the human body in the scene to prevent objects from penetrating. As shown in Figure 4.

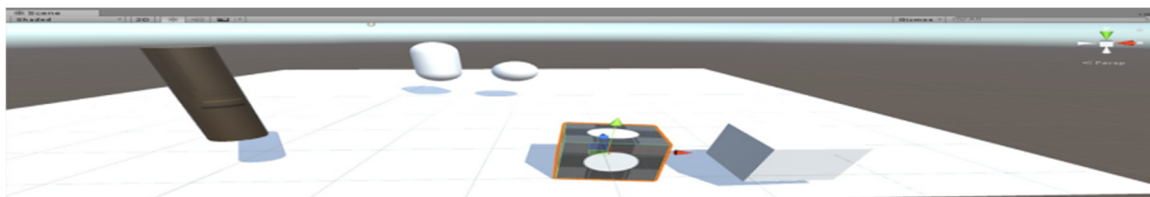


Figure 4 Adding collision body properties

5.3.2.2. Character Motion Capture

The principle of the motion capture system is to attach sensors to the bony landmarks of the human body, measure

the kinematic and dynamic data of the marker points through the sensors, transmit the data to the computer, receive and further process the data, and then input the human model to drive the model, so that the three-dimensional animation is reproduced in the computer. The workflow is shown in Figure 5.

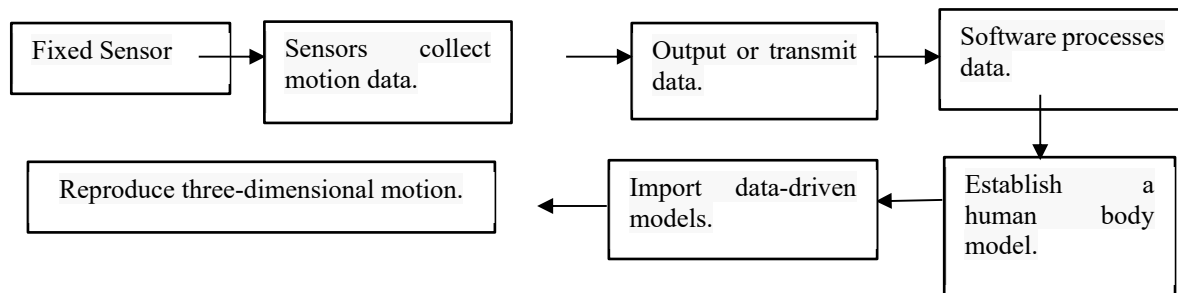


Figure 5 Workflow of Motion Capture System.

5.4. The continuous reform, construction and service plan of VR technology-based college football teaching mode.

After completing the VR, digital human, and AR-related construction content of the course, we will further build the course website. The content will be available to school teachers, students and the general public. To provide teaching guidance and practice for the development of national football. Solve the limitations of football teaching venues, personnel, teachers, funds, etc. This course and experimental content can be extended to primary and secondary schools and higher vocational colleges to promote national fitness, improve comprehensive football awareness, and help the implementation of national fitness plan and the construction of sports power.

6. Conclusion

There are shortcomings in the traditional college football teaching mode, and students' adaptability and on-site decision-making ability cannot be effectively improved. Using VR virtual reality technology, football tactical training scenarios are established for emergencies in competitions and training to enhance students' adaptability and psychological quality. The intelligent guidance and automatic correction functions of the VR teaching platform are utilized to enhance the open service ability and implementation effect of experimental teaching projects. With the support of modern virtual reality technologies such as VR, the reform of college football teaching mode will surely achieve greater breakthroughs and development.

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