



The Application and Improvement of Virtual Reality Technology in the Field of Pension

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Abstract. With the rapid development of science and technology, virtual reality technology has been more and more deeply into People's Daily life, and more and more important. At present, the aging problem of our population is becoming more and more serious. In order to respond positively, we should increase the support of the aging group and promote the development of the aging industry. The use of virtual reality technology for elderly care can not only provide technical support for the elderly, but also improve their service quality, improve their living environment, and bring them more happiness and happiness. On the basis of reference, combined with the proposed 3D data transmission technology, this paper develops a set of virtual reality pension system for the elderly industry. The system uses 3 Dmax, Unity, HTC Vive and other mainstream software, model creation, environment rendering, virtual reality interaction, and carried out a lot of experiments, the results show that the system can meet different application scenarios, but also can meet the needs of users [1].

Keywords: Virtual reality · population aging · indoor big scene · three-dimensional data transmission · VR pension system

1 Introduction

According to the 7th census released in May, the proportion of people over 60 years old in China is 18.70 percent, an increase of 5.44 percent year-on-year. Among them, the elderly over 65 accounted for 13.50%, indicating that our country has entered the aging society [2]. In order to realize the long-term development of Chinese economy and society in the future, we need to analyze the current issue of the aged and its influence on the aged, adopt appropriate countermeasures and policies, and actively promote the work of the aged. At present, Chinese pension services can be divided into daily life, financial management, health management, medical treatment, tourism, spiritual and cultural, legal, palliative care and long-term care services, and the combination of modern science and technology and pension services, is an inevitable trend to solve the aging problem [3].



Fig. 1. Virtual display, augmented display, and mixed reality



Fig. 2. OculusQuest2 Hand tracking effect

2 Review on the Application of Virtual Reality Technology in the Aging Background

In the field of virtual reality, VR is often combined with AR and MR, which contains many different concepts, as shown in Fig. 1. Every coin has two sides, and VR and AR are equally applicable. AR technology projects virtual objects into the real world, and projects real things into real life through AR technology. VR technology is an innovation for the purpose of virtual reality. AR technology is to use a variety of sensors, such as image sensors and laser sensors, through the relevant artificial intelligence technology, the accurate positioning, and then 3D rendering, just as the camera is the eyes of people, through the “eyes”, the real world, restore to reality. The development of VR technology is just the opposite. This paper discusses the concept of virtual continuum and the types of visual display [4]. As shown in Fig. 1:

In terms of its hardware, OculusRift is a representative head-mounted display (HMD) device that popularized virtual reality, and “OculusQuest2 (Fig. 1)” is the version of Bluetooth without connection. Cables are considered one of the drawbacks of helmet-type virtual reality devices. The “OculusQuest2” also includes hand tracking, which identifies the hand shown on the right in Fig. 2 [5].

3 Research on Fast Model Transmission Method Based On Indoor Large Scene Reconstruction

With the rapid development of virtual reality technology, 3D content storage, transmission, rendering and so on are a new research field. Large - scale 3D model is a key technology in the field of virtual reality. According to the specific needs and demands of

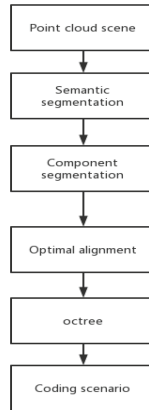


Fig. 3. Technical route of large three-dimensional point cloud scene flow model based on semantic classification

the elderly, an efficient algorithm suitable for indoor large-scale three-dimensional point cloud data compression is designed. Firstly, the deep learning technology is adopted to realize the component decomposition of point cloud data. Finally, the alignment method is optimized, and the mathematical model of octree is obtained, which completes the three-dimensional classification of objects. As shown in Fig. 3:

Due to the unordered nature of point clouds, there are three key issues in the processing of point clouds: how to aggregate local and global information, and how to design a shared alignment network. Then, 3D object classification, partial segmentation and scene semantic segmentation can be carried out effectively. Use symbols M said a large 3 d model, formula is as follows:

$$S_i = \text{PointNet}(M), \quad i = 1, 2, \dots, n \quad (\text{Formulaone})$$

$$M_j = \{P_i S_i = j, \quad i = 1, 2, \dots, n\}, \quad j = 1, 2, \dots, t \quad (\text{Formulatwo})$$

Here t represents the number of semantic classes. The semantics involved in these points are the same. Then, the composite pattern is further separated for redundancy analysis. Since the density of a single object in an image is often much higher than the average density of the whole image, Mean-Shift method is used to carry out density-based parameterless clustering. As shown in Table 1: Look at Fig. 4 [6].

4 Virtual Display Pension System for Elderly People

The system uses 3D Max technology, based on the models needed to construct the scene, through 3D scanning technology, to quickly model each model. dsMax has the following advantages [7]:

- 2) 1) Rich in functions. It can help modelers, renderers and designers create three-dimensional images that are widely used in media, advertising and entertainment.

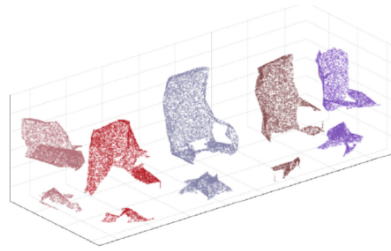


Fig. 4. Component separation of objects labeled “chairs” after being divided into separate models.

Table 1. Octree Structure Diagram

Models	Point	Box	Timing	Box	Timing	Box	Timing
Beam	5193	100	0.0032	50	0.0048	10	0.0163
Chair	7479	100	0.0068	50	0.0131	10	0.0474
Table	11650	100	0.0172	50	0.0158	10	0.0615
Chairs	14415	100	0.0191	50	0.0244	10	0.0951
Room1	442368	500	5.5776	100	30.4352	50	67.4987
Room2	796826	500	24.5327	100	103.5723	50	154.7326
Floor	41353055	10000	312.0544	500	631.6314	100	2888.8581

2) Good compatibility. Part with Windows system has good compatibility, compatible with Mac operating system, and in 2010201, 1201, 2201, 2201, 2201 three third edition compatible with Mac operating system. In the functional test part of the system, the functions of each module and the virtual scenes included are tested, and all their functions are listed in Table 2 [8].

Figure 5 respectively give the functional details test of the forest and beach scenes included in the relaxation module. Among them, the forest scene is mainly presented as the environment similar to the forest park, not completely belong to the pure broken

Table 2. List of functional tests

Test point	Interactive instruction	Ideal result	Test result
System operation	Turn on the system	The main interface for selecting modules is displayed	Success
Soothing module	Realize the functions of each scenario in the module	Screen and music play normally and can return to the main interface	Success
Training module	Realize the functions of each scenario in the module	Voice commands broadcast normally Timing correct Difficulty adjustment normal Limb tracking accuracy You can return to the main screen	Success



Fig. 5. Forest scenario test

forest, where users can walk freely or follow the line set by the system for sightseeing, so as to achieve the soothing effect [9].

5 Summary

Based on the current situation of the serious aging of the population in our country, the innovation and development of the pension industry relying on and combining the current virtual reality technology will be helpful to the pension service of the elderly groups in our country. Through a comprehensive analysis of relevant fields at home and abroad, this paper draws a conclusion that virtual reality technology can be better applied to the life of the elderly. However, the elderly in real life are often confined at home, unable to communicate with the outside world and unable to return to their homeland, so it is necessary to reconstruct virtual reality in the virtual world [10].

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