Research on Design and Experience of Immersive Virtual Reality Psychological Relaxation Game Based on Image

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Abstract. With the continuous progress of digital media technology and the rapid development of the game entertainment industry, people have put forward more demands on the display mode and immersion of games. Immersive stereoscopic display game based on game engine supports multi-machine and multi-projection display under various display environments, and has good stereoscopic effect and immersion feeling. The effect of psychological relaxation is highly related to immersive virtual reality environment. The relaxing effect in immersive environment is better than that in non-immersive environment. The more immersive the environment, the stronger the sense of presence, and the better the relaxing effect. With the improvement of virtual reality technology and the popularity of equipment, it provides a convenient and feasible way for the general public to obtain self-discipline of psychological relaxation. The effect of psychological relaxation is highly correlated with the immersive virtual reality environment. The relaxation effect in the immersive environment is better than that in the non-immersive environment. The more immersive the environment, the stronger the sense of presence and the better the relaxing effect.

1. Introduction

With the continuous progress of digital media technology and the rapid development of the game entertainment industry, people have put forward more demands on the display mode and immersion of games. Virtual reality system is a real-time three-dimensional space generated by a computer, in which users can move freely, observe the scenery at will, and interact with virtual objects through some special equipment, thus having a feeling of being personally present [1]. Compared with the traditional media form, the media content conveyed through the unique interactive mode and presentation mode of virtual reality may cause users' special media use experience [2]. In the early stage of virtual reality technology diffusion, games are the most important application mode of this technology. The unique experience and wonder of its technology have injected new possibilities into the game industry. Modular design can shorten the modeling time when building images, reduce the workload, and shorten the loading time of loading images, models and other resources [3]. For a long time, one of the psychological relaxation methods is to guide the user to imagine. By guiding the user to relax various parts of the body, the association allows him to produce a quiet image. It requires the user's own brain processing, and everyone's own cognitive construction is different, naturally think differently [4]. Virtual reality games can bring immersive effects to all aspects, avoiding the hassle of users' own imagination. How to enhance the immersion of the game image, better show the sense of presence in
the virtual world of the game, and enhance the fun of the game has become one of the focuses of research and industry research at home and abroad [5].

Virtual reality system is different from any previous system. It is a system in an unfinished state. Only when someone is involved and someone interacts with the system can it be counted as a complete system [6]. The parallel rendering game system based on virtual reality system has higher requirements on the efficiency of communication protocol in multi-node and large data volume transmission [7]. Therefore, it is necessary and necessary to analyze this system from the human aspect. This not only affects our understanding of the world, but also affects the development prospects of the existence of technology itself [8]. Virtual reality systems usually only need to synchronize a small amount of data such as camera parameters and object positions, and the more complex parallel drawing game system needs to synchronize a large amount of data such as game animation, random number, and game object state [9]. The invention and use of each technology is to satisfy a certain desire of human beings, and the ultimate goal is to obtain great pleasure in the body [10]. People pay attention to the connotation, culture, and core values behind consumption rather than pure quality and function. The application of virtual reality technology meets the needs of the experience economy for sense, interaction, participation, and personalization. With the improvement of virtual reality technology and the popularization of equipment, it provides a convenient and feasible method for the general public to obtain self-discipline of psychological relaxation [11]. Virtual reality technology helps people alleviate negative emotions such as anxiety and anxiety, learn relaxation training, and strengthen their awareness of mental health.

2. Theoretical Research on Immersive Virtual Reality Psychological Relaxation Games

In order to understand relaxation and its corresponding tension, we must first understand the composition of the nervous system, which includes autonomic nervous system and non-autonomic nervous system. We can control the movements of various parts of the body through the will of the brain, which is the autonomic nervous system. When we are in the state of anxiety, fear or excitement, the sympathetic nerve will become active, making us aware of changes in the body, resulting in dilated pupils, faster heartbeat, sweaty palms, dry mouth and tongue [12]. On the contrary, the relaxation state is a behavior dominated by parasympathetic nervous system, with low level of psychological arousal, stable mood, and calm and stable body and mind. When a person perceives a movie work, only visual perception and auditory perception play a role, and other perception methods cannot play a role [13]. In addition, the size of the characters in the film is very different from the actual size of the characters, so the immersion is not strong. In virtual reality technology, physical experience is a fundamental technical philosophy. Because virtual reality reshapes the body's alternative experience through the comprehensive re-creation of sensory experience, it can lead to discussions about the technical subversion of ontology. In a relaxed environment, the trainer is guided to a relaxed posture. Under the guidance of music videos and professionals, the trainer gradually imagines the release of pressure in a particular relaxed image.

Immersion refers to the degree of reality that users feel when they are in a virtual environment. However, the ideal state pursued by immersion virtual reality technology is to make it difficult for users to distinguish the true from the false and devote themselves to the virtual environment. Due to the development of its sensing technology, complete immersion becomes possible. Generally speaking, systems that can be called immersive virtual reality have a strong sense of immersion. The recipient and the system are surrounded by each other, and the user is completely in the system and becomes a part of the system [14]. Compared with the traditional virtual reality engine, the game engine provides developers with powerful functions such as image rendering, physical engine, sound effect, computer animation, artificial intelligence, etc. Through a series of visualization tools and reusable components, the development efficiency of developers is improved and the complexity of game development is reduced. Games are the mass media, and games are the extension of group perception. The game should not and need not stick to a unique definition, but it can be summarized as an activity that requires at least one player, has certain rules, and has a feedback mechanism.
The strong immersion of virtual reality games greatly narrows the psychological distance between users and systems. The consciousness of the recipients is completely immersed in the virtual environment and is separated from the real environment. This is also the effect that the previous technology can't achieve. After the user selects a road, he can query its properties in the attribute information bar on the right. In the second and third-dimensional modules, the road or place name can be searched by name to make it centered. Usually, the construction of the bounding box hierarchy tree is completed offline in the preprocessing stage, and the time overhead is not taken seriously. In order to improve the speed of solving problems, the optimization of various situations is often carried out at the cost of constructing the hierarchical tree. Virtual reality simulation modeling improves the simulation degree of the 3D model by using texture techniques and the like, and the modeling is shown in Fig. 1.

![Virtual Reality Modeling](image)

Figure 1 Virtual Reality Modeling

One of the major characteristics of immersive virtual reality is the sense of presence, which is different from immersion. Presence refers to the feeling that exists in a virtual environment, that is, in an external world that is distinguished from itself. Existing immersive display game systems divide the images of the game world into game object state images and game event images, and realize parallel rendering by synchronizing the game object state images and game event images. The goal pursued by virtual reality technology is to make users not feel the real external physical environment they are in, but in the computer-generated three-dimensional virtual environment [15]. Through technology, users have a real sense of integration into the virtual space and can interact with various objects in the virtual environment as in the real world. Immersion is a concept very close to presence or telepresence. Immersion is a technical term used to describe the occurrence of presence. Presence is highly related to immersion. An environment with a high degree of immersion can create a high sense of presence. The presence of a helmet-mounted display is higher than that of a desktop display. The server side completes the basic functions of the whole game, including receiving player input, executing game logic calculation, etc. At the same time, synchronous images are extracted from the game object state and sent to the client node. The client node updates the state of the local game world by receiving and analyzing the synchronous images of the server, and completes the drawing and display functions of the game images.

### 3. Design Principles of Immersive Virtual Reality Psychological Relaxation Games

3.1 Virtual Reality Game Acts on the Framework of Psychological Relaxation

Virtual reality technology is also an emotionally induced method. The virtual environment simulated by virtual reality can induce specific emotions. The positive virtual environment can induce positive emotions, and the negative virtual environment induces negative emotions. Emotions can influence the sense of presence, and the virtual environment that can induce emotions can deepen the user's sense of presence than the neutral virtual environment. This environment is more natural, convincing, and participatory. In the use of technology to improve people's physical and mental health, although the reality of virtual reality can not replace the real nature, but for those who are not convenient to go out to feel the real nature of the people, it is very beneficial to face a large number of complex games in the game world. Object state and game events, game developers are very likely to inadvertently cause
inconsistencies in the transmission and reception of game object state data or game event data, resulting in a stuck phenomenon in the entire game operation or even the entire game system rush [16]. The visual presentation of relaxed images enhances the participants' relaxation skills, especially in the immersive virtual reality. The virtual natural environment has a significant effect on relieving anxiety and relaxing. In such an environment, users receive visual, auditory and even tactile sensations. The high-fidelity stimuli can get a high sense of presence.

The art of virtual reality design has changed people's demand for spiritual life in terms of storage, browsing and audiovisual forms. It has also changed the way people think about the world and the way they think. The first development in virtual reality technology is geometric modeling, geometric modeling to deal with the geometric and shape representation of objects, and to study the basic problems of graphic data structures. Analyze its path density, number of nodes, and center potential. As shown in Table 1. As the path density increases, the shortest path between nodes increases. As shown in Fig. 2.

| Network            | Path density | Number of nodes | Central potential |
|--------------------|--------------|-----------------|-------------------|
| Encounter information | 1225         | 2522            | 0.737             |
| mutual information  | 2237         | 2638            | 0.564             |
| Weighted summation  | 532          | 3257            | 0.421             |

![Figure 2 Path Density And Node Path Relationship](image)

Immersive virtual reality system is a completely open system. The user is a part of the system. The system can be completed only by the user's behavior. The work is in an unfinished state and needs to be completed jointly by users, so there is no problem of one-way transmission, but complete multidirectional transmission and real-time feedback. The server first reads the object state or event information defined in the game world, and encapsulates the information content according to the structure of synchronous object information. The client first reads the data of the receiving buffer area, and then receives the synchronous data sent by the server when it is found that the data length to be read exceeds the data length of the receiving buffer area. The analysis of the traditional interface will find that the traditional interface interaction is less, and the products are in the finished state, which is not conducive to the production of the focus state. In the aspect of virtual reality, users are free from the trouble of their own imagination, so that they can directly participate in the virtual relaxing image interaction as participants, so that they can obtain the advantages of vividness, accuracy and participation that the guiding imagination does not have. The server side stores the encapsulated synchronization object data in the data transmission buffer. When the amount of synchronization information data of a game object's state or event is too large, which exceeds the remaining space of
the data transmission buffer, the system will decompose the synchronization object information data according to the remaining space of the buffer.

3.2 Playability of Games
Game is different from other art forms because of its interactivity. The playability of game is that players interact with the game world. Players input information to the game world in various ways, and the game world gives players feedback. In the parallel rendering game system, the server encapsulates the synchronization object information of the game, stores the encapsulated synchronization data in the data cache, and sends the cache data to the client node through the communication protocol confi.g.d by the user. In the game, exploring elements are widely used, such as obtaining new props, entering new levels, understanding new game characters, etc. New images, new interactive ways and diversified playing methods can enrich the connotation of the game and keep the players' attention. From a technical point of view, the process of human contact with the traditional interface is a single, non-intensive contact method [17]. One of the biggest features of virtual reality compared to all previous media is the re-creation of virtual space through the coordination of information technology and human perception systems. Players making different choices can lead to different outcomes. Players can choose a variety of methods to face challenges. The story evolves differently depending on the choice. Different games have different gameplay characteristics, and the same game can also have multiple gameplays.

Human beings can survive in the challenge. The challenge is our innate ability. We learn and grow in the challenge. When we overcome the challenge, we will get a great sense of accomplishment. The same is true in the game. When we overcome the challenges in the game, we will feel a great sense of accomplishment and form a virtuous circle to continuously challenge the next difficulty. Many games are designed based on immersion, such as many first-person shooting games. The first person perspective is the most effective way to insert players into the virtual world. The client reads data from the receiving buffer area, and when the data in the receiving buffer area is insufficient, the client receives the data sent by the server and stores the data in the receiving buffer area. In parallel rendering game systems, the efficiency and reliability of synchronous data transmission are prerequisites for correct game logic, and the performance evaluation of synchronous data transmission protocol is an important standard for the evaluation of parallel rendering system architecture [18]. Players are participatory and can actively participate in the virtual world instead of passively accepting it in the past. The progress of image technology plays a decisive role in obtaining immersion. The user is in a virtual and lifelike natural environment, and can see everything in the virtual world, hear natural sounds in the virtual world, and even feel tactile feedback. A variety of senses jointly serve the aesthetic feeling, thus bringing positive emotions and relaxing the body and mind to the players.

4. Conclusion
With the development of computer technology, the function of the game engine is gradually stronger. Compared to the traditional virtual reality engine, the game engine has more powerful functions in image rendering, physics engine, sound effects, animation, artificial intelligence and so on. Cognitive psychology in the state of separation of mind and body is a kind of virtual psychology between reality and fantasy. It has both its reality and a large degree of fantasy. It is influenced by the way of perception and perception. The immersive virtual reality mental relaxation game provides an effective, convenient, controllable, personalized, self-service method for relaxing the mind and body. In the immersive virtual reality system, the human body is in an extremely special state, the human consciousness exists to a certain extent apart from the body, and a remote perception of virtual things can be made. From the point of view of technical system, immersive virtual reality image is a kind of dense contact interface with multi-perception, which is easy to produce immersive feeling. This provides possibility for deep immersion and separation of body and mind. With the progress of technology, the reduction of cost and the standardization of the industry, virtual reality games, as a way of psychological relaxation, will certainly play a great value.
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