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The application of virtual reality: Authenticity and interactivity

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Abstract. In recent years, with the continuous advancement of science and technology, virtual reality technology has also been further developed and gradually applied to various fields. In the field of games, virtual reality technology has been fully applied, and virtual reality games provide the public with a more playable virtual space. At present, the research and analysis on virtual reality games is not sufficient enough to fully analyze and summarize the uniqueness of virtual reality games. Therefore, this paper makes the following research. First analyzes the characteristics of traditional computer games, then focuses on the application of virtual reality technology in games, elaborates from three aspects of game quality, authenticity and interactivity, and finally summarizes some shortcomings of the game at current virtual reality. Game quality refers to the improvement in game design, and the entire virtual reality game provides players with more realistic pictures and different interaction methods. At the end of the article, this article summarizes the full text and looks forward to the future research direction.

Keywords: virtual reality, game, application, immersive.

1. Introduction

With the further development of the times, the popularity of 5G technology has promoted the further development of virtual reality technology to a certain extent, 5G high-speed transmission greatly solves the delay problem of virtual reality games [1]. And games, as an indispensable form of entertainment in people's daily life, are also affected by virtual reality technology, resulting in new A branch of virtual reality games, an immersive game that can bring players more interactivity. A deeper understanding of virtual reality games can not only promote the development of games and allow people to have better entertainment, but also virtual reality games can be used to cure some mental diseases in the medical field, so virtual reality technology and virtual reality games are It occupies a certain part of people's life. Most of the current research is about virtual reality technology or virtual reality games, and rarely mentions how virtual reality games bring players an immersive experience. At present, there is no systematic comparison between virtual reality games and traditional computer games, and there is also a lack of in-depth research on the characteristics of virtual reality games. Usually, only a brief analysis of virtual reality technology and the production process of virtual reality games.

This article aims to better study and explore the differences between virtual reality games and traditional computer games, and the fact that virtual reality games are more attractive to players in terms of game quality, realism and immersion, and points out the existing problems of virtual reality games.

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2. The features of traditional computer games

Traditional online games refer to those online games that existed before the current mainstream game types appeared. These games are usually presented in various forms such as text, pictures, and sounds, and require players to play the game through the network. Compared with modern games, traditional online games pay more attention to communication and interaction among players, which can bring players a more real and intimate social experience. Next, this article will explore the characteristics of traditional online games.

Traditional games usually use screens as a medium, and players operate them using controllers such as gamepads or keyboards [2]. The gaming experience of traditional games is very rich and diverse, including various types of games such as role-playing, action-adventure, and simulation management. In traditional games, players can play different roles and experience different gaming experiences. For example, "World of Warcraft" is a very popular traditional game, where players can choose to play as different races like humans, orcs, and undead, and embark on adventures and battles.

The interaction method of traditional games is relatively simple, and players can only interact with the game through buttons or joysticks. This gaming method can make players more focused on the game content, while also increasing the challenge and fun of the game. In traditional games, players need to constantly operate to complete tasks or win victories, and this kind of interaction can enhance players' hands-on ability and reaction ability. In addition, the game environment of traditional games is usually a static screen. This game environment can make players more focused on the game content, while also saving the cost of game equipment. In traditional games, players can feel the fun of the game through different levels or scenes, such as classic games like "Super Mario."

The game content of traditional games usually focuses on the story plot. This gaming method can make players more immersed in the game world, while also improving their reading and understanding abilities. In traditional games, players need to follow the development of the game plot to complete tasks or unlock new scenes and characters. For example, the "Final Fantasy" series is a traditional game that focuses on the story plot, and players need to follow the game's development to solve various problems and challenges. Traditional games only require one game console or computer device. This kind of game equipment has a lower cost and is also convenient for players to play. In traditional games, players can experience different types of games through different game devices, such as home game consoles, handheld game consoles, and computers.

Most of the most popular games are played from the first-person perspective and lots of people enjoy the immersive experience brought by the first-person perspective, but there are also some people like to play games in the third person perspective, which is the so-called "God's perspective". So, unlike virtual reality game, traditional computer game has more games in the third perspective game for players.

Another major feature of traditional computer games is multiplayer cooperation. The five games listed above are all team games, Single-Player games are not popular in the game market. Players prefer to play team games, communicate effectively with teammates, and then cooperate tacitly to win the game. In multiplayer teamwork games, each player plays a different role, and each role has different parameters and abilities, which results in differences between games [3]. This difference brings players an immersive experience.

3. Application of virtual reality in games

Virtual reality technology is a comprehensive technology based on various modern technical means such as digital technology, computer technology and information technology, and is an emerging product in the information age [4]. At present, the development and application of virtual reality technology has formed a certain scale, realizing functions such as three-dimensional model construction, real scene restoration, and virtual item mapping. Virtual reality technology can create a more realistic user experience in a virtual environment through technical means, and help users to have a more realistic interactive experience in a virtual scene from a technical perspective, and has the characteristics of authenticity and interactivity. Therefore, the application of virtual reality technology in games can better provide players with a real environment and immersive experience.

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3.1. Authentic game environment

VR technology allows players to be in a simulated environment, and the movement of the human body, changes in visual focus and actual position give a real experience. At the same time, audio can be transmitted in real time to match the game effect. With the help of 3D surround effect, it can create a real world for players. Virtual reality games also provide players with a real binocular stereoscopic visual effect by wearing a game helmet, allowing players to be in a virtual game world, which is impossible for any traditional computer game [5]. Virtual reality games make the game more realistic and bring players a unique immersive experience.

Realistic environments and 3D effects close at hand give players the most realistic scenes and experiences. In the game which named Half Life: Alyx, the designers of game pay special attention to the details of the game environment (Figure 1). The dirt under the protagonist Alex Vance's nails, the player can also see the hair on the legs of the bloodthirsty giant crabs, they pounce on your face and try to eat your brain, VR glasses will provide players with these things happening in front of their eyes sense of reality [6]. There is no doubt that in the hearts of players, they are the protagonists of the game, characters living in the virtual world.

Figure 1. Half life: Alyx.

3.2. Unique interaction experience

Virtual reality technology has a unique space and real-time interaction function [5]. Players can use devices such as helmet and handles to simulate the actions of running characters in a virtual scene, which can increase the degree of interaction between humans and machines. Traditional computer games still need to rely on the keyboard to realize the interaction between the player and the game, but the virtual reality technology breaks this barrier, the player can directly interact through the handle or gloves, and no longer needs the intermediate medium of the keyboard, giving the player a better creation a seamless realistic world. As one of the human senses, touch is as important as sight and hearing, and it can also bring players a unique gaming experience in virtual games [7].

So, Gran Turismo 7 will be a great example of interactivity in virtual reality games (Figure 2). This game brings players a unique gaming experience via headsets and replica steering wheels. Unlike controlling a car with a keyboard in a computer racing game. It provides the player with a virtual space to drive a real car, piloting a replica steering wheel with adaptive triggers that reflect pedal resistance on the fingers. Also, if player collide with a wall or another vehicle, the haptic vibrator built into the headset provides satisfying vibration feedback. Through the unique interactive experience of interactive equipment, players can have the experience of driving a car in real life, making players have a more immersive experience in terms of vision, hearing and touch.

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Figure 2. Gran Turismo 7.

3.3. Improve the overall quality of the games

Reasonable use of virtual reality technology in the games can improve the overall quality of the games, which can attract more players to play it [8]. Virtual reality technology can make the games scene more realistic. Reasonable layout design of objects in the scene, and adding appropriate textures, materials and lights can make the objects get the most realistic effects and give players a better visual experience. What's more, virtual reality technology can also make game levels more diverse. In game design, we should focus on the levels that interact with players, because the unique interactivity of virtual reality technology can make players feel more immersive in interactive levels.

Because of VR glasses will present objects in the game world to players more clearly, designers need to be more precise when making models in the game scene, make more realistic models, texture maps, and carefully adjust the lighting in the scene, making objects more realistic. Such as Resident Evil 4, creating a gloomy environment and a terrifying atmosphere, especially Salazar Castle, the statue of a knight in armor, and its armor is rusty and dilapidated, which left a deep impression on the players (Figure 3). Combat changes are a major breakthrough for Resident Evil 4, reloading guns allows players to fight or flee when hordes of enemy give chase, but results in accidentally switching to my knife or incorrectly reloading weapons. Also, the grenade requires a lot of body movement - pull the pin before throwing. Increasing the fidelity of the scene and making changes to the game mechanism through material maps and so on are the reasons why virtual reality games attract more players.

Figure 3. Resident Evil 4s.

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4. Disadvantages of virtual reality games

Virtual reality games have attracted game lovers from all over the world with its extremely high game quality, strong interactivity and immersive experience in the game. Although virtual reality games can bring players a unique and immersive gaming experience, there are still some shortcomings in virtual reality games that prevent them from being as popular as computer games.

One of the important reasons is that virtual reality game equipment is expensive, and ordinary people cannot afford it. To play virtual reality games, players first need a PC with powerful performance, and secondly, to achieve an immersive gaming experience, they need to purchase head-mounted equipment, helmets, earphones, handles, etc, which costs a lot of money [9]. On a shopping platform, the price of virtual reality helmets ranges from 400-1500 dollars, which is only part of the cost, not everyone is willing to spend such a high price to play the game. In addition, due to compatibility reasons, players need to purchase specific equipment to play, which is another expensive expense.so virtual reality games are not popular.

On the other hand, playing games for a long time will cause physical discomfort. Experiments have proved that virtual reality games, which will cause a sense of dizziness by wearing virtual reality glasses [10].The reason why virtual reality games make people feel uncomfortable is that when the player wears glasses and plays the game, the brain will think that the body is moving according to the scene in front of them, but in fact the body is almost still, and there are no large movements such as running, jumping, and throwing, these will creating a disconnect between the two, which causes discomfort. Because the quality of virtual reality games is constantly improving, its sense of immersion will be stronger, which will cause players more discomfort of dizziness or even vomiting.

The last reason is that playing virtual reality games requires enough space, not only to accommodate the computer and all the equipment, but also to have enough space to ensure that large movements can be made while playing. The space required for each VR game is different, which is related to the headset specifications provided by the headset manufacturer. Different headsets have different sensors and tracking methods, but it is best to have a space of 2m x 1.5m to play VR games. This is not like traditional computer games that can be played with only a computer and a headset, and do not require a specific space size, as long as there is an Internet connection. So virtual games can only be played in a fixed room, unlike laptops, people can play games anytime and anywhere.

5. Conclusion

This paper mainly expounds the characteristics of traditional computer games, and analyzes the reasons why virtual reality games can bring players immersion from three aspects: game quality, game screen reality and game interactivity. Improve the overall quality of the game through materials, light maps and other aspects. Different from the mouse and keyboard interaction methods used in traditional computer games, more simulated interaction methods such as helmet handles are used. Finally, the shortcomings of virtual reality games are briefly described, and it is hoped that virtual reality can innovate in equipment and technology, which will not only bring players a better gaming experience, but also lower the threshold of the game, allowing more people to participate and have the opportunity to play virtual reality game.

In the future, the development of virtual reality games will become more civilian. By exploring and developing new technologies to reduce the number of equipment and reduce physical discomfort caused by playing games for a long time.

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