Research on the Application of VR in Games

Shijie Bian *

Shanghai Starriver Bilingual School, Shanghai, China

* Corresponding author email: 100535@yzpc.edu.cn

Abstract. From traditional 3D games to VR games, the technology in gaming has changed a lot. Vr brings people a new experience. It is used in various fields such as health care and education, but it is widely known for gaming. In order to explore the reasons why VR is widely used in the field of games, the principle of VR games and what they bring to people is the purpose of this article. This paper mainly discusses the application of virtual reality technology in games. It describes the facts of evolution of VR technology. Use this as fundamental element, several types of VR games were made out which provide different positive effects on players. There's difference between the traditional game and VR game. VR game is not yet a mature technology but will have a bright future. People can infer that VR application in the game is very suitable and have lots of potentials.

Keywords: VR (Virtual Reality); Video Games; Application; Future Games.

1. Introduction

VR is the abbreviation of Virtual Reality. From the invention of this technology to today, more and more people and enterprises begin to use it for varieties of purpose. This technology is starting to appear on video game sites, corporate websites, and mainly in game designing. The purpose of the study was to find out why VR is so widely used in games.

VR technology has taken decades to come to fruition and becomes popular recently. This technology integrates achievements of computer graphics technology, artificial intelligence, haptic feedback technique, interactive technology and so on. Its main attributes are multi-sensory, immersion, interactivity and imagination. In general, A complete virtual reality system is composed of virtual environment, which is with high performance computer as the core processor, wearing a display as the core of virtual environment vision system, speech recognition, speech synthesis and positioning as the core of auditory system, to Israel a tracker and data glove and clothing as the main body position of attitude tracking device. At the same time, taste, smell, touch and force can be fed back into the system. There are many other features [1].

Due to various characteristics of virtual reality technology, VR game take several advantages of traditional three-dimensional video game. But in the meantime, virtual reality technology is a not very mature technology and still has some disadvantages. Virtual reality can become more mature and be applied in a wider range of fields in the future.

2. The Evolution of Virtual Reality in Games

Virtual reality technology has appeared in science fiction in the early 1930s. At that time, a science fiction by the writer Stanley G. Weinbaum have the idea of a pair of goggles that can let the wearer experience a fictional world by using effect of holographic, smell, taste and touch [2]. This description is very similar to our modern VR headset use for playing VR game. Also in the mid-1950s, cinematographer Morton Heilig developed an arcade-style theatre cabinet that would stimulate all the senses, not just sight and sound, which is called Sensorama (Fig.1) [2]. The device is similar to the VR device in that it's designed to make the experience more immersive, and it's even similar in structure, but a bigger one.

The further information, stated by other researcher, virtual reality (VR) technology offers unique and compelling possibilities for theatre and performance. Despite some notable experiments achieved, there's article synthesizes some of its early history, investigating how it has been used in theatrical

and performance contexts. Its high-technology and features that have potential in future are most commonly used to summon ancient, traditional or primitive worlds and Spaces. Brenda Laurier and Rachel Strickland's Placeholders in 1993 and Cha Davis's Permeation (1994-95) go back to prehistoric scenes and times, while Yakov Shahrir and Diane Gromara's Dancing with the Virtual Tovish in 1994 also go back to nature and explore the inside of the human body. Through the analysis of the immersive live theater designed by Mark Reaney for ieVR, Richard Beacham's navigable VR reconstruction, and Blast Theory's Desert Rain "re-staging" the 1991 Gulf War as a participatory VR war game, using virtual reality technology as a 3D scene medium. The conclusion section analyzes the key problems that hinder the further application of this technology in theatre and performance at present, as well as the future development potential [3]. These talks about the history and future of the technology. It also has stated out that the performance of VR game is fantastic. The resource has informed that virtual reality's evolution is quite short and have plenty of room for improvement in the future.
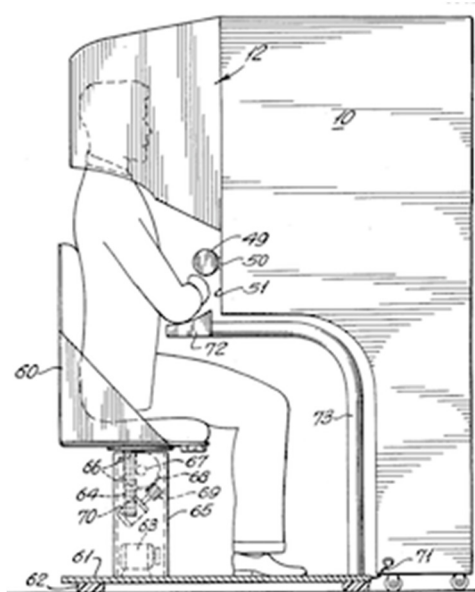

Fig 1. Sensorama

3.   Virtual Reality in Different Games

Virtual reality is widely used in games and was in vogue already for years. Statistics on the internet stated that the virtual reality industry earned $1.1 billion in 2020 [4] and experts said that it can be the mainstream in next 3-4 years [4], because the prices of VR systems will decrease and more people will be addicted to this new technology [4]. The virtual reality game is very popular on the famous live streaming websites since the statistics proved that there's 17.3 million hours of time for the Twitch viewers to watch VR gaming content in 2020 [4]. There are many types of games that can use virtual reality to enhance the player experience.

3.1 Horror Games

There are many horror games that are made in virtual reality technique. The game "Phasmophobia" is a multiplayer online horror game (Fig.2).

Players need to use various items to find clues and monster characteristics hidden in the map to find out what kind of monster. The player might encounter a monster during play because of a tool or because of a random encounter. Players can also use items to ward off various monsters. The game will fail when the monster kills the player. Players get bonus points for correctly guessing monster types using clues [5]. "Wraith: The Oblivion – Afterlife" is a virtual reality horror game too. Afterlife is a first-person VR horror exploration game set in the World of Darkness universe. The main

character is pretending to be Wraith. To be Wraith, uncover its secrets, eluding the insidious Spectres who tracks your steps. As the spirit of the dead, players can manipulate objects from a distance, change your surroundings or walk-through solid walls. As the players move deeper into the Shadowlands, Wraith power will increase, allowing you to reach new areas [6]. The horror game with virtual reality technique will increase the feeling of immersion. People will have an illusion that they actually encounter a monster or facing horror events. Even the brave has to be wary of trying such games.

Fig 2. Phasmophobia

3.2 Role-Playing Games

And, in virtual reality games, role-playing games account for a large part too. Adventure games are a big part of virtual reality games. "Half Life: Alyx" is one of those games (Fig.3).

Fig 3. Half Life: Alyx

It has been well received since its release. The exquisite setting and excellent story make the player feel very connected. But it's the use of virtual reality that makes it most immersive. Players take on the role of Alyx Vance, who is humanity's only hope for survival. A group of armies corralled the humans who survived the disaster into the city. Among the crowd were two of the finest scientists on the planet: Alyx and her father. In this game, Alyx has to fight off enemies along the way to save her

father. The game includes a mix of first-person shooter and stealth gameplay. When players played the game themselves, it was a very real experience. The game also has a high degree of freedom, even in the game can pick up objects flipped to observe. At the same time, the tension in stealth and facing enemies is much higher than in normal 3D games [7].

3.3 Rhythmic Game

Surprisingly, rhythmic game using virtual reality technique gives players a good experience too. The most famous VR rhythmic game Beat Saber requires players to play with the left and right joysticks. It requires players to play with the left and right joysticks. The left and right handles act as two lightsabers. The player uses two lightsabers to hack the combo of the corresponding color. While moving body, players get exercise too. This kind of virtual reality game let people have a realistic body motion and got exercise [8].

There are many traditional PC and console games that have been remade into VR games. This is usually the case for popular games, because VR games are expensive and only established game companies with the financial firepower can make money from this operation. At the same time, when converted into VR games, it will give players a full immersive game experience. They are also often played as a reward to fans of the original game. Fans of the original game are more likely to buy it if the VR version is of good quality.

VR's various types of games have a certain appeal to players. VR horror games, role-playing games, etc. all bring different feelings to people, and also have different benefits.

4. VR versus Traditional Games

In traditional video games, players often play as a character representing themselves and complete missions to achieve the game's final goal. However, virtual reality games really leverage player's physical abilities and lets players to create dynamic gameplay around themselves. This gives the player more freedom and richer game content.

4.1 Advantages

Virtual reality games have 3D surround-like scenes that give players more immersion during the game. Under the same scenario modeling, the realism of traditional games is inferior to that of virtual reality games. With feedback from the headset and gamepad, the player can simulate what their actual motion in the real world. When the player is around, they also can see the things, which is presented in 3D form, all around themselves. These effects let some players even have the illusion that they are inside the game world with their own body. For instance, there's a called FNAF (Five Nights at Freddy's). In its first installment, game failure suddenly pops up in the face of a scary toy. When users play traditional 3D games, the shock is minimal, and users may even get used to it after a few failed games. However, when players play the VR version, because of the surrounding scene and the way to simulate real action, they bring a strong sense of immersion and shock to the players.

In addition, original VR games usually have higher playability due to the use of somatosensory operating modes that provide higher operating space. For example, using gamepads or other equipment to grab game items directly or using them to control monsters' limbs are new VR gameplay innovations. The game "Half Life: Alyx" achieve this in a very well way. In the game, users can control the gamepad to grab an item up close or remotely and then put it in the backpack or throw it out. Just grabbing items is a lot of fun. Items can also be thrown in different states, such as bottles that can be shattered. In addition, there is a small monster that players can capture and kill, creating a new and interesting way to fight enemies. Many VR gamers are fascinated by this feature.

4.2 Disadvantages

But despite the advantages, virtual reality games also have drawbacks. That's why they haven't completely replaced traditional 3D games yet. By the way, VR games are more expensive than regular

games, which is why a lot of games don't look good, and may cause several negative effects on people. Because of the limited screen size, even decades-old game graphics can satisfy the human eye. Most modestly, VR games can sometimes make 3D vertigo sufferers feel dizzy during the game. Especially when there are a lot of games that aren't very good, or the player's equipment isn't very good, VR games aren't very smooth. Traditional games don't have a big impact on these people. Compare to traditional game manipulation compilation, VR games typically require higher frames and finer graphics to satisfy the human eye, which is often expensive. Therefore, people can't make enough money out of VR games. Because a good game stands out, and a good game costs a lot of money. This sometimes even leads to people not being able to recoup their costs. For example, there was a game studio, opened by individuals, that used all of its savings to make a VR game, but the profit didn't cover the cost and the studio went out of business. At the same time, because fewer people buy VR devices and invest too much, fewer people will choose to make VR games. This has also led to a lack of quality VR games. So even though VR games are so immersive, they don't fully satisfy the people who love them.

Therefore, virtual reality games often require expensive headsets to play. And the use of helmets is more complicated than computers and mobile phones. When on the busy days, few people will turn to virtual reality games as a way to relieve stress, instead of this they tend to play traditional games such as mobile, PC or console games. These games are also played by far more people than VR games.

However, the high cost of personal use of VR devices also provides more people with entrepreneurial opportunities. Walking in the mall, there are many VR experience halls with advanced VR equipment. In addition to the traditional VR glasses, there is also a novel facility that simulates roller coasters with moving and rotating seats and VR glasses. Some VR shooters include a gun model to add realism. The opening of such shops is good for both the owners and the consumers. Shop owners can make money because this kind of shop has a high-tech sense, which can attract some parents and children. Instead of paying a small price at a time to play the game, the consumer can enjoy a more immersive experience without having to pay the high price of their own purchase.

VR games have significant advantages and disadvantages over traditional 3D games. But these shortcomings can be addressed one by one over time, and even now there are some close to being addressed. VR gaming has a lot of potential.

5. Future of Virtual Reality Games

In the future of virtual reality games, first of all, the scenes will be more realistic and immersive. VR devices are still in their infancy. In fact, a simple VR headset can be made from a cardboard box, a mobile phone, and some simple tools that users can easily get. According to the research on the internet, there's some people state that it is obvious that hardware and headsets will continue to develop. Bur, the future of VR software is unclear. One area that has emerged in recent years is VRMMO, aka virtual reality massively multiplayer online role-playing games (VRMMORPG) [9]. These games are also played by far more people than VR games. Instead of heavy head-glasses, people may be able to put themselves into a deep sleep using devices that will bring them into a new, near-real world. There's a concept called the metaverse, which is A virtual alternative to the Internet, using virtual reality (VR) and augmented reality (AR) headsets. This device and method of use make the internet a unitary, universal, and immersive virtual world [10].

At the same time, because of the development of devices, devices will become more convenient, maybe even as convenient as mobile phones and computers. The equipment used to play games may become as small and portable as regular glasses. As a result, the number of people playing virtual reality games will increase. Virtual reality games will become more popular and the market will become larger and more profitable. However, since direct experiments on the brain are prohibited because of the violation of human relations, people still have to seek a more secure and appropriate way to complete the research and development of new technology VR devices. It will take more time, perhaps decades.

VR can also mimic social interaction in the real world by connecting with other people. Some VR games have features that simulate full-body movements. For example, one company developed a game called "VR Chat." Some models can be used to deal with others in accordance with their own voice, expression and action. In the future, it may be able to reach a new height, so that people's VR social more realistic, to the point where people can make friends without leaving home.

In general, VR games may do more harm than good, but as a novel technology they are excellent. It brings a full sense of immersion to the majority of players and enhances the game experience of players.

6. Conclusion

In conclusion, there is a lot of potential for virtual reality to be used in gaming. VR games and their devices were first proposed decades ago, and are now emerging in the public eye. At the same time, its features appeal to many players. There are a variety of VR games that give players a sense of immersion, showing the potential of virtual reality games. By the way, while there are pros and cons to traditional gaming, future improvements will take virtual reality gaming to a new level. Virtual reality technology's application in gaming will be a breakthrough technology that will captivate gamers around the world.

References

[1] Corcos A. Being enjoyably challenged is the key to an enjoyable gaming experience: an experimental approach in a first-person shooter game. Socioaffect Neurosci Psychol. 2018, 15;8(1):1474668.

[2] I. Makarov, M. Tokmakov, and L. Tokmakova. Imitation of human behavior in 3D-shooter game. In 4th International Conference on Analysis of Images, Social Networks and Texts, 2015,64-77.

[3] Wang D. Tan A. H.. Creating autonomous adaptive agents in a real-time first-person shooter computer game. IEEE Transactions on Computational Intelligence and AI in Games, 2015, 7(2):.123-138.

[4] Jansz, Jeroen, Tanis, Martin. Appeal of Playing Online First Person Shooter Games. Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society, 2020, 10:133-136.

[5] Sebastian L, Octavianus A, Rudy P, Behavior Correlation between Games in First-Person Shooter Genre based on Personality Traits, Procedia Computer Science, 2021, 179, 185-194.

[6] Zhang Y. Wang, Chen L. FPS Game Design and Implementation Based on Unity3D. DEStech Transactions on Engineering and Technology Research. 2017, 10:1-11.

[7] Kenneth H. Jim W. Design patterns in FPS levels. In Proceedings of the Fifth International Conference on the Foundations of Digital Games. Association for Computing Machinery, New York, NY, USA, 2010:78–85.

[8] Hendrix, Maurice, et al. Implementing adaptive game difficulty balancing in serious games. IEEE Transactions on Games 11.4 2018: 320-327.

[9] Hall, Richard A. Dr. Theopolis and Twiki. Robots in Popular Culture: Androids and Cyborgs in the American Imagination 2021. 134-134.

[10] Halpern, Jared. Characters, Coroutines, and Spawn Points. Developing 2D Games with Unity. Apress, Berkeley, CA, 2019: 233-275.