

Immersive narrative design in VR game

Linhai Li ^{1,*†}, Mingchong Li ^{2,†}, Dean Pan ^{3,†}

¹ Animation school, University for the creative Art, Farnham, UK

² College of artificial intelligence, North China University of Science and Technology, Xingtai, China

³ Hangzhou Wycombe Abbey international school, Hangzhou, China

* Corresponding Author Email: 1910604@students.creative.ac.up

†These authors contributed equally.

Abstract. VR game is to simulate a false world and substitute the player's consciousness into the game to make the player feel more real. Compared with traditional games, VR game is freer. In order to provide a good immersive game, this paper develops a game called "Defer our homeland". The purpose is to find out how to refine the details better, so as to improve the immersive experience of players. Therefore, we refined the details of background music, interaction design and scene respectively. In terms of background music, different from other games, the concert changes with the change of the plot. For example, the music is low and depressed at the beginning of the plot, and will gradually turn into passionate after the victory. In terms of scene design, considering some factors in the background story, in order to set off other details, the dilapidation degree of each map is different. As the map gets more and more dilapidated, the light will gradually dim. This means that the player is close to the boss. After players' feedback, the conclusion is that almost details of the game itself will affect the players' immersive experience. Especially in interactive design and background music, it is deeply praised and loved by players.

Keywords: VR game; interaction; narrative; immersion.

1. Introduction

Virtual reality technology, also known as spiritual environment technology, is a new practical technology developed in the 20th century. Virtual reality technology includes computer, electronic information and simulation technology. With the continuous development of social productivity and science and technology, the demand for VR technology in all walks of life is becoming stronger and stronger. VR technology has also made great progress and gradually become a new field of science and technology [1]. The so-called virtual reality, as the name suggests, is the combination of virtual reality and reality. In theory, VR is a computer simulation system that can create and experience the virtual world. It uses the computer to generate a simulation environment and immerse users in the environment [1].

There are many differences between VR games and traditional games. For example, VR games do not have a screen as a medium. In traditional games, there is a screen between players and the game world. The UI on the screen will help players better play the game, such as blood bar and task list. In VR games, there is no UI, and players need to control the game information themselves. In terms of scenes, compared with traditional games, VR games are freer. Players can freely choose the direction of observation, and developers cannot interfere with the lens. Therefore, compared with traditional games, VR games have higher degrees of freedom, higher playability and more development potential. VR games require players to wear opaque HMD devices, and the only remaining devices are operating handles. Thus, in terms of interactive design, VR games are more developmental than traditional games, such as eye tracking, motion capture, sound control, and even reading brain nerve signals [2]. It is precisely because of the problem of equipment that VR games can only be improved on the game itself if they want to attract players. However, due to the development of VR games, VR games can be played on various devices. The difference is only the effect [3]. VR games can even affect the senses of reality [4].

Aiming at the development of VR game, this paper designs a game called defer our home land. The game designed in this paper is to observe how to better improve the immersive experience of players, how to better improve the playability of the game, and contribute to the development of VR games [5]. Many details in the game have been refined, such as story line, interaction design, scene characteristics, background music and background story. The game will be provided to a group of players to analyze how to improve the immersive experience of players according to the feedback from players.

2. Related works

The modern game industry has become more and more mature. People are trying to find a breakthrough, what is try to create more different new game modes. Just like the meta-universe fantasy that many people worship now. Some people really hope to live or really exist in the game. Nowadays, VR can bring us a visual and auditory game experience. Sometimes it can even deceive the brain to make people really feel that they are in it. The VR device does not make people's consciousness exist in the game, but it increases more possibilities and strengthens people's connection with the game. Game producers need to add more elements to increase the interaction between players and games, which is also immersive to achieve this. On the most basic level which without the regardless of gameplay.

A good story is indeed the way to bring people into the game, regardless of the type of game. Video games are a collector of a variety of information, in which players will experience a variety of elements such as audio, text and pictures. When players start to play, they will switch from passive to active reception of information [6]. In this way, not only enhanced players' sense of control can also increase the sense of immersion. The game made this time needs to be more linear story-oriented narrative mode. After the game conditions are activated, the player will continue to understand what will happen next according to the logic of the story. There are two narrative modes of the story. One is a necklace connected like a pearl and the other is a branch pattern like a branch like a branch [1]. The plot of the first mode is simpler. In the later game, players may reduce their sense of control over the game as the plot develops. But the latter has more plot points for players to choose, so it can increase players' sense of silence in the later stage of the game. If possible, we will also add this branch mode to assist the game.

For VR games, there are also realistic physical effects that increase the immersion of playing. It is extremely important for different types of games. The outstanding VR game on this point is the half-life of the game: Alyx. Players can pick up objects through controlled hands in this game. As long as we can see the modelling here, it can basically be picked up by players. Among them, it is more interesting that players can control the marker in the game to draw and write on the glass. Even during the epidemic online classes, one teacher directly used the markers and glass in Alyx to teach. This video was later published on YouTube. Some more realistic physical effects will be needed in our game. For example, the flight distance and landing point after the bow and arrow are fired. Will it bounce when an arrow touches a harder object, such as a stone? Will their bodies block or be pushed away by the player after the enemy dies? In the half-life Alyx, firearms will stick to the player's hands. This can prevent players from losing weapons and props or falling off cliffs in battle. If players lose these items, they may affect the game process and fail to guarantee smoothness [6]. We should add these features to the game, which will have a special adsorption effect on weapons or specific props. Although the game is a battle-type RPG game, the increase and control of details will increase more immersion.

It is also extremely important for game designers to grasp the design scale. As long as it is not completely dependent on freedom games. All the work is to add icing on the cake to this story. For the half-life mentioned earlier: Alyx, good physical effects and the interaction before objects are its selling points. But these things should not be allowed to hide the story itself or the theme of the game. Therefore, it has the view that rational utilisation is higher than freedom [7]. Alyx, the protagonist of

the game, is a hacker. Therefore, the game does not advocate blind killing. Players can't use anything other than the weapons given by the game to deal damage to the enemy. All the clear main lines are also helpful for game production. This has to mention another game The Elder Scrolls 5 VR. Although this game is an open world game. But players are free to explore every place at will. There are also many side quests to do in it. What's interesting is that there are a lot of places and main quests in this one. Therefore, whether it is a small garden world or an open world, it needs to have its own process logic. Avoid losing the player's connection to the main story.

3. Method

In this game, players will incarnate into elves, hold bows and arrows, kill demons, defeat demon lords and defend their homes. In this research, the game uses multiple details to make players more involved in the game. Such as background music, story line, model design, interaction design and background story. For instance, in terms of music, game has added corresponding music in the initial scene, during the fight and after the victory, which can drive the emotions of players and make them more substituted into the game. In terms of background story, game refers to several similar popular games on the market, compare them and design our own background story to study the impact of background story on player experience. In terms of character modeling, the game polishes and refines some details of the character, such as facial expressions and clothes wrinkles. We hope that the character can attract players to the game. The following will introduce the game in detail from the aspects of story design, 3D modeling, interaction design.

3.1. Story design

The plot of this game begins in the magical world of the Middle Ages. An elf accidentally opened the seal to release a large number of monsters. They invaded the elves' homes. Players need to use their own power to destroy them and save their homes. The game character is an elf named "Leia", who has two weapons: dagger and bow. The enemy is all kinds of monsters and even a dragon. Players not only need to attack, but also need to avoid their attacks. The game atmosphere is tense and exciting, which can bring players a good game experience. Figure 1 below is the plot flow chart of the game.

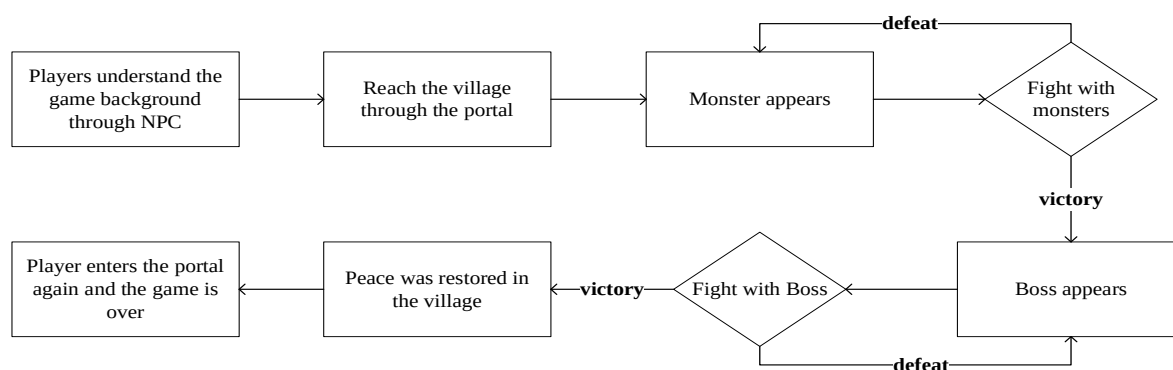


Figure 1. Story flow chart

This game is divided into three levels.

The first level is the teaching level. It is easier to defeat monsters at the beginning. The number is 5. Players can withstand multiple attacks.

Then comes the battle level. There will be more monsters in number and types. What players need to do is find and kill them, and ensure that they will not be attacked by monsters many times.

The third level is the boss level. There will be a large black dragon flying in the air and can launch fireballs. Players need to beat him to pass.

In the process of playing, once the player is attacked ten times, he will "die". At this time, the player will return to the plot before the start of this level and challenge again.

As for the teaching part, before formulating the teaching content, first determine what players need to learn [8]. In our game, we need to let players know their identity, that is, an elf. This requires

players to understand through the NPC who is also an elf. After understanding the background story, the game will enter the teaching part. Players will not accept classroom teaching in the game, which will be very boring. Therefore, these contents will be put in the plot in the game. Players will find monsters when they arrive at the village. At this time, players need to attack, and then naturally insert the teaching of weapon use.

Enhancing the sense of substitution of players is also a key point of the game. When players log in to the game at the beginning, their understanding of the role is blank. In addition to knowing their identity and task through the words of NPC, they can also understand it through the picture. In our game, players can see their feet by lowering their head and their hands by reaching out, which can make players substitute for the role faster.

A clear goal is indispensable in content design [8]. Many RPG Games will put the current task prompt on the right side of the screen, as shown in the figure 2. In our game, the goal of each stage will be indicated in the upper right corner of the screen, for example: go to the portal, eliminate monsters and kill the boss. These tasks are coherent. When the player completes one task, the next one will appear, which not only ensures the continuity of the plot, but also allows the player to have a good experience.



Figure 2. Real machine demonstration of Final Fantasy XV

3.2. 3D model design

The existing mainstream modeling software includes 3ds Max and Maya, which are widely used in the simulation of various static and dynamic scenes, such as architectural design, 3D animation, audio-visual production and so on. Adding functions needs to be developed with the help of game engines. The most widely used game engines are fantasy engine and unity, which can import files in different formats to facilitate the development of game developers.

In terms of modeling, take Maya as an example. Design roles and scenes through Maya software, and then import the designed model file into unity for the next development.

Character modeling: For the modeling of characters, the first thing is to design the concept map with reference to the background story and character setting [9]. The modeling can be carried out according to the following steps:

Draw three-view drawing: When drawing, we need to fully consider the proportion and style of cartoon characters. When determining the proportion, we can prepare the pictures of front, side and bottom as the reference drawing for making the model.

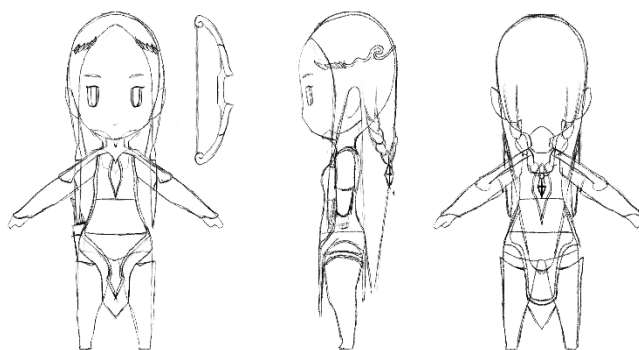


Figure 3. Three-view drawing of the protagonist

Create the basic body: The basic shapes of cartoon characters include head, body, limbs and so on. When creating the shape of the basic model, we need to make the character model strictly according to the provided reference drawing, and use as few faces as possible to shape more structural features.

Making models using polygon Technology: When building the cartoon character's head model, different polygon commands are used to make the features of the model, such as nose, mouth and so on. Use the associative mirror tool to copy both sides of the polygonal character, which can reduce the workload of model making.

Compared with the character model, the modeling of weapons is relatively simple. It can also be designed through the above three steps of character modeling, and the required weapon model can be designed by referring to the pictures and models of similar weapons in reality.

Scene modeling: In scene modeling, scene modeling can generally be divided into the following steps [10]:

Analysis scene design drawing, understanding the scene layout: Determine the layout of each object in the scene through the design drawing, determine the movable range of the character, and also consider the immovable area. The whole process needs to roughly show the scope.

Make rough models: After dividing the area of the scene, first replace the model in the scene with simple geometry. The main purpose is to match the ratio between the high and low points in the scene and each model, so as to roughly determine the scene.

Refine and adjust model details: When the layout and proportion of the model are determined, it is necessary to make all the details to finally meet the requirements of the design drawing. When refining the model, we should also follow the principle of treating the long-range and close-range separately. After the model design is completed, it should be compared with the design drawing.

Texture mapping: After the model is built, it needs to be mapped. In 3D software, the appearance expression of objects has two main concepts: material and texture. Texture is equivalent to pasting pictures on the model, while texture is to add the reflection coefficient, refractive index and other attributes of the object. The material types of Maya mainly include lambert, blinn, phong, etc. In terms of texture, there are also various options such as 2D, 3D and environment mapping.

The method of Maya mapping depends on the type of surfaces. About UV, which is the XY coordinate of the object surface. Without UV, Maya doesn't know how to paste the picture on the object. Nurbs has its own UV attribute, while polygon is more complex, it needs UV to be set before mapping. In the mapping process, we need to pay attention to the use of light and shadow. The reasonable combination of the two can make the mapping full, and can make the characters and scenes more realistic and increase the sense of substitution.

3.3. Interaction design

After completing the story design and modeling, it is necessary to design the interactive part of players in the game. Due to the development of VR technology and the support of devices, VR games

have a richer immersive experience than traditional computer games. So, we will design from three aspects: character movement, scene interaction and music.

For character movement, VR head display devices supporting position tracking such as HTC and VIVE are used to allow players to move in a certain space [11]. In this game, in addition to the commonly used whole body movement, players can also use the way of instantaneous transmission to move. When using the instantaneous movement mode to play, the handle used by the player can mark a bright spot in front of the player. The player can move to the position marked by pressing the button on the handle. Although the whole-body movement can make the picture more natural and the game more realistic, the actions of the player's body will frequently lead to the picture shaking, which will lead to the player's dizziness. The way of instant transmission can not only meet the function of players' movement, but also make the picture more stable, and players will not be limited by the environment.

In terms of scene interaction, it includes scene changes and role combat [12]. In this game, we set up two scenes, one is the unknown place at the beginning, and the other is the destroyed village. The protagonist needs to pass through the portal from the unknown place to the village. When players enter the portal, they will switch the scene. In order not to make this way seem abrupt, we load an animation during the switching. When players fight, the atmosphere of the scene will also change. The players first arrive at the village, they will be in the dark, but after the defeat the boss, the day will slowly brighten.

In order to be more realistic, when players switch weapons, they need to make specific actions. If the players want to switch the dagger, they need to use the handle to take out the dagger from his waist. At the same time, the weapons in the game will follow the logic of reality. For example, the arrow shot through the bow will present a parabola.

In terms of music, we have prepared three different styles of background music and surround sound effects for the game [13]. Through the conversion of background music, players' emotions can be effectively mobilized. At first, the concert was gloomy, but as the battle progressed, the music became exciting. When the player defeats the BOSS, the concert becomes soft with dawn. The sound effects needed in the game, such as the sound of flame burning, the sound of monster roaring and the sound of player attack, will be expressed by three-dimensional surround sound.

4. Results and discussion

Most of the game design this time focuses on the discussion of characters. Need to focus on research and then discuss the battle exam. In order to better control the size of the game. The game as a whole is still going according to our plan and process. We spend a lot of time on game characters. Because we made and designed the characters first. Therefore, when choosing the scene style, our work also chose the design that matches the character. Next, we will analyze the advantages and disadvantages of the game from five perspectives.

4.1. Utilisation platform

We used maya for modelling this time. Use the Unity3d engine when creating the game. It has an editable IDE environment and a component system that gives objects can also use code to drive objects. This software also supports multi-platform. We use win's system to make this time. Because the platform has the largest number of users and the widest coverage, and people are also particularly familiar with the operation of the platform. In the follow-up plan, we are going to invest time to get started with mobile VR devices. Mobile phones are a necessity for modern people. There are also many companies that are successively launching VR devices that are compatible with mobile phones. Professional VR equipment will be more expensive for most people. And most VR games are controlled by computer as a carrier. They won't be particularly difficult for people who like to play games. After all, external display VR still has a small number of users. Compared with mobile phone platforms, it is only a drop in the bucket. It will take a long time to build a huge platform with

hardware, and mobile platforms have ready-made national user resources [14]. So if we want to attract more users, we can try a multi-platform method to release the game.

4.2. Character design

This game puts the main goal on the story framework of the game and the design of the game characters. The character design is biased towards the Q version of the game and also has a three-headed body. For many games, character design is particularly important because characters are the first line of defense to bring into the story. Players can roughly understand what kind of world the game they want to play is in through the character's background before playing. The character design took the longest time in this game production. There will be basically no problems in the early stage of design. As long as designers master the story background of the character and add elements that can represent the character. This character is in the style of Q version, so try to restrain our own design. Complete the character design under the premise of simplicity and beauty. Then drag the character's design drawing into the 3D design software maya used this time. The modelling process is relatively boring and requires slowly depicting details. When making animations, designers will bind the bones and skin of the characters and pay attention to the weight of skin. If the weight is properly depicted, it will make the character's movements more natural. The design of characters, scenes and items is extremely important, because if the preparation in the early stage is sufficient, it can avoid a sense of discord when putting the character into the background story, so as to recreate the character or change the design. This will also make the post-game production more difficult. Therefore, when making, designers should increase communication with the planner to avoid the negative impact [15]. There are many VR game modes. Some designers may highlight the playability of the game and weaken the protagonist. What player can see in the VR device can only be a suspended hand. But the sadness produced this time is an RPG game about character stories. So, a complete character will be designed to be put into the game. In this way, players will not only have two pairs of suspended hands in the air but an entire arm when playing. If so, there may be faults between the player and the game. Therefore, if the player bows his head, he can see the character's body and legs. In doing so, more animations need to be added to the characters. Compared with some hand-only games, it may be more time-consuming.

4.3. Character setting

Our character setting is a long yellow-haired female elf. The stories of the Middle Earth world have always been particularly grand and epic. This is an outstanding representative of European and American culture and a well-known virtual species in the world. The elf design was inspired by the elves in Lord of the Rings in our game. The elves have agile body methods. They are extremely proficient in light weapons and live much longer than other races. So the weapons used by the elves this time are bows, arrows and daggers. The main attack method is the bow and arrow behind it, which can be used with VR devices. When executing the enemy, player can use daggers to execute when the enemy has a specific amount of health. Players can also use daggers to attack targets. The character uses a three-headed design in this game. Make the game biased towards Q version design. Therefore, player should also choose a good style when designing a scene. This scene also adopts the style of Q version. The scene is located in the village of the elves. The background-based protagonist is transmitted to the elf's village through the ruins. Therefore, traces for transmission should also be added to the scene.

4.4. Scene setting

The experience of the scene feels ordinary. By observing figure 4 and 5. The number of monsters in the scene is relatively small. Some houses sometimes feel less connected to background stories if they are not destroyed by monsters. The house destroyed by the elves can add some flame effects to increase the richness of the scene. The scene has changes in light and shadow. It's relatively good that the terrain also has ups and downs. In it we can add more colors to emphasize the atmosphere. It can

effectively drive the player's emotions through color, and at the same time provide players with an excellent gaming experience [16].



Figure 4. Game scene test map daytime



Figure 5. Game scene test map nighttime

4.5. Game summary

After a series of game comparisons, two different forms of role-playing VR games were found. One is a mode where the player can see the entire arm while playing (Figure 6). The other is that the player can only see two pairs of hands suspended in the air (Figure7 and Figure8).



Figure 6. Sword and Magic In-game screenshot



Figure 7. The Elder Scrolls 5 VR in-game screenshot



Figure 8. Half life alyx in-game screenshot

The first mode will have a stronger sense of substitution. But because the length of the arms of the players is not the same field. So be careful to cancel this sense of inconsistency when making it. The game designer can program the proportions or adjust the length of the in-game character's arms according to the length of the player's arms from the beginning. Another mode is that players can only see their two pairs of floating hands. Doing so may affect the player's sense of immersion. Because the two hands floating in the air may make players curious when playing. Such a design could suddenly interrupt the player's game immersion. There are benefits to doing so, however. It can reduce the modeling of the character without taking into account the difficulties caused by the different arm lengths of the player's hands. This approach has been welcomed by more games. We have seen some typical VR representations such as "The Elder Scrolls 5 VR " and "Half-Life: Alyx". These two games are particularly representative and have extremely rich gameplay content and a good gameplay experience. The method they use is the second mode. Although it will not bring game mechanics or game process problems to the game when playing, it will reduce the player's immersion. The satisfactory establishment of the sense of simulation is highlighted in the fact that the "world reality" construction of VR games does not rely solely on images, but is based on simulation [17]. So, we stick to the first mode where we can see our arms and body (Figure 9 and Figure 10).



Figure 9. Character front view of hands



Figure 10. Character down perspective

5. Conclusion

In order to solve the problem of how to improve the immersive experience of players, this paper designs a game called defer our homeland. In order to achieve experimental results, most of the details of the game have been specially refined. After players experience the game designed in this paper, each player provides different feedback. Some players say that the most attractive thing to him is the background music, the music enriches his experience, and some players think that the most interesting thing is the backstory, and the interesting backstory can stimulate the player's desire to explore. From the feedback of players, this paper can draw a conclusion that the refinement of details in VR games can more or less improve the immersive experience of players, but the most important thing is the fit between players' own interests and game details. Different players are interested in different details, so the immersive experience improved by the refinement of details will be affected by the player's personality. The work of this paper will have a certain reference value for relevant research.

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