Udacity VR Nanodegree Puzzler Project Report

Edward Terry – March 2017

Introduction

This report summarizes the process of designing a simple VR game. This experience was based on a prefabricated setting and game provided by Udacity, with the focus instead being on interface design and user testing. The game is a "Simon Says" type puzzle where the player has to repeat a sequence generated by the game engine. The final product can be viewed here.

Story of the process

The first step in developing the experience was making a sketch of the setting, as shown in Figure 1. Figure 2 shows how this vision was rendered.

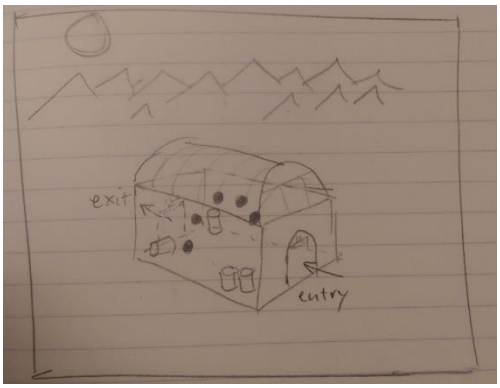

Figure 1 Game environment sketch

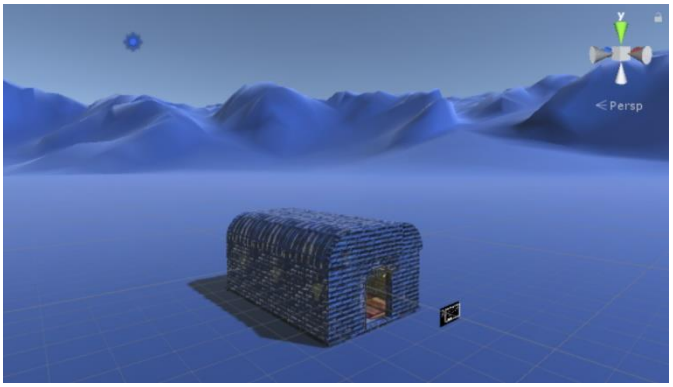

Figure 2 Game environment render

The following profile for a notional target user was used as a basis for creating this game.

Rudy, 20 - Student

"I want to build new cool technology and VR sounds promising"

Rudy is studying chemical engineering at university but is not convinced that it will be an interesting career. He has read about the potential for VR and has made a visit to a futurist fair especially to try out VR experiences. He has no experience with VR.

Game Description

Game Sequence

The game comprises three components. The first is a text panel inviting the user to commence the game (Figure 3). The second is a haunted, abandoned building in which a “Simon Says” puzzle is located. A series of orbs lights up in a sequence (Figure 4). When the user successfully repeats the sequence, they are transported to the final waypoint where they are congratulated and offered the chance to start again (Figure 5).

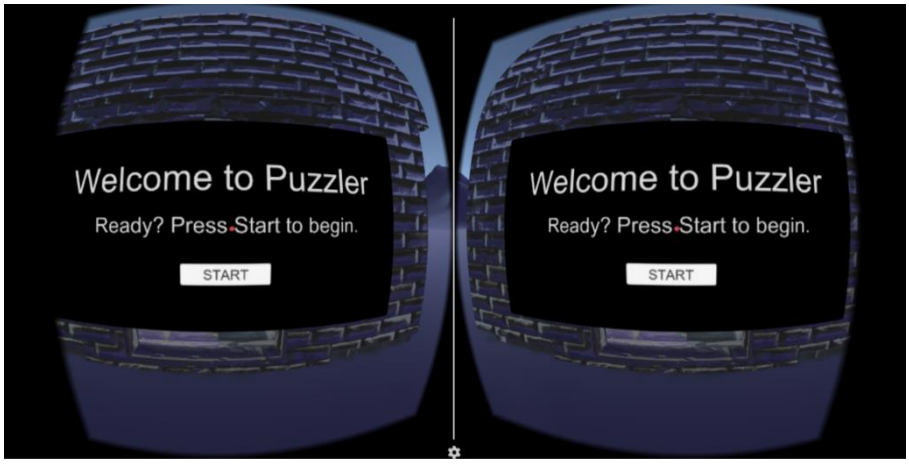

Figure 3 Start waypoint user interface

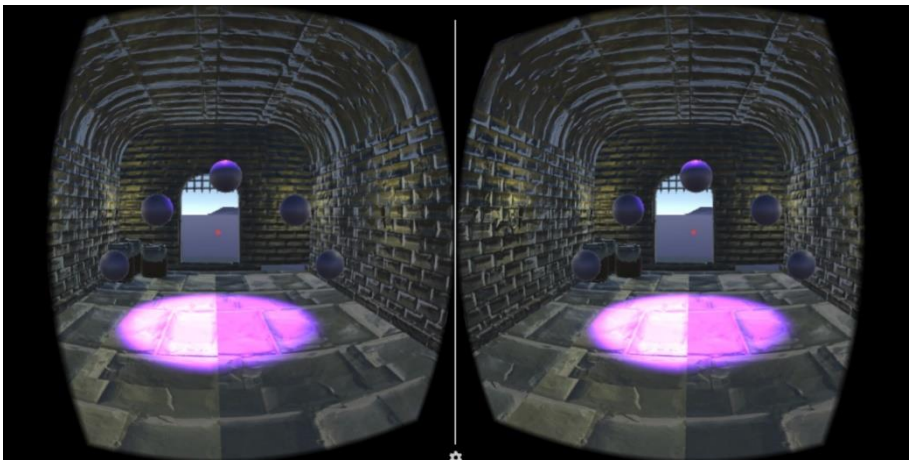

Figure 4 Game waypoint

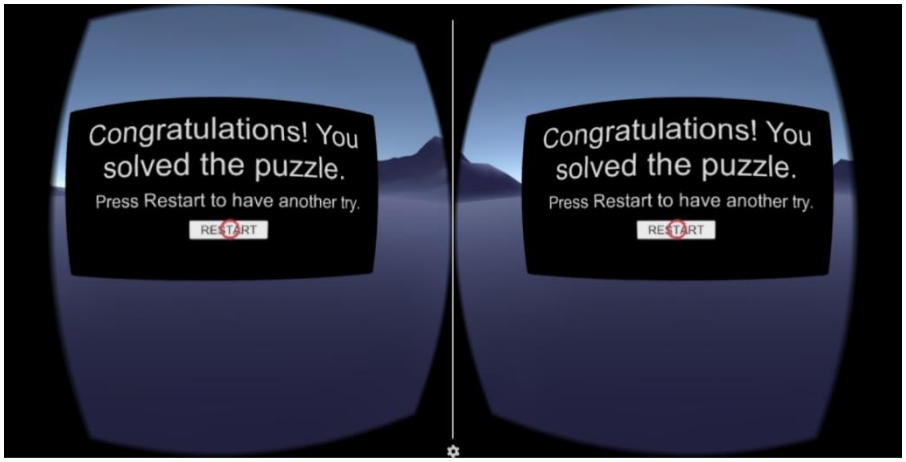

Figure 5 End Waypoint User Interface

Setting The Scene With Audio And Lighting

The game is set in an abandoned stone building surrounded by a mountain range. The absence of any other structures and the timing around sunset enhances the feeling of desolation. The interior of the building is lit with torches on the walls and a bright spotlight directs the user's attention to the game. The game makes use of background sounds and direct audio feedback during the game. To enhance the feeling of isolation, a gloomy track featuring crickets plays throughout the experience. When the player enters the building, a separate melodic track with haunting voices plays.

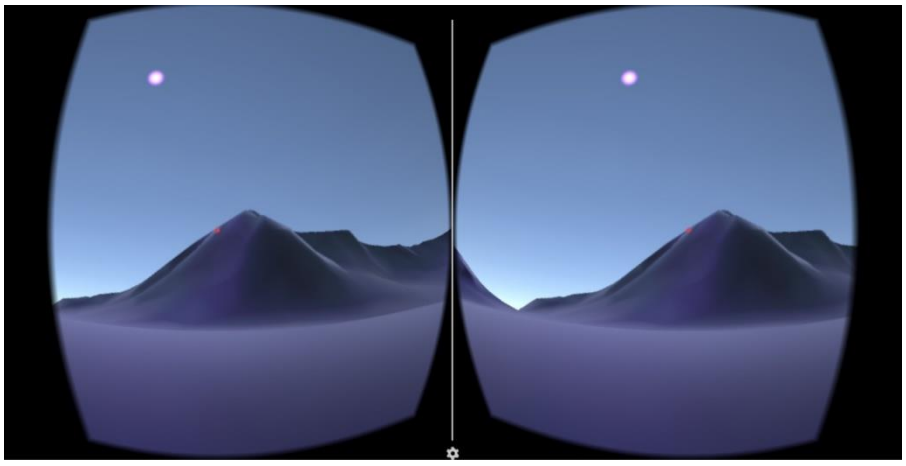

Figure 6 Surrounding mountain range

Interface Feedback

There are three elements of interface feedback for the user. Firstly, when they hover the reticle over any active object, the reticle expands, signifying that the object can be interacted with. Secondly, when they hover the reticle over the puzzle orbs, the orbs light up. Finally, when they select an orb, a sound plays to confirm that their choice has been registered, matching the sound created by the orbs when the sequence plays. This combination of visual and aural cues is an effective means of interaction feedback.

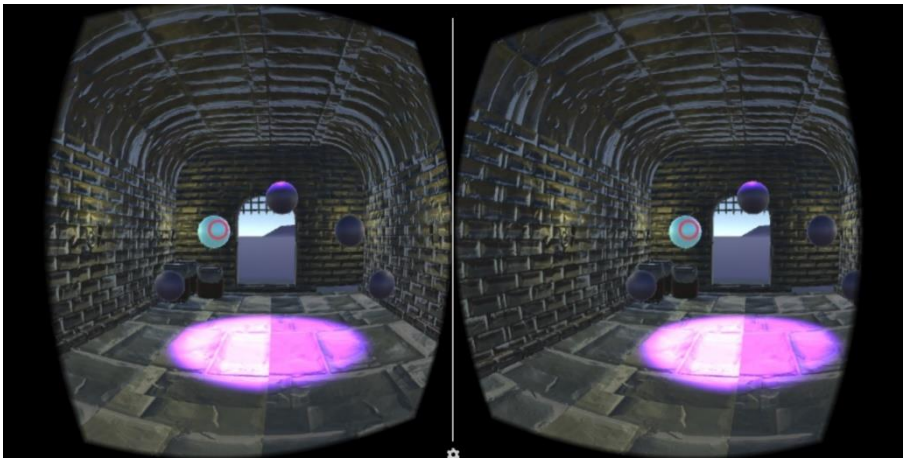

Figure 7 Double visual cues from hovering reticle over ball

User Testing Outcomes And Iteration

Testing was conducted with two users to validate the design decisions that were made. Their responses are classified in three themes. After warning the user of impending motion and instructing them for how to react in case of simulator sickness, the test was commenced.

Atmosphere

One user observed that the barrels seemed too modern for the building environment. As these were included as part of the prefab, they were not changed. The other user correctly described it as a castle dungeon-type environment and noticed the cobwebs on the ceiling.

Graphics

Both users noted that the scene appeared blurry when looking at the mountain scene. One said that he saw two reticle dots – in other words, they were not merging into one. The position of the device in the viewer and the user's distance from the lenses can impact this, and it is not a problem with the game design. Both users found the speed of motion between waypoints to be acceptable and did not report any feelings of motion sickness. Users also reported that the physical scale was appropriate. One user noted that the mountains appeared to be "rolling" when the view was rotated. To correct this, the camera's far clipping plane distance was increased.

Game interface

Both users were confused about how the game was to be played. Part of this was due to being distracted by the fresh scene inside the building; just as the player has entered and is inspecting the space, the orbs start to light up. After this, there is no cue to indicate how to replay the sequence. One user also mistook the orb lighting up in response to his gaze as being an input, when instead he needed to press the button. Both users needed specific instructions on how to use the cardboard button.

As a result of this feedback, the following improvements were made:

- A note was added on the first panel to instruct the player in the use of the cardboard button (Figure 8)
- A second panel was added which explained how to play the game (Figure 9)
- The distance to each panel was made equal and increased to 0.8m

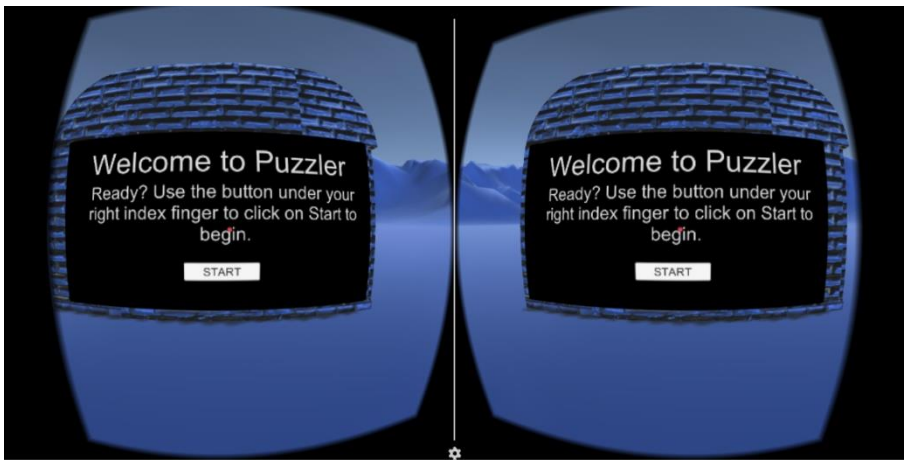

Figure 8 Modified start waypoint user interface

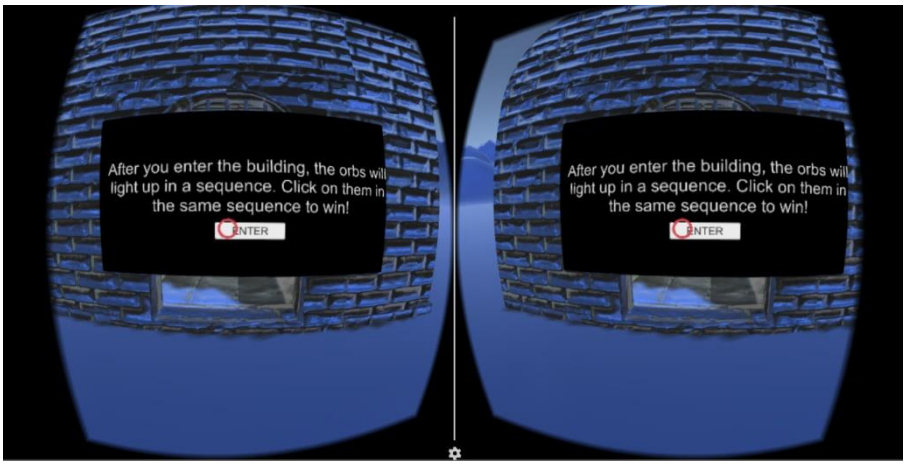

Figure 9 Instruction waypoint user interface

Conclusion

The intent of this project was to become proficient in the user interface design aspects of a VR experience. By subjecting the game to user tests focused on validating specific design features such as scale, interface and motion, the design of the experience was built up from a solid foundation.