4-25-2021

Language Immersion Simulator

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by

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An Honors Capstone

submitted in partial fulfillment of the requirements

for the Honors Diploma

to

The Honors College

of

The University of Alabama in Huntsville

April 25, 2021

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Language Immersion Simulator Manuscript

The Language Immersion Simulator game is a virtual reality (VR) game built for the Oculus Quest 2. I have always heard that the best way to learn a language is to spend time in a country that speaks the language, a phenomenon called language immersion. I wondered if simulating that immersion could be just as effective, especially in circumstances where travel is not possible. I tested this theory myself while spending time playing a non-VR game that provided verbal dialogue in a foreign language. After extensive play, I began to pick up on words from the foreign language just by playing the game and hearing the phrases repeatedly. This is what inspired me to create a virtual reality game to increase immersion that I had already experienced in a non-VR video game. I held onto this idea since my freshman year at UAH, and realized its merit in a time of a pandemic where travel was suspended indefinitely. I decided to make it real through my Honors Capstone requirement in the Spring 2021 semester.

I began the project with research, planning, and paper prototyping with the guidance of my professor. Once I had a high-level picture of what the program would look like, I began to plan what the low-level requirements would be. The next step was to create a Unity project, imagine what a playable prototype of my idea would look like, and plan what data structures and systems would be involved.

Unfortunately, my computer hardware at the time was insufficient for virtual reality development. I was able to mitigate these issues until I received my order for a new computer, but the process proved very slow and tedious. I was also plagued with issues with Unity's rendering pipeline for an extended period of time, which prevented me from

using pre-created art assets to build the world that I was imagining since I lacked 3D modeling skills and knowledge to create my own art assets. However, after lengthy research and trial-and-error, this issue was resolved.

Once I built the world, I worked on player controls using the Oculus controllers. This process required many hours of research and trial-and-error, but eventually all of my issues were resolved. Once completed, the game allowed the player to be able to move around the environment with the controller joysticks, as well as use the triggers to teleport around the world.

The next step was to create non-player characters (NPCs) for the player to interact with. I wanted to include interactions that teach the player basic but important phrases to know in English. I decided to have a hotel attendant NPC, a chef NPC, and a doctor NPC. Through these interactions, the player will learn how to request a hotel room, order chicken soup, and request medicine from a doctor for a headache. These represent a person's basic needs (shelter, food, and health), thus providing the player with critical skills to request a place to sleep, food, and medicine in a foreign language.

Due to my limited time and experience, I was not able to implement player-NPC interaction the way that I had initially imagined. Ideally, I would have preferred for the player to approach a person, hear their words, and then be expected to speak a response. Then the program would detect whether their response was correct, and provide hints if it was incorrect. Due to my time and skillset limitations, I decided to use a text-based dialogue system for NPC interactions. When a player approaches an NPC, text appears. The top text represents what the NPC has said to the player, and the two

text options below represent two choices the player must choose in order to respond. One option is correct, and the other is incorrect. Because I wanted this version of the project to be tailored for Spanish-speakers who wish to learn English, I contacted a friend and fellow UAH alumna Daniela Sumoza in order to tailor the incorrect responses to Spanish-speakers beginning to learn English. Although this version of NPC interaction was not ideal, it still has merit and may be easier for players who are just getting started learning English.

Once the options were created, I had to build the user interface interactions. To allow the player to choose an option, raycasting needed to be implemented to allow the player to point at an option with their controller and select it. I implemented this so that the rays are only visible when pointing at potential options, making it clear to the user that they are interactable, and one must be selected. To make it easier for a player to select an option, I decided to make both controller's triggers functional for this interaction to avoid confusion. To make it clear to the user whether they chose correctly or not, I decided to implement a couple of factors. First, I used color. When the player chooses correctly, the option turns green. When the player chooses incorrectly, the option turns red. This color variation clearly indicates to the player which option is correct and incorrect. Additionally, I decided to add haptic feedback to the interaction. When the player chooses correctly, the controllers vibrate for two seconds through controller haptics. When the player chooses incorrectly, the controllers do not give any haptic feedback. This provides an additional sensory indication for the player whether they have chosen correctly or not. The combination of color and haptic feedback

indicates to the user whether they have correctly chosen through a combination of visual and physical feedback.

Once I tested the game's functionality, I created a menu for the game. I decided that since the game is tailored for Spanish-speakers who are beginners at learning English, the menu options should reflect that goal. With the help of my friend Daniela, I created a set of game instructions in Spanish, along with a set in English for the player to choose in order to fully understand the game's purpose and how to play. The button options in the menu also provide both English and Spanish labels. In order to implement a way for the player to exit the game once past the main menu, I decided to make the hotel attendant the way back to the main menu. When the player interacts with the hotel attendant, they must correctly choose the option to request a hotel room in order to return to the main menu. If the player chooses incorrectly, the option turns red and the player remains in the play world.

Overall, I am pleased with the current state of the project. Although I have more complicated systems that I plan to implement, such as voice acting and speech recognition, the current system is functional and provides a playable prototype (vertical slice), that matches my original vision for the project. My main goal for the project is to extend the phenomenon of language immersion to those who may be unable to travel but still wish to learn a new language in a way that is fun and effective. I believe that this project has the foundation to provide that service and successfully proves the concept.

Non-Original Materials Used in Project

Oculus Integration | Integration | Unity Asset Store

Low Poly Ultimate Pack | 3D Props | Unity Asset Store

Low Poly Animated People | 3D Humanoids | Unity Asset Store

FREE Skybox Extended Shader | VFX Shaders | Unity Asset Store

Nature Sound FX | Audio Sound FX | Unity Asset Store

Game Demo

YouTube Link to Game Demo