VR Project Report and summary

Claude Bernard Lyon 1 University - TERA 2024

Made by *Burger Loan, Jeannin Dylan, Lazhari Klhalil, Petit Lucas, Spataro Mathis* in 30 to 40 hrs.

Project Goal

Creating a virtual reality game in Unity using a given VR headset and controllers, as well as a motion capture (MoCap) setup with 8 camera.

We chose to start with a beat saber clone, using two sabers attached to the player's hands to destroy incoming blocks using the VR gear we had. However, the ultimate objective was to use the MoCap system to get rid of the controllers and have the game character be in a mine cart, smashing rocks with his fists. We did not manage to achieve this second goal within the five days time frame.

Work done

We managed to get a beat saber clone working with minimal graphics, as our focus was on implementing the core mechanic of the game.

- the sabers are controlled with the VR controllers.
- the character and their position is controlled by the position of the headset
- blocks are generated and are destroyable only by hitting them using the correct saber and through a given impact direction.

We used the OpenXR plugin to link the unity project and the VR gear through steamVR

To detect the incoming direction of the saber through the cubes, we start by computing a normal vector from the saber, going into the cube upon impact. We then compute the angle between that vector and the normal of the authorized side of the cube. If that angle is above a given threshold, the cube is destroyed.
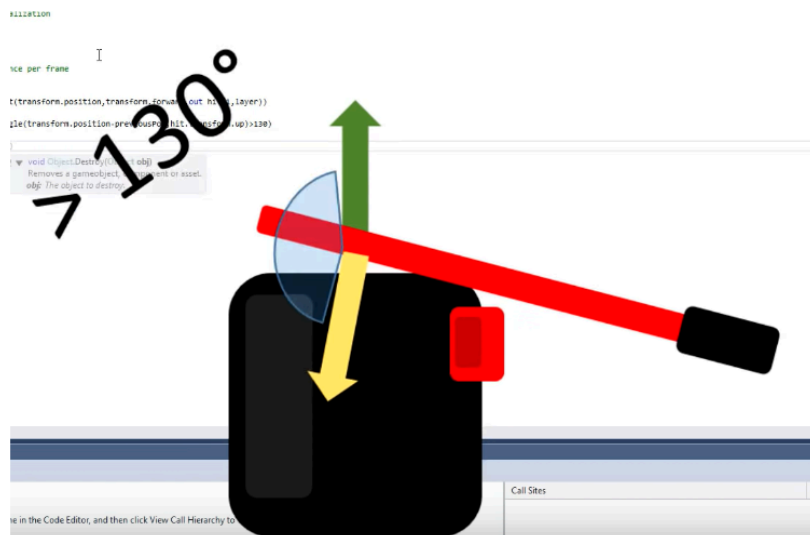
The mocap system we had at hand was an optitrack setup consisting of 8 cameras forming a cube around the play area. Optitrack compiles the cameras outputs and generates a 3D skeleton of the player, which is accessible through a server in the playing room's local network.

What was attempted

While we did manage to link the output skeleton to the character's motion in-game, we didn't manage to transcribe real-life movement into in-game movement accurately enough for it to be playable, especially when dealing with arms.

We believe that given more time, we would have managed to make it work.

We lost a fairly big amount of time calibrating the MoCap system and setting up the VR gear, which given that we could only have access to these systems during the building's opening hours and outside of other classes and projects, lead to a massive reduction in available development time. We therefore reduced our goal to the beat saber clone and went on.

What we could have done better

First, setting up Unity version control, git lfs or another versioning system could have given us a few more hours to work on this project, which is not small relative to the total development time.

Regarding the game in itself, a little graphics upgrade with fog and glowing as well as additional obstacles such as walls or bombs could have made it more interesting.