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EE 267 Project Proposal

Proposal 1 – Lighthouse Calibration

Problem Statement, Previous Work, New Approach

We currently have a working lighthouse. The lighthouse sweeps the room periodically at a set frequency, sweeping in both the X and Y directions, allowing triangulation of position and the calculations of homographies and poses with high accuracy and good performance. It's an exciting piece of hardware that can improve immersion in VR, beyond the simple head-neck models we've seen already in use.

However, currently we do not account for the intrinsic parameters of lens distortions and different principle points. This can cause inaccuracies in the actual calculated position. These could inconvenience future generations using the Lighthouse. I would like to work on solving this issue, and enable more precise calibration for these parameters, and to extend functionality in other ways.

Timeline

First week:

1. Talk and coordinate with the TA's/Professor in more detail about lighthouse calibration. Continue coordination.
2. Set up the necessary software and hardware.
3. Research and fully comprehend the subject.
4. Assess full feasibility of project and what I can and can't do.
5. Plan out solution. Figure out how to assess and test success.

6. Finish initial solution.

Second week:

1. Test solution and adjust where necessary.
2. Complete solution.
3. Write up a final summary/report of progress, changes, and any potential problems that may need to be addressed.

Backup Proposal – Content Creation in VR

Due to potential complications with (likely) going solo, feasibility, and hardware conflicts, I will also submit a backup proposal.

I will create a VR experience, most likely using Unreal Engine, which I am familiar with and have some graphical assets I could potentially reuse.

There are a variety of VR experiences already out there, attempting to take advantage of the immersive-ness of VR. Horror is a popular genre, as well as classical gaming genres like FPS's attempting to find their niche in the platform. Others are more playful, like one where you can experience being a cat knocking things over.

Inspired by our latest homework, something I'd maybe like to do is create a customizable audio environment, maybe for relaxation or fun. In particular, I'd like to empower the user will be able to place "speakers" or other objects playing/emitting various sounds in the VR environment. By moving/teleporting around their environment, they can change the type and volume of sounds they hear. This could be an interesting spin on simply scrolling around a playlist. For this, I'll need to acquire a variety of interesting sounds/music. Additionally, as I go along, I may add features like changing backgrounds – maybe 2 or 3, if I have time, or if I can find some environments – other forms of interaction, and precipitation. In particular, I'm thinking it might make certain sounds more cool to listen to when you're on a rainy beach, inside a futuristic underwater tunnel, or a dark city street at nighttime instead of your room!

Timeline

Week 1: Set up necessary equipment and complete basic concept of experience.

1. Figure out how to interface with the headset. Verify that the headset still works.
2. Figure out if there's any interactive hardware I could use, like controllers. Default will be keyboard controls with WASD.
3. Update my Unreal Engine software and salvage my assets, acquire any I might need. Re-familiarize myself with UE, or WebGL if for some reason they do not work.
4. Set up basic environment, navigation, user control features.
5. Finish first draft of experience before the end of the week.
6. Do some user tests and ask for feedback.

Week 2: Polish the experience.

1. Decide on what I can and can't finish.
2. Quickly complete any unfinished crucial parts and fix any bugs.
3. Use user feedback to improve experience.
4. Do some more user tests, if time allows.
5. Wrap up the project.