EE 267: Project Proposal

Team:

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Introduction & Motivation:

Our motivation is to create a fun demo that makes a more immersive virtual reality experience. Our background is more related to embedded systems than computer science, therefore, we would like to create an immersive experience through the introduction of new hardware compared to a project that looks to improve graphic rendering.

In order to make this experience more immersive, we would like to bring the user's hands into the virtual environment. This will allow them to interact with the environment with more than just their head movements. We are going to try to do this using a leap motion mounted to the HMD or a Kinect placed in front of the user, which should allow us to obtain the users hand position in reference to the HMD. This should enable us to represent their hand positions & movement in the virtual reality in some way.

A fun application for this project is 3D fruit ninja. Essentially, a virtual reality game that has objects move toward the user. The user is supposed to cut these objects with their hands before they get hit by these fruits.

There are a number of interesting design questions to consider with this project: How will depth of objects be conveyed effectively? How will the hands appear in the virtual space? How will we match the user's hand position to objects positions in the virtual space? …

Scientific References:

Bowman, Doug A., and Larry F. Hodges. "An evaluation of techniques for grabbing and manipulating remote objects in immersive virtual environments." *Proceedings of the 1997 symposium on Interactive 3D graphics*. ACM, 1997.

Mine, Mark R., Frederick P. Brooks Jr, and Carlo H. Sequin. "Moving objects in space: exploiting proprioception in virtual-environment interaction."*Proceedings of the 24th annual conference on Computer graphics and interactive techniques*. ACM Press/Addison-Wesley Publishing Co., 1997.

Mine, Mark. "Virtual environment interaction techniques." *UNC Chapel Hill computer science technical report TR95-018* (1995): 507248-2.

Rokita, Przemyslaw. "Generating depth of-field effects in virtual reality applications." *Computer Graphics and Applications, IEEE* 16.2 (1996): 18-21.

Milestones & Timeline:

Project Proposal Due – 5/6

Project Proposal Presentation – 5/9

Hand Position from Kinect or Leap Motion – 5/13

Creation of Virtual Environment with Random Objects Moving Towards User (with accurate Depth Rendering) – 5/20

Representation of Hand Position in a Virtual Space – 5/20

Integration of Hand Position representation and Developed Virtual Environment – 5/27

Refinement before Demo – 5/31

Project Poster and Demo Session – 6/1

Project Reports and Code Due – 6/2