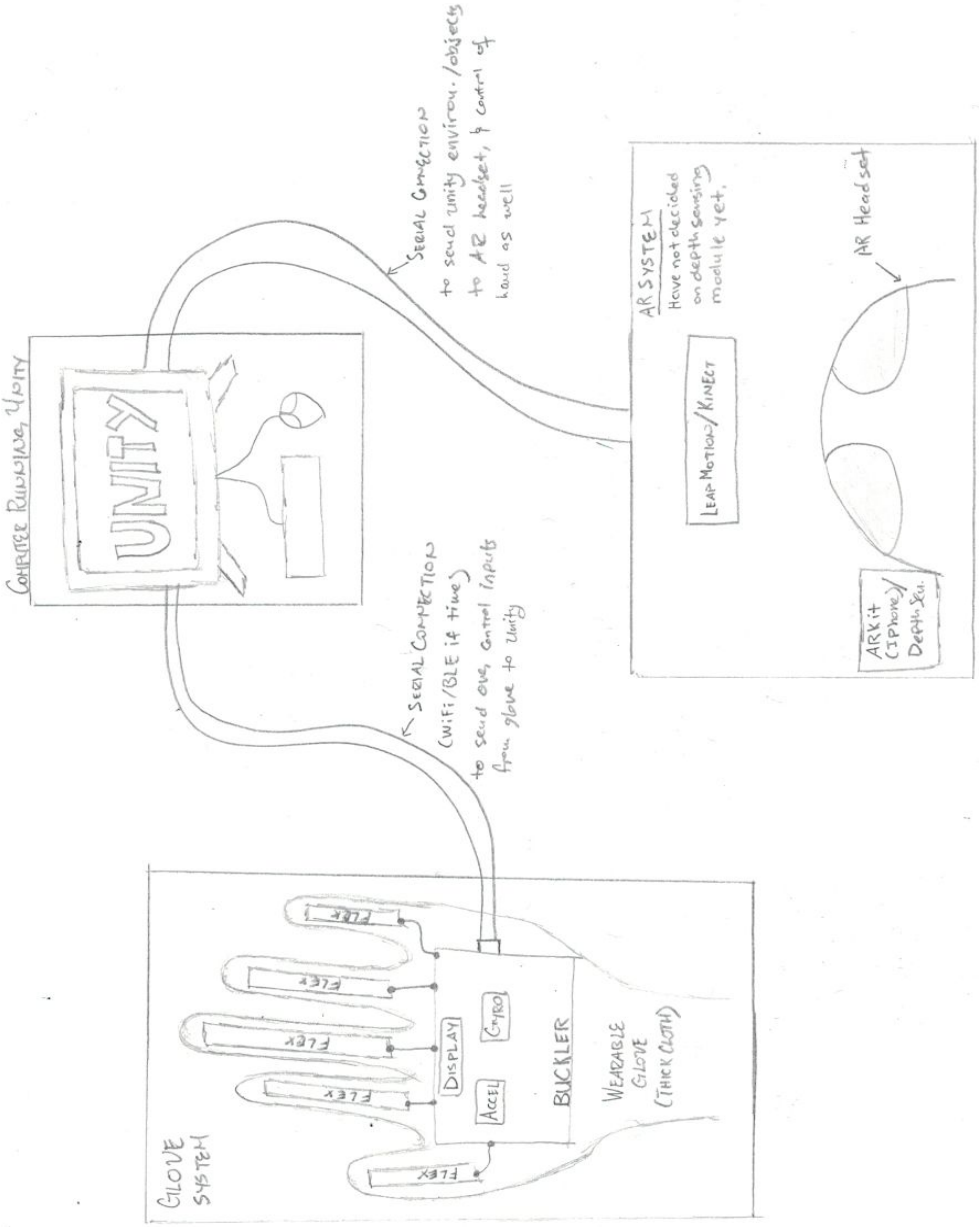
Architecture Drawing



Progress So Far

We have acquired permission for use of a AR headset and begun to familiarize ourselves with Unity so far. We've been researching sensors and depth perception techniques as well. No updates to the repo have been made, but here is a link anyway: **Github Link**

Project Goal

Project goal is still the same as what we gave in our proposal. Our project consists of a glove I/O device component worn by a user to control a virtual environment and its objects, where the virtual environment is created in Unity. Using a gyroscope, our glove device will be capable of rotational orientation in a 3D space, and using an accelerometer we plan to illustrate the magnitude of the physical glove's movement in the 3D environment. The second component is in conjunction with an AR headset and depth perception device (such as a LeapMotion, Kinect, iPhone) that allows the user to 1) view the virtual 3D environments objects in the real-world, and 2) allow the user to perform translational motion in the virtual 3D environment. Given time, we may also tailor our project to some specific application -- such as a program like Solidworks CAD or for use in a presentation -- but the main goal is to develop a general-purpose, 6DOF I/O device with a tracking system.

Resources

For Glove

Component	**Link**	**Cost**
Glove	https://amzn.to/2OX7kPl	$17.04
nRF52DK		In Lab
Buckler		In Lab
Flex Sensor 2.2" x1	https://www.sparkfun.com/products/10264	$7.95 each
Flex Sensor 4.5" x4	https://www.sparkfun.com/products/8606	$12.95 each

For AR Tracking

Component	Link	Cost
AR Headset		Access through Bala
Kinect/Leap Motion		May be able to obtain from Bala or Lab
Unity		Free
iPhone w/ ARKit		Use project member's

Member Task:

Sachin DeYoung: Depth perception and electronics mounting.
Ahmed Malik: Sensor data processing and depth perception.
Chase Muramoto: Glove electronics and sensor data processing.
Luis Sanchez: Glove electronics and Unity integration.

Updated Schedule

Oct 26 - Nov 1: Create architecture drawing showcasing main ideas of project and the overall system specific goals/outputs. Begin creating system to get basic 3 axis orientation for glove and interfacing this into Unity. Understand the basics requirements for depth perception.
Oct 30: Milestone 1
Nov 2 - 8: Finalize glove-to-Unity orientation, begin working on translational movement in conjunction with depth perception.
Nov 9 - 15: Showcase 6DOF movement in AR with a very basic system, where the glove is simply a rod. We don't care about individual fingers yet.
Nov 13: Milestone 2
Nov 16 - 22: Work on finer gesture control, as well as using individual fingers for control by employing the flex sensors. Begin to interface an actual hand within Unity. Work on sending data over wireless or wired connection to computer.
Nov 23 - Dec 6: Work on fine tuning, gesture control, and Unity integration. Work on sending data over wireless or wired connection to computer. If time use more complex application
Dec 7 - 14: Work on poster and report.

Risks and Feasibility (unchanged)

There are many unknowns, starting with how accurate our baseline readings and classification for orientation and gestures is. We anticipate that making the gesture control robust and natural will require a lot of time and fine-tuning parameters to allow a user to use it comfortably. With poor sensors or noise, this process may become quite difficult. Inputting control quickly to the computer via a wifi or BLE connection may be difficult as well; we'll focus on a serial connection first. Most definitely, performing the depth perception will be quite difficult, requiring lots of research on current techniques.