The Mouse of All Trades

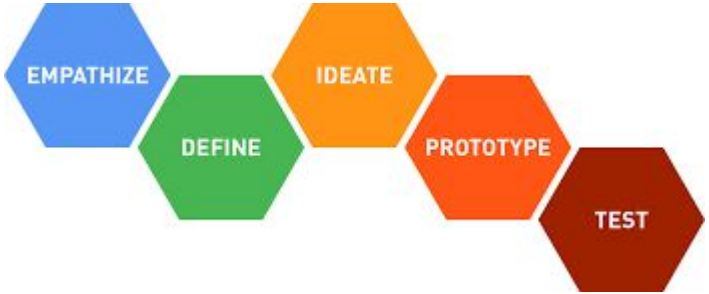
By: David, Paul, and Vinny

Introduction

- Our device was built for our client who has a physical disability that greatly reduces her fine motor skills.
- the problem that we were facing is that we needed to develop a device that could improve her use of her computer and aid with her rehabilitation.

Metrics and Benchmarking

- After empathizing with our user, we were able to establish some key metrics and benchmarks.
- We also established very early that we wanted to center our design around rehabilitation.

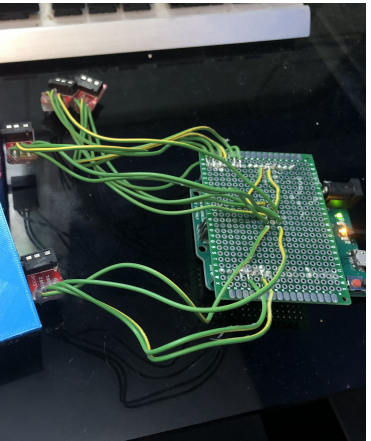


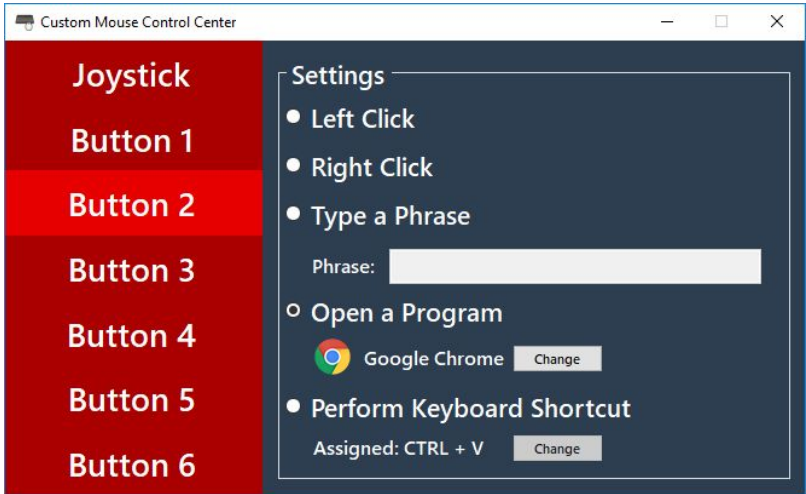
Our Solution

- We settled on a single affordable design that could meet all of our user's needs.
  - Arduino controlled
  - Joystick and capacitive touch sensors
  - On-Screen-Keyboard
  - Integrated control software and easy to use GUI

Our Solution (continued)

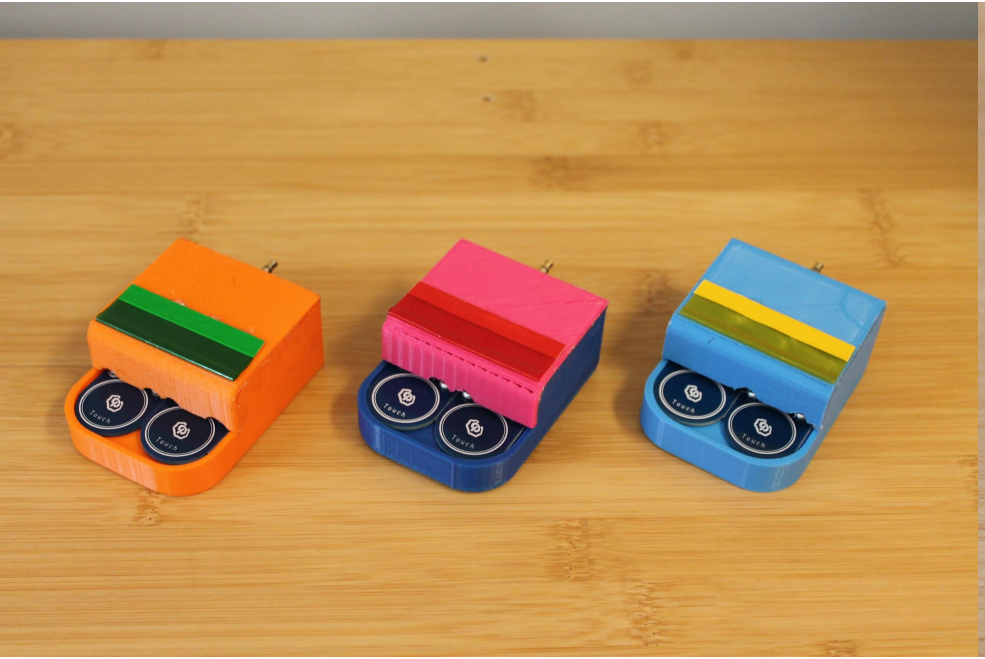
- We also determined that we would use a “plug and play” style design.
- We decided that our touch sensors would be able to have an array of possible functions

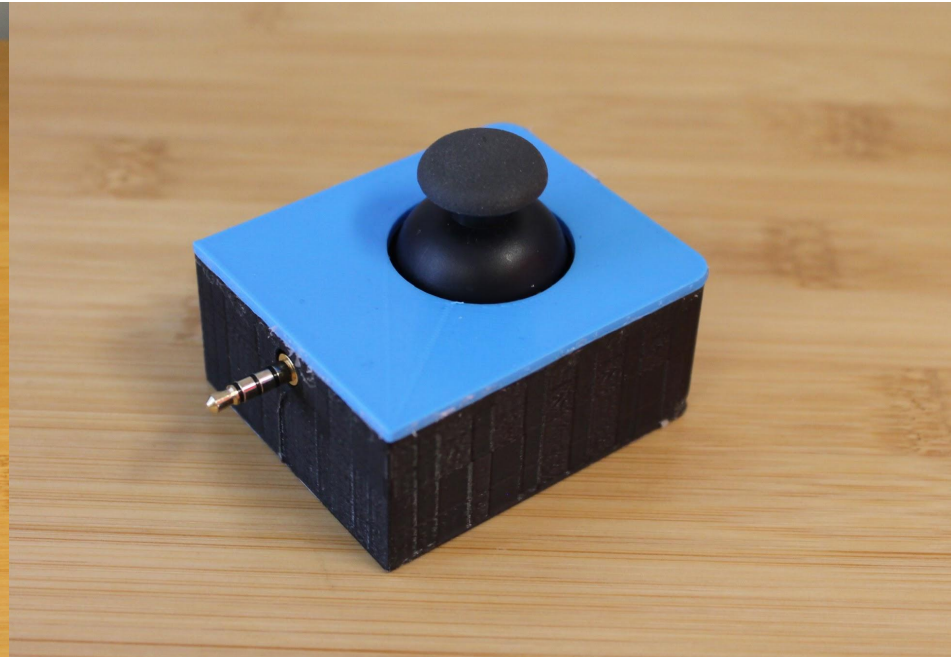




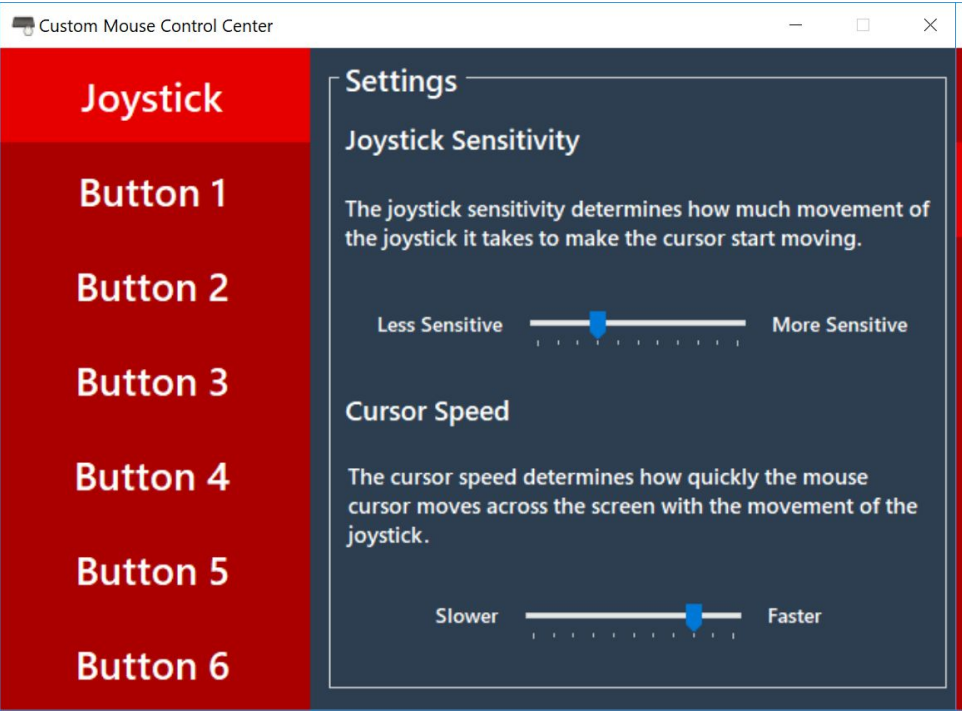
Complete Device and Spreader

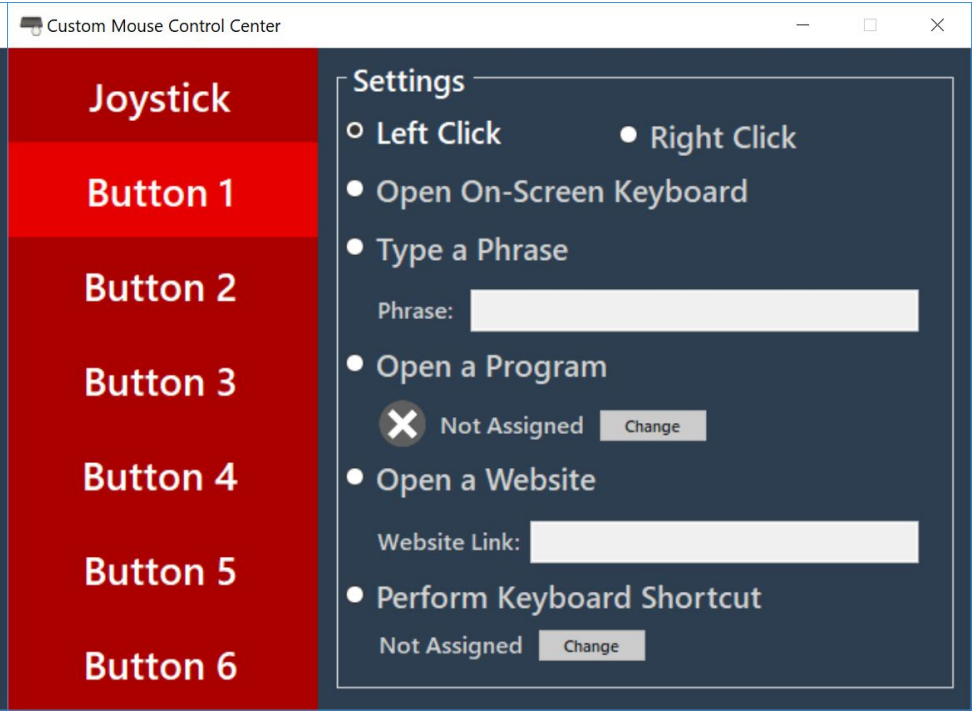
Joystick and Touch Sensor Modules





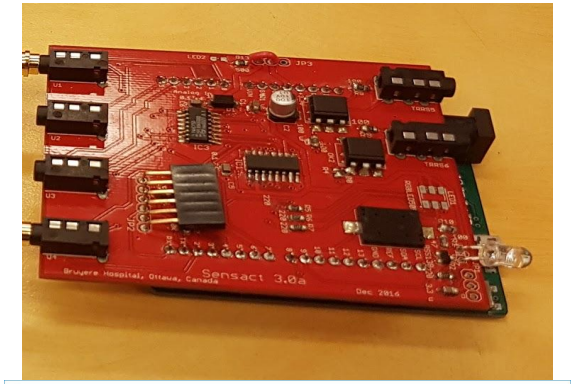
Graphical User Interface

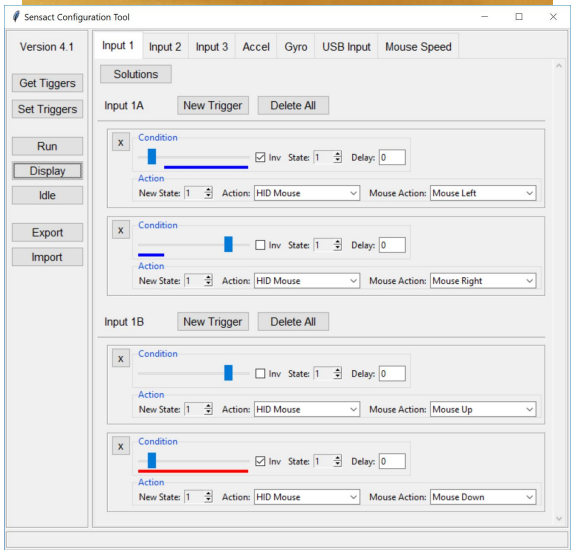




Early Design

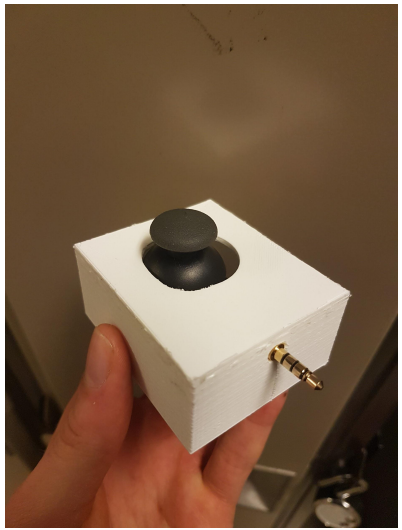
- We initially opted to use the Sensact Arduino Leonardo shield developed by the St. Vincent Hospital
- The software originally consisted of a Windows service running in the background and a GUI to control settings

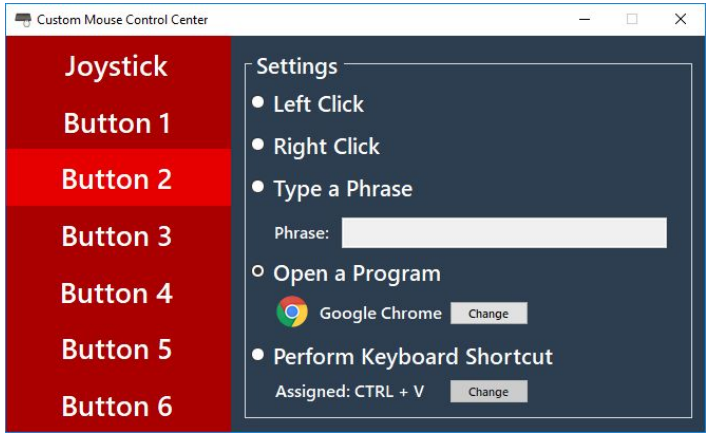




Early Design - Mockups

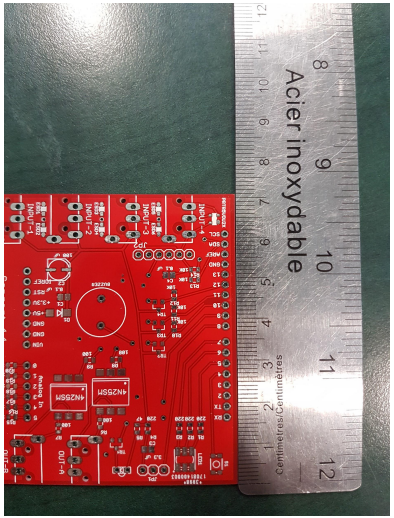
- We started prototyping modules together
- We designed a mockup GUI for the software that is user-friendly





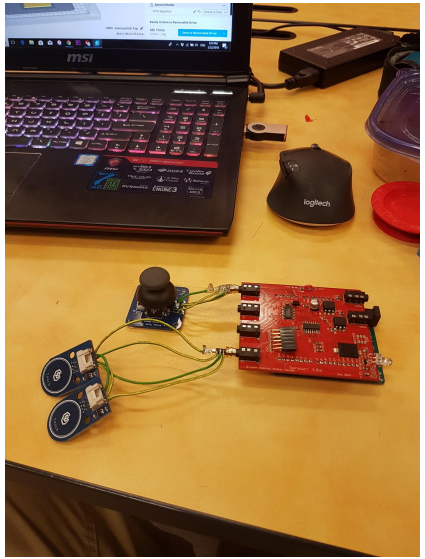
Early Design - Circuitry and Printing

- We soldered different sensors and connectors together
- We also re-measured pieces and printed several case mockups

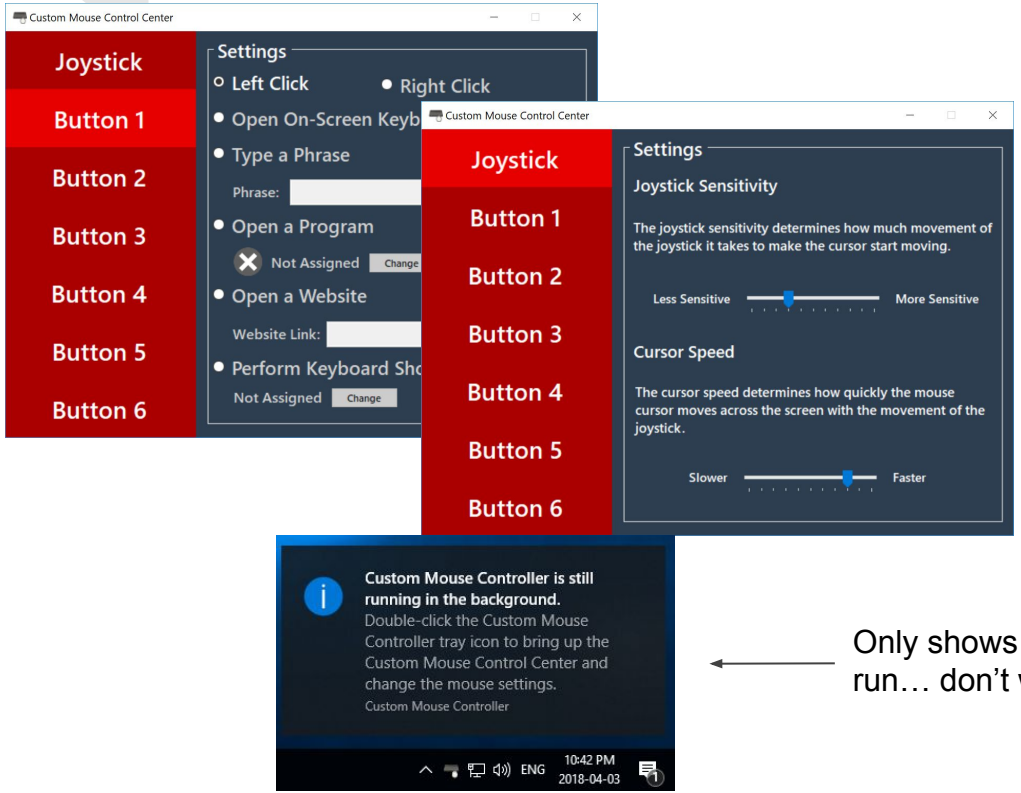


Early Design - Testing

- We continuously tested what we had along the way and kept making sure everything was working as expected



Software Progress

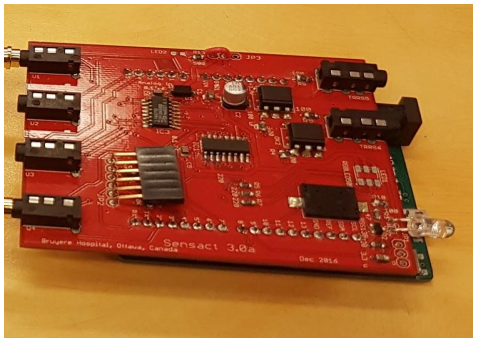


- We found out that Windows services cannot control the desktop
- Instead, we opted for a regular program that runs in the background, controlled by a GUI that sits in the taskbar

Only shows on first run… don't worry!

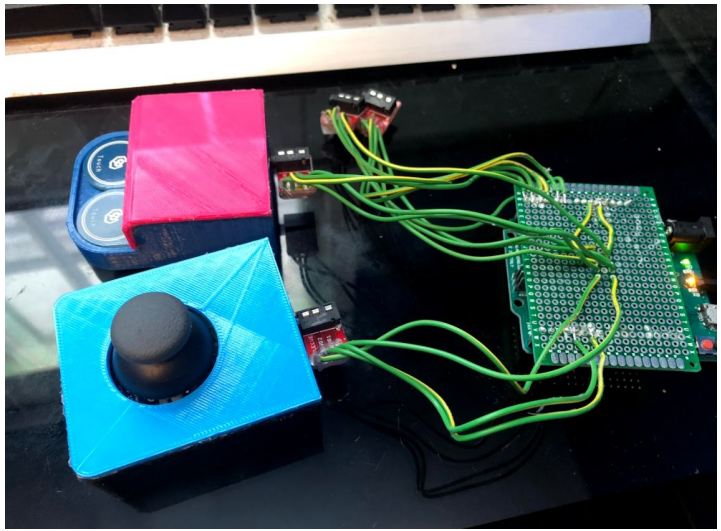
Arduino Code

- The Sensact code was bloated and had more functionality than needed built in
- We decided it was best to use the Sensact for its AUX inputs, but write the code from scratch



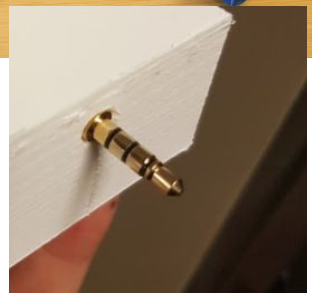
Ditching the Sensact

- The Sensact was nice because of its inputs, but it was causing a lot of instability
- We made a risky but worthwhile decision of scrapping the Sensact completely

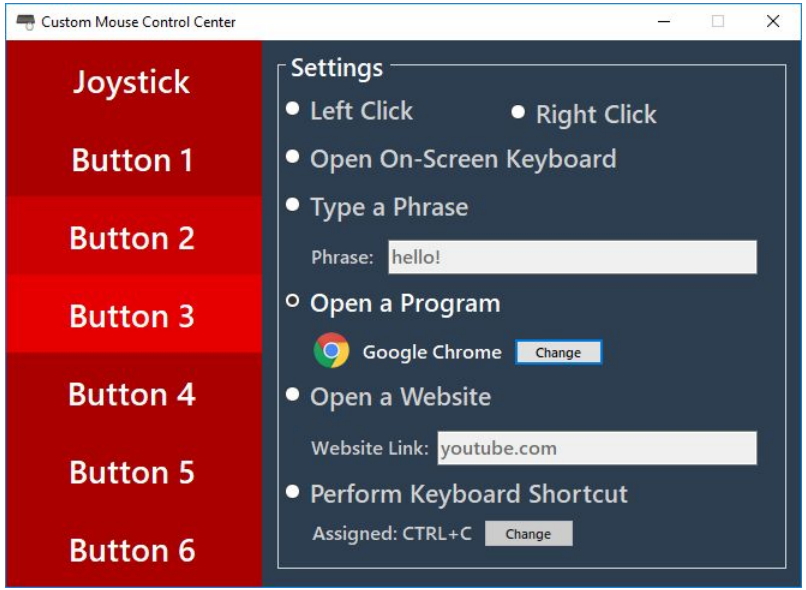


A sticky situation…

- When we were finalizing everything a couple days before it was due, we got epoxy into the female AUX jacks and on the male AUX connectors when gluing them in the casing despite our preventative measures
- Thankfully, we were able to solve the problem, but it was a bit of a panic moment



The Finished Product



Lessons learned

- It isn’t done until it’s done
- Different strengths apply to different tasks
- Time management of a long term project

Next Steps

- Present device to the client
- Gauge the usefulness of the device
- Complete remaining deliverable

Future Work

- Project comes to an end with the course
- Memories last forever