Electronic Design Lab

Exoskeleton Glove

Milestone-2

Progress since Milestone-1

- Ideated and 3D-printed out **3** different mechanisms for the **finger-joint**
- Completed the schematic on **KiCad** started **spice simulations**
- **Tested** out the sensor
- **Modelled** a rigged 3d hand using Blender

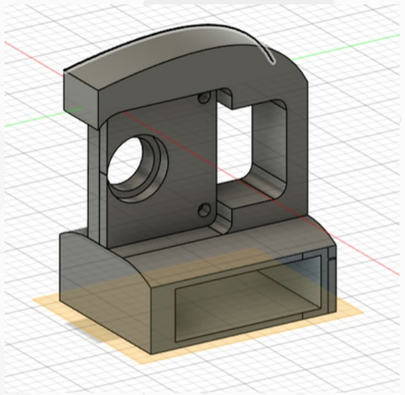
Feeback :

We were suggested to start testing immediately to make sure robustness, and also start analyzing sensor data

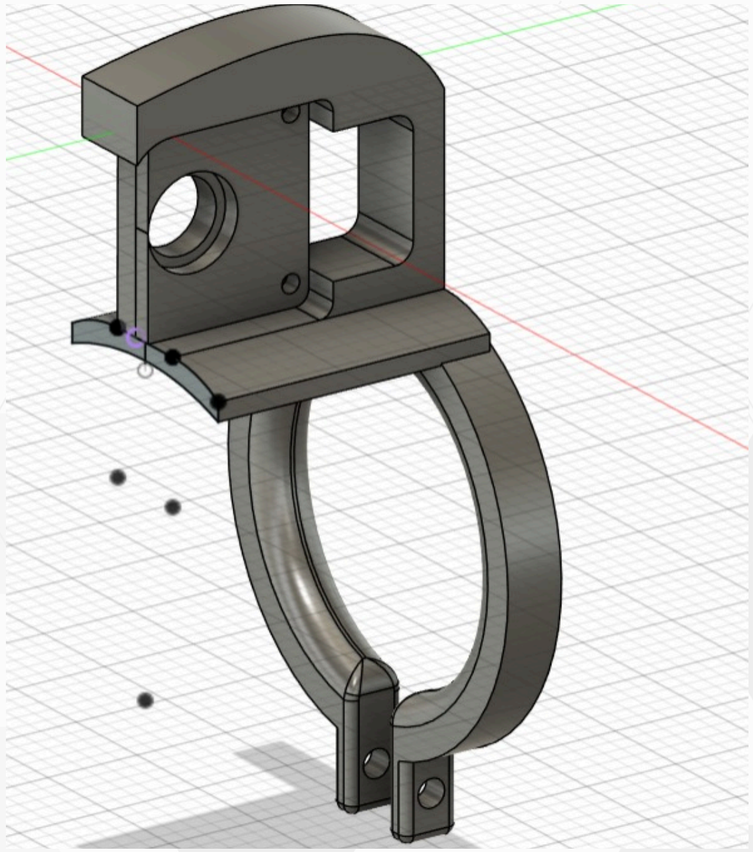
In accordance to that, we have decided to start component testing and cad designing immediately!

This has helped us improve our model further as we were able to spot potential improvements early on!

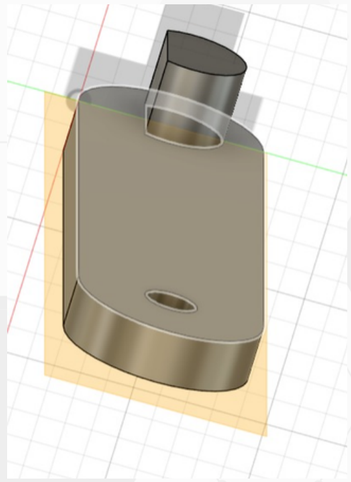
Our CAD Models :



Sensor slot

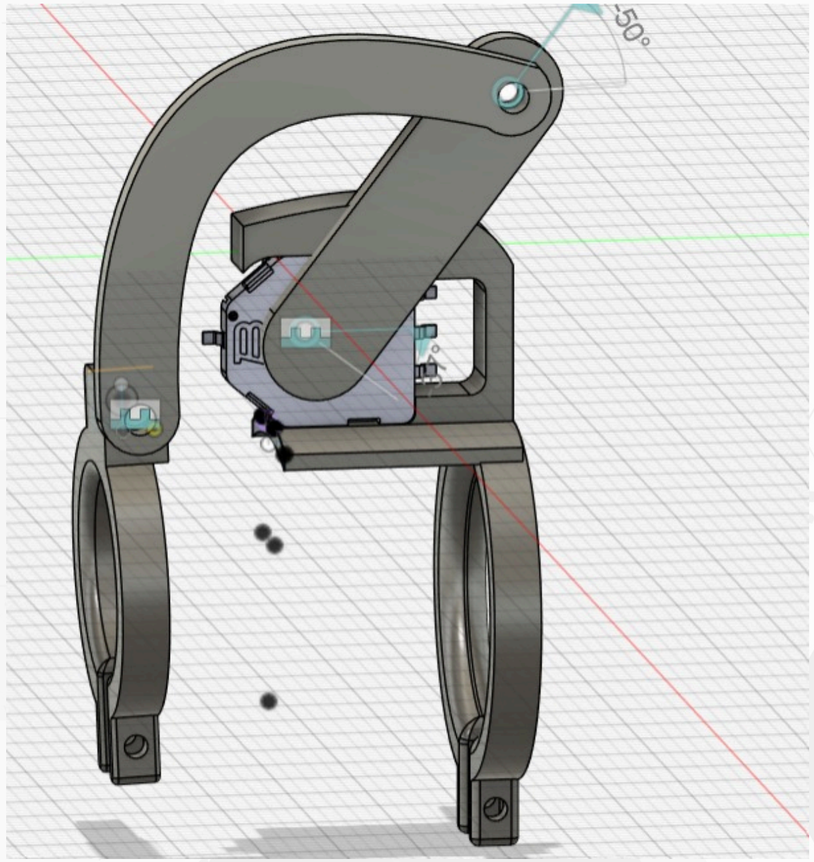


Finger holder(ring)

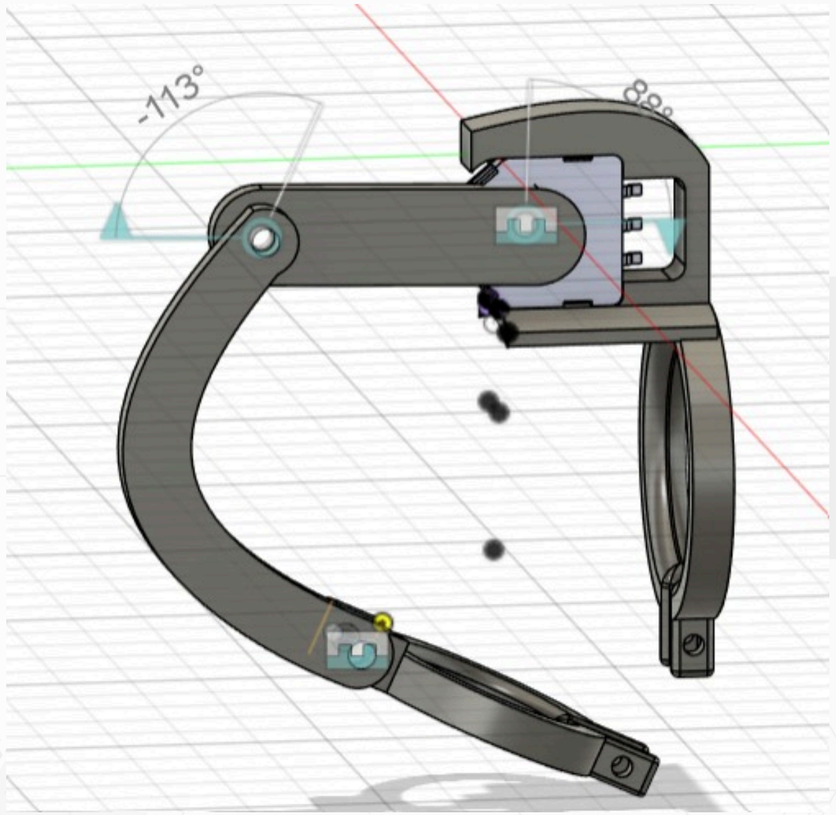


Rotating Pivot

Assembly (Iteration 1) :

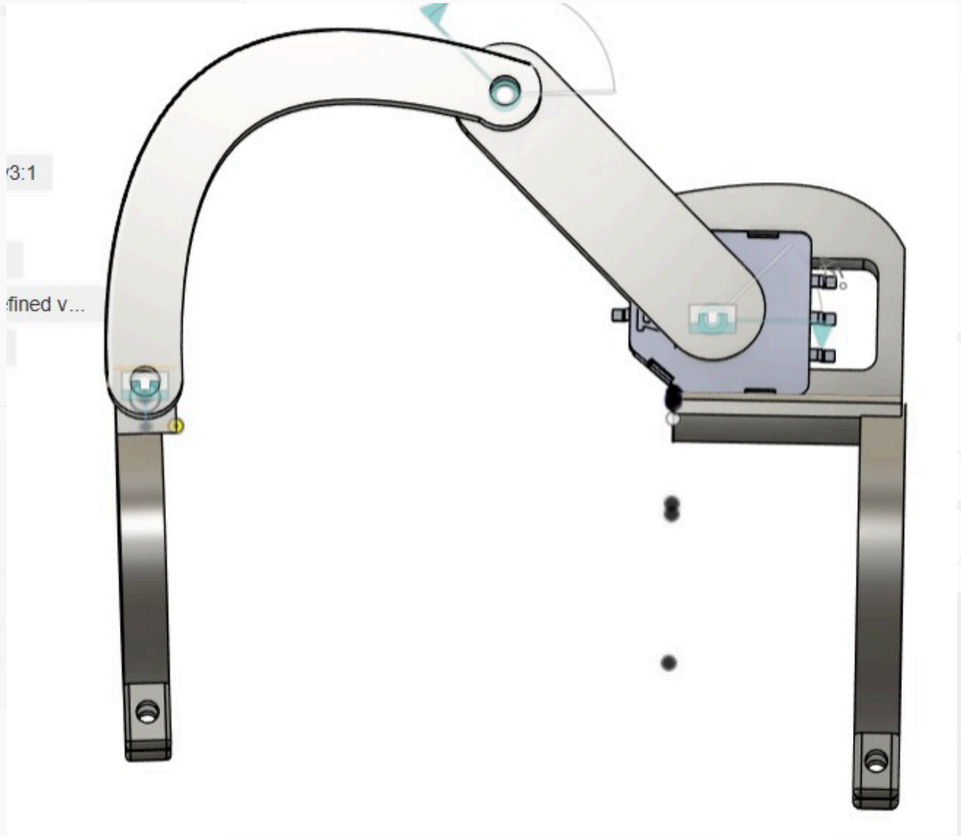


Straight



Flexion

Assembly (Iteration 2):

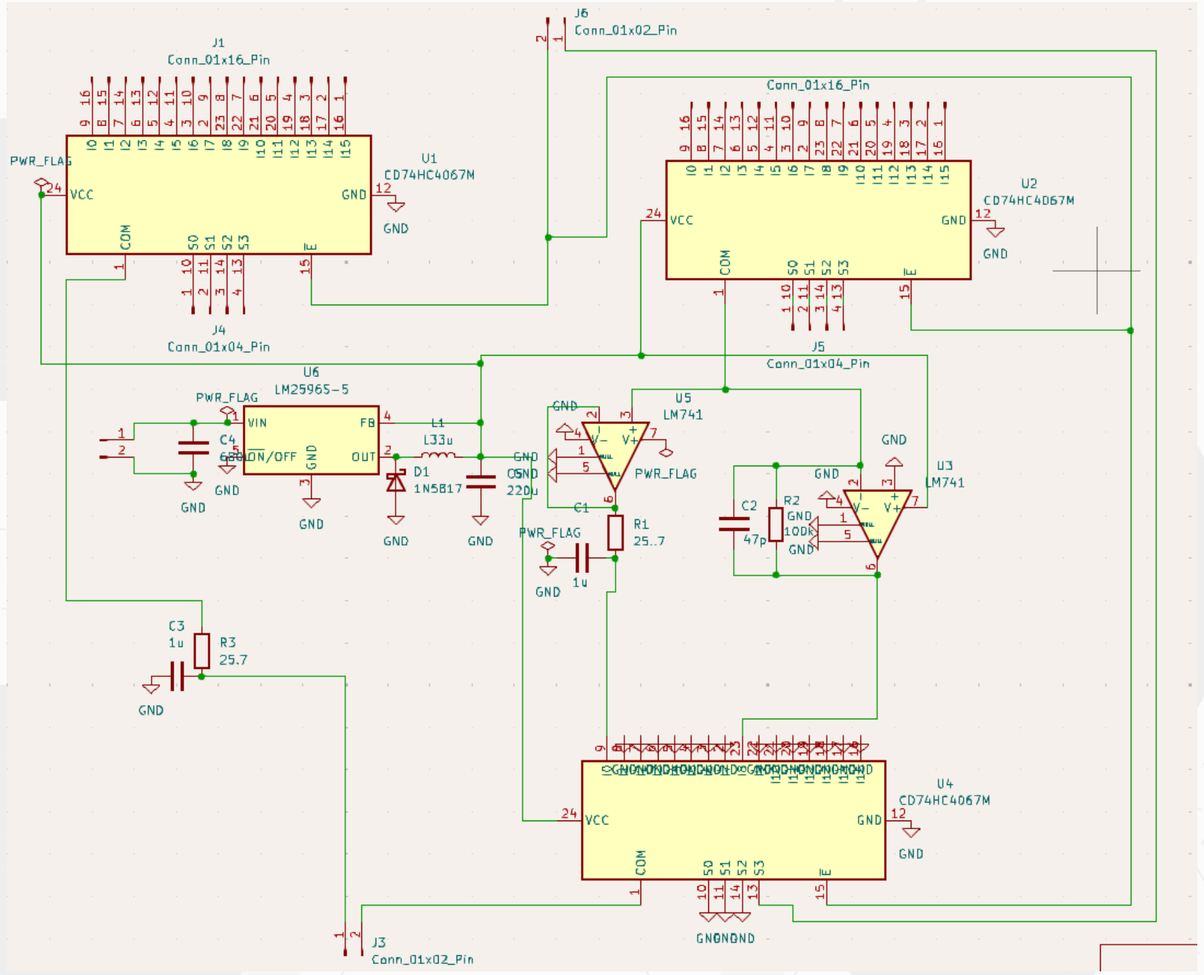


Straight

Flexion

Schematic on KiCAD with Footprints

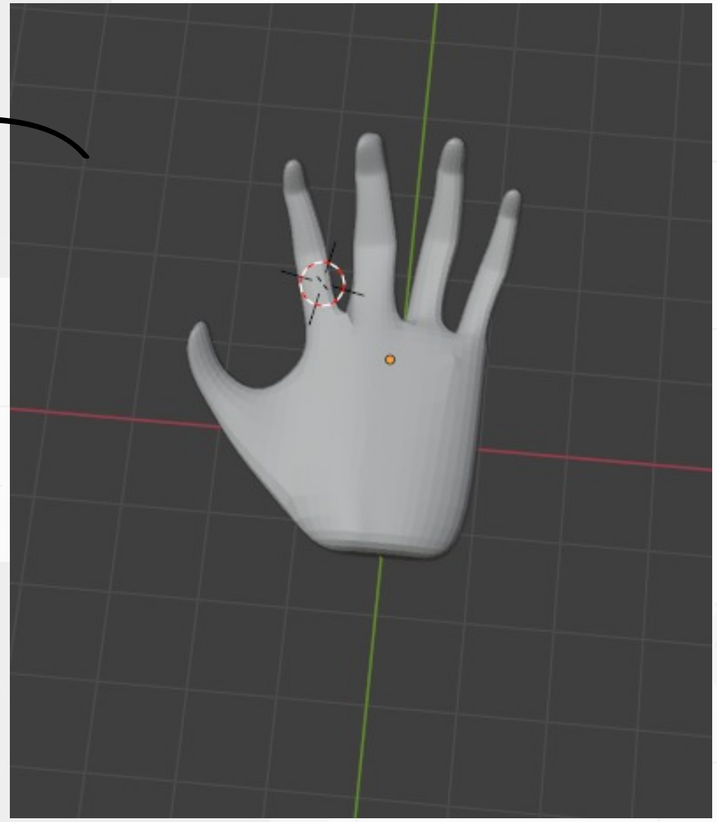
We’ve started working on our PCB design, plan is to implement a single layer double sided layout



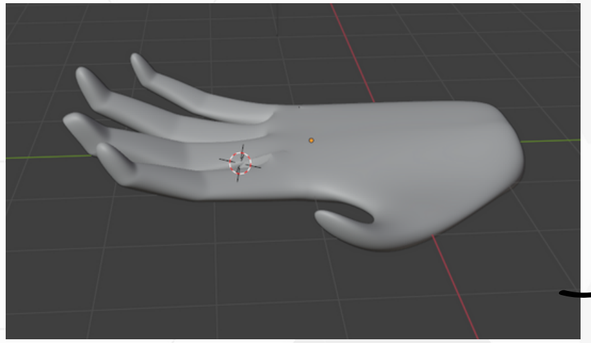
Resistor and Capacitor values have been tuned according to filter simulations on LTspice. Base input voltage to CD74 is 5V

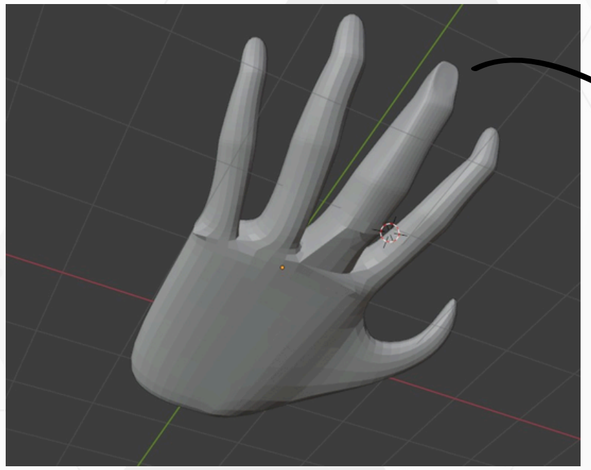
Blender : Hand 3D Model

Top View



Side View



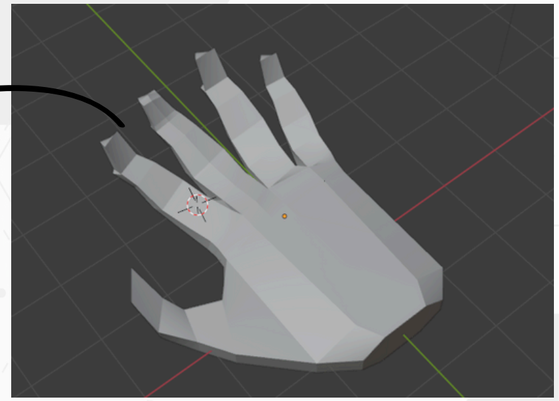


Nail Engraving

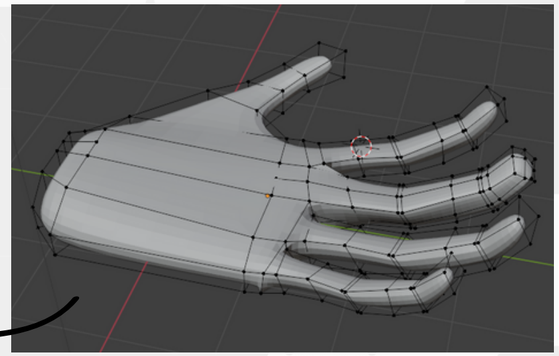
3d Hand model : Wireframe

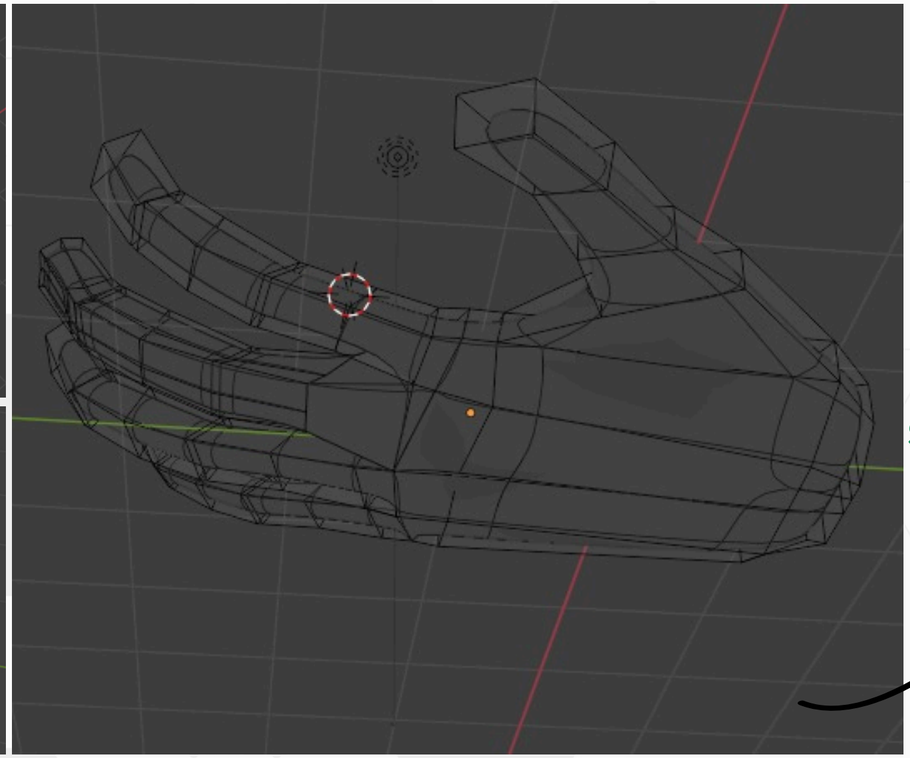
The original model is blocky as shown in the left-top image. We needed a smoother surface to make the hand look realistic, for which we applied “Surface Subdivision Modifier” which gave the final look as in the left-bottom image

Original model



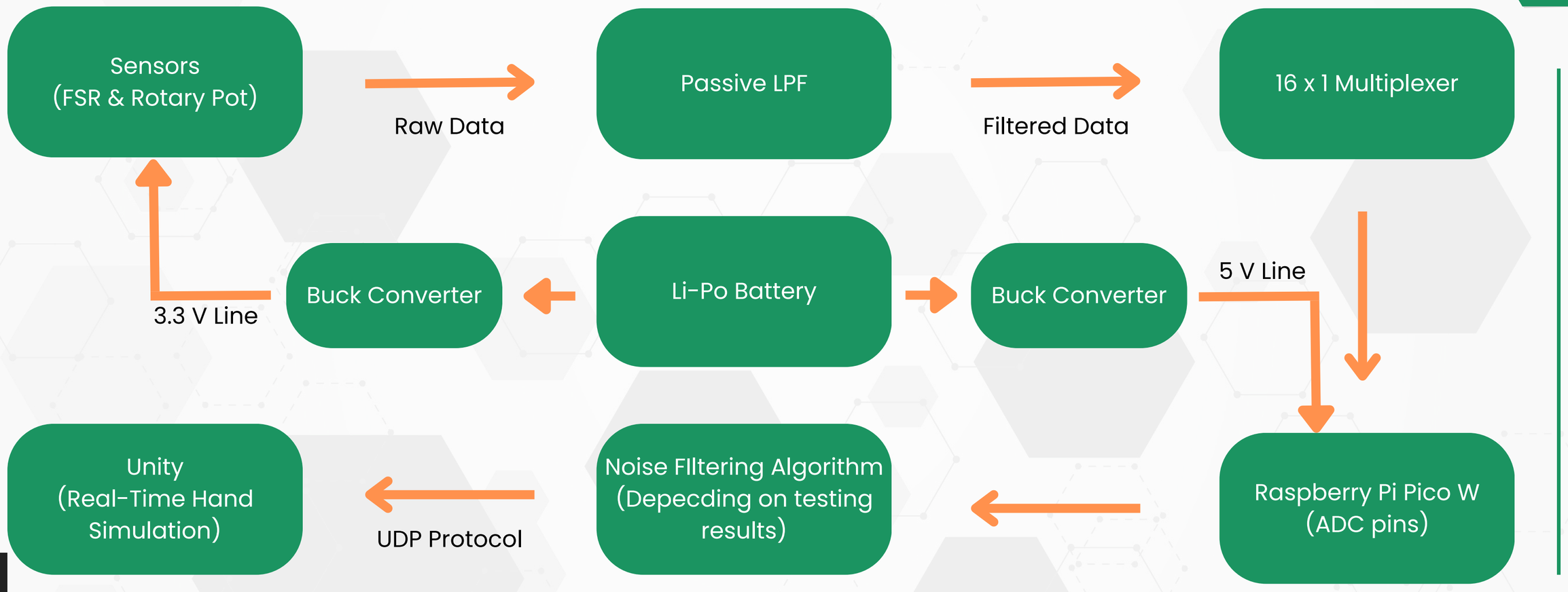
Final Look

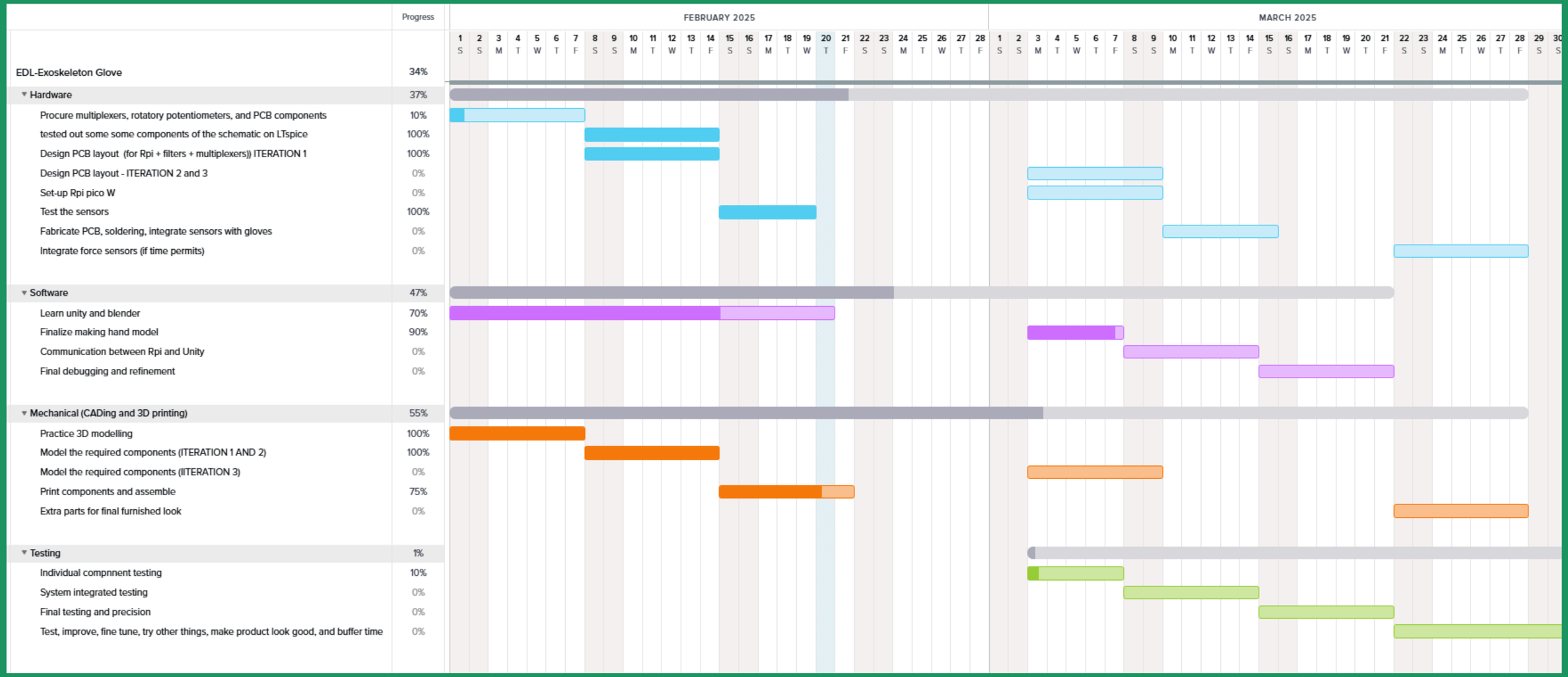




Applying Surface subdivision modifier

Methodology




Progress
FEBRUARY 2025
MARCH 2025
EDL-Exoskeleton Glove 34%
Hardware 37%
Procure multiplexers, rotatory potentiometers, and PCB components 10%
tested out some some components of the schematic on LTspice 100%
Design PCB layout (for Rpi + filters + multiplexers)) ITERATION 1 100%
Design PCB layout - ITERATION 2 and 3 0%
Set-up Rpi pico W 0%
Test the sensors 100%
Fabricate PCB, soldering, integrate sensors with gloves 0%
Integrate force sensors (if time permits) 0%
Software 47%
Learn unity and blender 70%
Finalize making hand model 90%
Communication between Rpi and Unity 0%
Final debugging and refinement 0%
Mechanical (CADing and 3D printing) 55%
Practice 3D modelling 100%
Model the required components (ITERATION 1 AND 2) 100%
Model the required components (IITERATION 3) 0%
Print components and assemble 75%
Extra parts for final furnished look 0%
Testing 1%
Individual compnnent testing 10%
System integrated testing 0%
Final testing and precision 0%
Test, improve, fine tune, try other things, make product look good, and buffer time 0%

Thank You