

5 Implementation

5.1 OVERVIEW

Our next goals are to expand the prototype's scope to operate with more motors and more subdivisions in the camera's vision. Our prototype currently operates with 4 motors, and we will next double it to operate with 8, and then again to our desired final number of 16 motors. Each of these expansions is a proof of concept milestone that allows us to know our design is scalable. Each of these expansions will also demand a doubling of the raspberry pi's computing power and an increase in power draw. Alongside these prototype developments we will be making a number of ergonomic improvements to allow for easier testing.

1. The sleeve, worn on the user's forearm and holding the motor array, will be finished. Once it has been completed and is capable of adjusting and securely holding the motor array we will sew each motor into place on the sleeve.
2. Once we have proven our design works at 16 motors, we will permanently connect our motors to the Raspberry Pi via soldering. This permanent connection will allow for easier testing and more variable prototype design.
3. The wires from the motor array will be bundled into a cable when the array is soldered to the Raspberry Pi. Turning 32 wires into 1 cable will make the system significantly more manageable is a large step towards establishing wearability.
4. The d435i camera will be mounted upon a pair of safety glasses. The cables from it and the Raspberry Pi will run into a backpack where the Raspberry Pi is located in a secure container.

Following the above breakthroughs, we intend to shift our focus to testing and improving our prototype's accuracy. This testing will be invariably tied to the development of our project, as it is this testing that allows us to improve its abilities. It will largely be conducted by a user using our device to either analyze a fixed We will test many different designs for our haptic motor array in an effort to find the design that most intuitively conveys depth information. Additionally, we will work to improve the algorithm that determines how strong a motor should vibrate according to the depth mapping, so that the wearer is able to draw as much information from the changing vibrational patterns as possible.

Further areas of improvement include improving the camera's accuracy, and ensuring the most necessary information is always considered by our image analyzing algorithm. Alongside testing the performance of our individual components we will test the entire prototype in obstacle courses to ensure operational efficiency and that each component works as intended and in tandem with the other components. Once we have developed a prototype capable of navigating through a variety of obstacle courses and can promptly and accurately respond to changes in its environment we will begin the next stages of our project.