Jeron Osguthorpe - Science Research/Science Fair - Abstract

Abstract:

In this project, my objective was to make a prosthetic hand that could do the basic functions of an actual hand, such as making fingers be able to move based off of sensors. But the biggest part of my project was to make this cheap, so I had to go well on this and had to make it so it could be improved on in the future. In order to do this, I needed a board with what is called GPIO pins that could be programmed and run by a computer. I decided that the best and most efficient way of doing this was with a Raspberry Pi, which I happened to have a Raspberry Pi 3B+. But, I needed something for the sensors, I decided to go with what is a called a Micro:Bit, this uses a special kind of code called Micro:Python, but can be combined with Python and JavaScript if wanted, Python was the code of choices because the PI in Raspberry Pi means, “python interpreter”, which means I was going to be able to control driver boards to what are called, stepper motors, which are what are used for the fingers, to make it so that the hand functions with the preinstalled GPIO pins on the Raspberry Pi.

I was later able to accomplish this by using a program called CAD with the CAD interpreter program called TinkerCAD because at the time I did not fully understand actual full on CAD. This allowed me to design and print out my own design of a 3D hand. I then just had to put the hand together and put the code through the Raspberry Pi. In the end, after many trials I was able to get things to start working.

There are many things that could be improved upon in this project. Raspberry Pi INC just released a new Raspberry Pi about a week ago, as of 1/26/2021, that is called the Raspberry Pi PICO which is way smaller than the normal Raspberry Pi. I could then gather a usb stick to run a program onto a 3.5 in Touchscreen which with a little altering to the 3D files from a University, I would be able to make it so that all of this would be integrated together allowing the entire thing, with a battery pack, to run all 100% portable, making the project be fully complete.

In the end, there are many things that could be improved on if I had more time, but with the time that I had, I was able to make a hand that was actually able to move due to stepper motors and a Raspberry Pi with sensors. I think that this was a successful project because the results were that it at least worked, even though it took me many attempts, I completed it.