

# Hand Use Monitoring Device

## Background:

A stroke is when blood stops flowing to certain areas of the brain. When the brain is deprived of blood, it loses oxygen and the cells start dying. Therefore, abilities that the brain controls cease functioning. Common post-stroke symptoms are difficulty swallowing, memory loss, and paralysis of muscles. A way for patients to regain a function like muscle control is to do exercises such as: practice writing, pinch clothespins, assemble nuts and bolts, string beads, play checkers, put together puzzles, etc. There exist devices that assist patients in their rehabilitation exercises and also those that track their hand usage. Our focus will be on rehabilitation for paralysis of muscle. We want to come up with a tracking device that monitors a patient's hand.



## Goal:

Observe rehabilitating patients that have regained, or still have enough, motor ability to pick up or grasp objects. We want to make a non-obtrusive wearable device that monitors, as closely as possible, how often there is an object in their hand.

## Objective:

With an Arduino and vibration sensor, we want to log the varying frequency output of a patient's hand throughout the day. Frequencies vary depending on the stiffness of their hand and the mass of their hand.

## Requirements:

- Non-obtrusive
- Light weight
- Long battery life, preferably from waking up to going to sleep
- Interval measurement of patient's hand
- Easy to put on and take off
- If assembly is necessary, easy to assemble

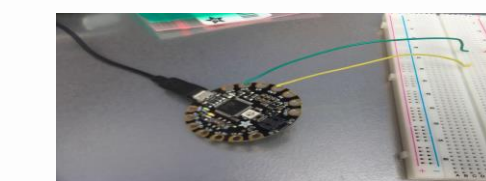
## Timeline:

Fall	Winter	Spring
<ul style="list-style-type: none"> <li>• Introduction to project</li> <li>• Research on similar projects in order to gain insight on how we can assemble project</li> <li>• Assess budget</li> <li>• Design</li> </ul>	<ul style="list-style-type: none"> <li>• Begin development and have working model by end of the quarter</li> </ul>	<ul style="list-style-type: none"> <li>• Test device</li> <li>• Debug device</li> </ul>

## Budget:

Part	Quantity	Price
Arduino (Flora)	1	\$17.97
USB Cable	1	\$4.19
Vibration Sensor	1	\$16.59
Lithium Ion Polymer Battery - 3.7v 150mAh	1	\$12.85
Adafruit Micro Lipo - USB LiIon/LiPoly charger - v1	1	\$5.95
Total		\$57.55
Remainder		\$342.40

## Parts:



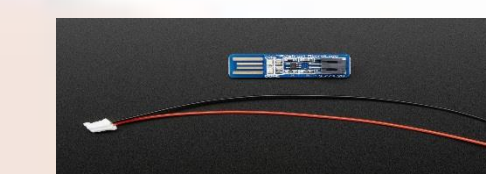
Adafruit Arduino Flora



Piezo Vibration Sensor Large

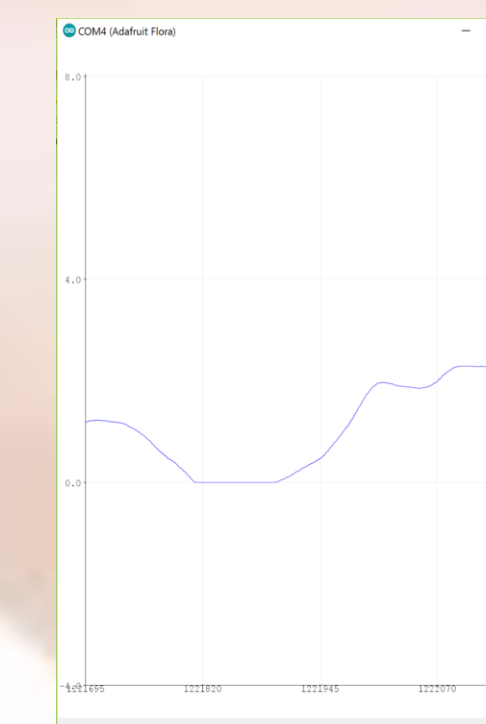


Lithium Ion Polymer Battery - 3.7 V 150 mAh



Adafruit Micro Lipo - USB LiIon/LiPoly charger - v1

## Testing:



With the current code we have, we are able to plot any vibrational changes to the vibration sensor.



Our current setup has the vibration sensor connected to the Arduino's ground and pin #10.