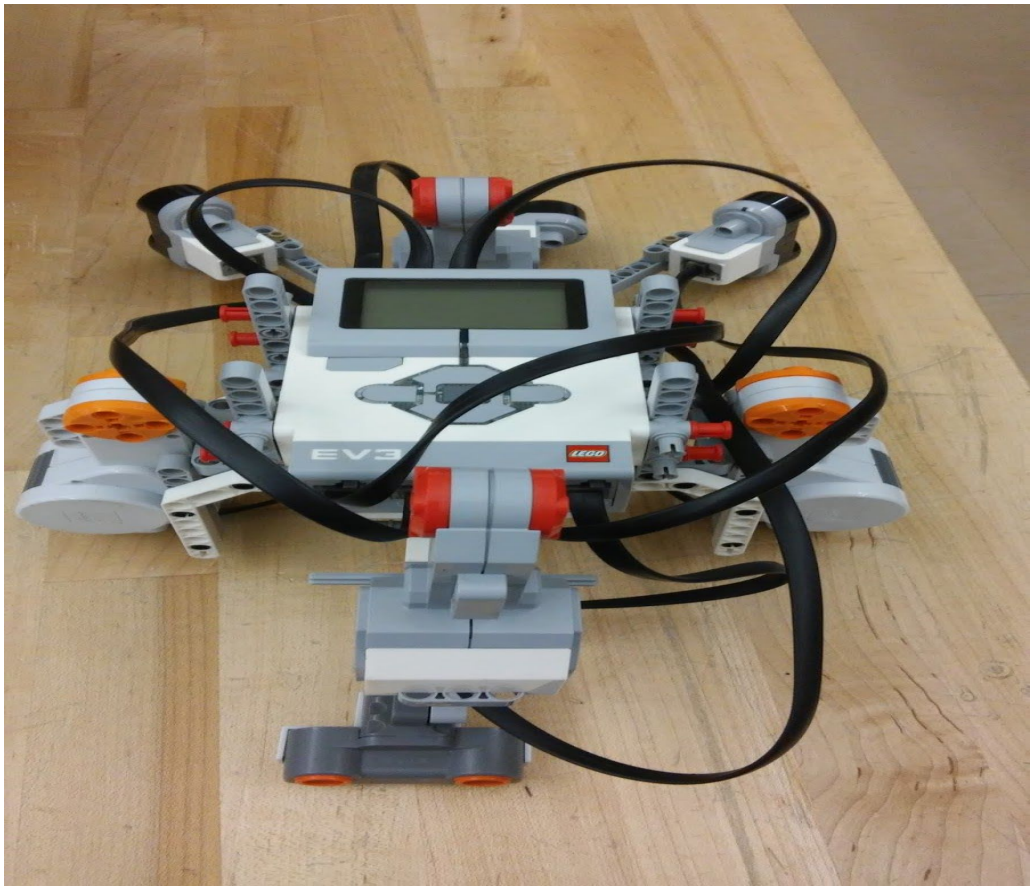
We are the advanced robotics class. We are building a haptic awareness device for visually impaired students at our school. The haptic awareness device consists of three vibrating motors and three ultrasonic sensors attached to an arduino. We program the ultrasonic sensors to detect distance from 0 to 157 inches. The vibrating motor vibrates at an intensity based on the distance the device is from an object. All of this is attached to the hat.

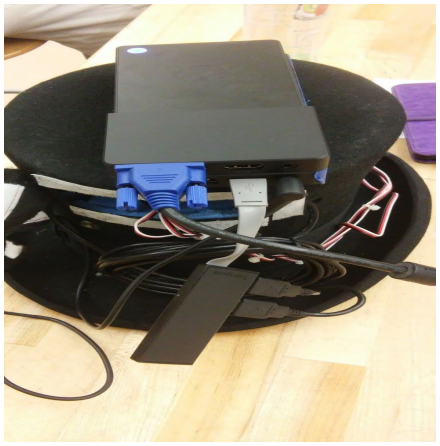


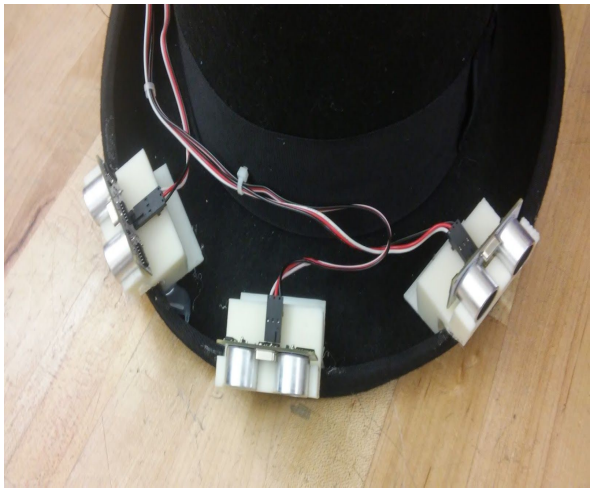
The prototype for the device the motors are connected to the ultrasonic sensor attached to the brain. This simulates how the ultrasonic sensors and small vibrating motors will be attached to the arduino on the final project.

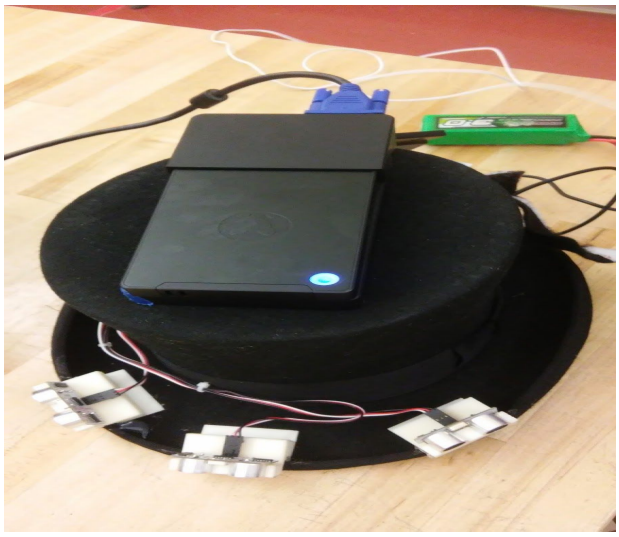
Here is a copy of the original parts list.

- 4 RobotGeek Buzzer
  - http://www.trossenrobotics.com/robotgeek-buzzer
- 4 HC-SR04 Ultrasonic Sensor Distance Measuring Module - Blue
  - http://www.dx.com/p/hc-sr04-ultrasonic-sensor-distance-measuring-module-133696?Utm_rid=37202148&Utm_source=affiliate#.WBOqGS0rLcs
- 1 RobotGeek Sensor Shield (Version 2)
  - http://www.trossenrobotics.com/robotgeek-sensor-shield
- 4 3-Pin Dual-Female To Grove 4-Pin Converter Cable - 20cm
  - https://www.itead.cc/3-pin-dual-female-to-grove-4-pin-converter-cable-20cm.html
- Battery
  - https://www.amazon.com/Gens-ace-5000mAh-Battery-Traxxas/dp/B01JCSOJIY/ref=sr_1_1?ie=UTF8&qid=1478030122&sr=8-1-spons&keywords=5000mah+3s+lipo&psc=1
- LiPo Battery Wiring Harness
  - http://www.trossenrobotics.com/battery-wiring-harness
- Belfry John Bull - Classic Wool Top Hat - Size medium, black
  - https://www.hatsinthebelfry.com/product/belfry-john-bull.html
- Phidgets 12 foot Sensor Cable
  - http://www.trossenrobotics.com/p/phidgets-12-foot-sensor-cable.asp
- 4 Phidgets 24 Inch Sensor Cable
  - http://www.trossenrobotics.com/p/phidgets-24-inch-sensor-cable.aspx

After the first prototype we selected a top hat and we were able to program three ultrasonic sensors into the hat. One on the left, one in the center, and one in the right. We used the mobile desktop pro by kangaroo and connected with the arduinos at the the top of the hat. Then, we added foam to prevent the parts from poking the hats wearer. We then created a three ultrasonic sensor holders and adhered the ultrasonic sensors to them. They are on the front rim of the hat. this is powered by a lithium battery.







Here is the final prototype for the haptic awareness device

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2/10/17