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Smart Walking Stick for the Blind

Both of us have been playing around with Arduino for a while now, and we decided to go with this project when the Code Day Seattle Winter 2018 Hackathon was announced. We thought this would be a good project to challenge ourselves as well as to learn new Arduino commands. This entire project took us 2 days to build from start to end. The stick consists of several key electrical items such as ultrasonic sensors, vibration motor, buzzer, SD Card reader for Arduino, GSM module for Arduino, GPS module for Arduino, push button, servo motor, and the Arduino itself, of course. We began by dividing the work among ourselves.
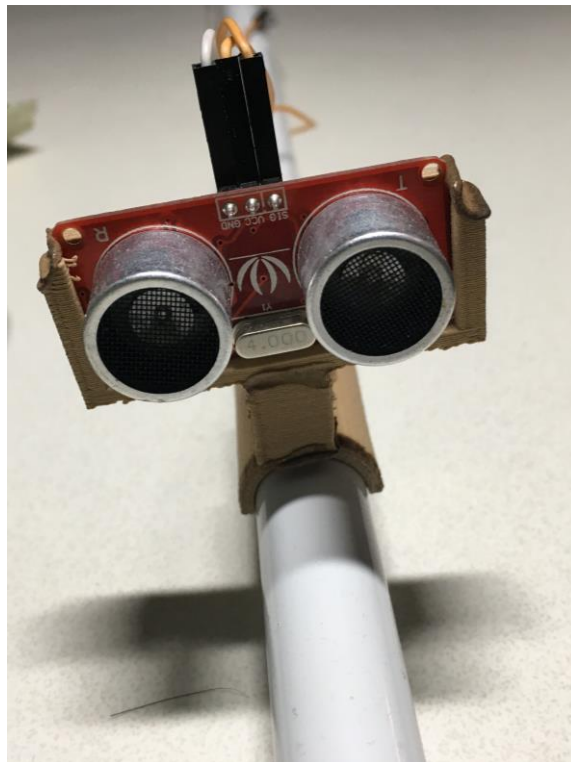

The third sensor at the bottom of the stick, fixed in the 3-D printed mount.
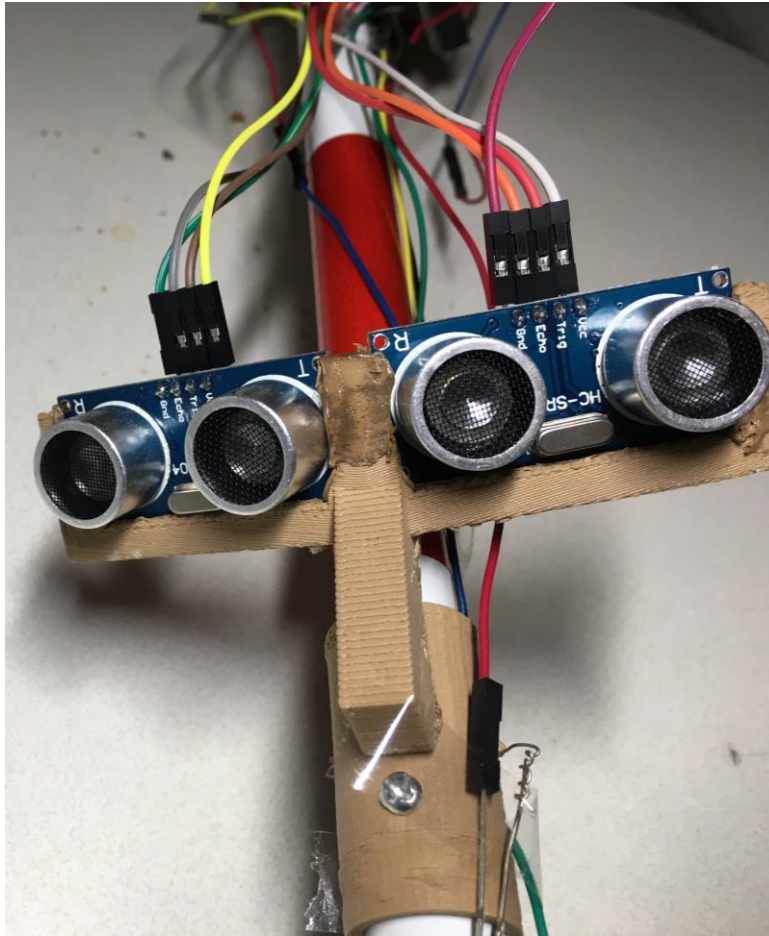
The 2 sensors at the top of the stick, secured into their 3-D printed mounts.

Stefan began by 3-D printing the mounts to hold the ultrasonic sensors, while I got down to testing out all the sensors and wiring them. After several hours of working on our respective tasks, we were ready to put together the walking stick. We began by sticking the mounts and wiring the ultrasonic sensors. Then, we began to wire the sensors to the Arduino while simultaneously coding to keep track of which pin of which sensor was plugged into which pin in the Arduino. After carefully assembling the parts, we had to secure everything in place. The Arduino was mounted on its board, the breadboard was stuck to the back of the Arduino, while the wires were stuck to the stick by tape. There were 3 ultrasonic sensors in total. 2 on the upper end of the stick, while 1 was at the bottom of the stick. Each sensor has a range of 3 meters. The

two top sensors were passive, and were detecting obstacles all the time, sending back feedback in

the form of vibrations, and beeps. The frequency of the feedback increased as the stick came

closer to the obstacle. The third sensor was at the bottom of the stick and can only be activated

by pressing a push button at the top of the stick. The reason why this sensor can only be activated

by the push button is because the user would get confused if there is an obstacle at the bottom or

in front of him/ her. This also serves a second purpose of acting as a distance gauge, by

measuring the distance of anything that the stick is pointing at. The user can know his/ her

distance from any object in any direction because of this sensor. The stick also consists of the

SIM 900 GSM module that is used to send an emergency message to contacts that have been

pre–loaded on to the SD card. Since, there were a lot of different electrical components involved,

we decided to power the Arduino using a 9V battery that was stuck on to the stick.
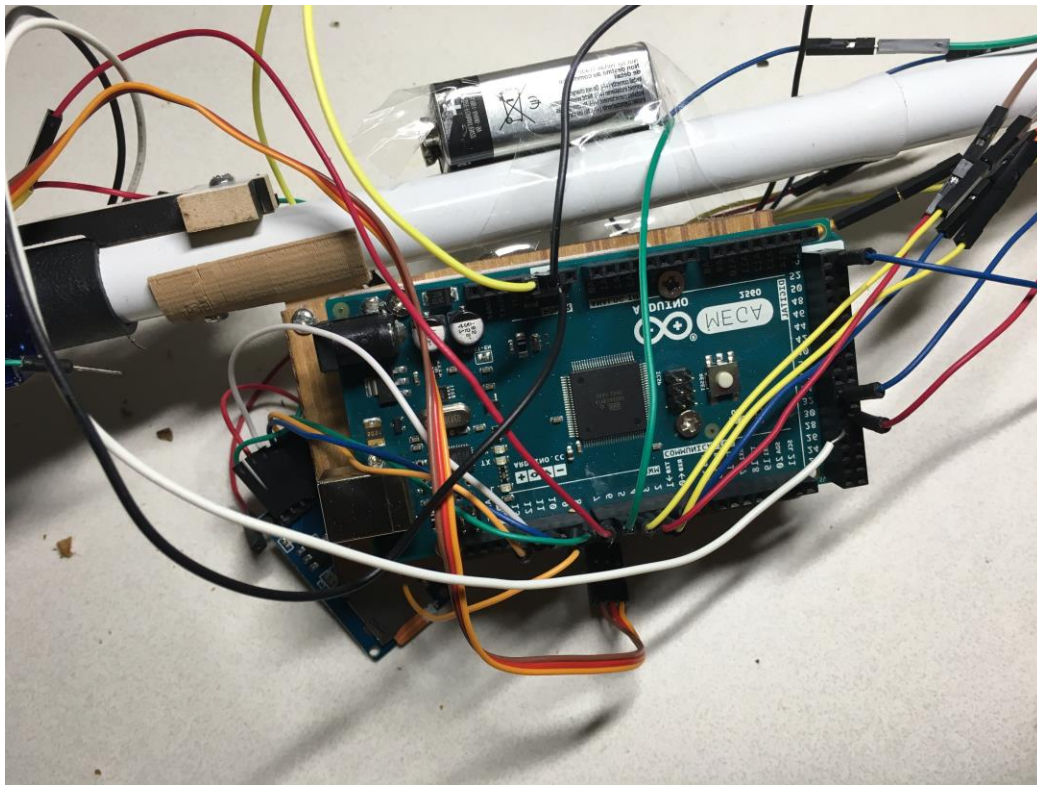
The Arduino Mega, fully wired up, and the 9V battery.
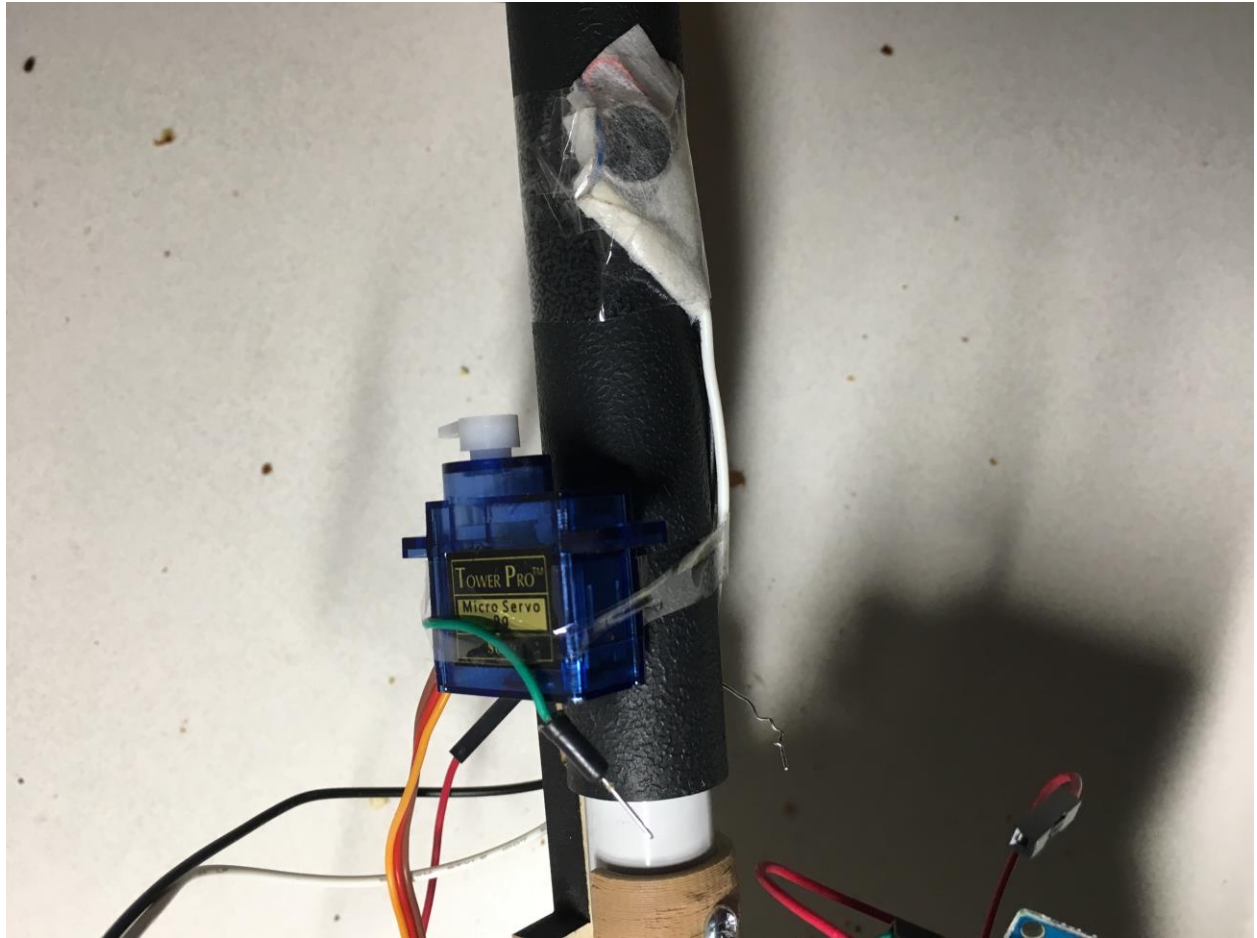
The Servo motor telling the distance, along with the vibration motor stuck onto the handle.
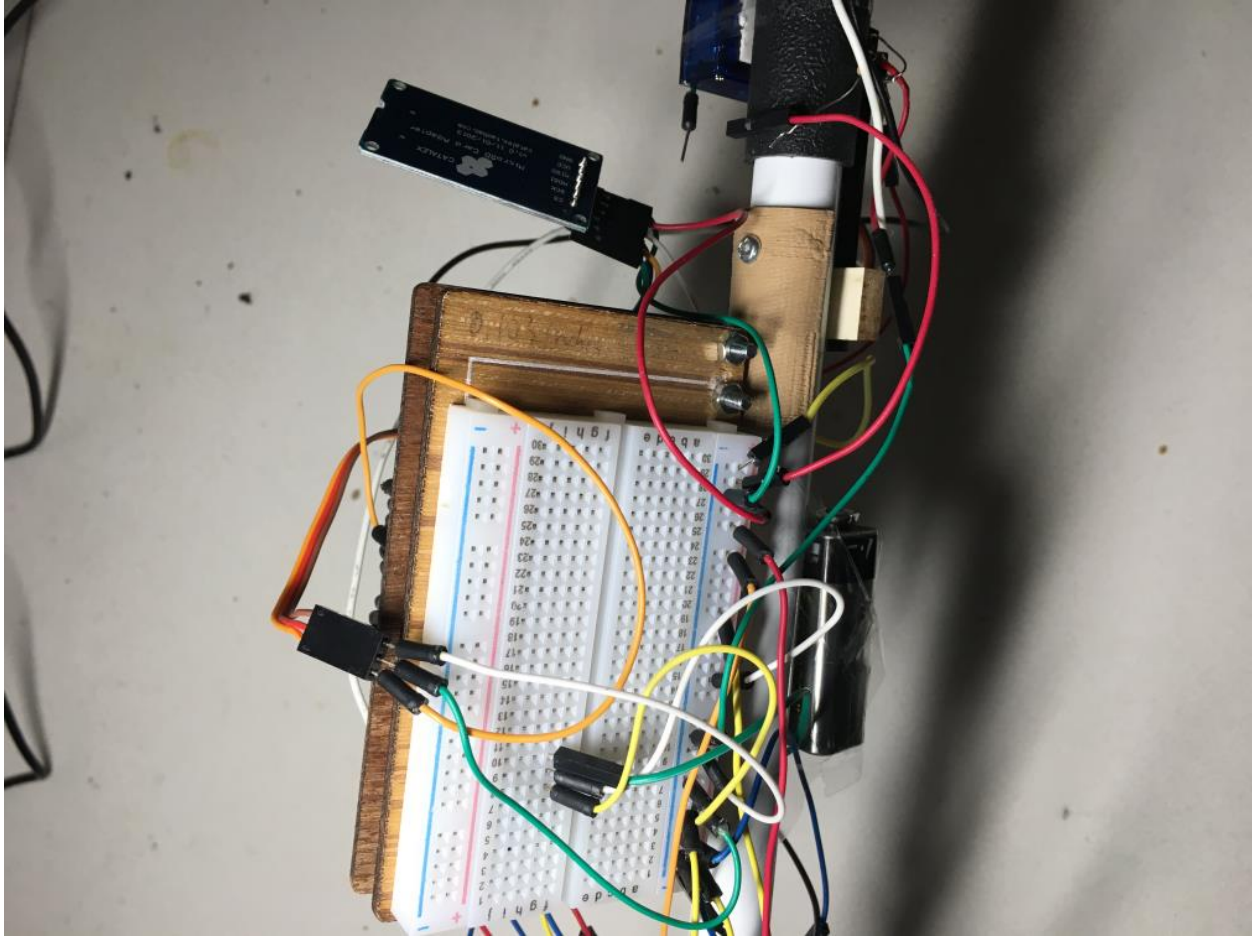
The breadboard along with the SD card reader.

The stick was appreciated by everyone at the event, even our competitors. Deako, a local tech startup invited us to their factory to give us a tour and tell us about their work. They too started by improvising and 3-D printing their first prototype. We won the "Best in show" award at Code Day Seattle, 2018 for this product.