

Milestone Report 1: Gesture Control Bracelet Team

Philip (PJ) Loury, Jiarong Fu, Ian Chen, Brian Kim

Software Development

Our software team is working on the gesture recognition algorithm and the computer side scripting. In parallel with the progress of the hardware team, the software team works with a TI Chronos Watch, which is functionally similar to our targeted hardware end product. The TI Chronos Watch is a hardware kit developed by Texas Instruments Inc., which included a three-axis accelerometer and wireless communication module with PC. The software team has succeeded in reading live accelerometer data from the watch and plotting the data on PC, which the complementary TI Chronos Watch interface did not come to have.

With the accelerometer data the software team has been experimenting with different gesture recognition algorithms, from simple thresholding to machine learning techniques. A Python Script was written for monitoring the serial port and parsing accelerometer data. We have also built a diagnostic graphical interface plotting accelerometer data using matplotlib.

On the other hand, the action scripts that are used to execute gesture commands have been implemented on Mac OS, which includes adjusting the volume, playing and pausing music, and triggering application specific hot-keys with the help of Better Touch Tool software.

Hardware Layout

A layout was created using some of the dimensions provided in the documentation for the accelerometer, the battery compartment, the microcontroller, and the bluetooth module. The design was made with consideration for the wiring and function of the device, along with the idea of facilitating the easy change of batteries.

Hardware Components

An microcontroller was programmed to poll a 3-axis accelerometer and send the X,Y,Z values using a Bluetooth 2.0 module. Our current prototype includes a:

- 3.3V coin cell battery
- Adafruit Arduino Trinket with an ATTiny85
- Bluetooth 2.0 Module
- ADXL 335 3-axis accelerometer

Future Goals: - PJ

- We are currently working with our industry advisor to upgrade our system from Bluetooth 2.0 to Bluetooth Low Energy
- We are in the process of moving our breadboarded prototype into a 3-D printed enclosure.
- A basic gesture detection algorithm needs to be prototyped in MATLAB
- The gesture detection algorithm will need to be trained so that gesture classification can be implemented on the device instead of one the computer