

DEC15-04

## Senior Design 491 - Weekly Report - DEC15-04 Week 13 (4/13/15 - 4/20/15)

**Advisor:** Suraj Kothari  
**Project:** Future Wearables  
**Client:** Ted Krepos ("*Krepos Physical Therapy and Performance*")  
Ensoft - Jeremías Saucedá  
**Members:** Aaron Reyes - Team Leader  
Nick Plutt - Webmaster  
William Park - Communication Leader  
Josh Cline - Key Concept Holder #1  
Nick Gonner - Key Concept Holder #2

### Weekly Recap:

This week was all preparation for our mini presentation with our clients. We had to show EnSoft as well as Ted our prototype and what stage of the project we were on.

### Meeting Overview:

April 14, 2015 - **Meeting-15**

Duration: 2.75 Hours

### Attendance - **15**

William Park	Absent
Nick Plutt	In Person
Aaron Reyes	In Person
Josh Cline	In Person
Nick Gonner	In Person

These meeting was mainly for Electrical / Computer team as it was to put the device together.

1. Worked on getting the EMG to be read by the Pro Micro. We had some problems as we were not able to read from the analog pin of our Micro Controller board. We tested the EMG using an oscilloscope and it worked fine for reading the EMG. We therefore concluded it was either the micro controller board or us connecting wires. We tested writing to the computer using the board and that worked. We tried testing just a straight voltage with the board but it still would not read. Nick G decided he would try to get the EMG to work on his arduino later and we would try that code and method on our pro micro after he got the arduino to work since they are similar devices.

April 15, 2015 - **Meeting-16**

Duration: 1.25 Hours

**Attendance - 16**

William Park	In Person
Nick Plutt	In Person
Aaron Reyes	In Person
Josh Cline	In Person
Nick Gonner	In Person

1. The day before we could not get the EMG to work with our Pro Micro board. Nick G tried on his own to get it to work with an Arduino he succeeded and found out in the process that we were not grounding the EMG properly. After testing with a DC power supply to get a signal in on the pro micro which we did we attempted again with the EMG. This time we were successful after messing with the EMG a little to get a good signal. We discovered in the process that the EMG leads need to be just right or we will not receive a clear signal. This is a problem that we will need to solve in the future. After we tested the EMG we soldered on a wire to the second ground on the EMG which is the one we were not hooking up since we assumed that the main ground worked the same. At the end of the meeting Nick G said he would write some code for the IMU that we would test on the board on 4/16 to see if it works. We then scheduled another meeting for 4/16 at 2pm to test the IMU and hopefully get all the components of the board not including the SD card board working. We also need to figure out if we need to increase the

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gain on the EMG or Pro Micro to receive a better resolution of muscle activity. In doing so we also may need to add a hardware filter to reduce the amount of noise so it is not as prevalent when we increase the gain.

April 16, 2015 - **Meeting-17**

Duration: 3 Hours

Attendance - **17**

William Park	Absent
Nick Plutt	In Person
Aaron Reyes	In Person
Josh Cline	In Person
Nick Gonner	In Person

1. Getting the IMU to work on the Micro Controller had to go with I2C instead of SPI because of the board not having a SPI out pin. We then had to solder the jumper to determine the addresses of the board. We then wrote the embedded systems code so that the micro controller was able to read and display the information from the IMU's. We also tested everything together to ensure that it would work when our clients Ted and Jeremias would see it on Friday.

April 17, 2015 - **Meeting-18**

Duration: 3 Hours

Attendance - **16**

William Park	In Person
Nick Plutt	In Person
Aaron Reyes	In Person
Josh Cline	In Person
Nick Gonner	In Person

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1. Meeting with Ted and Jeremias on the progress of our project and moving forward.
2. We received some vital feedback on the data that we were receiving from the prototype. The EMG sensors need to be adjusted a bit so that the data will be more clear in the future.
3. This Presentation demo gave us a good understanding of our stance in our project and will prepare us for the presentation for the faculty.
4. We also had a quick team meeting after this presentation to figure out what next steps will have to come for the future.

### **Accomplishments this week:**

EE and CpRE team has been working hard in trying to get a working prototype ready for a demonstration. We have to push hard to succeed to get a working prototype by the 17th.

Presentation went... well? We received some valuable feedback from Jeremais as well as Ted in what direction our project needs to go.

Microcontroller was working well for what needed to be demonstrated.

### **Pending Issues:**

1. Microcontroller needs to be changed. We need to find another arduino compatible controller to use for our device.
2. Now that we have received feedback from Ted and Jeremais, the direction of our project has changed for the future terms. (Summer , Fall)
3. Software Team is planning on making a mock application in the meantime instead of waiting for Hardware to finish the device.

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### **Planning:**

- i. More frequent meetings.
- ii. Getting the design for the PCB finished. (Summer)
- iii. Getting the embedded system programming done
- iv. Assembling the first prototype.
- v. Meeting for Summer Plans (Everyone besides Nick G. will be here in Ames)
- vi. Software Team needs to create a plan of action for the Summer term to create an application that is usable on an Android Device.

### **Individual Contributions**

Aaron : -- (10.25 hr)

- i. meeting
- ii. Design and construction

William: -- (7 hr)

- i. Weekly Report
- ii. Meetings

Josh: -- (14.5 hr)

- i. Meeting
- ii. Pro Micro and EMG communication
- iii. Testing Pro Micro and EMG for data collection
- iv. Moving to IMU and Pro Micro Communication
- v. Cleaning Embedded Coed
- vi. Logging Time - meeting recaps for Weekly Report

Nick P. -- ( 10 hrs)

- i. Meetings
- ii. Working on Graphs with Android Studio / Java

Nick G: -- ( 12.5 hr)

- i. Meeting

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- ii. Get EMG working with Arduino

**Total Contribution for the Project:**

Aaron Reyes (46.2 hrs)

William Park (37.5 hrs)

Josh Cline (59.3 hrs)

\*Nick Plutt (46 hrs)

Nick Gonner(52.1 hrs)