CPRE 492 April 3rd, 2025

Cy-Vital Status Report 5

Advisor: Professor Meng Lu

Group: 22

Members:

- Sajan Patel (Fullstack Software)
- Daniel Karpov (Data Processing)
- Jay Patel (Data Processing)
- Ty Beresford (Fullstack Software)
- Chuck Mallek (Physical & Electrical Design)

Project: CyVital

Project Purpose: CyVital project is dedicated to providing modular hardware in the form of sensors and its corresponding software counterpart to read, analyze and display data seen within the sensors. The hardware-software will be used for the Biomedical Engineering Lab, so it must be created so that students, professor(s) and TA(s) can use it with ease.

💮 CyVital Private

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Languages:

- Graphical User Interface: Python
- Backend Data Analysis: Python

System:

- Configuration: Universally modular
- Open Sourced: GitHub Repository

License:

- For educational purposes through Iowa State

Weekly Summary

Group Success:

As a group, we made solid progress for our EKG and pulse oximeter devices in which we could pick up a proper signal to the Analog Discovery 2 through our own GUI interface. We have now started the signal processing on our GUI on the data received from the DAQ. We are working on implementing an API that will take the signal produced and will find the "features to extract" from that data.

Individual Roles:

Sajan Patel Hours: 6 Cum. Hours: 77 Issues: N/A	Continue to work on getting the pulseOx code to work with the sensor. Continue research into data analysis that can be implemented into the code.
Daniel Karpov Hours: 6 Cum. Hours: 77 Issues: N/A	Worked on going through the biopac lab modules and taking final notes on what we will be asking students for our lab. I also worked on getting the pulse oximeter I2C working.
Jay Patel Hours: 6 Cum. Hours: 77 Issues: N/A	Improved algorithm for heart rate measurement accuracy and fixed issues with hardware power cycling. Added features to the graphing script to adjust graph parameters
Ty Beresford Hours: 6 Cum Hours: 77 Issues: N/A	Completed GUI with functional unit testing; added FPS filtering to monitor frame locking and date transfer rates to GUI.
Chuck Mallek Hours: 6 Cum Hours: 77 Issues: N/A	Worked with one of Meng Lu's PhD students and was able to successfully get the EMG sensor to respond to muscle contractions. The student also advised us on how to advance for the pulse oximeter.

Advisor Meeting

Room to improve: We need to get the Software to work with the DAQ and sensors. And get some of our sensors to work

The Good: We got multiple sensors to work correctly on the hardware side and got the multiplexer to work.

Upcoming Week

Upcoming Group Success:

 \rightarrow Meet on Sunday to try to get the rest of the sensors connected and working with Waveform.

Upcoming Individual Roles:

Sajan Patel	Continue work with pulseOx code in order to get it to work properly with the sensor. Continue research of different data analysis strategies possible for blood oxygen waveform.
Daniel Karpov	I will work on the software for the EMG sensor that will allow students to work with their muscles. I will also implement the I2C into eh pulse oximeter to get it working.
Jay Patel	Will continue development on the pulse oximeter and begin work on developing data analysis for the myogram module.
Ty Beresford	Merge the first successful sensor, ECG, with the GUI. Initial local branch shows potential success, but will require testing to show potential effectiveness.
Chuck Mallek	I will be working on getting I2C to work with waveforms for the pulse oximeter. This will be the last sensor to function before our final deadline, and we are making significant progress everywhere.