CPRE 492
March 13, 2025

Cy-Vital Status Report 3

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.

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: 71 Issues: N/A	Worked on getting pulseOx code to work with sensor. Got code to recognize the Diligent Waveforms SDK and able to run by itself with no issues.
Daniel Karpov Hours: 6 Cum. Hours: 71 Issues: N/A	Worked on reading the different lab modules for the old labs that we are trying to replace. Taking note of how the experiments were done and what type of data was being collected.
Jay Patel Hours: 6 Cum. Hours: 71 Issues: N/A	Got the AD3 to work with our plotting script. Developed a multithreaded approach to power and monitor the signal coming from the ecg.
Ty Beresford Hours: 6 Cum Hours: 71 Issues: N/A	Initial bindings for [imgui-bundle] has been locally created; full menu created but recreates cuts to remove unnecessary built-in features.
Chuck Mallek Hours: 6 Cum Hours: 71 Issues: N/A	I was able to solder together the muscle sensor shields and get a signal from the board to the computer. Worked on the I2C implementation of the pulse oximeter still trying to get the correct data back.

Advisor Meeting

Room to improve: We need to get the Software to work with the DAQ and sensors.

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

Upcoming Week

Upcoming Group Success:
→ Meet on Sunday to try to get the rest of the sensors connected and working with Waveform.

Upcoming Individual Roles:

Sajan Patel	Work with pulseOx code in order to get it to work properly with sensor. Research different data analysis strategies possible for blood oxygen wave form.
Daniel Karpov	Create the lab modules for our own lab using the sensors that we made. Make sure that we can get all of the data that we need from the sensors.
Jay Patel	Work on oversampling issues with the ecg using the new script. Will start integrating with the gui.
Ty Beresford	Full menu requires cutting to reduce unnecessary overhead; personal bindings and touches need to be finalized since EKG sensors had been completed in alternate software. Ensure framelocking is complete and remove all features not relevant to the project. Goal: get menu features pushed after Spring Break.
Chuck Mallek	The muscle sensor still needs a lot more work. It was getting a constant flicker of data when it should have been more gradual on the increase/ decrease. Will try and get this and the pulse oximeter working by my next group meeting.