

CPRE 492
April 17th, 2025

Cy-Vital Status Report 6

Advisor: Professor Meng Lu

Group: 22

Members:

- Sajjan 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 3 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: 83 Issues: N/A	Worked on implementing sensor with circuit board. Also research data analysis methods.
Daniel Karpov Hours: 6 Cum. Hours: 83 Issues: N/A	Started implementing the pulse oximeter to be read using python. Had to do research on I2C protocol and implement it. Currently running into a non acknowledgment bug when trying to connect to the i2c sensor.
Jay Patel Hours: 6 Cum. Hours: 83 Issues: N/A	Worked with Daniel on python implementation of acquiring digital sensor data via I2C for the pulse oximeter.
Ty Beresford Hours: 6 Cum Hours: 83 Issues: N/A	Still remains issues with ECG sensor modularity with imGui frames. Worked on separating graphing, modules and frames into acceptable unit testing. Removed unnecessary bloat that locked frames.
Chuck Mallek Hours: 6 Cum Hours: 83 Issues: N/A	Finished implementing the pulse oximeter and EMG sensors. Making sure they functioned on waveforms the pre build GUI software before the get implemented into our software.

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:

→ Meet on Sunday to try to get the rest of the sensors connected and working with our custom built software.

Upcoming Individual Roles:

Sajan Patel	Work on code to work with sensor and have it be able to work seamlessly. Keep researching data analysis. Look into testing methods
Daniel Karpov	Will finish up getting the pulse oximeter to work completely in python with data logging. Will also start on writing the lab modules for the students.
Jay Patel	Will continue to work to finish the I2C implementation of the pulse oximeter for python. Will research methods to export data to excel at the request of Dr. Meng
Ty Beresford	Continue to address Python's severe lack of modularity; it is incredibly hard to maintain object permanence without definite classes. Continue working closely with the group to finalize results.
Chuck Mallek	Continue making the lab documents for the different sensors such that the students can learn from our lab experiments. This will go hand in hand with our code in which they can learn how the sensors work and how to code them.