CPRE 491
Oct 14, 2024

Weekly Report 9

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 device, in which we could pick up a proper signal to the DAQ 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: 47 Issues: N/A	Worked on getting data to display from the sensor in our custom code. Displayed a valid heartbeat and are implementing an API to help clean up noise and output reports.
Daniel Karpov Hours: 6 Cum. Hours: 47 Issues: N/A	Worked on getting the correct data to display when using the ECG sensors. We were able to display a valid heartbeat from whoever tried on the sensors. We also coded a moving window filter that cleans the data up and makes it neater to read.
Jay Patel Hours: 6 Cum. Hours:47 Issues: N/A	Researched and developed an acquisition api for the ecg sensor using the Biosspy python library. Worked extensively with Daniel to improve sensor output data and debug live analysis using the api
Ty Beresford Hours: 6 Cum Hours: 47 Issues: N/A	I cleaned our entire repository and began sorting directories. I also moved the process to [main.py] to centralize run features; created GUI handler and Exception handler as well.
Chuck Mallek Hours: 6 Cum Hours: 47 Issues: N/A	I finished verifying input to the DAQ. We ran into a problem when testing that the DAQ needs a common ground, which is why our prior test to our client malfunctioned. This is massive progress since we received the proper signal to our GUI and have started signal analysis.

Advisor Meeting

Talked about getting proper heartbeat sensor output and next steps. Talked about possible solutions to ground a breadboard in order for the heartbeat sensor to work

Room to improve:

- Try to get the sensor data to have a cleaner output and find a way to ground a circuit
- Output our data into a PDF

The Good:

- Good progress on our heartbeat sensor and GUI

Upcoming Week

Upcoming Group Success:
→ Attempt to clean up signal noise, find an easy way to ground circuit and have a report generated after sensor is done recording

Upcoming Individual Roles:

Sajan Patel	Clean up data from the ECG sensor with APIs and try to have our code output a report of the data after it is done recording.
Daniel Karpov	Get important information from the ECG sensor data from each peak during a heartbeat. We will have to display the data in a PDF using python code
Jay Patel	Continue to work on getting the sensor data from the ecg properly formatted and processed using the developed api to get a smooth graph with analytical breakdowns
Ty Beresford	I will continue work on the raw Python code, whether it is in the GUI handler or Exception handler.
Chuck Mallek	I will be working on getting a sql database for us to store information from tests using our own GUI. I will also be looking to create the first lab document to teach our users how to use the equipment and what the output of the biological sensor means,