

## **EE / CprE / SE 492 – sdmay25-12**

### **Pressure Sensor Patch**

### **Status Report 3**

*February 13th, 2025 - February 27th, 2025*

*Client: BAE Systems, Adaptive Adventures*

*Faculty Advisor: Santosh Pandey*

#### **Team Members:**

*Aina Qistina Binti Azman - Software Developer*

*Bilal Hodzic - Software Lead*

*Nathan Turnis - Software Developer*

*Osaïd Samman - Scrum Master/Manager/Team Organization*

*Sabrina Francis - Hardware Developer*

*Zane Lenz - Hardware Developer*

*Ivan Alvarado Santoy - Hardware Lead*

#### **Weekly Summary**

This week we met with both BAE and our advisor. We discussed the progress we had made so far with both. We discussed various testing opportunities with BAE, and they recommended ways to integrate testing with our users. They brought up good points about potential issues that could arise, helping us to discuss solutions. We updated our advisor on our latest progress as well. We set realistic timelines about our upcoming milestones, such as Bluetooth support and testing with a foam pad in between the sensors.

We made massive progress towards communicating over Bluetooth. This has become more of a challenge than initially thought of. We also implemented a notification system within the app, as well as a foreground service so the app's process can run in the background.

On the hardware side, we got four tiles simultaneously collecting data and sending them to the Raspberry Pico to be received by the Android app. We also adjusted the amplifier library, increasing the sample rate.

#### **Past Week Accomplishments**

- Osaïd Samman:
  - Improved design for collective sensors
  - Began the technical documentation for instructions on how to use product
  - Ordered battery case
- Ivan Alvarado-Santoy:
  - Re-created entire amplifier interface library in order to interface with multiple amplifiers at the same time and increase sample rate from 10 Hz to 80 Hz
    - Looked into adding filtering to reduce noise in readings due to increase of sampling rate
    - Started working on updating calibration program to use new

#### library

- Soldered and tested working set up with all 4 tiles and collecting data
- Updated server program to collect 4 tile readings and send to mobile app through wifi
- Updated hardware documentation
- Zane Lenz
  - Created FMEA (Failure Mode and Effects Analysis) documentation
  - Soldered hardware components
  - 3D modeled “platform” for hardware
- Nathan Turnis:
  - Created a system for the app to request for notification permissions
    - Created a notification channel for the app to send notifications
    - Created notification builder so we can send notifications
  - Created a foreground service
    - Needed to communicate with app while phone is off
    - Sent a test notification
    - Got data sent
  - Cleaned up UI
- Bilal Hodzic
  - Created Bluetooth abstractions for connecting to BLE device
    - Wrote Scan code, broadcast manager
  - Transitioned project to Dagger Hilt for improved DI and view mapping
  - Wrote handling code for subscribing to BLE GATT service and reading data from service characteristics
  - Wrote microcontroller side code for hosting BLE with registered services
    - Researched BLE and valid characteristics
  - Wrote MeanList data structure for constant time mean tracking
- Aina Azman:
  - Finishing up on User Backend
  - Working on caregiver view of the application
- Sabrina Francis:
  - Researched implementation of simple machine learning model to determine too much pressure
    - Looked for dataset to train model
    - Looked into types of models
  - Built more tiles

### **Individual Contributions**

<b>Team Member</b>	<b>Contribution</b>	<b>Weekly Hours</b>	<b>Total Hours</b>
Aina Qistina Binti Azman	User Backend & Caregiver View	4	67
Bilal Hodzic	Got BLE working for reads, improved project	20	76
Nathan Turnis	Notifications & Foreground Service	12	69
Sabrina Francis	Researched machine learning for project and built more tiles	12	65
Osaid Samman	Documentation, design, organization	10	53
Zane Lenz	Documentation, 3D modeling, Soldering	6	60
Ivan Alvarado-Santoy	Hardware testing, updating libraries and integration	18	80

### **Pending Issues**

- Write receiving stateflow control for BLE to constant stream
- Integrate into foreground service
- Connect data stream to wifi before sending the sample
- Update tile calibration program
- Test 4 tile set up with power circuit

### **Plans For the Upcoming Week**

- Fully assemble tiles, power circuit, and support board
- Write set up instructions