EE / CprE / SE 491 – sdmay25-12
Pressure Sensor Patch
Week 3 Report

September 26th 2024 – October 3rd, 2024
Client: BAE Systems
Faculty Advisor: Santosh Pandey

Team Members:

Aina Qistina Binti Azman - *Software Developer*
Bilal Hodzic - *Software Lead*
Nathan Turnis - *Software Developer*
Osaid Samman - *Scrum Master/Manager/Team Organization*
Sabrina Francis - *Hardware Developer*
Zane Lenz - *Hardware Developer*
Ivan Alvarado-Santoy - *Hardware Lead*

Weekly Summary

This week, our efforts were primarily focused on identifying and researching commercial pressure sensors that meet the requirements for our project. Specifically, we considered factors such as:

- Budget constraints: Ensuring the sensors are cost-effective within our grant funding.
- Physical characteristics: Emphasizing flexibility and small size to ensure the sensors can be easily integrated into the patch design.

After careful evaluation, we placed an order with ETG for three pressure sensors that align with our needs. We are currently awaiting their arrival to begin testing.

In parallel, we started researching microcontrollers that are compatible with the sensors we ordered. This research will help us ensure seamless integration of the sensors into the larger system as we prepare for the next phase of the project.

Past Week Accomplishments

- Osaid Samman:
    - Maintained contact with the advisor and the client, keeping them updated on progress. Coordinated meeting times with the client. Stayed in communication with all parties involved.
- Ivan Alvarado-Santoy:
    - Narrowed down options of possible microcontrollers (Arduino Uno Rev 3, Esp32, Nordic NRF52840-DK
    - Collected Tech Specs to compare and narrow down best option
    - Narrow down which tech specs are key to the project

- Zane Lenz
    - Researched methods for making a silicone mold
        - Need RTV Platinum cured silicone for skin safety
        - RTV Platinum silicon can be found on amazon
        - Xometry might be a good source for producing higher quality molds
        - 3D scanners in Student Innovation Center for getting digital models if necessary
- Nathan Turnis:
    - Researched various potential software solutions for collecting data from the pressure sensor and transforming it into an app. Looked into Android development as it will be easiest to start with over iOS.
    - Researched how a notification system will work on mobile devices. How to receive information from the pressure sensor (most likely Bluetooth). This will most likely require the sensor to be hooked up to some other small device that will be with the person that can send the signal over Bluetooth to the connected mobile device.
- Bilal Hodzic
    - Researched more commercially available pressure sensors. Researched specifically sensors that are very cheap and will be within budget for use. Looked into software hardware connection options for retrieving data.
    - Additionally researched other app platforms for making native apps. Specifically read docs on Android for live bluetooth connection.
- Aina Azman
    - Researched software solutions that could assist in the development of the app. Specifically Microsoft Power Apps and Microsoft Power BI. Both platforms offer quite a potential to enhance our project:
        - **Microsoft Power Apps** can be used to create the front-end app where users can interact with the sensor data and receive alerts.
        - **Microsoft Power BI** can be used for deeper analytics, creating reports for healthcare providers based on the data collected from the sensor.
    - Looked further into commercial pressure sensors offered by Tekscan, particularly focusing on their 'Body-Pressure-Mapping' applications.
        - Two products, the **F-Socket** (https://www.tekscan.com/products-solutions/systems/f-socket-system) and the **CONFORMat System** (https://www.tekscan.com/products-solutions/systems/conformat-system), align well with the objectives of our project. Both systems seem promising for our needs in monitoring pressure distribution.
        - Interacting with Tekscan's employees to inquire about pricing and to gather more detailed information that could be useful in refining our approach with the project.
- Sabrina Francis:

- Created the bill of materials spreadsheet and sent it to ETG to order 3 different sensors to test.
- Researched additional pressure sensors that would be more flexible.
- Looked more into the Nordic NRF52840-DK microcontroller and what features it offers.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Aina Qistina Binti Azman	Looked into potential software solutions for the application. Researched commercial pressure sensors by Tekscan.	3	7
Bilal Hodzic	Looked at more pressure sensors on the market. Looked at app development frameworks	3	7
Nathan Turnis	Researched app solutions and notification solutions	3	7
Sabrina Francis	Placed ETG order and researched more about other sensors and microcontrollers.	3	6
Osaid Samman	Kept track of what was being done and what's needed to be done, coordinated meeting times with advisor and client as well as the team itself.	2	4
Zane Lenz	Looked at ways to make silicone molds	3	6
Ivan Alvarado-Santoy	Looked at possible microcontroller options	3	7

Pending Issues

- Waiting for sensors to arrive.
- Waiting to finalize meeting schedule with BAE Engineers
- Waiting to finalize the meeting schedule with Adaptive Sports reps.

Plans For the Upcoming Week

We placed an order with ETG earlier this week and are hoping the order will come in this upcoming week. Once order is received, we can begin initial testing and familiarize ourselves with the sensors. Schedule an official meeting with the client.