

EE/CprE/SE 491 WEEKLY REPORT 6

Start Date – End Date: 10/17/2024 - 10/24/2024

Group number: 13

Project title: PTSD Detection Device

Client &/Advisor:

Advisor: Mohammed Selim

Mentors: Bae Systems - Alice Crutcher, Michael Goderre, Jennifer Plakyda, Ryan Littler

Client: America's VetDogs - Cheyenne Whitetree

Team Members/Role:

Justin Scherrman - Design Engineer - Communications and Sensors

Neil Prange - Software Engineer

Aidan Klimczak - Design Engineer - Microcontroller

Justin Jaeckel - Software Engineer - Embedded systems

Ty Decker - Team stenographer

Katerina Zubic - Team organizer and sensor engineer

- **Weekly Summary**

This week we are going forward with our hardware and software testing with components from a previous design team. We confirmed that our PPG sensor for blood pressure gives quality data. The microcontroller has gone through some testing to learn how to program the device. We made a decision for our prototype to keep the dog microcontroller the same as the main device for ease of programming. The full design of our prototype should be coming together relatively soon based on this progress.

- **Past week accomplishments**

- Began developing the software for our microcontroller.
- tested the PPG for good results on the development board from the previous team.
- The collected data is accurate on our ppg sensor.
- Simplified the design and kept both the veteran and dog microcontrollers to be the same.
- Completed a rough block diagram to represent the design of the project.

Neil Prange - Research/Testing

- Learned how to use the MAX86150 Evaluation Kit, gathered some simple data for it
- Researched the most effective algorithms for detecting peaks in PPG data
- Got some useful results on heart rate data based on experimental data from PPG

Aidan Klimczak - Research

- Looked into how to properly power the microcontroller.
- Developed a KiCAD file for the device schematic.

Justin Scherrman - Research

- ESP32-PICO-V3-02 Bluetooth communication between this microcontroller.
- Communication will be between 2 of the same microcontrollers, both ESP32-PICO-V3-02.

Justin Jaeckel - Research / Development

- Started interfacing ESP32 and MAX86150(heartbeat sensor) to pull data for processing

Ty Decker - Research

- Started initial research into Bluetooth security features.

Katerina Zubic - Research & Testing

- Started testing the MAX86150 module. Gathered data, in the process of deciphering.
- Looked into market alternatives for the MAX86150 as backup.
 - This is due to unknown data readings and predictions of electromagnetic interference from micro USB port.

- **Pending issues**

- Getting control data from VetDogs (is in the works currently).
- Deciphering Data from Max86150 PPG and EKG sensor.

- **Individual contributions**

<u>NAME</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>HOURS cumulative</u>
Neil Prange	Ran experiments on data from PPG	5	32
Justin Scherrman	Bluetooth communication protocols.	4	32
Justin Jaeckel	Interfacing ESP32 and MAX86180	4	32
Aidan Klimczak	Looked into powering the microcontroller and developed a Kicad file for the project	4	30
Katerina Zubic	Connected MAX86180 and began pulling data. Researched market alternatives for PPG sensor.	4	31
Ty Decker	Researched meaning of PPG readings and Bluetooth security.	4	31

○ **Plans for the upcoming week**

- Complete lightning talk presentation
- Research communication protocols (Bluetooth) between two ESP32-PICO-V3-02
 - Begin researching adequate transmitters and receivers
- Research a vibration device.
- Receive a prototype vest from Vetdogs
- Successfully pull data from the heartbeat sensor

○ **Summary of biweekly advisor meeting**

During our meeting with Professor Selim, we started by updating him on our latest meetings/contact with VetDogs and BAE. Since BAE meetings have been open ended and largely driven by our questions, there were no updates on that end, however we did update Selim on how we might get contact with doctors who work with VetDogs. After this, each group member presented a brief report on their last two weeks' progress and their plans for the next two weeks. A general discussion of project problems and ideas followed these reports, where Selim recommended that we start with same-size microcontrollers for dog and human, and that Ty should do research on Bluetooth security. We ended the meeting with clarification on how parts should be ordered through ETG.

