EE/CprE/SE 492 Status Report 6

Start Date – End Date: 04/03/2025 - 04/17/2025

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, Sensors, and PCB

Neil Prange - Software Engineer

Aidan Klimczak - Design Engineer - Microcontroller

Justin Jaeckel - Software Engineer - Embedded systems

Ty Decker - Security

Katerina Zubic - Team organizer and PCB engineer

- **Bi-Weekly Summary**
  - Ordered PCBs for Dog and Veteran side devices.
  - Finalized method for estimating veteran blood pressure.

- **Past week's accomplishments**
  - Ordered PCBs through ETG as well as JLCPCB for redundancy.
  - Updated and tested Bluetooth code to ensure it works on the newly selected

ESP32S3 microcontroller.

Neil Prange - Research/Implementation

- Finished model generation to detect blood pressure in real time.
- Performed model evaluation on sample PPG data.
- Began porting machine learning library to ESP32.

Aidan Klimczak - Research/Design

- Received prototype PCBs and began planning testing
- Began developing breadboard implementation

Justin Scherrman - Research/Design

- Ordered a set of PCBs through JLCPCB.
- Assisted with correcting an issue with TX and RX pins on the current PCB designs.
- Began work on finishing final deliverables.

Justin Jaeckel - Research / Development

- Continued to improve abnormal heartbeat detection algorithm
- Worked on speeding up heart rate detection

Ty Decker - Research / Security

- Began reviewing code for security checklist items.
- Confirmed checklist items 8, 17, and 28.

Katerina Zubic - Research & Testing

- Began building the dog side of the breadboard prototype.
    - Found errors in our first iteration of the PCB (Tx and Rx pins).
    - Found errors with our mosfet logic
        - Our Vgs was not high enough to turn on our ERM motors.

- **Pending issues**

    - Integrating TensorFlow runtime with ESP runtime.

- **Individual contributions**

NAME	Individual Contributions	Hours	HOURS cumulative
Neil Prange	Trained and tested a 1D CNN model to associate PPG signals with blood pressure.	8	35

	Generated model version suitable for running on ESP32. Began importing TensorFlow libraries to arduino IDE.		
Justin Scherrman	Helped with getting the Bluetooth code to work again. Finished development of PCB on the dog side.	20	61
Justin Jaeckel	Continued improvements on abnormal heartbeat detection and heart rate detection	12	44
Aidan Klimczak	Began working on PCB prototype boards and breadboard design and developing testing methods	5	65
Katerina Zubic	Building the breadboard prototype of the PCB. This is for risk mitigation and future iterations for the PCB.	20	61
Ty Decker	Reviewed security checklist items. Went through Bluetooth code to confirm 3 items.	8	28

- **Plans for the upcoming weeks**

  - Begin work on finalizing the final deliverables.
  - Implement breadboard design using the components used in PCB.
  - Receive ordered PCBs and begin assembling.
  - Get blood pressure detection working on ESP32 with PPG sensor.
  - Integrate Bluetooth, heart rate detection, and blood pressure detection code bases.
  - Continue reviewing Bluetooth code for security
  - Attempt to scan the device for security items