
EE/CprE/SE 492 STATUS REPORT 3
02/14/2025 - 02/27/2025
Group number: sdmay25-15
Project title: Millimeter-wave 3D Scanner
Client &/Advisor: Mohammad Tayeb Al Qaseer
Team Members/Role:
Nathan Reff
Luke Post
James Peterson
Daniel Ripley-Betts

Week's Overview

This week we finished the automatic movement portion of the scanner and started work on the backend and frontend. Successfully testing our basic model. We plan to put in as much work as possible before spring break to avoid crunch after.

- **Key Accomplishments:**

- Nate: Collaborated with Luke on the frontend and backend using python and flask for the backend. I worked mainly on the backend and sending the proper G-codes for correct movement. Made movement in any direction and go-to-coordinate button working for backend.
- Luke: Worked with Nate and Daniel on the frontend and backend using python and flask. I worked mostly on the frontend, preparing the visual aesthetics of the GUI
- Daniel: In the first week I made final physical touches before we focused all our efforts on software and sensor integration. In these visits I implemented a new 3D printed Z endstop trigger, 3D printed Z endstop housing, and last but not least, flashed the customized Marlin firmware on the octopus motion board. In the second week I ported the backend code from Fast API to Flask. Additionally in the second week, I researched and installed an image of lightweight Debian onto the BTT Pi, and successfully connected to it via SSH using software called TFTPd to make my laptop act as a router and be able to go direct through ethernet.
- James: Assisted in software design with the direction of flask for web hosting with Python. Determining the use of HTML with assistance of CSS and JS for front end development.
- Collectively:

- Collectively we have had major success moving the motion system automatically and homing using our custom configuration of limit switches. We have also had great success setting up the pie the more work is necessary on that front.

- **Challenges/Issues:**

- Nate: None
- Luke: None
- Daniel: I can't believe that I repeated the part of coms309 where we had to evaluate two different backend tools, on my own only to decide that flask was our backend and we're sticking to it.
- James: None

Individual Contributions

Name	Individual Contributions	Hours this week	Hours cumulative
Nate	Worked on backend, accomplished GUI application working. Worked on movement and go-to functions for backend	12	70
Luke	Learned how to use Flask and html. Utilized those skills to help create a frontend and a little bit of backend in python	12	67
Daniel	Contributed on the backend, firmware, physical components, and testing. I explored FastAPI and built the backend in it, but we ultimately decided to move forward with Flask and so I ported the basic backend code I had to Flask.	12	76
James	Assisted in software design	6	65

Upcoming Week's Plan

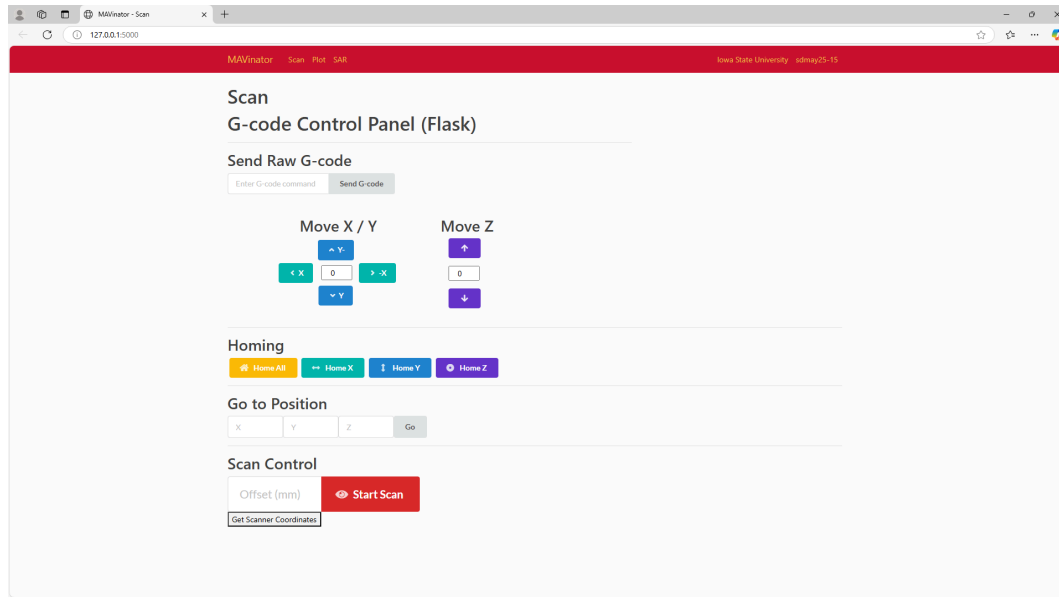
- Nate: Continue work on backend - make offset correctly for z-direction in go-to-coordinate function. Start on scanning functionality and other frontend buttons.
- Luke: Get the SAR page worked on for our frontend and backend and figure out how to do the sar calculations
- James: Continue to progress further with the software development of the UI's front and back ends. Refine design for GUI.
- Daniel: I need to find a 3D model to print that will mount on the extrusions for the 3D printer frame and allow us to zip tie the cables down. I need to test out my new and improved method of connecting to the Pi, using my smartphone as a hotspot while directly sshing using Tftpd64. and potentially get it on the CNDE's local network. Potentially rework Gantt chart.

Advisor Meeting Summary

- **Key Discussions:**
 - We met with Dr. Tayeb on Wednesday of this week and he was pleased with our progress.
 - We did a brief walkthrough of the back end code before bringing Dr. Tayeb to the lab and performing a simple demonstration of the web UI and functioning motion system.
- **Action Items:**
 - Dr. Tayeb was pleased with the UI design but would like to see a more futuristic and refined design. He recommended taking inspiration from Apple and Klipper.
 - Our advisor also recommended zip-tying down the cables

Pictures, Videos, and Mock-ups

UI so far:



30 second clip of motion system and web UI in action:

<https://photos.app.goo.gl/KecSLBVUXaBsW8C46>

Most recent software diagram:

