EE/CprE/SE 492 STATUS REPORT 4 02/28/2025 - 03/13/2025 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 continued work on the frontend and backend of the user interface to properly interact with the scanner. We updated and improved the functionality, and added more actions. In addition, we implemented web sockets to assist in real-time data transfer from the scanner's location and data from the 'scan' to the frontend user interface.

• Key Accomplishments:

- Nate: Did some more work on the front end. Worked on the visual of tracking the movement of the scanner. I did some research and helped with the implementation of web sockets. Cleaned up and improved the user interface functionality and fixing errors.
- Luke: Worked mostly on implementing a live plot that can update with our scan data every time the sensor receives data and worked a little with websockets for this. Also just began to implement SAR.
- Daniel: Moved start scan button to the page with real time scan data, added websockets for position tracking, added websockets for scanning, added basic scan pattern, updated gantt chart
- James: Worked on Scan file save location solution as well as the actual saving of the file. Additionally worked on the emergency stop button to stop all actions and require a restart with the click of a button on each page. Both are still in progress.
- Collectively:
 - We now have working websockets, scan patterns, can configure the sensor, view data returned in real time, scanner motion is reliable and safely within bounds, motion is tracked with sliders on the web-GUI. Software automatically puts itself in debug mode.

• Challenges/Issues:

- Nate: None
- Luke: Struggling to understand the coding at this level as I have only taken one coding class in C but I am slowly getting the hang of it
- Daniel: I really struggled with front end modifications
- James: None

Hours this Hours Name Individual Contributions cumulative week More work on the frontend and user interface. Assisted on the start of WebSockets on the frontend Nate 80 10 side. Cleaned up and improved application functionality Created a baseline code for the real time plotting Luke 6 73 using websockets. Did research into ftdi device connection. Started to work on the SAR function Moved start scan button to the page with real time scan data, added websockets for position tracking, Daniel 6 82 added websockets for scanning, added basic scan pattern, updated gantt chart Worked on Scan file save location as well as scan file save operations. Also worked on a button on all 73 James pages that will perform an emergency stop on all 8 actions being performed and require a restart of the entire system for safety reasons.

Individual Contributions

Upcoming Week's Plan

- Nate: spring break week: Do some research and familiarize myself with the scan implementation code, and other important information to be ready for work after break
- Luke: Get the SAR function completely done

- James: Complete the scan file save location and scan file save operations. Complete the emergency stop button functionality.
- Daniel: Spring break, find a way to get into the lab, find a way to get simulated or real saved data to start implementing file handling and SAR tests.

Advisor Meeting Summary

- Key Discussions:
 - Separate x y step size If not divisible by step provide options to make it divisible
 - Check on importable Matlab file File .scan matlab git import and export scan
- Action Items:
 - Conversion of SAR mathlab files to python/javascript
 - Positional tracking of the tool head
 - Emergency stop that supersedes all other actions
 - Collecting user input for where to save the scan file or if to save the scan file, using proprietary .scan format
 - Sensor connection and sensing method

Pictures, Videos, and Mock-ups

(Updated) UI so far running on Pi:

| | MAVinator Scan Plot SAR | Iowa State University sdmay25-15 |
|---|--|--|
| | MAVinator Sam Por SAR Scan Control Panel Move X / Y Move Z A A A A A A A A A A A A A | A state University admits/5-15 Status Messages Sert gr To command: Ge X175,9 1737,0 278,0 1530 Sert gr To command: Ge X175,9 1737,0 278,0 1530 Sert gr To command: Ge X175,9 173,0 278,0 1530 Sert gr To command: Ge X175,9 175,0 278,0 1750 Sert gr To command: Ge X175,9 175,0 278 |
| O corr | X Position: 0.0 Y Restinc: 0.0 Z Position: N/plot | х и в о С (ос) об (об) : |
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| | MAVinator Sam Port SAV Real-time Radar Data Plot Number of Frequency Points 501 Start Frequency (GHz) 114 Stop Frequency (GHz) 134 Sweep Time (ms) 10 Ramp Delay (us) 100 Update Parameters Scan Setup <u>2Offset (Journ) X kingth (mm) Y kingth (mm) StarsSize (Dam) Start</u> | lowa State University admay25-15 Status Messages Status messages will be displayed here. Connected to Mediactet |
| | Real-time Radar Data | |

3min video demo:

https://www.youtube.com/watch?si=EVi8e2ZaVTeYmNma&v=ihfuvM6mICI&feature=you tu.be

Updated Gantt Chart

Gantt Chart 2.xlsx

