EE / CprE / SE 4920 - sdmay26-07
Salt Spreading Autonomous Mobile Robot
Status Report 3

01/13/2026 - 02/26/2026
Client: student-led
Faculty Advisor: Alexander Stoytchev

Team Members:

Isaac Blandin - Project Manager & Software Team Lead
Dylan Bunting - Electrical Team Lead
Hoyt Dzwoniarski - Electrical Team
Thomas Huedepohl - Electrical Team
Mikhail McDade - Software Team
Shobhit Singh - Scribe & Software Team

Work Period Summary

During this work period, the next generation of prototype has undergone a significant transformation, as the proposed final shape has begun to take form through cardboard-aided and computer-aided design, and some 3D printing. Multiple subsystems have made major strides as circuit boards have been laid out, grid-based navigation has reached a major milestone, and our object-detection/avoidance has been improved.

Past Work Period Accomplishments

- Isaac & Dylan
    - Spent time mocking up the battery and electronics enclosures for our next prototype iteration using cardboard and tape.
    - Tested maintenance access and determined initial dimensions before the start of CAD modeling.
    - Mocked up sensor mounting positions.
- Isaac:
    - Created CAD models of an electronics enclosure and a battery holder. Modeled wire passthroughs between the compartments.
    - Performed testing on the GPS module using differential GPS
        - Created a script that pipes sensor data from the controller to a pc and parses the data into data structures for future use.
        - Created data visualization for the GPS accuracy data.
    - Worked on general team-level future design and scope planning

Past Work Period Accomplishments (cont.)

- Thomas:
  - Completed outline of circuit board and got price quotes
- Dylan:
  - 3D Printed Battery Containment
  - Designed Chain Guards
- Mikhail:
  - Continued working on grid-based navigation using the A* algorithm, and finally got a working visual implementation of the algorithm, as well as a sort of waypoint navigation, so that the robot can generate the best path with obstacles for spreading the salt throughout the driveway.
  - Started working on the server side for the Arduino again.
- Hoyt:
  - Planning for the future electrical subsystem.
  - General subteam planning.
- Shobhit:
  - A working polygon drawing in the map for user interaction and input achieved.
  - No crashes detected while using the camera for extended periods of time.
  - Started working on bumper sensor interrupts, made the library tested the ISR with an Arduino Uno module.
  - Worked on the GeoJSON for fetching the GPS coordinates from the module and parsing it in the Android application over Wifi along with fixing other map API issues.
  - Started working on the new camera module (3mp sensor as opposed to the previous 2mp sensor). Training the obstacle detection based on the new camera positioning with the bot's corners in vision for better distance referencing.

Time Tracking

Name	Hours This Period	Cumulative Hours
Isaac Blandin	11	29
Dylan Bunting	8	19
Hoyt Dzwoniarski	8	17
Thomas Huedepohl	4	14
Mikhail McDade	12	22
Shobhit Singh	11	22

Plans for the Upcoming Work Period

- Thomas:
    - Make switch for salt spreader then complete/order circuit board
- Dylan:
    - Prototype and create an updated drivetrain with bevel gearing
- Mikhail:
    - Implement a more realistic visual simulation
    - Have a bigger resolution for the grid for more accurate path finding
    - Fix Waypoint Navigation around objects and improve how the algorithm determines what the best path is to spread salt across the whole driveway
- Shobhit:
    - Explore the possibility of stereo camera setup.
    - Change the bumper sensor to normally closed.
    - Continue and finish configuring the OV3660 (3mp) camera sensor.
    - Work on integrating the ESP code with the Arduino using the new R4.
- Isaac:
    - CAD model sensor mounting
    - CAD model bumper sensors.
    - CAD model bevel gear drive motor mounting concept.
    - Magnetometer integration (if it gets delivered)
    - Place a parts order for upcoming new physical design

Summary of weekly advisor meeting

- 02/19/2026
    - ***Multiple members could not attend this meeting, so scope of the meeting was limited
    - General discussion of ongoing and upcoming work.
    - Expressed desire to see a physical mock up the future robot shape.
    - Talked in depth with members on his standards of component placement and appearance for a commercial robot.
- 02/26/2026
    - General discussion of ongoing and upcoming work.
    - Reviewed the current state of the physical robot design
        - Expressed concerns about the robot's stability, the group decided to add a second caster wheel.
        - Requested us to mock up bumpers and more sensor mounting positions.
        - Recommended additional sensor positions.
    - Requested final full form prototype mock up before spring break.
    - Discussed next steps.