sddec18-22 Automower (Autonomous Lawn Mower)

Team Members

Sam Tinklenberg - Team Leader
Andi Li - Meeting Facilitator/Software Dev
Bryton Hayes - Test Engineer
Grant Duncan - Software Lead
Joel Seaser - Hardware Lead

Summary of Report

During the term of this report, we had our second PIRM and received some very helpful feedback about our ideas and goals for the remainder of the project. We finished ordering the parts we think we need to assemble the chassis and start testing our code on it. We have been working on our Arduino libraries for motor control, motor feedback, GPS handling, and perimeter wire signal analysis. We have upgraded the mobile app to support Google Maps and Polylines.

Tasks Completed:

General Tasks:
- Finish ordering parts to assemble proof of concept
- Inventoried all received parts

Specific Tasks:
- Mobile
  - Added spoofed GPS data
  - Created polyline Google Maps display
  - Added type converter so that lat and longs could be saved in the entity
  - Added RecyclerView for all past histories
- Raspberry pi
  - Pi is accepting test HTTP post and get requests.
- Embedded
  - Added functionality and second PWM timer to motor control library
  - Got GPS library ready to test
  - Started testing encoder feedback
  - Research regulations for perimeter wire circuit
  - Researched Autonomous functionality

Tasks In Progress:

General Tasks:
- Assemble chassis and organize wiring
- Final system diagram

Specific Tasks:
- Mobile
  - Finish history selection screen
  - Make Polylines the same size as the cutting width of the mower
  - Add bluetooth connection support
- Raspberry Pi
  - HTTP Server
    - Handle HTTP post and get requests.
    - Get php scripts to work to add stuff to database
  - Networking
    - Work on getting the phone and raspberry pi to be able to connect together more automatically and less manually.
  - Database
    - Create other tables for more information from the arduino.
  - Firewall
    - Make a little bit more robust.
- Embedded
  - Test and validate WAAS data (need antenna)
  - Test motor feedback and GPS libraries
  - Send/receive data from Raspberry Pi
  - Add functionality to Arduino libraries
  - Research methods of object detection
  - Integrate libraries with autonomous code
  - Assemble and test perimeter wire circuitry
  - List and handle all errors and safety shutoffs
- Hardware
  - Assemble chassis
  - Meet with ETG to discuss mounting blade

Upcoming Tasks:

General Tasks:
- Start preparing poster and final presentation

Specific Tasks:
- Raspberry pi
  - Authentication
    - Come up with a way to authenticate users when they try and send requests to the web server.
  - Connectivity
    - Connect the raspberry pi to the local network automatically.

- ■ Come up with a solution for the raspberry pi to still be functional when it loses connection while it mows.
- ● Embedded
  - ○ Plumb GPS and motor data to Raspberry Pi database
  - ○ Incorporate library functionality into autonomous code
  - ○ Finish assembling and integrating methods for object detection
  - ○ Finish testing perimeter wire circuit
- ● Mobile
  - ○ Connect mower and app through bluetooth and wifi
  - ○ Update weather to use mower's location instead of phone's
- ● Hardware
  - ○ Finish assembling chassis/wiring
  - ○ Compare motor feedback to GPS data and speed control

Name	Individual Contributions	Hours this report	Cumulative hours
Sam Tinklenberg	Raspberry pi web server fix and testing.	14	46
Andi Li	Updated Cad Diagram, went over Arduino functionality with Bryton, researched autonomous code	12	44
Bryton Hayes	Add functionality to Arduino libraries, organize and order parts	18	70
Grant Duncan	Worked on the mobile app	12	52
Joel Seaser	Ordered parts for the rest of the mower. Finalized the perimeter wire	12	44