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

The term of this report was highly focused on assembly of the chassis and testing integration of motors and perimeter wire. We are still waiting on some parts that have been out of stock to arrive, but we have gotten a lot done with the individual components. Once we have all of the parts, we can finish assembly and wiring the project together. We have been working with our advisor, client and ETG to finish up. We have also started working on our final poster and presentation. We also spent a good amount of time finishing up the communications between the app and the raspberry pi.

Tasks Completed:

General Tasks:
- Start assembling chassis and organizing received parts
- High-level system diagram

Specific Tasks:
- Mobile
  - Added RecyclerView to History screen, so that the user can select which date they want to view
  - Added query to select all past dates
  - Added bluetooth support
- Embedded
  - Tested motor encoders
  - Assembled and tested perimeter wire circuit
  - Started testing with mock gps data
  - Started merging arduino autonomous code with libraries
- Raspberry Pi
  - HTTP Server
    - Handle HTTP post and get requests better.
    - Get php scripts to work to add stuff to database correctly.

Tasks In Progress:

General Tasks:
- Finish putty together chassis
- Mounting of blade

Specific Tasks:
- Mobile
  - Make Polylines the same size as the cutting width of the mower
  - Connect the app with the mower through bluetooth

- Raspberry Pi
  - 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
  - Sending GPS coordinates to Raspberry pi to be us
  - Implementing motor control loop
  - Enhancing safety features and error handling
  - Add object detection switches
- Hardware
  - Finish assembling chassis
  - Meet with ETG to discuss mounting blade

Upcoming Tasks:

General Tasks:
- Prepare 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
  - 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 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	HTTP Server is working, responding to post and gets accordingly.	30	88
Andi Li	Perimeter wire testing and assembly, soldered some parts, and did more autonomous testing	13	65
Bryton Hayes	Add functionality to Arduino libraries, GPS integration	20	102
Grant Duncan	Worked on the mobile app	12	76
Joel Seaser	Perimeter wire testing and assembly	16	72