

EE/CPRE/SE 492 - sdmay19-29

Automating Inventory Management & Routing through Sensor Networks

Week 7 Report

3/11/19 - 3/17/19

Client: Jimmy Paul

Faculty Advisor: Goce Trajcevski

Team Members:

David Bis - *Meeting Facilitator*

Hanna Moser - *Meeting Scribe*

Adam Hauge - *Report Manager*

Sam Guenette - *Public Relations*

Ben Gruman - *Resource Acquisition*

Noah Bix - *Documentation Manager*

Past Week Accomplishments

This week the team was able to get together to begin the integration phase of the project. By the end of the week a video presentation was made showcasing the project's front-end user interface. This video was shown to the client.

- **Final Report** - Adam
 - Continued to work on refining the final report
 - Still need to gather test data at this point for the report
- **Heuristic Based Search Algorithm Research** - Adam
 - Researched several algorithms and heuristic information to potentially use with the routing algorithms
 - Greedy Best First Search
 - Memory Bounded Search
 - A* search
 - Beam Search
 - Admissible Heuristics
 - Consistent Heuristics
 - S. J. Russell and P. Norvig, *Artificial intelligence: a modern approach*. Upper Saddle River, NJ: Prentice Hall, 2010.
- **Routing Component** (Continued)- David, Sam
 - Implement route optimization algorithm
 - Expanded on Clarke-Wright Algorithm
 - Implement mapping API with routing algorithm
- **Improved API for Front-End Use** - Sam, David
 - Adjusted endpoints to better suit requirements of the front-end
 - Order Log endpoint now shows company name and item name instead of numeric ID's
- **ESP chip integration**

- Researched ideas for stepping up voltage source from 3.3V to 5V
- **Display Data in Tabular Format With Filter** - Hanna
 - First, displayed data in tabular format on Inventory, Registered Devices, and Routing pages using virtualized-table package
 - Bar with column names hovers while scrolling
 - Can select each individual row
 - Found new, better package for displaying information in a table that had an simpler add on for a filter and search bar
 - Went back and implemented tabular display using new package
 - Also implemented filter and search bar for table that was provided as add-on with package
 - Filter unique to each individual table
- **Convert Weight Sensor Driver from Python to C** - Ben
 - Created C file to run on ESP8266 for weight scale
 - Tested implementation on Arduino Uno

Pending Issues

- **Integration needs to happen faster** - All
 - More progress needs to be made on the integration side of the project, as soon as possible
- **Routing Algorithm Must Consider More Constraints** - David, Sam
 - Routing algorithm considers distance as the only constraint. It must be refactored to consider truck capacity and traffic variance into the algorithm.
 - Capacity will be handled by initializing each “destination” as a route from the depot to the destination and back. The Clarke-Wright Algorithm will merge routes that meet certain criteria, including satisfying capacity requirements
 - Time Constraint
 - Routes must limit with overtime-pay
- **Behind on sensor integration**
 - Switching from the arduino to ESP chip took longer than we initially thought
 - Will have to complete the sensors as soon as possible, may need to bring other groups to help if not done next week

Plans for Upcoming Reporting Period

- **Integration Testing** - All
 - All parts of the project should be integrated soon for testing
- **Expand Routing Algorithm to Constraints** - David, Sam
 - Expand routing algorithm to consider truck capacity and traffic variance.
- **Test Routing Algorithm** -Sam, David
- **Modify Database** - Sam

- Add accounts and account types
- Use real world products and weights
- **Complete sensors** - Ben, Noah
 - Sensors need to be completed by the end of this week
- **Implement Device Registration and Modal Popups** - Hanna
 - Upon clicking row of data on Inventory and Registered Devices page, a modal should popup that allows the user to update certain parameters for the product or device
 - The user will fill out this modal and select the Apply button at the bottom of the modal causing modal to close. A toast will popup indicating success or failure of update
 - A simple page for registering a new device should be created. It will be in the design of a simple form with a register button at the bottom of the page

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
David Bis	Routing Algorithm Implementation API Improvements	7	41
Hanna Moser	Display Data in Tabular Format With Filter	10	48
Adam Hauge	Final Report Algorithm Research	7	48
Sam Guenette	Routing Algorithm Implementation API Improvements	6	48
Ben Gruman	Weight Sensor Driver Prototype Assembly	7	30
Noah Bix	ESP chip integration Missed most of week to due medical reasons	2	36