EE/CPRE/SE 492 - sdmay19-29
Automating Inventory Management & Routing through Sensor Networks
Week 8 Report
3/18/19 - 3/31/19
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 was planned to be the final week of development for the project. Significant progress has been made in terms of both the inventory management side and the routing side. Testing is scheduled to begin in the coming weeks.

- **Network Debugging** - Adam
    - Registered new Raspberry Pi to work on Iowa State Wi-Fi
    - Fixed some bugs in startup scripts for raspberry pi
        - Raspberry Pi now works correctly on the Iowa State Wi-Fi network
        - LCD Screen Now always displays correct IP address
        - Startup script now waits until Raspberry Pi is ready to start the server
        - LCD Screen no longer randomly displays garbage data
    - Updated startup script for LCD screen
        - All information processing for screen is more efficient
            - Utilizes multi-threading instead of multiple processes
        - Server status is now displayed on the LCD Screen
        - IP address and Server status handled in the same program via threading
            - Implemented mutex system for handling LCD memory space
        - All scripts for boot up now contained in boot subfolder
- **Completed sonar sensor** - Noah
    - Found that there is a 5V output from ESP8266 chip and used that to power the sonar sensor instead of the 3.3V output.
    - Used a voltage divider to reduce the input signal from the sonar sensor from 5V to 2.5V
        - 2.5V is a better voltage to use since the ESP chip receiving 5V signals was making the distance measurement inconsistent.
- **ESP8266 chips** - Noah
    - Soldered the remaining ESP8266 chips

- **Device Registration** - Sam
  - Back-End modification
    - Modify backend component to assume pre-registered scales
- **Device Registration Button and Modal** - Hanna
  - Added button to device registration page
    - Upon click will pull up modal to register new device
    - Modal has drop down list of available device IDs that can be registered
    - Min and Max threshold and product name boxes to be set
    - Placeholders for min and max threshold text boxes
    - Upon submission modal closes and submits information
- **Final Report** - Adam
  - Continued revising the final report
    - Initial draft planned for completion by April 12
- **Routing Algorithm Development** - David, Sam
  - Successfully implemented Clarke-Wright Savings algorithm for route optimization
    - Algorithm takes input of a distance matrix of locations, with the warehouse/depot in the first index, and a list of shipment size for each destination
    - Algorithm outputs list of routes for the day.
    - Algorithm considers capacity of each truck, so a route will not be generated if a single truck cannot satisfy each stop.
  - Progress on getting data from Google Maps API supply real data for the algorithm.
    - Google Maps API outputs distance matrix (where distance is the time in seconds to travel between locations)
    - Order list for a day generates the locations per day and the shipment size
    - Functions accurately take input from Database and inputs into Clarke-Wright algorithm
  - Met with Masters students Srinandan and Hooman to discuss their route optimization plans, specifically their traffic abnormality management (such as a car accident)
- **Built Additional Scale Sensors** - Ben, David
  - Built 3 additional scales to help later test scalable requirements of project

Pending Issues
- **Testing** - All
  - Testing needs to start
  - Full integration needs to happen

Plans for Upcoming Reporting Period
- **Begin testing** - All
  - Integration testing will begin

- **Routing Algorithm Traffic Consideration** - David
  - Routing algorithm must consider variable traffic for route generation. This will be done by considering the savings variance on route link additions each algorithm addition
- **Row Click Modal Popup** - Hanna
  - Upon clicking a row on Inventory/Devices page, modal should pull up to be able to update info with respect to that row
    - On Inventory page can update min and max threshold
    - On Device page can update min and max threshold along with product being monitored

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
David Bis	Routing Algorithm Built Additional Scales	15	56
Hanna Moser	Device Registration Modal	10	58
Adam Hauge	Raspberry Pi Debugging Final Report	10	58
Sam Guenette	API Routing Algorithm integration Device Registration Modification	10	58
Ben Gruman	Built Additional Scales	5	35
Noah Bix	Completed sonar sensors Built ESP8266 chips	8	44