

EE/CPRE/SE 491 - sdmay29

Automating Inventory Management & Routing through Sensor Networks

Week 2 Report

9/10/18 - 9/16/18

Client: Crafty

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:

- **Analyzed Crafty Documentation** - All
 - Client currently uses Google Docs form that's physically filled out by a crafty employee
 - The finished project should fill out form automatically
- **High-Level Architectural Plan of Project Design** - David and Sam
 - Designed three-tier architecture for project
 - Client-Side
 - Identified ReactJS as the primary framework
 - Server-Side
 - Identified NodeJS as the primary framework
 - Will be integrated using ExpressJS
 - Identified MySQL as database framework
 - Hardware
 - Will communicate over HTTP(s) to back-end to update database based on sensor data from stockrooms
 - Architecture is based off of MVC frameworks
 - Project Solution should be independent from existing Crafty products
 - Only required output currently is order information based on inventory data
- **Item Sensing Options** - Noah, Ben, and Adam
 - Looked into the different types of sensors to use
 - Bar Code Scanning
 - Easiest to implement
 - Inexpensive
 - Items would not be read as efficiently as we would like
 - Wastes time by making the employee scan each item

- Measuring height/location
 - Hard to implement
 - Not all products are measurable by height
 - RFID sensing
 - Employee doesn't have to waste time by scanning each item
 - Different RFID tags would have to be attached to every product
 - Purchasing tags could be too expensive in the long run
 - Weight sensing
 - Doesn't have recurring purchases (barcodes, RFID tags)
 - No extra labor for employees (tagging boxes, scanning items)
 - May be the most accurate way of measuring
 - Decided on choosing two different sensors: weight sensing and RFID sensing
 - Discussed that these two would be the most effective options to explore considering the points listed above
 - Identified either Arduino or Raspberry Pi for Master system for sensor network
 - Discussed using Arduino and attaching a wifi connection unit
 - This will work if sensor network uses socket connection
- **Researched Front-End Technology** - Hanna Moser
 - Read articles about React Native and ReactJS programs
 - Looked at different features that might apply to project
 - Built simple "Hello World" program
 - Created a program with an image
 - Created simple programs using two types of data controlling components: props and state
 - Wrote small program to practice using plugins
 - ReactJS very flexible in interacting with external libraries
 - Hooks used to interface
- **Sensor Network** - Adam
 - Decided that using multiple microcontrollers communicating wirelessly will be easier to implement rather than a single microcontroller with many GPIO pins
 - Decided on implementing sensor network either through UART communication or through socket network
 - Researched various microcontroller models
 - Decided that Raspberry Pi and Arduino would be best for a working prototype

Pending Issues

- **Measuring quantity** - All
 - Need to determine how our sensor network will measure food quantity
 - Crafty has a lot of different products
 - Need a solution that will handle relevant cases

- **Delivery Routing** - All
 - Need to determine how delivery routing will be handled
 - Place orders as soon as an item is almost gone?
 - Place orders upon predicting that an item will be running low soon?
- **Microcontrollers** - Adam
 - Need to decide what kinds of microcontrollers we are going to use
 - Decided Raspberry Pi or Arduino
 - Need to pick a model based on built-in features and price point
 - Needs to be reliable

Plans for Upcoming Reporting Period

- **Research and select RFID** - Noah
 - Look into different companies and suppliers who sell RFID sensors
 - Discuss with team on which RFID will communicate best with the hardware/software
- **Research and select Weight sensors** - Ben
 - Research the different products that are available for weight sensing
 - Confirm with team that chosen sensors will work
- **Investigate microcontroller for Master system for sensor network** - Adam
 - Explore solutions with Arduino or Raspberry Pi that will be used for sensor network
 - Analyze and assess which will be the best microcontroller for the project
 - Raspberry Pi or Arduino
 - Which model to use
 - Determine how microcontrollers in sensor network should communicate
- **Use React Native and ReactJS to create simple front-end pages** - Hanna
 - Develop page for entering given facility
 - Once facility entered will continue to page with status of products at that facility
 - Start developing product status page for each individual facility
 - Can view status of products
 - Threshold Value
 - Current Weight
 - Can manually order more of a given product
- **Create skeleton architecture** - David, Sam, Hanna
 - Create project for ReactJS front-end
 - Create project for NodeJS back-end with ExpressJS framework
 - Create MySQL database

- The software side should be established to handle data flow to all of the major parts of the project
 - System should be able to receive data via the API endpoints and update the database
 - System should be able to query data from database to update views

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
David Bis	Architecture Design, Architecture Analysis	5	11
Hanna Moser	React Native Research	5	11
Adam Hauge	Microcontroller Research	6	12
Sam Guenette	Architecture Design, Architecture Analysis	5	12
Ben Gruman	Weight Sensor Research	3	9
Noah Bix	RFID Sensor Research	4	10

Gitlab Activity Summary

Nothing to report.