Lab 1 – Team Yellow

Collaborative Outline

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CS 410

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1. Introduction
   1. Societal Problem
      1. Professional movers are expensive.
      2. DIY Movers inexperienced with move logistics
         1. Cost estimation
         2. Keeping track of everything
         3. Efficient space usage
         4. Packing
      3. Truck Loading takes careful consideration
      4. There are so many unknowns!
   2. Market Analysis
      1. Most people already DIY move
      2. Pro movers vs. DIY cost assessment
      3. Size of moving industry
   3. Introduction to Load.In
      1. Hi we’re load.in
      2. Computer Vision & AI
      3. Combine cost of DIY moving with expertise of Pro movers
   4. Solution Characteristics
      1. Load Plan Generation
      2. Keep track of box throughout move
      3. Tips and tricks
      4. Cost/time optimization
2. Product Description  
   Summary  
   Goals and Objectives
   1. Key Product Features and Capabilities
      1. Load Plan
         1. Measure your furniture
         2. 3D Model Generation
         3. Detailed instructions on how to load the truck
      2. Move Inventory
         1. Catalogue of all stored items and their location
      3. Rental Estimation
         1. Estimated total number of trips
         2. Estimated time to move
         3. Estimated rental truck costs per truck
      4. Expert Tips
         1. Display tips and suggestions for packing
         2. Search for tips
         3. Move experts write articles for help
      5. Chatbot and Live Help
         1. Help user interact though automation with AI that searches through tips
         2. Fallback to live move expert
      6. Vendor Synchronization
         1. Pulls in the data from the 3rd party rental companies
         2. Web scraper
         3. Web API Reader
      7. Move Analytics
         1. Location data
            1. Start location
            2. End location
            3. Total amount of trips
            4. Distance Traveled
         2. Move data
            1. Gas Cost
            2. Rental cost
            3. Supply cost
            4. Time to load and unload
         3. Feedback Data
            1. Ratings per move
         4. User Inventory
            1. Weight of items
            2. Fragility of items
            3. Measurements of items
            4. Box Dimensions
      8. Heat Map
         1. Smartphone utilization
         2. Used for analyzing a difficult UI
   2. Major Components (Hardware/Software)
      1. Database
         * 1. AWS
           2. RDS
           3. MySQL
      2. Smartphone Client
         1. Hardware Overview
            1. Storage
            2. CPU
            3. Memory
            4. Wi-Fi Connectivity
            5. Bandwidth
            6. Cellular
            7. Camera
         2. OS Overview
            1. Android
         3. Photo Compression
      3. Website Client
         1. Hardware Overview
            1. Storage
            2. CPU
            3. Memory
            4. Wi-Fi Connectivity
            5. Bandwidth
         2. Browser Capability and Operating Systems
      4. Web API
         1. Java
         2. AWS Elastic Beanstalk
         3. Apache CFX with Tomcat
      5. Web Application
         1. Java
         2. AWS Elastic Beanstalk
         3. Spring MVC with Tomcat
      6. Vendor Synchronization
         1. Java
         2. AWS Lambda
         3. Triggered to run on a schedule to bring in data from the vendor sites
3. Identification of Case Study
   * 1. Average Family
        1. Moving across town < 20 miles
        2. Need to move approx. 2,200 sq. ft (average house size)
        3. 3 persons and the family dog
        4. Needs moving vehicle because too much to fit into vehicles
        5. Moving Furniture
        6. Need to accurately tell costs because cost is important
        7. Friends or family members may collaborate on the load plan
        8. Do not have any tricky items to pack, and do not need expert help
4. Load.In Product Prototype Description

Introduction  
[Top Level Description]  
[Are features or capabilities reduced]  
[Which features simulated versus modeled] (not sure?)  
[Table of RWP versus Prototype here]

* 1. Prototype Architecture (Hardware/Software)  
     1. Key components
        1. Ubuntu 16.04 Virtual Machine
        2. Docker
           1. Apache tomcat
           2. CFX for web API
           3. MySQL
        3. UI
           1. Android app interface
           2. Test harness interface
     2. Demonstrated Functionality
        1. Docker serves as platform.
        2. Tomcat platform for web API
        3. MySQL platform for data
        4. Android Application for client interaction
        5. Test harness for demo

[Text explaining it here]  
[MFCD for prototype here]

* 1. Prototype Features and Capabilities
     1. What is demonstrated?
        1. Measuring an item
        2. 3d model generation
        3. Box locator
        4. Load plan
        5. Trip estimation
        6. Packing tips
        7. Expert articles
        8. Move feedback
     2. Why is that significant?
        1. Core features
        2. Innovative
     3. How does the prototype address CS410 project risk mitigation?
        1. Risk C-1: Move Feedback
        2. Risk C-2: Undo button
        3. Security S-1: Locally store data on phone
        4. Security S-2: Option to delete data.
     4. Functional goals and objectives
        1. Show proof of concept
        2. Capture move inventory
        3. Generate a load plan
        4. Change truck sizes
        5. Generate expert tips
        6. Find expert tips
        7. Search for items
        8. Random generator for move items
  2. Prototype Development Challenges
     1. Test Harness changing values in the database
     2. Changing truck sizes
     3. Changing move inventory
     4. Prioritizing search results for expert tips
     5. Multiple trips
     6. Dealing with edge cases

1. Glossary

**3D** – Three Dimensional

**Administrator** – Someone who will access elevated features of the Load.In system in order to maintain and detect issues.

**Amazon Lambda** - a serverless compute service that lets you run code without provisioning or managing servers

**Amazon RDS** - Amazon relational database service

**Amazon Web Services (AWS) –** A cloud platform on which Load.In’s databases are hosted.

**Android** - a mobile operating system based on a modified version of the Linux kernel and other open-source software

**Application Programming Interface (API)** – An interface for programs to share information and functionality with one another through a series of call or connections.

**AWS Elastic Beanstalk** - an orchestration service offered by Amazon Web Services for deploying applications which orchestrates various AWS services, including EC2, S3, Simple Notification Service, CloudWatch, autoscaling, and Elastic Load Balancers

**AWS Elastic File Storage** – an AWS service that provides file storage with the ability to auto-scale up with increased demand.

**Apache CFX** – A popular library for hosting web apis.

**Apache Tomcat** - an open-source implementation of the Java Servlet, JavaServer Pages, Java Expression Language and WebSocket technologies. Tomcat provides a "pure Java" HTTP web server environment in which Java code can run

**Chatbot** – A feature within Load.In that provides information to users and guides them towards helpful articles and other resources interactively.

**Cloud** – A term used to describe several computing models such that a company or individual can purchase resources for hosting a variety of things in a centralized location accessible from anywhere in the world.

**Computer Vision** – a subclassification of Artificial Intelligence that involves computing information about the world from various sensory data, such as images. Techniques of this classification are used throughout Load.In to observe real world objects.

**CPU** – Central processing unit.

**CSS** – Cascading style sheet.

**Do-It-Yourself(DIY)Mover** – Non-professional movers that rent a truck for their move, but and handle all packing, unpacking, manual labor themselves. This is the primary end user of Load.In

**Expert Tips** – Feature of Load.In that allows for a mover to search for helpful articles pertaining to a variety of useful information on how to accomplish various tasks during a move.

**GHZ –** Gigahertz

**Guest** – Someone who is accessing the Load.In system anonymously and has not registered for an account or someone who has registered but has not authenticated to the system at the time of access.

**GUI** - graphical user interface, the aspect of a software program that the end user interacts with.

**HTML5** – Hyper Text Markup Language version 5

**Java** - a set of computer software and specifications developed by James Gosling at Sun Microsystems, which was later acquired by the Oracle Corporation, that provides a system for developing application software and deploying it in a cross-platform computing environment

**JavaScript** - A scripting language that runs in the browser and performs one or more function to animate an otherwise static HTML document.

**Linux -** An open-source and community-developed operating system for personal computers and work stations.

**Load Plan** – A set of instructions on how to optimally load a container, generated automatically by Load.In from the boxes and furniture input into the system by the user.

**Logistics Planning** – A feature of Load.In that assists the mover with determining what rental trucks cost, how many trips the truck might need to take and whether the truck is available to rent based off proximity to the mover.

**Mbps** – Mega-bits per second, a unit of measurement for network speeds.

**Megapixel** – One million pixels, typically used to measure the size and quality of images

**Move Inventory** – A feature of Load.In that catalogs all boxes and items the mover intends to move.

**MySQL** - an open-source relational database management system

**MacOS -** An operating system used on Apple’s MacIntosh line of personal computers and work stations.

**Operating System (OS)** – A collection of programs designed to provide a platform on a device to run other applications and typically provides a layer of abstraction from the hardware it interacts with.

**Pixel** – A small square of color that is part of a larger display screen or image.

**Photogrammetry** – A computational method of deriving three-dimensional information from images. This method is used in Load.In to construct 3D models of boxes, furniture, and other items from pictures taken from the end user’s cell phone camera.

**Portable Network Graphics (PNG)** – Portable Network Graphics, a common image file format that Load.In uses

**Professional Mover** - Professionals who handle the physical labor of loading and unloading a moving truck, as well as driving the truck to the destination.

**Real World Product (RWP)** – The actual Load.In solution as it was intended.

**Rental Administrator** – A representative of a rental company who will access the Load.In system on behalf of the rental company.

**Rental Company** – Any company which rents moving vehicles for a Do-It-Yourself Mover to assist them with their move.

**Smartphone** – A device, typically handheld, which can act as both a cellular phone and a computer by running one or more applications through typically a touch screen interface.

**SPRING MVS** - an application framework and inversion of control container for the Java platform

**Test Harness** – A set of special features used during the development of Load.In to enable testing and demonstration of the application

**Vendor Synchronization** – A feature of Load.in that brings in truck sizes and availability of rental information from third party moving company websites.

**Windows –** An operating system developed by Microsoft for use on personal computers and work stations.

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