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Detailed Request For Proposal (RFP2)

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V00834552	V00729307	V00221256	V00178742	**SERVEitude**
				Version 2.0

Version	When	Who	What
1.0	8 Jan 2016	TaxiPack Corp.	Initial Drafting
2.0	29 Jan 2016	TaxiPack Corp.	Detailed RFP

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1.0 Problem description / expression of need

Brick and Mortar stores are currently trying to adapt and resist the digitization of the industry.These stores are in constant competition and are looking for new ways to thrive. People are less likely to physically go to a location and then physically carry the goods home. Often when a customer is shopping at a large department store, they will fill their cart before they are finished shopping, possibly causing them to leave early, and therefore not spending as much as they might have spent had their cart not been filled. As a result, the vendor misses out on sales and as a direct result, does not make as much revenue. To improve this brick and mortar experience, creative systems incorporating modern technology are needed.

2.0 Project Objectives

The proposed project, SERVEitude, aims to benefit both department stores and their customers in providing a service of convenience that maximizes transaction volume. The service will be able to keep customers shopping more and for longer periods of time, creating higher revenue for department stores. In addition, the service will provide convenience for customers, increasing customer satisfaction and thus brand loyalty.

The entire system will consist of a mobile app, a base station, several robots, and several QR codes distributed at regular intervals throughout the store. The customer will interact with SERVEitude through a mobile app that functions identically for any store using the service, allowing the user to use the same app for every store that uses the service. The mobile app will allow the user to indicate that their shopping cart is full, and tag their location. The mobile app will have a QR scanner feature built in, which the user will use to scan on of the QR codes located around the store in order to indicate their location to the system.

Once the user indicates their location, the app will send a signal containing the location to the base station. The base station will be an HTTP server that will maintain a list of free robots.

After receiving a user's location, the base station will dispatch the next free robot by sending an HTTP request containing the user's location to the robot. The robot will then bring an empty shopping cart to the user's location. Once the robot arrives at the user's location and leaves it's shopping cart, the app will prompt the user to roll their full shopping cart onto the robot, which will then bring the full shopping cart to a cashier. Once the robot has delivered the full shopping cart to the cashier, the robot will return to the base station. Once the robot has returned to the base station, it will send an HTTP request to the server that indicates that the robot is ince again available for dispatch. The robots and base station have already been implemented. Therefore, the supplier must implement a mobile app that can scan QR codes, contact the appropriate base station, transmit a location based on a scanned QR code, prompt a user to move a cart onto a robot when needed.

3.0 Current System(s)

The basic aim of the SERVEitude app is to help ease the stress of going grocery shopping. There are a couple of systems currently out there that offers services similar to what the SERVEitude app is supposed to do. Microsoft recently partnered with a software development company to create an autonomous Kinect shopping cart. The product is currently still in its test phase but the prototype contains a Microsoft Kinect with a screen that tracks the movement of the user and follows the user around. The problem with the prototype was that the chances of the cart clashing into another cart was pretty high because the system did not keep track of the surrounding obstacles. Most big brand stores currently offer services that allow the user to order his/her items online and have them delivered to the customer's home. This model offers high levels of convenience, but lacks the personal experience of visiting and interacting with people in a store.

4.0 Intended users and their interaction with the system

Store customers will download the app and use it to call a new cart when their cart is full. Customers can press a button that indicates that their cart is full, and sends the location of the customer to the central server, which then dispatches a robot to the customer's indicated location.

The robot will be dispatched from the base station with an empty cart to replace the full cart from the customer. The robot will then drop the full cart off at the store's checkout station. This process can be repeated multiple times as the customer keeps filling up shopping carts. When the customer is done shopping, they can bring their final cart to the checkout station where their previously chosen items are processed, and finalize their purchase.

5.0 Known interaction with other systems within or outside the client organization

Seamless interaction has to occur between the mobile application, the central server, the robots that are deployed, the employees of the department store, and the customers. The customers of the store must be able to operate the application within the perimeter of the department store. The application must also interact with the central store server that deploys the robots. At this point of interaction, the location of the customer must be sent from the app to the server, and the robot must be able to safely traverse the store towards the customer with an empty shopping cart. The robot must then retrieve the customer's full shopping cart and bring it to a checkout station in order for the customer and a cashier to later process the items. The department store will provide a wireless network connection in order for customers to use the application.

6.0 Known constraints to development

Robot navigation of a store requires many tests to avoid obstacles and customers. If a store has multiple floors, robots will be required to traverse from different floors to customers and drop off points. For maximum travel efficiency, known lines of robot travel must be clear and unobstructed. A degree of relaxation must be available for the robots to safely maneuver around customers, employees and sensitive merchandise.

The system is available according to the availability of the network. Since the mobile app must wirelessly connect to the store server, a network malfunction will result in loss of system control. The system must be available during all store open hours.

The robots must be physically stable enough to safely transport fully loaded shopping carts. The robots must be constructed from strong materials, and provide enough force and torque to move a full shopping cart reliably.

The robots will only be able to stop at posted locations of the QR codes. Therefore points of accuracy are limited to the number of QR codes. The QR codes must be available for mobile devices to scan and hold correct information regarding its location.

7.0 Project Schedule

8 Jan – RFP submitted
21 Jan – Informal requirements definition
15 Jan – Set up website
26 Jan – Obtain customer feedback on on website
30 Jan – Begin Formal Requirements Specification
16 Feb - Formal Requirements Specification
18 Feb - Obtain customer feedback on formal requirements specification
20 Feb – Begin Detailed Requirements Specification 1 March – Detailed Requirements Specification
2 March – Prepare Prototype demo
3 March – Prototype demo
8 March – Obtain customer feedback on Detailed Requirements Specification and Prototype Demo
9 March – Begin preparing Final Requirements Specification
15 March - Final Requirements Specification
21 March – Begin User manual
22 March – User manual
24 March – Obtain customer feedback on Final Requirements Specification and User manual
22 March – Begin final project

29 March – Demo final project, obtain customer feedback on final project

8.0 Project team

Adewale Adekoya - 3rd year computer science student

Chris Kelly - 3rd year software engineering student

Richard Lui - 3rd year computer science student

Trison Nguyen - 3rd year software engineering student

9.0 Glossary of terms

- **Brick and Mortar store**: A store where shopping and purchases are done physically inside a building. This is contrasted with an online store, where there is no physical presence for shoppers to visit.

- **HTTP:** HyperText Transfer Protocol, an application protocol for data transfer and communication between information systems.

- **Server:** A system that waits for, responds, and processes information to clients on a network.

- **Kinect:** Motion sensing devices developed by Microsoft for use on its Xbox 360 and Xbox video game consoles, and on Windows PCs.

- **QR Code:** Quick Response Code, a matrix barcode that is popular due to its fast readability and storage capacity.

- **Base Station:** HTTP server that maintains a free list of robots.

EXECUTIVE SUMMARY

Project Objectives:

- Make the shopping system at different types of stores more efficient.
- Allow users to successfully checkout their goods while shopping for other goods.
- Increase store profits
- Increase customer satisfaction and loyalty

Needs:

- Deliver an empty cart to the user as soon as the user makes a request.
- Deliver the user's full cart to the checkout station.
- Pinpoint the customer's approximate location.
- Keep track of obstacles and other objects in the store
- QR code reader
- QR codes in stores to act as store locations

Requirements:

- A mobile app for android or iOS that can:
    - Scan QR codes distributed throughout the store
    - Contact the appropriate base station via HTTP
    - Transmit the customer's location to the base station
    - Signal the customer to place their full cart onto a robot