

# Smart Buy

## Progress Report

## For an Advanced Shopping Cart System



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## Overview

For the past 3 months, Smart Buy has been progressing towards the completion of the Advanced Shopping Cart system. We have strictly adhered to the given functional and design specifications, as well as the proposed milestones.

We have entered the final stages of integration between hardware and software systems, which will allow us to test and tweak the component interactions in the finalized product. Software integration between PC and tablets can still be improved after installation and integration, and will be pursued if time permits.

## Technical Development

### Shopping Cart Unit

#### Hardware

The fabrication of the mount was delayed for few weeks due insufficient of equipment and tools available. The metal bender in the machine workshop was broken down and the metal cutter was not able to cut our metal sheet smoothly. A lot of vibration was influencing the cutting process and we had to switch to a new station. The hardware team went to surrey machine shop, but unable to access it due to lack of permission. Despite that, the cutting and bending the metal into shape was completed. The hurricane dials were also properly installed on the two sides of the mount. However, the team was unable to find two models of hurricane dials that are designed to be identical but opposite to each other, therefore the mount would look mismatch in the side.

One of the major problem hardware team is currently encountering is that the clamp we bought was not able to hold the mount and the tablet in a stable position, due to the relatively large amount of weight of the tablet. Since the shopping cart we borrowed for prototyping does not belong to us, we would not be able to drill holes in the handle to secure the mount. We would have to come up with alternative ways to solve this issue.

As for the RFID reader, since there are four holes on the back of the device, and all the screws came with the reader as purchased, our team successfully mounted it on the shopping cart.

The siren alarm system is built and fully functional, however malfunctioned when we put the circuit on the prototype board. We are still in the process of debugging the circuitry, expected to complete in a few days.

## Software

The engineers were successful in reading multiple tags attached on product items. The design of the GUI (graphical user interface) was completed. The GUI was able to display the shopping list in real-time while multiple items were being put into and taken out from the shopping cart. The Bluetooth-to-RS232 adapter did not work as expected. Because of that the communication between the RFID reader and the Windows tablet were done through physical serial cable. The integration with the server part was also successful despite that the engineers are still trying to come up with a better and more efficient mechanism of communication.

## PC Server Unit

### Software - Database

The software team have successfully structured and programmed the central database components. This system was able to wirelessly connect to all portable tablets and was able to upload and download information in real-time. The creation of a user-friendly GUI for employee use was a challenge, since many issues had to be considered to ensure the functionalities are accessible and reliable. The broadcasting system has been completed, and we found the most effective method is to utilize a router to set up a local area network. The integration between the tablet and PC is completed, but we are still working to improve the information passing between the two devices as it is hard to determine the most efficient and reliable way to pass information between the database and the portable tablets. Other than this, all other functionalities have been essentially met. All the software features have room for improvement, and we will continue to improve it if time allows. However, any future changes will not affect the functionalities or design specifications outlined in previous documents.

## Budget

The Chief Financial Officer (CFO) of Smart Buy has reported the development cost of the ASC has gone over the initial budget of \$450 to approximately \$750. Result of being over budget was majorly due to the change of equipment used. The original idea was to use a barcode scanner instead of the RFID reader currently used, which is much more expensive. Also, due to the underestimating of the cost required for shipping from Hong Kong and USA. The shipping and handling fee cost more than what we expected and they were account for more than 10% of the total budget, roughly \$50. We are planning to submit an application to the Wighton Fund to compensate the cost for the ASC prototype. The majority of the components for the prototype have been purchased. Therefore, the development cost will not change drastically.

## **Human Resources / Team Dynamics**

The members of Smart Buy have created a strong bond during the entire development phase. The team has spent numerous of hours discussing problems and solution to our project. Everyone in the team is very cooperative and evenly contributed the work among ourselves in order to keep the project on track. Formal and informal meetings were held regularly either via email, phone or in person meeting for updated of member's tasks and to ensure the project is following our proposed schedule.

## **Action Items**

The next milestone of the ASC prototype is the completion of the placement of the mount and troubleshooting of the alarm circuit. After that, the alarm circuit will be put into a waterproof enclosure.

We will thoroughly conduct testing on the prototype once the integration is completed. We will ensure all functional specifications are met. To conclude the development of the ASC prototype, we will be applying water proof material to the RFID reader and the alarm system. If time permits, we will also implement a simple anti-shoplifting mechanism to make our system more sophisticated. The completed ASC prototype will be a system that has undergone a full-scale in-depth testing ensuring every component is working properly both individually and as a whole system.