



# **CSCI 5708 Mobile Computing**

## **Project Proposal: *SmartShopper***

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## **Abstract**

Now that computers are pervasively used in the form of smartphones, spreading information has become convenient and efficient. All we need to do is take out the little device from our pockets and connect to this juggernaut network called the internet and access information about literally anything. On top of that, mobile applications have made this task much easier. Now the users don't even need to write a query or type in the URL of a website for particular information. The goal of our application called "SmartShopper" is to provide the users with information about the stores where they can find the cheapest groceries or other household products. This application is going to help the users to save money, especially if they buy groceries in bulk rather than on a daily basis.

## **Introduction**

Smartphones are ubiquitous and once connected to the Internet, can be one of the most efficient mediums for spreading information. One way of connecting to the people around the globe through smartphones and the Internet is by creating a mobile application. If the objective of the mobile application is to meet the needs of the users and is developed with compliance to Nielsen's usability heuristics, the app can have a good chance to succeed. The goal of our application is to inform the users about the stores where they can find the cheapest utilitarian products and groceries. This application will especially be helpful for university students to save their money.

This application will eliminate the need of an individual to compare the prices of a household product or grocery as our application will do it for them. Also, it is unviable for a person to visit various stores in order to know the cheapest deal that they can make for a product. This application will help the users to keep track of the best possible deals around the city and save their money, especially if they are planning to buy the products in medium or large quantities. Also, even if the users are not planning to buy anything in a large quantity, but they happen to be passing by the store that is giving them the best deal or, all the stores are approximately equally distanced from their place, it will still be saving.

The idea that motivated us to develop such an application is to help university students with their budget. However, it will be just as beneficial for other users who want to pare down their expenses and increase the savings. All they need to do is open the application and type the name of the product or the grocery item that they want to buy. If they are already in a store, they can use their smartphone's camera to scan the barcode and the application will fetch the best deal for that product around the city.

Moreover, the application will compare the prices of each product after fetching the current prices from the databases of various stores through their APIs. And so, as soon as the deals arrive at the stores, they will be updated on the application without any delay. Therefore, the users will always be seeing the current and updated deals around the city.

## **Users**

There are many people around the world who live from paycheque to paycheque and for them even being able to save a little money, almost every week consistently makes a big difference. Even if people are not so tight with their budgets, it never hurts to save some extra money. So, our target audience in a broader spectrum is anyone with an android mobile phone having the ability to connect to the internet and who is also willing to spend some extra time looking for the best prices offered for the same products in the stores around their location rather than spending some extra money in the store. Therefore, the application is being made in a generic way without using any references or expressions which are not commonly used so that most of the general public does not face any kind of difficulty using the application.

Although, the application is being made in a generic way to show the price differences of any type of product among the various stores available in both the online and offline world we are at the moment focusing only on the groceries and household items in some of the popular stores in Canada like Sobeys, Walmart, Atlantic Super Store, etc. Since the majority of the people who we are familiar with, who fall into the category mentioned above are either students who are trying to live or living a financially independent life or are working professionals with a modest income the audiences we are targeting for this application are college or university going students and the people who are earning close to the minimum wages across Canada.

## **Purpose and Benefits**

Most of the popular applications which are similar to our core concept do not provide an easy option to the users for searching the details of a particular item. Instead, the user is made to look at a lot of flyers or advertisements containing the information about the current offers in the stores one after the other which is like dumping a lot of information on the user and making them manually search, compare and remember the details of the item they were looking for. Whereas our app's aim is to let the users get the information regarding the offers and prices of the exact item they are searching for. We are also reducing the user's effort even further by making the search much easier by providing the users with the choice of just scanning the barcode of the product apart from typing in that particular product in the search bar.

Apart from making the search for the products easier, we want to develop a few features like saving a grocery list and sending notifications to the user regarding the offers on the items saved in the grocery list. Thus, the users need not check for new deals on those products or reenter the list of routine groceries.

The main focus while developing our application to make it appealing is to have a minimalistic yet aesthetic user interface and also to ensure that the application has as fewer glitches as possible because our targeted audience mentioned before are usually very busy and do not prefer to spend too much time doing any kind of grocery shopping. Thus, helping them save money whenever possible within the minimum time.

## **Medium, Mode and Environment**

### **Mode**

The key factor behind the success of a mobile application is delivering services to users that are streamlined and serve the purpose of interacting with the user in a spontaneous manner. It is very difficult to describe a state of mind of a user while using the app. Our app serves users with providing the best deals/prices on day to day needs of an individual. The user can be in a joyous mood enjoying the weekend and planning out what stuff to buy. Users can even be stressed, returning from work or school and struggling to decide where to find cheaper options for their desired product. Users can be in a hurry and maybe looking for getting the best prices at the nearest location. Users can also be very busy and need to find cheap options quickly. In every state of mind, users can find the best outputs of the products needed. The most important factor is that the user won't need to spend a lot of time while traversing the application as they could easily find/compare the product prices by searching the product name or by scanning the barcode if the user is in a store and has already finalized what they are looking for. Based on the output of the application, users can easily make decisions for the product they are interested in.

### **Medium**

When designing the medium of device, aspects such as display sizes, network connectivity and resolution should be kept in mind. We are building an Android application that will run on all the android devices over Android version Lollipop (5.0). The application would give its best performance with devices having at least 2GB of RAM. The application would work on any android touch screens except the small ones such as smartwatches. Also, the user data would be stored in a database and not on local storage, so internet connectivity over mobile data or Wi-Fi would be required in order to fetch the details from the database. The application would also require a Camera (for scanning barcode) and Location (for directions) permissions for best experience.

### **Environment**

Apps are an integral part of our day to day routine. Our application helps users to find the best price on the products the user wants to purchase. For that, the user needs to scan the barcode of the product or search for the product name in the application. The user's physical location is essential as the user's environment would decide how the user accesses the information and how the value is derived. The user can easily use the application while doing household chores like cooking, eating, watching tv, playing with their pet, studying or taking rest. The application will be easily accessible while travelling by public transport or when walking on the street. The user just needs to remember the name of the product they want to purchase and that is it. If the product is within physical contact, the user only needs to scan the barcode and will get the best price of it. The product scan feature can be useful when in a superstore by allowing the user to find a cheaper price or compare the price with other stores. It mainly helps users when at home, trying to figure out where to go and buy.

However, it would be difficult for users to use this application while driving as they are expected to either type or scan. Except for this scenario, the application can be used at any time or any place. Also, users don't have to login every time when looking for cheaper options for a product. This would be beneficial for users when they are in a hurry or are travelling.

## **Functionality**

The app functionality is one of the core components that help build a user base and increase downloads on the app store. It is not necessary for an app to have a number of functionalities to succeed. Efficiency and usability are key factors. Overloading an app with superfluous features makes it bloated. This adds an undesirable learning curve which may often lead to the user deleting the app [1].

### **Minimum functionality**

1. Users will be able to register by providing email, username and password, which will be stored in a database to keep user profile and history, or the user can use the “guest” account in which the user can access the core functionality of the application.
2. Users can search the product using the name of the product or can scan the barcode of the product.
3. On clicking the product from the search result, users see the description of the product, images, average price, current price, and name of the store.
4. Users select “Get Directions” which will open google maps providing the route from the current location of the user to the selected store.

### **Expected functionality**

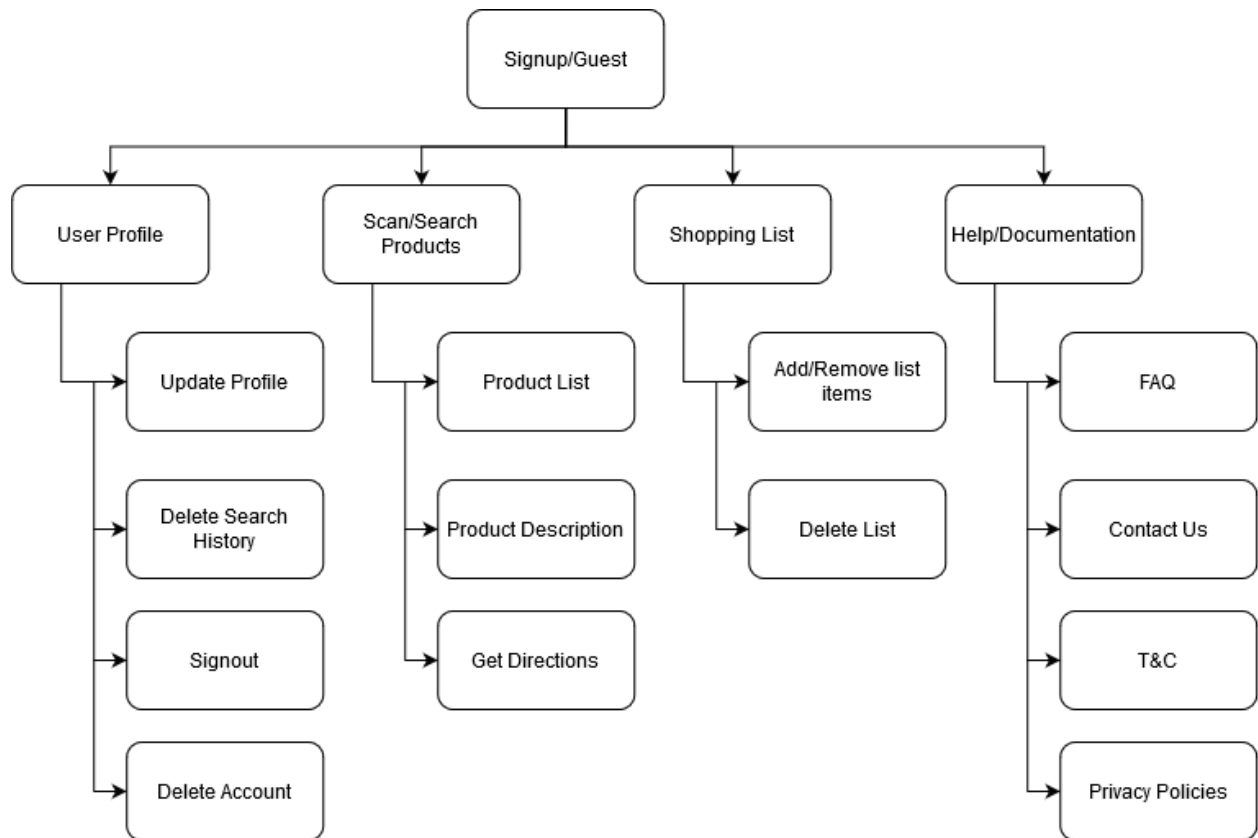
1. Users can filter the list based on different criteria like price, distance of store, availability, etc.
2. Users can access the history of searched products, which can be saved on the server (cloud), if the user has registered.
3. Users can save their shopping list.

### **Bonus functionality**

1. Users can see the latest flyers from different stores on the home screen.
2. Show combo-offers for searched products available in different stores.
3. Products reviews and rating system.
4. Users can share the product (link) on different social media applications.
5. Notify users about discounts based on their saved shopping list.

## High-Level User Flow

As with any mobile application, our app has an organizational structure for the UX. We are using a hierarchical structure for the UX flow. On a high level, our app's interaction flow is depicted by the structure in figure 1.



**Figure 1: High Level User Flow**

The app starts with the main screen which gives the user a choice to scan the barcode of a product or enter the name of that product. The barcode can be scanned when the user clicks on the barcode scanner widget. Alternatively, the user can enter the product name on the search bar. Either of the operations routes the application to the *Product List* screen which displays a list of all the versions of that product from different stores. Each item in the list has that product's picture, price, name of the store, and a widget to get directions to that store. This list can be sorted by price, distance to the store and timestamp of the price. This allows the user to select the best price nearby.

When an item from the list is selected or when the user selects *get directions* option, the user navigates to the *Product Description* screen which has a description for that particular product and a map view which shows the route from the user's location to the store.

Users can access their shopping lists by navigating to the *Shopping List* screen to create and manage their shopping list. In the case of signed in users, this list is stored on the cloud and is used by a backend service to notify the users about price drops. On the other hand, users can navigate to the help and documentation section to know about the usage and FAQs.

Every screen will have a home button which navigates the user to the main screen. Also, every screen has a back button that navigates the user to the previous screen. Users can see the search history in the suggestive drop-down list when they try to search for a product on the search bar. Users shall use the app either in guest mode or sign up with their Gmail account. The latter would allow them to keep track of the searched products and grocery lists.

## **Backend**

Our app gets the data related to the products from the API provided by the retailers. Since all we need is the data as provided by the retailer, we do not require a heavy backend with thorough business logic at this point. However, we have a service layer (a service class) which makes the calls to the API provided by different retailers.

On the other hand, the user's data (frequent grocery lists, account details, etc.) is stored on the database provided by the backend-as-a-service (BaaS) by Firebase and is processed by a user service. For this module, we are using the Model View Controller (MVC) paradigm.

**References:**

[1] Gabriel Shaoolian, the blog on “Key Functionalities Your Mobile App Design Needs To Invest In”  
retrieved on 5 February 2020, from  
<https://www.forbes.com/sites/gabrielshaoolian/2017/10/04/key-functionalities-your-mobile-app-design-needs-to-invest-in/#12309ed21424>