CS486C – Senior Capstone Design in Computer Science

Project Description

Project Title: Crowd intelligence grocery shopping mobile app	
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Project Overview:

A quick glance at the iOS or Android app stores will tell you that there are already plenty of "shopping list" apps out there, many of them quite functional with features like shared list-making, and storing commonly bought items. None of them, however, give you much help when you actually arrive at the store: you have to spend considerable time and frustration searching through the aisles to find the items that you're looking for. The problem only becomes worse if shoppers would like to stop at an unfamiliar store that happens to be more convenient at that moment. For this reason alone, many shoppers drive miles out of the way just to shop at their "usual" store, simply because they have developed some idea of where things are in that store. Even if you are at your "usual" store, it is not particularly clear how to pursue a sizeable shopping list, i.e., in what order to pursue your list items in order to minimize your time hiking through the store. To make matters worse, recent developments in marketing strategy literally encourage stores to change item locations frequently, in order to keep customers in the store longer. How can customers work together to make shopping more efficient that ever?

The goal of this project is to explore the concept of adding some "intelligence" to a grocery store app, based on two observations: First, every grocery store is *somebody's* "usual store", so that one might be able to "crowd-source" the knowledge about where items are located in particular stores. Second, most grocery stores have the same simple layout (square store area, transected by lots of aisles) so that, knowing the aisle and approximate placement of each item along that aisle, a simple algorithm should be able to suggest a "most efficient route" to satisfy your whole grocery list. Key features of this mobile application would include:

Phase 0: minimum viable product

- App is based on cloud-based web portal that allows sharing of list between people, as well as sharing of grocery store item locations of in all stores throughout the app.
- Users have accounts storing their authentication information, as well as profile information, e.g., past shopping lists, commonly purchased items, etc.
- Allows users to create a grocery list and efficiently populate it from pre-defined catalog of items; items can be deleted or checked off
- Allows list to be shared with specific other users. Both users can then check off items, and add/update item locations.
- Supports multiple grocery stores. In "shopping" mode, the mobile GPS suggests which store the user is at, then produces an ordered "shopping plan" for the selected shopping list at that store. Items for which locations are not known are marked; user can add those locations when found.
- Basic admin interface for the web portal supporting the mobile app.

Phase 1: A useful application

- A high quality graphical interface. Item locations are displayed on a 2-D schematic of the store; the ideal shopping plan appears as a numbered line (or something similar) connecting the dots.

- Full crowd-sourcing of location information. Item locations for a given store entered by any user are accessible and used to guide all users at that store. Includes clever algorithm for resolving conflicting location information.
- Highly streamlines grocery list management. For instance, could provide way to store/retrieve "list templates" so that users could start with their "standard list" and just add/delete items. Plus a super-efficient "item browser" to easily find items items in the catalog, e.g., hierarchical browser.
- Fast, GUI-based item management: easy to update product, aisle, and location information.
- When users can't find an item in the catalog, they should be able to add it. A smart interface will suggest similar existing (partial hits, spelling errors) items as candidates, in an effort to avoid having several slightly different catalog entries for the same item.

Phase 2: Really cool added features

- Exploration and integration of information available from grocery stores. May get access to inventory catalog and/or items locations.
- Add item price information, and allow super-easy updating. This would allow users to see at a glance what their list would cost to fill at various stores.

In sum, the nearly universal proliferation of smart phones makes it possible for a large user base to work together to create a database of grocery store item location information. Simply by marking where items are at their favorite store to make their own shopping easier, users can crowd-source a database that makes shopping easy at any store. The success of this project will hinge on interface design: the product can only be successful if it is extremely fast at creating and sharing lists, and it is nearly painless to quickly mark item locations as you do your shopping and check items off.

Knowledge, skills, and expertise required for this project:

- Familiarity with web services to create underlying web portal.
- Familiarity with mobile app programming. Exact platform (iOS/Android) to be negotiation with client in early design.
- Familiarity with GPS and location-based services.
- Excellent GUI design and refinement skills. Will need the ability to provide a simple app presentation that is easy to use and easy to modify (as previously specified)
- May also need competencies in the area of data access if grocery store information, or coupon or sale information is to be acquired, or GPS information is applied

Equipment Requirements:

- There should be no equipment or software required other than a development platform and software/tools commonly available online.

Software and other Deliverables:

- Web service portal outlined above, installed on a cloud service of client's choosing. Basic "admin manual" describing installation and maintenance operations.
- Mobile application, as outlined above. User manual describing features and operation.
- A strong as-built report detailing the design and implementation of the product in a complete, clear and professional manner. This document should provide a strong basis for delivery of the product to other potential developers and/ future development of the product.
- Complete professionally-documented codebase, delivered both as a repository in GitHub, BitBucket, or some other version control repository; and as a physical archive on a USB drive.