UNIVERSITY OF WITWATERSRAND, DEPARTMENT OF ELECTRICAL ENGINEERING

Software Requirement Specification for Shopping Route Recommender

Luka Cakic (671913), Ronen Freeman (386910), Devin Taylor (603956) and Matthew Marsden (609293)

March 10, 2016

1 Introduction

1.1 Purpose

This document details the Software Requirements Specification (SRS) for the Shopping Route Recommender (SRRec) web application. The document also follows the IEEE standard for SRS documents.

Shopping can often prove to be tedious and frustrating when you find out that the shop you are at does not stock or is out of stock of certain products that are on your shopping list. One then needs to go to other shops in the hopes that those shops will have the items not yet ticked off ones shopping list. Even then, the next shop may not have the items and you have to keep going from shop to shop until you finally get all the items needed. There is clearly a need for a more efficient way of finding all the items on your shopping list in the shortest travel time, shortest route or most cost effective route.

The purpose of this project is to provide a web application that allows a user to enter their shopping list and in turn provides the user with the ideal route to the nearest stores that will fulfil their needs.

1.2 Document Conventions

This document is intended to accompany the SRRec software and should be updated with each update to the software. This will ensure that the document remains relevant and useful.

1.3 Intended Audience and Reading Suggestions

This SRS document is intended for:

- Programmers that want to understand the outlines of how the SRRec web application works and the way in which the software has been implemented.
- Project testers to use in order to better their testing strategies since some bugs are easier to find by using an SRS document.
- End users of this web application who would like to read about how the SRRec can help them or what it is capable of doing.

1.4 Project Scope

SRRec is a web application that is capable of providing a route to all the nearest shops so as to fulfil a users entire shopping list while either following the shortest route, the route with the shortest travel time or the route that will result in minimal total expenses. The shopper can continuously add items to their list and these items are logged to their respective list. When the shopper finally runs the SRRec he/she will obtain their user-determined recommended route of shops to visit is a particular order according to items on their list. It provides a Graphical User Interface (GUI) with embedded Google Maps.
We assume the following:

- There is already a map of all shopping malls and shops that sell various items that a shopper could add to their list.
- Each shop has a database of the items that they stock and their respective prices.
- The price of each item is a simple Rand value or indicated by Rand/kilogram, etc.
- The SRRec runs on a website with access to the databases of all the shops.
- Google maps is available on the website and shows the route from one shopping mall or shop to the next.

The shopper is able to select one of three types of recommendation:

- shortest route.
- Shortest route for minimal total expenses.
- Route with shortest travel time.

The shopper will also be able to change their selected recommendation after visiting some shops and eliminating some items from their list. The SRRec can also incorporate stop-overs for coffe, drinks, lunch, etc. The Shopper can also give a price range that they are willing to pay for each item.

1.5 References

NONE YET

2 Overall Description

2.1 Product Perspective

The Shopping Route Recommender is an application used by consumers to maximise their shopping experience in terms of three preferred optimisations: minimum cost, travel distance and travel time. The consumer is able to log onto a Website or Smartphone application and create a shopping list with a desired route being generated. Enabling a user to optimise their shopping experience is a potential success from the start, as their daily routines can become more efficiently and effectively undertaken. The application's use is not only restricted to the general public, but can also be used by businesses and companies involved in the stock collection courier service industries. The application is aimed at being user friendly, simple, and interactive with maximum customisation being a priority aspect in order to maximise an individuals needs.

2.2 Product Features

The list of product features below aim to provide an easy-to-use, customizable application interface for all users.

- Interactive shopping list menu.
  - add or remove item
- Interactive optimisation selection options.
  - minimise cost
  - minimise travel time
  - minimise travle distance
- Interactive shopping area selection options.

  - select from a number of suburbs or regions
- Interactive route map displaying alternate routes for selection.
  - rotate map
  - slide map
  - zoom in/out
  - satellite view

2.3 User Classes and Characteristics

The application is aimed for the general public's use as well as certain business industries.

- General Public
  - General population wanting to buy their routine shopping list
  - General population looking for more specific products and their preferred optimised route
  - Foreign individuals looking for their ideal shopping locations or travel routes
- Business Industries
  - Courier companies collecting stock or products from various distributors/stores

2.4 Operating Environment

Shopping Route Recommender is an application designed to run on the most Web Browsers as well on Google Android and Mac OS X Smartphones.

- Software Requirements
  - Internet connectivity
  - Entry level Smartphone
  - Mozilla Firefox, Microsoft Edge, Google Chrome, Microsoft Explorer, Safari
- Hardware Requirements
  - Entry level Smartphone with interactive touch screen

2.5 Design and Implementation Constraints

Shopping Route Recommender is platform independent and is written in language. In addition, Google Maps API is implemented for generating the desired optimised shopping route. The accuracy of the generated route and optimisation algorithms is therefore dependent on the accuracy of the Google Maps detailing.

2.6 User Documentation

A general help and FAQ menu will be provided within the application. This will function as the "user manual" of the application.

2.7 Assumptions and Dependencies

3 System Features

Shopping Route Recommender was designed with user experience as its primary concern. As a result of this the product features are simplistic in nature in order to provide the customer with only the essentials. This section provides a detailed description of each system features in order to make future system extensions as easy as possible.

3.1 System Feature 1 - Adding items to shopping cart

3.1.1 Description

The Shopping Route Recommender's primary feature is for the user to be able to continuously add shopping items to their cart. The user will be able to continuously log into the application and add items to the shopping cart on an add-hock basis. These items will remain in the basket until such time that the user wants to go shopping.

3.1.2 Stimulus/Response Sequences

The user will click in the "Add Items" field at which point a list will be displayed that will contain all previously added items listed one after the other (in the order in which they were added). Within this list the user will be able to complete one of the following actions:

- Add new item - The user will be able to select the "Add new item" button in order to be allowed to enter a new item.
- Remove existing item - The user will be able to select the cross new to a specific item at which point the item will be removed from the shopping list.
- Edit existing item - The user will be able to make modifications to the description of an existing item.

3.1.3 Functional Requirements

- The user can only add a single item at a time.
- The user can only remove a single item at a time.
- The user can only edit a single item at a time.

3.2 System Feature 2 - Upload Existing List

3.2.1 Description

The developers acknowledge the fact that not all users will have continuous access to internet and thus the ability to access the above mentioned shopping list. The proposed solution was to allow the user to add items to a .csv file and upload this only when they actual want to go shopping.

3.2.2 Stimulus/Response Sequences

On the home page there is a "Upload Shopping List" button. Once the user clicks on this button the user will be required to provide the path to the .csv document. Once the path has been provided the user will be required to click on the upload button and the .csv file will be imported. Upon completion the user will be able to access, and interact with, the shopping list as mentioned in Section 3.1.

3.3 System Feature 3 - Add Location

3.3.1 Description

In order for the route to be provided it is required that the application know the user's location.

3.3.2 Stimulus/Response Sequences

The user is presented with a ”Add Location” option on the home screen. Upon selecting this option the user has the ability to make their location known in two different ways:

- Entering their location manually.
- Finding their location through the use of the Google Maps API.

The primary motivation behind allowing the user to manually enter their location is that not all users will have access to GPS and thus will be able to find their location.

The location entered at this point is the same location that will be used as the starting position for the route that is planned when the ”Generate Route” option is selected.

3.3.3 Functional Requirements

- In order to use the ”find my location” option the user is required to have GPS access.

3.4 System Feature 4 - Preferred Optimisation

3.4.1 Description

A decision was made in order to allow the user to have control of the nature of the route that they will follow. This was due to the fact that multiple customers will view different aspects as their primary concern. In other words, some users might value the cost of things over the distance required to travel, while for other the cost of things may not be of concern.

3.4.2 Stimulus/Response Sequences

On the home page there is a ”Preffered Optimisation” drop down menu. Once the user selects the ”Preffered Optimisation” drop-down menu they will be provided with the following options:

- Fastest Route - The user will be allowed to select that they would like to take the fastest possible route in order to obtain all the items on their shopping list. The primary contributor to delays will be traffic.
- Shortest Route - The user will be allowed to select that they would like to travel the shortest possible distance in order to obtain all the items on their shopping list. This selection will not incorporate traffic information.
- Cheapest Total Cost - The optimisation will primarily consider the cost of items at the expense of the distance required to be travelled in order to obtain these items.

The user will also be provided with all alternative routes and they time expense that would be incurred if they select to take the alternate routes. The route distance optimisation will primarily be achieved through the use of the Google Maps API.

3.4.3 Functional Requirements

- The application is required to link to the Google Maps API.
- The user is required to have GPS activated on their mobile device if they wish to use navigation.

3.5 System Feature 5 - Generate Route

3.5.1 Description

The generate route option incorporates all the above mentioned features and provides the user the with the preferred route.

3.5.2 Stimulus/Response Sequences

Upon selection of the ”Generate Route” option the user will be directed to a page that contains the Google Map with the route drawn onto it as well as a set of directions in order to allow for off-line use. If the user would prefer to navigate using a mobile device they will be able to do so through the use of Google Maps.

3.5.3 Functional Requirements

- Access to Google Maps API is required.

4 External Interface Requirements

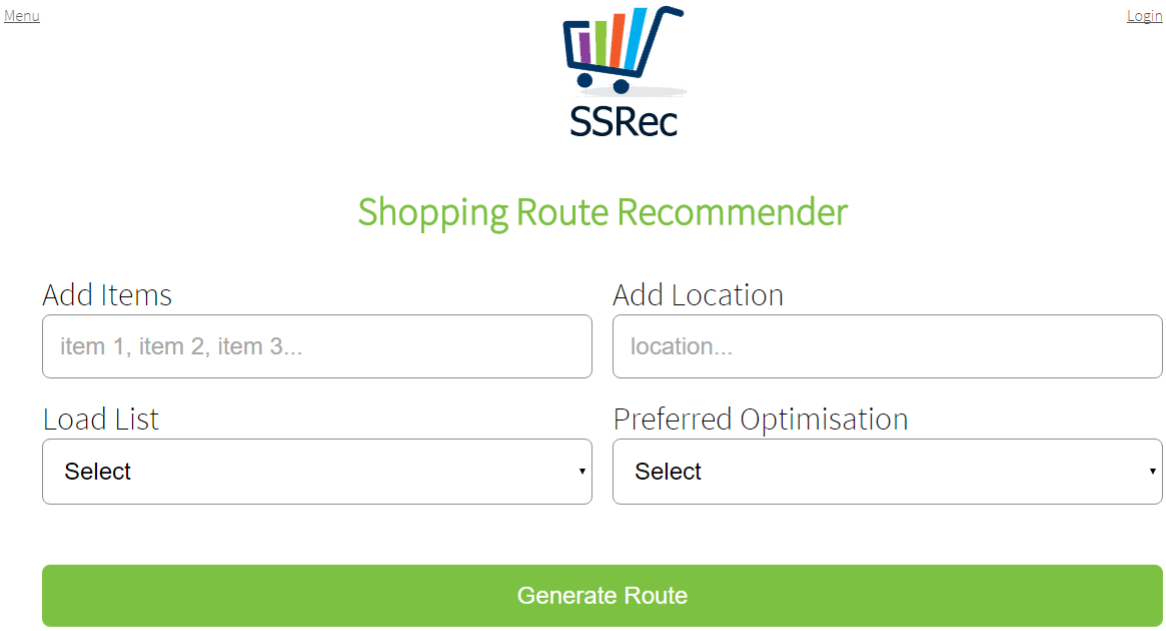
4.1 User Interfaces - GUI

The Shopping Route Recommender (SRRec) GUI is simple to use and designed such that the user is able to access all the main features easily. The interface communicates with the data layer which then incorporates Googles' API to deliver the most accurate and optimised shopping route. . Furthermore the application is easily portable between devices of different screen sizes, in that the content on the pages automatically adjust to fit the appropriate screen.

The most common features of SSRec's GUI are:

- The sidebar menu accessible from all the subsequent pages:

- The landing page and main application window where a user inputs their shopping list, location and preferred optimisation from which the application generates an optimised route:
- Route and Directions page generated after a user has input their shopping list, location and preferred optimisation:
- The page where a new user can create an account:
- The page where a user can either login or create a new account:



4.2 Hardware Interfaces

The SSRec application does not require nor support any hardware interfaces.

4.3 Software Interfaces

SSRec is a web application. Therefore it will be compatible with all operating systems including smartphone and tablet OS. It only needs to be compatible on a web browser which support html, css, javascript and php. It has been tested on Motzilla Firefox, Google Chrome and Microsoft Edge.

Furthermore the application makes use of the Google Maps API in order to generate the optimised route displayed on a map.

4.4 Communications Interfaces

Since SSRec is a web application, network communication are necessary. It runs off a cloud hosted server such that it is readily available with an internet connection so to communicate with the both the user and the Google Maps API. Another communication interface is through the users GPS (if available), where the application is able to locate the nearest shops.

5 Other Non-functional Requirements

5.1 Performance Requirements

The SRRec is dependent on retrieving only relevant information from multiple large databases. This is to be done in an optimised fashion in order to allow fast data retrieval without unnecessary delays. The application should respond in real-time as the user inputs information.

Menu

Login

SSRec

Shopping Route Recommender

Your optimised route has been generated!

Directions:

Generated map:

Since the SRRec is a website application, any changes or updates made will be automatically available to the user the next time the website is loaded. Thus SRRec will always be up-to-date.

The application should have a maximum range for the shops selected so as not to recommend an infeasible route. It should also be able to still provide a route even if certain items are not available nearby.

5.2 Safety Requirements

The application should avoid taking users to the wrong locations, especially if those locations are in dangerous areas. The SRRec should only provide routes along known roads.

5.3 Security Requirements

The databases used by SRRec should be protected from random access. User credentials are to be taken in by the application for users to sign into their profiles. Thus there needs to be a secure authentication system. The credentials also need to be safely stored on a secure server to protect them.

5.4 Software Quality Attributes

This application incorporates the use of user credentials to allow users to store and access their lists on a server without losing their list or having to keep the website active. The application has a simplistic graphical interface that is easy-to-use. The website is easily interpreted and a new user should be able to use the website without requiring any sort of tutorial or explanations.

5.5 Other Requirements

NOT APPLICABLE TO US YET

Menu

Login

SSRec

Shopping Route Recommender

Login or Create Account

New user

- Create and save shopping lists
- Save your routes
- Manage your shopping schedule
- Earn rewards

Create Account

Returning user

Email address

Password

(forgot your password?)

Login

Menu

Login

SSRec

Shopping Route Recommender

Create Account

Full Name

Email

Password

Confirm password

Enter the text in the image above

Create Account