SFWR ENG 3A04 Project
Cabpool
Deliverable 1 - SRS Document

Group 10

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November 6, 2014

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1 Introduction

1.1 Purpose

This document will describe what our product intends to accomplish, what its assumptions are, and what it relies on. This document was created for software engineers, developers and management. These users shall be able to read and understand how the **Application** will work on a higher level after reading this requirements specification document.

1.2 Scope

Cabpool shall be an **Android Application** produced for a Hamilton taxi company to be used in conjunction with their **Dispatcher** system with the aim of increasing the volume of taxi users. The software will serve as a social networking service to connect users who want to travel to similar locations. The software shall provide a platform for users to share taxis and reduce individual fare cost without having to share personal contact information. The software will allow the **User** to enter a taxi and scan the taxi **QR code** to offer the taxi and will also allow a **User** to request a taxi. When offering or requesting a taxi the **User** can accept or reject a taxi share match based on distance, rating and fare price. As well, the **User** of the software shall be able to invite fellow users to their *Friends List* and share contact information with one another. Conversely, users will be able to add other users to a *Blacklist* to ensure they never share a cab with that **User** again. The **User** can also manage their own *Favourite Locations List*. If a **User** is travelling to a location on another user's *Favourite Locations List*, the system can notify the user(s) outside the cab if they would like to join. The software will interface with **Google Maps** to enable users to view their route and potential route changes. The software shall not allow third party interception of personal information nor shall it allow release of personal information to unauthorized **Users**.

1.3 Definitions, Acronyms, and Abbreviations

1. **Android** - the **Android** mobile operating system.

2. **Application** - for the purposes of this SRS, **Application** and app refer to a mobile application.

3. *Blacklist* - a list of users who will not share a cab with the person who placed them on this list.

4. **Cabpool** - the name of the taxi sharing app.

5. **Dispatcher** - the system co-ordinating and keeping track of where users are who are offering/requesting a cab.

6. *Favourite Locations List* - a **User**-managed list of locations.

7. *Friends List* - a list of users who will be able to see if the **User** is using Cabpool and easily share cabs.

8. **GPS** - Global Positioning System, an accurate worldwide navigational and surveying facility based on the reception of signals from an array of orbiting satellites.

9. **Google Maps** - an online mapping solution which can show user's locations using GPS.

10. **Google Play** - the **Android** App Store which this app will be launched on.

11. **Legal** - the viewpoint of the law.

12. **QR code** - a machine-readable optical label that contains information about the taxi to which it is associated.

13. **Security** - the viewpoint of all things related to confidentiality, integrity and auditability.

14. **Smartphone** - a mobile phone with advanced computing capability and the features of a personal digital assistant, a media player, a digital camera, and a **GPS** navigation unit.

15. **User** - the person(s) using the app.

1.4   References

The following applications were referenced for comparison purposes to put our product into perspective:

1. Lyft, `https://www.lyft.com`

2. Uber, `https://www.uber.com`

All references to privacy laws throughout the SRS are from the following document:

1. Freedom of Information and Protection of Privacy Act, R.S.O. 1990, CHAPTER F.31, `http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90f31_e.htm`

1.5   Overview

A general description of the project is discussed in Section 2 of this document including perspective, functions, constraints, assumptions and user characteristics. Section 3 details the functional requirements of the system from user, dispatcher, security and legal viewpoints. Section 4 outlines the non-functional requirements of the application, discussing the external interface requirements and other usability and performance-related requirements.

2   Overall Description

2.1   Product Perspective

Two notably similar applications, Lyft and Uber, already exist in the **Google Play** store. There are some key differences between those products and ours. Lyft only attempts to make it easier for friends or strangers to carpool with their personal vehicles, not using a taxi service. Uber uses a taxi service, but customers who share a taxi must be picked up, and dropped off at the same destination. Our product uses a taxi service, thus eliminating risk of illegal activities that may occur when carpooling with a stranger, and does not limit carpoolers to having the exact same pick-up and destination locations.

Our **Application** is intended to be used as a sub-component of the taxi company dispatching system. The company dispatching system requires filling any taxi requests. Our **Application** will allow users to offer a taxi up for sharing. When this happens, the dispatching system will be notified of a taxi that may be able to fill another taxi request. Information such as the taxi's current location, and destination will be passed. Users are also able to request a shared taxi. When this request is filed, the dispatching system is again notified, so it may try to match a shared taxi offer with a shared taxi request. Matches will only be made if the users will save money choosing to share, as opposed to requesting a new taxi, and not sharing. If one match or more is made, the **User** who initiated the request may view which taxis they may take in order to save money. Information about each taxi ride will be shown to the user. The **User** may then submit a final request for the specific taxi chosen in the viewable list. The **User** that offered that taxi will be notified of a potential taxi sharer, and will have the choice to accept or decline the request.

2.2   Product Functions

a) The **Application** will enable users to create a profile and enter two modes, Request Taxi Carpool and Offer Taxi Carpool. In the Offer Taxi Carpool mode the **User** will scan a **QR code** within the taxi which will contain taxi identification information to be sent to the Dispatcher. In each mode the **User** will be able to enter their destination and sort their search results by distance, ratings and fare price.

b) The **User** will be able to enter constraint criteria such as preferred sex and maximum number of passengers. When a match is selected a request is sent to the **Dispatcher** which will relay the request for confirmation from the potential match.

c) The **Dispatcher** will store all taxi and **User** information to enable users to connect with one another, sharing taxis and reducing fares without releasing personal information to strangers. The **Application** will ensure that all messages will retain confidentiality and integrity. The **Dispatcher** stores **User Favourite Locations** and will alert **User** of opportunities to carpool to that location.

d) The **Application** will display the fare owed by each customer and allow rating of customers with whom the ride was shared. Additionally, customers will be able to add other riders to a **Friends List** or a **Blacklist**.

e) The **Application** will enable customers to view their route on **Google Maps**, as well as any potential route changes.

2.3 User Characteristics

We expect two different types of users to use this application:

- users *requesting* a taxi

- users *offering* a taxi

The **User** must to be over the age of eighteen for **Legal** reasons. The **User** is expected to be English literate and be able to navigate through an application. The **Application** will have options to input personal information, destinations, schedules, etc. Therefore the **User** must be capable of understanding what the **Application** is doing.

The **User** will not be expected to have technical expertise or high education, as the **Application** will be built to be **User** friendly to the general public. Since the expected users will be taxi sharing many times, the **User** is encouraged to be social to make rides more pleasant for all users.

2.4 Constraints

The successful completion of this project will be contingent upon our ability to work within the following contstraints:

1. The **Application** must be built and submitted before the final deadline of December 3rd, 2014

2.5 Assumptions and Dependencies

This Software Requirements Specification document makes the following assumptions:

1. The software does not need to provide directions for the driver of the taxi. If it is necessary that the taxi driver should receive directions to customers the SRS will have to be modified.

2. The **Android** operating system will be available on the hardware for which the software is designed.

3. The taxi company has a regular method of sending out taxis in addition to the sharing service. If the app is to be the only way to call a cab the SRS will need to be modified with this in mind.

4. Although the fare will be displayed on the app, the payment transactions are not completed within the app.

5. The **Google Maps** API will be available, as it will be needed to fulfill many of the requirements.

6. The taxi company operates all hours of the day, every day of the week.

2.6 Apportioning of Requirements

Requirements pertaining to size, and speed will not be considered for this version of the system but may need to be considered if the system is to work with large volumes of consumers in later versions. At a later date the system could be modified to accommodate individuals with mobility access difficulties and/or visual impairments. In addition, the system can later consider auditing functionality for system management.

3 Functional Requirements

BE1. **User** wants to register with the system.

  VP1.1 User

  i. The system shall provide a means for the **User** to express desire to register with the system.
  ii. The system shall request valid and unique authentication information from the **User**.

  VP1.2 Dispatcher

  i. The system shall verify if the **User** provided authentication information is unique.
  ii. The system shall display an error message if non unique authentication information is entered.
  iii. The system shall store the unique authentication information of the new **User**.

  VP1.3 Security

  i. The system shall ensure **User** information is not intercepted by third parties.

  VP1.4 Legal

  i. The system shall protect confidential information of the **User**.

BE2. **User** wants to login to system.

  VP2.1 User

  i. The system shall provide a means for the **User** to express their desire to login.
  ii. The system shall request login credentials from the **User**.

  VP2.2 Dispatcher

  i. The system shall verify login credentials.
  ii. The system shall notify the **Dispatcher** that the **User** has logged in.

  VP2.3 Security

  i. The system shall ensure **User** information is not intercepted by third parties.
  ii. The system shall not allow **User** to access unauthorized account.

  VP2.4 Legal

  i. The system shall protect login and location information of the **User** from unauthorized parties.

BE3. **User** wants to manage settings.

  VP3.1 User

  i. The system shall provide a means for the **User** to express their desire to manage settings.
  ii. The system shall allow the **User** to manage *Friends List*.
  iii. The system shall allow the **User** to manage *Blacklist*.
  iv. The system shall allow the **User** to manage *Favourite Locations*.

  VP3.2 Dispatcher

       i. The system shall notify **Dispatcher** when the **User** makes changes to ***Friends List***.

      ii. The system shall notify **Dispatcher** when the **User** makes changes to ***Blacklist***.

    iii. The system shall notify **Dispatcher** when the **User** makes changes to ***Favourite Locations***.

VP3.3 Security

       i. The system shall ensure **User** information is not intercepted by third parties.

      ii. The system shall prevent an unauthorized **User** from accessing the settings.

VP3.4 Legal

       i. The system shall protect personal information of the **User** from unauthorized parties.

BE4. **User** wants to offer a taxi.

VP4.1 User

       i. The system shall provide a means for the **User** to scan the taxi **QR code**.

      ii. The system shall request offer information from the **User**.

    iii. The system shall notify the **User** when a match is found.

    iv. The system shall allow the **User** to accept or reject request matches.

VP4.2 Dispatcher

       i. The system shall match an offering **User** with requesting **Users**.

VP4.3 Security

       i. The system shall ensure **User** information is not intercepted by third parties.

      ii. The system shall prevent unauthorized **User** from modification of offer taxi information.

VP4.4 Legal

       i. The system shall protect offer information of the **User** from unauthorized parties.

BE5. **User** wants to request a taxi.

VP5.1 **User**

       i. The system shall provide a means for the **User** to request a taxi.

      ii. The system shall require taxi request information from the **User**.

    iii. The system shall notify the **User** of relevant offers.

    iv. The system shall allow the **User** to reject any offer.

     v. The system shall allow the **User** to accept only one taxi.

VP5.2 Dispatcher

       i. The system shall match the **User** requesting a taxi with **Users** offering a taxi.

VP5.3 Security

       i. The system shall ensure **User** information is not intercepted by third parties.

      ii. The system shall prevent unauthorized **User** from modification of request taxi information.

VP5.4 Legal

       i. The system shall protect request information of the **User** from unauthorized parties.

BE6. Time to pay fare.

VP6.1 User

       i. The system shall notify **User** they have arrived at their destination and then display the corresponding fare.

      ii. The system shall allow the **User** to rate the **User** with whom they shared the taxi.

      iii. The system shall allow the **User** to add the **User** with whom they shared the taxi to their ***Friends List***.

      iv. The system shall allow the **User** to add the **User** with whom they shared the taxi to their ***Blacklist***.

      v. The system shall allow the **User** to add the route travelled to their ***Favourite Locations***.

  VP6.2 Dispatcher

      i. The system shall calculate the fare owed and distance travelled.

  VP6.3 Security

      i. The system shall ensure **User** information is not intercepted by third parties.

      ii. The system shall prevent unauthorized **User** from modification of route and rating information.

  VP6.4 Legal

      i. The system shall protect fare, location and rating information of the **User** from unauthorized parties.

BE7. User wants to logout of system.

  VP7.1 User

      i. The system shall provide a means for the **User** to express their desire to logout.

      ii. The system shall notify the **User** if logout is successful.

  VP7.2 Dispatcher

      i. The system shall terminate offers and/or requests of the **User**.

      ii. The system shall notify the **Dispatcher** that the **User** is logged out of the system.

  VP7.3 Security

      i. The system shall ensure communication between **User** and the system is not intercepted by third parties.

      ii. The system shall notify the **User** of logout only if logout is successful.

  VP7.4 Legal

      i. **User** information must not be accessible by any third party, with the exception of those on the **User's** ***Friends List*** who shall know the **User** is logged out of the system.

BE8. User wants to deregister.

  VP8.1 User

      i. The system shall provide a means for the **User** to express their desire to deregister from the system.

      ii. The system shall notify the **User** if de-registration is successful.

  VP8.2 Dispatcher

      i. The system shall require the **User** to confirm the request to deregister from the system.

      ii. The system shall notify the **User** when de-registration is successful.

  VP8.3 Security

      i. The system shall ensure communication between **User** and the system is not intercepted by third parties.

  VP8.4 Legal

      i. All **User** information shall be removed from the system.

4 Non-Functional Requirements

4.1 Look and Feel Requirements

4.1.1 Appearance Requirements

AR1. The **Application** shall provide a satellite image of the users destination and location and all surroundings using **GPS** capabilities.

AR2. The **Application** should show a **Splash Page** when **User** first enters the application.

AR3. The **Application** should have a default bright and colorful scheme, using uniform colors.

4.1.2 Style Requirements

SR1. The **Application** should provide a uniform look and feel between all the pages and tabs.

SR2. The **Application** should clearly show all buttons, tabs and pages, it will not cluttered.

SR3. Using the **Application** should feel like a seamless experience to the user, long loading screen times should be minimized.

4.2 Usability and Humanity Requirements

4.2.1 Ease of Use Requirements

EUR1. The **Application** must be usable with one hand, for users who are on the go.

EUR2. The Offer and Request Taxi process must be simple, requiring no more than 3 steps to complete.

4.2.2 Personalization and Internationalization Requirements

PIR1. Users shall be able to personalize their experience in a Settimgs environment, allowing them to add other **Users** to, or remove from their *Friends List* and *Blacklist*.

4.2.3 Learning Requirements

LR1. The product should have an intuitive layout, it will take the **User** no longer than 10 minutes to learn to use.

4.2.4 Understandability and Politeness Requirements

UPR1. The product should be clear to understand and should not contain profane language.

4.2.5 Accessibility Requirements

ACR1. The system shall have a readable font size.

4.3 Performance Requirements

4.3.1 Speed and Latency Requirements

SLR1. Load times between screens should be no longer than 2 seconds, to provide the **User** with a seamless experience.

4.3.2 Safety-Critical Requirements

SCR1. VOID

4.3.3 Precision or Accuracy Requirements

PAR1. The system must calculate fare in dollars and cents, to 2 decimal places.

PAR2. The system must show correct locations.

4.3.4 Reliability and Availability Requirements

RAR1. The system shall be available at all times.

4.3.5 Robustness or Fault-Tolerance Requirements

RFR1. The system shall be stable within specified app capacity.

RFR2. The system must respond to all **User** inputs inside the app. The app should give useful results when the **User** encounters an error.

RFR3. The system must save **Users** previous action in case of dropped connections or app crashes.

RFR4. The system allows **User** with no Internet connection to view app but not in real time.

4.3.6 Capacity Requirements

CR1. The system must be able to handle 20 to 30 users at one time.

4.3.7 Scalability or Extensibility Requirements

SER1. The system shall be designed in such a manner that it would be able to support more users and taxi companies with minimal upgrades and modifications.

4.3.8 Longevity Requirements

LONGR1. The system shall last as long as the current version of the **Android** OS is supported.

4.4 Operational and Environmental Requirements

4.4.1 Expected Physical Environment

EPE1. The **Application** will be used in and around taxis and while travelling outdoors.

EPE2. The **Application** will run on **Android smartphones**.

4.4.2 Requirements for Interfacing with Adjacent Systems

RIAS1. The **Application** will interface with **Google Maps**.

RIAS2. The **Application** will interface with the **smartphone's** GPS.

RIAS3. The **Application** will interface with the **smartphone's** camera for **QR code** scanning.

4.4.3 Productization Requirements

PR1. Initially the system will work for a small number of taxis and users. Prior to completion this will be increased to reflect an expected expanded **User** base.

4.4.4 Release Requirements

RR1. The **Application** will be available for download and install through **Google Play Application** store.

4.5 Maintainability and Support Requirements

4.5.1 Maintenance Requirements

MR1. The system should be documented in such a way that maintaining and updating it is easy for programmers who did not build it initially.

4.5.2 Supportability Requirements

MSR1. The **Application** will operate on KitKat and Lollipop OS.

MSR2. The **Application** shall only run on **smartphones**.

4.5.3 Adaptability Requirements

MAR1. The system should be built in such a way that adding entirely new features does not require the rewriting of old features.

4.6 Security Requirements

4.6.1 Access Requirements

SAR1. The **Application** will be accessible to **Smartphone Users**.

4.6.2 Integrity Requirements

SIR1. The system shall encrypt all it's data before sending it between the **Application** and the **Dispatcher**.

4.6.3 Privacy Requirements

SPR1. The system shall protect the privacy of users, not allowing users to access others users personal information.

4.6.4 Audit Requirements

SAUR1. VOID

4.6.5 Immunity Requirements

SIMR1. VOID

4.7 Cultural and Political Requirements

4.7.1 Cultural Requirements

CCR1. The product will use British spelling.

4.7.2 Political Requirements

CPR1. This **Application** will work with the taxi cab company that commissioned it only.

4.8 Legal Requirements

4.8.1 Compliance Requirements

LCR1. This product will comply with the Personal Information Protection and Electronic Documents Act.

LCR2. This product will comply with the Ontario Freedom of Information and Privacy Act.

4.8.2 Standards Requirements

LSR1.   VOID

A Division of Labour

Due to the nature of this document, we worked collaboratively to complete each section. The sections built upon one another and, as such, we met regularly to complete the document as a team. Each group member made an equal contribution to the project. By signing below, we hereby acknowledge that the work was in fact divided equally.

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