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Travlendar+ project

Requirement Analysis and Specification Document

Riccardo Facchini

Andrea Guglielmetti

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1   Introduction

1.1   Purpose

This Requirement Analysis and Specification Document (RASD for short) document has the purpose of fully describing to a wide range of potential readers the system and to function as a base for legal agreements between developers and other parties.
In the following pages there will be precise descriptions of all the functional and non-functional requirements, the different scenarios and cases of interaction between the system and the users, with attention to what the users need from it, the domain of the system and the constraints that it implies.
The readers of this document comprise the developers of the system and its applications and agents from the local public transportation agencies or independent company in similar professions such as taxi businesses or bike/car sharing companies.

1.2   Scope

The scope of this project is to develop a system called Travlendar+ that will allow in the most possible efficient way the paring of daily commutes and the management of scheduled appointments and meetings, by providing for each situation the best alternatives of moving throughout the city both for work related reasons and for personal motives.
Users of Travlendar+ can create a calendar with every appointment paired with time and place, the system will then compute the best way of reaching each location in time by choosing between every commuting option available at the moment and taking into account the preferences expressed by the user in the customization settings, possible strikes of the local transportation services and the weather, if the location is too far and cannot be reached in time a warning is going to pop up on the screen of the user.
Each time a scheduled appointment is coming up a notification is going to appear in advance by a configurable amount of time, the user will then be able to confirm, change or refuse the proposed trip.

1.3   Stakeholders

Here are listed all the potential stakeholders with a brief description and how they may be affected by the system:

- **User**: All the individuals that will use the system to schedule their daily commute.

- **Public transportation companies**: Local and international companies that handle public transportation may have an advantage in giving an easy way to integrate their schedules with Travlendar+ as it could mean a higher number of sold tickets.

- **Taxi and Car/Bike sharing companies**: Given that is not always possible for each type of user to walk long distances and public transport does not reach every possible destination they may be interested in a partnership between their service and the system.

- **Mobile network carriers**: They have an interest in providing a network and contracts to connect devices to the service.

1.4   Definitions, acronyms and abbreviations

What follows is the list of all the main terms and abbreviations used in the document.

1.4.1   Definitions

- **User**: who is using the system to schedule their calendar.

- **Trip**: the plan to move from point A to point B done using one or more means.

- **Travel**: synonymous of trip.

- **System**: All the software needed to deliver all the functionalities desired, often used as a synonymous of Travlendar+.

1.4.2   Acronyms

- **RASD**: Requirement Analysis and Specification Document

- **SRS**: Software Requirement Specification. Synonymous of RASD

- **ETA**: Estimated Time of Arrival

- **GPS**: Global Positioning System

- **W3C**: World Wide Web Consortium

- **HTTP**: HyperText Transfer Protocol

- **HTTPS**: HyperText Transfer Protocol over Secure Socket Layer

- **SDK**: Software Development Kit

- **TCP**: Transfer Control Protocol

- **API**: Application Programming Interface

- **RAM**: Random Access Memory

- **UMTS**: Universal Mobile Telecommunications System

1.4.3   Abbreviations

No other abbreviations aside from acronyms were used.

1.4.4   Revision History

- 07/10/2017 Introduction.

- 09/10/2017 Product perspective and Specific requirements.

1.5   Reference documents

- Document of the assignment: Mandatory Project Assignments.pdf

2   Overall Description

2.1   Product Perspective

The system will have three main parts:

1. Mobile application version for phones and tablets.

2. Web browser version.

3. Backend structure to support the functioning of the service.

While the backend structure is needed for the functioning of the service provided, only one of the two applications is needed to interact with the system.
APIs for each component must be provided in order to allow future development and introduction of new functionalities like an automated system for buying of public transportation vehicles.

2.2   Product Functions

The system allows each user to create their personal calendar by specifying place and time of each appointment and then view the proposed solution, to be more specific the user can: Register to the system with username and password.

1. Logging to the service.

2. Manage the information of an account and delete it.

3. Specify means of travel preferences.

4. Create an appointment in the calendar.

5. Manage information about appointments and delete them.

6. Schedule flexible lunch/breaks of specific length in a given interval.

2.3   User Characteristics

The users interested in using the system should be at least familiar with the concept of navigating a web page and using a smartphone in the day to day routine without needing any technical competence regarding the topic, they must be aware of the laws regarding the public circulation on the streets of the country they wish to use the services provided and need a valid driver licence if they want to use a car and they must possess an electronic payment method to use third party car/bike sharing options.

2.4   Domain Assumptions

We assume that the following statements are true:

1. It exists a combination of means of transportation that will take the user to his/her destination even if not before the desired time.

2. The GPS location of the user is always correct.

3. Weather forecasts have a 100% accuracy.

4. Public transportations always arrive on time.

5. Internet connection is never lost.

6. Is possible to integrate the system with already existing application from third party companies and public transportations.

3   Specific Requirements

3.1   External Interface Requirements

3.1.1   User Interfaces

The main way the users can interact with the system is via the mobile application for their smartphone, the interface should be user-friendly and in particular easy to read, with large and high contrast text to minimize reading problems in direct sunlight; the second way of connecting to the services provided is to use the web application their personal computer. In both cases the user interfaces must satisfy the following constrains:

- The first page must always ask the user to login or register to service.

- After the login, the system redirects the user to his/her home page.

- (Web) A toolbar must be present in every page, except login and registration page.

- (Mobile) A toolbar must be present in the homepage.

- The *Create a meeting* page must provide a guided process to set-up a meeting and clearly show if the created meeting is not reachable in time from the location of a previous appointment.

- The *Manage meetings* page must show a list of user's meetings divided by day and hour, and allows the user to select a meeting to obtain further information.

- The interface must offer the possibility to choose between a set of different languages.

- The user interface must dynamically adapt to the screen size.

- The Mobile and Web application must use the same graphical elements.

In addition to these constraints, other platform-dependent constraints are provided:

- Web Application:

  All the pages must submit to W3C standards.

- Mobile Application:

  All mobile versions must follow the design guidelines provided by the respective platform manufacturer (Android, iOS, Windows . . .).

3.1.2   Hardware Interfaces

The web application needs any personal computer connected to the internet, while the mobile application must be able to connect to the network in order to exchange information with the server, such as destination and location of the user retrieved via the GPS of the mobile device.
Hardware requirements for both are later specified in subsubsection 3.4.2

3.1.3 Software Interfaces

Supported browsers for the web application should include Google Chrome, Mozilla Firefox, Opera, Safari, Internet Explorer and Edge, while the mobile application must be available on Android, iOS, Windows Phone and Blackberry OS.
The server side of the application requires:

- Java EE, to write the server application that perform the travel computation and the database access.

- MySQL, to memorize user information and meetings inside a relational database.

The client side of the application requires the latest version of the platform SDK.

3.1.4 Communication Interfaces

The client communicates to the server via HTTPS protocol using TCP.
In addition, the system must be able to use the API of other application in order to retrieves weather and news about road conditions or strike.

3.2 Functional Requirements

3.3 Performance Requirements

Without taking into consideration the speed of the internet connection, in order to guarantee an acceptable user experience the following requirements must be satisfied:

- Navigation between pages of the system must happen in 0.5s or less.

- The best travel plan must be computed in 5s or less.

- No limit of registered users in the database.

- No limit of schedulable appointments.

- At least 1000 users must be able to use the service at the same time.

3.4 Design Constraints

3.4.1 Standards Compliance

3.4.2 Hardware Limitations

Minimum system requirements for the two applications:

- Web application

  - 512Mb of RAM.
  - 2Mb/s internet connections.
  - 800X600 screen resolution.

- Mobile application

  - 1Gb of RAM.
  - 3G UMTS internet connections.
  - 100Mb of free space.

3.4.3 Other Constraints