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**SAFESTREETS**

Requirement analysis and specification Document

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1. **Introduction**
   1. Purpose

This document is the Requirements Analysis and specification Document (RASD) for the Safestreets application offers, about requirements and goals that the system must present. This document offers also an analysis of the world and shared phenomena regarding Safestreets. RASD contains class diagrams to show domain models and other diagrams which illustrates, with more details, transaction of the functionalities of the application.

* 1. Scope

Safestreets is a crowd-sourced application that allows users to send reports about traffic violations. A person become a user of Safestreets by registering himself into the application. After this phase, user can start to use the basic functionalities of the app (e.g. sending reports and retrieving traffic information). Safestreets allows, also, to authorities to register, log-in and use advance functionalities of the app.

The app allows users to send reports to the authorities and querying the app for traffic and violations highlights. The goal of Safestreets is to send the reports, made by the users, to the authorities helping and facilitating with their job.

When a user creates a new report, he can add a picture of the car plate so that the app can extrapolate the car plate id automatically, user can also add the geographical position of the violation and of course the type and timing of the traffic violation. Moreover users are allowed to visualize traffic highlights using the app.

The app allows authorities to querying all the reports and also to extrapolate useful information and statistic from the app.

The system interfaces with other firms (e.g. municipality services, territory maps companies) to offer a more comprehensive costumer experience.

* + 1. Goals

**[G1]:** Users should be able to send reports regarding traffic violations.

[G1]#1 specify traffic violation

[G1]#2 attach a picture of the car plate

[G1]#3 include the geographical position

**[G2]:** Authorities should be able to access to all the reports

**[G3]:** Costumers should be able to access to different kind of information depending on their role

[G3]#1 users can access only to traffic highlights, and their reports

[G3]#2 authorities can access to traffic highlights, violation statistics and all the reports

**[G4]:** The application allows communication with external services

* 1. Definitions, Acronyms, Abbreviations
     1. Definitions

Here is provided a list of definitions of words and expressions used in the document

* **Users:** the “normal” costumer of the application that exploits the application only to send traffic violations and to retrieve information from it.
* **Authorities:** the customer of the application that exploits it to monitor the reports and take adequate measures.
* **Customers:** people that uses Safestreets, can be an authority or a common user
* **Report:** a module reporting a traffic violations containing useful data
* **Traffic violations:** violation of the laws that regulate vehicle operation on streets and highways.
* **Affiliated company:** a company that has deals with the S2B
  + 1. Acronyms
* API = Application Programming Interface
* GPS = Global Positioning System
* UI = User Interface
* S2B = Software To Be
  + 1. Abbreviations
* G*n = nth* goal
* D*n = nth* domain assumption
* R*n = nth* requirement
  1. Revision history
  2. Document Structure

After purpose and scope, used to briefly introduce the topic, are delineated the goals that the S2B should achieve coupled with a list of useful definitions and acronyms. Subsequentially, the text proceeds with an analysis of the functions that the app should provide. The analysis starts with a general exposition of the scenarios and becomes gradually more detailed passing through the analysis of the actors that will interact with the S2B and the statements of the domain assumptions. After that, the specific requirements are exposed focusing firstly on the external interfaces and then providing the models used to highlights the relations between the actors and S2B and describe the internal structure of the latter. After that, Functional and non-Functional requirements are sequentially discussed. Before ending with the effort spent the references is provided a formal analysis performed with alloy.

1. **Overall Description**
   1. Product perspective

The system will be developed from scratch and it will use externals services including Google services and the services provided by affiliated companies. This is because the services provided by Google offers high quality and reliability and there is no point in trying to redevelop them. The services of affiliated companies are needed to interface with them information regarding traffic and vehicles.

* 1. Product Functions

Here are provided several scenarios to better delineate the purposes for which the app should be designed, the situations the S2B will deal with and more generally to have a better comprehension of the associated environment. The scenario are describe in an informal way in this section but they will be formalized in the next chapter.

* + 1. Scenario 1

Carlo is a diligent citizen that riding his bike find a car parked on the cycle path. Worried about this parking violation take his phone and open the Safestreets app, in which he was recently registered, and start creating a new report. After having specified what type of violations occurred, the app asks him if he wants to insert the car plate or take a photo of it he choose to take a picture of the car plate and attach it to the report, he also allows the app to collect his geographical position through the phone GPS and attach it to the report. Finally he confirm and send the report. Finished the report he received a mail containing the last report made by him to the mail address given during the registration. Now he can also see in his private area on the app the new report.

* + 1. Scenario 2

Paolo is a citizen that wants to check the traffic condition in the various street that bring to his office, so he decide to rely on Safestreets to choose the best path. He opens the app and log-in, open the integrated map in the app, agreed to the acquisition of his position, and insert the office address, the app gives him the various rotes with the estimated time of arrival and also shows if some other users reported some traffic violation on the way. Paolo decide the fast and secure route to go to his office.

* + 1. Scenario 3

Gabriele is a police officer that agreed to the collaboration with Safestreets and register himself in the application as an authority. During his watch he opens the application and check the reports. Today there were lot’s of reports so he open the integrated map and search for all the reports with attached a position far at most 5Km to his position. Using this service he optimize the watch`s route.

* + 1. Scenario 4 (authority mining statistical data)

Piero is a chief police officer that wants to understand how to relocate efficaciously his mans so decide to use the app Safestreets. As authority he can access to all statistical data and in particular, he is interested in the zone with an high density of reports so he opens the integrated map and the system highlights the zones with different colors based on the reports density in the zone.

* + 1. Scenario 5 (me verrà)
  1. User characteristics
     1. Actors
* Person: a person that does not have a registered account. The only thing that he/she can do is to proceed with the Sign Up operation.
* User: a person passed through a successful registration process and now able to use Safestreets services. He/she can login to the system and, after that, use the platform’s functionalities.
* Authority: a police officer that passed through a successful registration process and now able to use all Safestreets services. He/she can login to the system and, after that, use all the platform’s functionalities.
* Google: the system with whom the S2B retrieves the maps and related information about routes, real-time traffic situations, estimated travel time.
  1. Assumptions, dependencies and constrains
     1. Domain Assumptions

**[D1]** the User’s device should be allow the app to retrieve the language settings

**[D2]** when the registration process begin, the Person always insert his/her credential

**[D3]** when the S2B sends an email, it is always received by the receiver

**[D4]**  every Person has an email address

**[D5]** the User and the Authority shall remember their password

**[D6]** the User and the Authority know only their password

**[D7]** the User’s device has a working GPS installed, to which the app has access

**[D8]** Google Maps services take traffic into consideration

1. **Specific Requirements**
   1. External Interface Requirements
      1. User Interfaces

Here is provided some basic mockups to show how the interface should appear to the user:

* + 1. Hardware Interfaces

The main hardware interface of the system consists in the access to the GPS data and the camera in the mobile application. The application also requires Internet connectivity.

* + 1. Software Interfaces

The mobile application must support Android, iOS and the remaining main Oss (further details are discussed in paragraph 3.6.5 Portability).

* + 1. Communication Interfaces

The communication between clients and server should be HTTP requests/responses based.

* 1. UML modeling
     1. Use case diagrams
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  2. Functional Requirement
  3. Performance Requirement
  4. Design Constrains
     1. Standard Compliance
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     3. Any other constraint
  5. Software System Attributes
     1. Reliability
     2. Availability
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1. **Formal Analysis Using Alloy**
   1. Alloy Code
   2. Results of Alloy Analysis
   3. Alloy Model
2. **Effort Spent**