



POLITECNICO DI MILANO 1863

SOFTWARE ENGINEERING 2 PROJECT

REQUIREMENT ANALYSIS AND SPECIFICATION DOCUMENT (RASD)

SafeStreets

Version 1.0

Authors

TIBERIO GALBIATI
SAEID REZAEI

Supervisor

Dr. MATTEO ROSSI

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Download page: [HTTPS://GITHUB.COM/TIBERIOG/GALBIATIREZAEI.GIT](https://github.com/TiberioG/GalbiatiRezaei.git)

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1 Introduction

1.1 Purpose

general description ...

1.2 Scope

1.2.1 Description of the given problem

1.2.2 Goals

- [G1] Allow users to notify authorities about traffic violations
- [G2] Allow users to send pictures with metadata of violations
- [G3] Allow users to mine information recorded
- [G6] Have at least two different privilege for mining data
- [G7] Generate traffic tickets
- [G8] Generate statistics
- [G3] Be sure every information uploaded is never altered

1.3 Definitions, acronyms, abbreviations

1.3.1 Definitions

1.3.2 acronyms

1.3.3 abbreviations

1.4 Revision history

1.5 Reference Documents

1.6 Document Structure

2 Overall Description

2.1 Product perspective

add here class diagram + verbal description

2.2 Product functions

2.2.1 login

2.2.2 sending pics

2.2.3 mining info

The app will offer the possibility to the users to visualize the data collected. Two kind of visualizations are offered:

1. Streets with the highest frequency of violations
2. Veichles that commit the most violations

In order to get those data the system will periodically query the database of violations in order to create a table where the count of violation is stored, both for streets and veichles. There will be a section in the app called "Explore Data" where will be able to choose which kind of data to visualize.

2.2.4 issue a ticket

2.2.5 generate statistics

2.3 User characteristics

2.4 Assumptions, dependencies and constraints

- [D1] The device should acquire position with an accuracy of enough meters in order to univocally determine the road (e.g. 5 meters)
- [D1] The device should take pictures with enough resolution to be able to read the licence plate using the external software
- [D] Device has internet connection
- [D2] Every veichle that can be reported shoud have a licence plate visible
- [D3] The number and kind of violations should be finite (defined by the law)
- [D4] Every authority account is verified and it's not possible to be created using the frontend
- [D5] The third part service which reads the licence plate has an accuracy of more than 90%

The app will be dependent on a third-party service to read the licence plate of the cars. (For example <http://www.openalpr.com>)

The app will be dependent on a smartphone, which has to provide the following features:

1. Internet connection, possibily using 2G/3G/4G in order to be available where there is no WiFi, considering the use case "on the road"
2. GPS sensor

3 Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.2 Hardware Interfaces

3.1.3 Software Interfaces

3.1.4 Communication Interfaces

3.2 Functional Requirements

Every function should work only after successful login.

[G1] Allow users to notify authorities about traffic violations

[R1] User must be able to choose the kind of violation from a list

[G2] Allow users to send pictures with metadata of violations

[R1] Application should access the camera

[R2] Date, time and position should be automatically added to the violation reported

[R] We should require the user to send again a picture in case the plate is not visible

[R] The user must be able to select the vehicle to report in case there are other vehicles in picture

[G3] Allow users to mine information recorded

[R1] Application must be able to count occurrence of violations

[R2] Application must be able to count violation for each vehicle

[R3] Application should show streets with highest frequency of violation

[R] Application should show the first n (input by user) vehicles with the highest number of violations

3 The type of violation should be clear in the picture. 3 Be sure every information uploaded is never altered 4 Automatically add metadata to the reported pictures 5 allow users to mine information recorded All individual users who have signed up for mining the information 6 have at least two different privilege for mining data 7 generate traffic tickets 8 Authorities can see the license plates of violators, regular users cannot

think about use cases @both

3.2.1 Use Cases

This section contains all the use cases initially described with the use cases UML model, then the most important Use Case have their own table which provide further details such as: involved actors, entry conditions, flow of events, exit conditions and exceptional conditions.

- **ID:** [UC1]
Name: Sign-Up
Actor: Guest
Entry conditions:
 - (a) A citizen who wants to use the service**Event flow:**
 - (a)
 - (b) The system shows the page with a list of all pending request for the individual (**Show requests** [UC2])
 - (c) The individual selects the desired action (accept or reject) and clicks the Submit button
 - (d) The system **Accepts the request** ([UC3]) or **Rejects the request** ([UC4])**Exit conditions:**
 - The request is set as accepted or rejected**Exceptions:** -
-

- ID:** [UC3]
Name: Mine information - streets
Actor: User
Entry conditions:
 - (a) User is logged in
 - (b) User is in ex**Event flow:**
 - (a) User enters the section "Explore data"
 - (b) The system asks which kind of data the user wants to know
 - (c) The user chooses to get the data about streets with highest frequency of violations
 - (d) The system queries in descending order the table where for each streets is associated the count of violations
 - (e) The system will report in a tabular way the name of streets and the count for the first record to fill the device screen
 - (f) If the user scrolls down the system will offer the chance to load more rows**Exit conditions:**
- User wants to go back to "Explore data" area **Exceptions:**
 - (a) If there are no records the app will report no data available message
-

- ID:** [UC3a]
Name: Mine information - offenders
Actor: Users
Entry conditions:
 - (a) User is logged in
 - (b)**Event flow:**
 - (a) User enters the section "Explore data"
 - (b) The system asks which kind of data the user wants to know

- (c) The EndUser chooses to get the data about vehicles that committed the highest number of violations
- (d) The system queries the table where for each licence plate is associated the count of violations
- (e) The system will report in a tabular way an anonymized identifier of the vehicle and the count of violations committed if the request comes from a regular User
- (f) The system will report in a tabular way the plate of the vehicle and the count of violations committed if the request comes from an authority User
- (g) If the user scrolls down the system will offer the chance to load more rows

Exit conditions:

- (a) User wants to go back to "Explore data" area

Exceptions:

- (a) If there are no records the app will report no data available message

User Page use cases

Reporting Violation use cases

3.2.2 User

3.2.3 Third party

3.2.4 Requirements

Requirements in order to satisfy the goals

1 test

3.3 Performance Requirements

3.4 Design Constraints

3.4.1 Standards compliance

The app should be available for the two main operating systems of smartphones: Android OS and Apple iOS.

The traffic violations which can be reported should be compliant to the local traffic code where the app will be used.

For an use in Italy the app should be compliant to the "Codice della Strada", in particular parking violations are reported in Art. 157.

3.4.2 Hardware limitations

The app will have a server side and a client side (smartphone). On server side limitations can be the size of available storage and the bandwidth. On smartphone side we have the network connectivity (3G/4G connection) and GPS limitations in some areas.

3.4.3 Any other constraint

Application should be compliant to European GDPR and don't track users.

3.5 Software System Attributes

3.5.1 Simple User Interface

The user interface has to be as simple and intuitive as possible, the application should allow an average user to set up an account and start using the application understanding its functionality in no more than a dozen minutes. In addition there should be a complete tutorial to makes it easy using the application.

3.5.2 Reliability

The application provides a reliable service in which individual users can easily log in and report the violations in the most optimal way. Furthermore it Warranties that the chain of custody of the information coming from the users is never broken, and the information is never altered. This would provide a secure and reliable system. In addition, if the license plate is not readable from the picture the application should warn the user to send an other photo.

3.5.3 Availability

The application must offer the maximum availability, granting its service every day at any time (24/7). The lack of service must be minimal. Reporting violation and taking the information about the vioalation coming from SafeStreets must be active every day at any time. The lack of service is acceptable only if it is due to maintenance. In this case, users must receive a warning 48 hours before.

3.5.4 Security

The application need to be safe and it does not have particular security concerns except the ones related to unauthorized login. The login of Users and especially of authorities must be very safe to avoid reporting. Moreover, the means of communication must be encrypted to save the confidentiality of information sent to SafeStreets.

3.5.5 Maintainability

The application will be maintained and designed in such a way it makes it easier to maintain and it shoul be understandable for both the users and the authorities. Furthermore, the system will put eort in keeping the live data services (such as highlighting the streets with the highest frequency of violations or the vehicles that commit the most violation) always online.

3.5.6 Portability

Portability of user data from a device to another is possible by entering personal login data. Also the application will be able to run for devices with different operating systems. Trackme wants to focus on the both Android iOS market and Apple iOS , because Android is the largest OS in the world and it is expected that the market share of Apple iOS will increase in the coming years.

4 Formal Analysis Using Alloy

5 Effort Spent

References