POLITECNICO
MILANO 1863

M.Sc. Computer Science and Engineering
Software Engineering 2 Project

Design Document

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GitHub Repository: https://github.com/ste7en/FerraraFormicolaGuerra

Version 0.1

Contents

Chapter 1

Introduction

1.1 Purpose

This document constitutes Design Document (i.e. DD) It provides a more technical overview to the Requirement Analysis and Specification Document of the system-to-be, describing the main architectural components, their communication interfaces and their interactions. It will also present the implementation, integration and testing plan. This type of document is mainly addressed to developers, since that it provides a guide during the developement process through an accurate vision of all parts of the software-to-be.

SafeStreets is a crowd-sourced application that intends to provide *Users* with the possibility to notify *Municipality* when *Traffic violations* occur, and in particular parking violations. The application allows *Users* to send pictures of violations, including their date, time, and position to *Municipality*.

1.2 Scope

Crowd-sourced applications have become more popular nowadays thanks to the massive diffusion of smart devices and to the consequent interconnection between people, so that they started feeling part of a community, where everyone can contribute concretely.

SafeStreets is a crowd-sourced application whose aim is, indeed, to provide a tool to allow registered citizens to help *Municipality*, reporting *Traffic violations* that occur in their cities. In particular, they can take pictures of parking violations, specifying their type. A *License plate recognition service* recognizes the license plate from the *User picture*. SafeStreets sends the generated *User reports* to *Municipality*, granting they have not been corrupted. Examples of parking which represent a violation are the ones on bike lanes, sidewalks, in front of vehicle entrances or on reserved parking lots.

Users and *Municipality* can also retrieve analytics about data collected by the application, in order to obtain information, for example, about violations in certain areas or to identify vehicles with the highest number of violations, respectively.

Moreover, given that *Municipality* provides access to its data about *Accidents*, the system-to-be can integrate those information with its own data and finally suggest *Municipality Possible interventions* to apply.
SafeStreets can also build statistics from data sent by *Municipality* which concern issued *Traffic tickets* generated by *User reports*.

1.3 Definitions, Acronyms, Abbreviations

1.3.1 Definitions

User: individual registered to SafeStreets who agreed to the acquisition and processing of the data he/she sends;

User identifier: email provided by the *User* during the registration phase; it represents a single *User*;

User report: report created by the *User* including the fields *User identifier*, *User picture*, *Timestamp*, *Recognized license plate* and type of *Traffic violation*;

Terms and conditions: a set of regulations which *Users* must agree to follow in order to use SafeStreets;

Privacy statement: describes why and how SafeStreets collects and uses personal data and provides information about *Users*' rights.

Reference code: unique code which represents a single *Municipality*;

User picture: picture of *Traffic violation* taken by the *User*;

Traffic violation: violation of parking laws;

User position: *Users*' GPS location;

License plate recognition service: third party service which provides the recognition of the license plate from the *User picture*;

Recognized license plate: text representing the license plate recognized by the *License plate recognition service*;

Timestamp: digital record of date and time of the day when it has been registered;

Public statistics: set of *User report* statistics provided by SafeStreets, available for all the registered *Users*;

Detailed statistics: set of *User report* statistics provided by SafeStreets, only available for the *Municipality*;

Traffic ticket: a notice issued to someone who violates a traffic regulation;

Accidents: data of *Municipality* Database, concerning previous *Traffic violations*;

Possible interventions: suggestions automatically generated by SafeStreets and forwarded to the *Municipality*;

Ticket feedback: information on whether a *User report* led to the generation of a *Traffic tickets* or not;

Municipality: district of a town or a city which has local government.

1.3.2 Acronyms

1.3.3 Abbreviations

1.4 Revision History

1. Version 0.1 - 11th November 2019 - Start of the DD;

1.5 Reference Documents

- Rumbaugh, Jacobson, Booch. 1999. *The Unified Modeling Language Reference Manual*. Addison-Wesley.

1.6 Document Structure

This document is structured as follows:

1. Introduction A general introduction to the system-to-be. It aims giving general but exhaustive information about what this document is going to explain.

2. Architectural Design An overview about the high-level components and their interaction, with focus on both static and dynamic view, helped by diagrams.

3. User Interface Design A representation of how the user interfaces will look like.

4. Requirements Traceability An explaination about how the requirements defined in the RASD map to the design elements defined in this document.

5. Implementation, Integration and Test Plan Identification of the order in which the subcomponents of the system should be implemented and of the order in which they should be integrated and tested.

6. Effort spent Effort spent by all team members shown as the list of all the activities done during the realization of this document.

7. References References of documents opun which this project was developed.

Chapter 2

Architectural Design

Chapter 3

User Interface Design

3.1 User Interface Mockups

Chapter 4

Requirements Traceability

Chapter 5

Implementation, Integration and Test Plan

Chapter 6

Effort Spent

Ferrara Fabiana Total hours of work:

- 1h General LaTeX setting.
- xxh DD Review homework

Formicola Stefano Total hours of work:

- 1h General LaTeX setting.
- xxh DD Review homework

Guerra Leonardo Total hours of work:

- 1h General LaTeX setting.
- xxh DD Review homework

Chapter 7

References

1 E. Di Nitto. *Lecture Slides*. Politecnico di Milano.