POLITECNICO
MILANO 1863

SCUOLA DI INGEGNERIA INDUSTRIALE
E DELL'INFORMAZIONE

Software Engineering 2 Requirements Analysis and Specification Document

Author(s): **Irfan Cela [10694934]**

Mario Cela [10685242]

Alessandro Cogollo [10571078]

Academic Year: 2022-2023

Contents

Contents **i**

1 Introduction **1**
1.1 Purpose . . . 1
1.2 Scope . . . 1
1.3 Definition, Acronyms, Abbreviations . . . 1
1.4 Revision history . . . 1
1.5 Reference Documents . . . 1
1.6 Document Structure . . . 1

2 Overall Description **3**
2.1 Product perspective . . . 3
2.2 Product functions . . . 3
2.3 User characteristics . . . 3
2.4 Assumptions, dependencies and constraints . . . 3

3 Specific Requirements **5**
3.1 External Interface Requirements . . . 5
3.1.1 User Interfaces . . . 5
3.1.2 Hardware Interfaces . . . 5
3.1.3 Software Interfaces . . . 5
3.1.4 Communication Interfaces . . . 5
3.2 Functional Requirements . . . 5
3.3 Performance Requirements . . . 5
3.4 Design Constraints . . . 5
3.4.1 Standards compliance . . . 5
3.4.2 Hardware limitations . . . 5
3.4.3 Any other constraint . . . 5

3.5 Software System Attributes 5
3.5.1 Reliability 5
3.5.2 Availability 5
3.5.3 Security 5
3.5.4 Maintainability 6
3.5.5 Portability 6

4 Formal Analysis Using Alloy **7**

5 Effort Spent **9**

6 References **11**

A Appendix A **13**

List of Figures **15**

List of Tables **17**

1 | Introduction

The EVs are eco-friendly vehicles that will be on our roads in the next future. In order to keep global warming below 1.5°C, Europe have decided to reduce greenhouse gas emissions of CO2 per person per year by 2030, and, by the same year, the IEA predicts that electric vehicles will have a market share of roughly 30 percent, with a total number of 23 million e-cars on the roads. EVs consumption is measured in kilowatt-hours per 100 kilometers, and most of the current electric cars can travel between 150 and 350 kilometers on a single charge, but premium-brand models can currently cover more than 500 kilometers.

In this context, when people use an electric vehicle, knowing where to charge it and carefully planning the charging process in such a way that it introduces minimal interference and constraints on our daily schedule is of great importance.

That's were `eMALL` operates: it can find charging stations owned by several Charging Point Operators (CPO) and, considering the activities in user's schedule, it can propose the best possible path of charging process in order to minimize the cost and the waisted time at the station.

1.1. Purpose

1.2. Scope

1.3. Definition, Acronyms, Abbreviations

1.4. Revision history

1.5. Reference Documents

1.6. Document Structure

2 | Overall Description

2.1. Product perspective

2.2. Product functions

2.3. User characteristics

2.4. Assumptions, dependencies and constraints

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

3.3. Performance Requirements

3.4. Design Constraints

3.4.1. Standards compliance

3.4.2. Hardware limitations

3.4.3. Any other constraint

3.5. Software System Attributes

3.5.1. Reliability

3.5.2. Availability

3.5.3. Security

3.5.4. Maintainability

3.5.5. Portability

4 | Formal Analysis Using Alloy

5 | Effort Spent

6 | References

A | Appendix A

If you need to include an appendix to support the research in your thesis, you can place it at the end of the manuscript. An appendix contains supplementary material (figures, tables, data, codes, mathematical proofs, surveys, ...) which supplement the main results contained in the previous chapters.

List of Figures

List of Tables