



POLITECNICO DI MILANO

MASTER'S DEGREE IN
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SOFTWARE ENGINEERING 2

TrackMe

Requirements Analysis and Specification Document

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1 Introduction

1.1 Purpose

1.1.1 Project description

TrackMe wants to develop a software-based service that allows individual users to collect health data, called **Data4Help**. This data can be retrieved from the system and visualized according to different filters by a user interface. The system allows third parties registration. Third parties can request access to users' collected data in two ways:

Single-person data After the the third party makes a request to the system for a single user data sharing (providing for example the fiscal code of the user), the system asks the user for authorization; if positively provided, the third party is granted access to the user's data

Anonymous-group data Third parties can be interested in big amounts of data, but not in who are the people that are providing it; the system, once the request by the third party is sent, checks if the data can be effectively anonymized (it must find at least 1000 people that match the third party request) and, if positively evaluated, grants access to the anonymized data to the third party that requested it

Third parties can subscribe to new data and receive it as soon as it is collected by the system.

Another service that TrackMe wants to develop is **AutomatedSOS**, built on **Data4Help**. This service analyzes users' data and calls a SOS whenever data exceeds the basic health parameters. For this particular purpose, system performances will be a critical aspect to be taken into account, because even the slightest delay matters in critical health situations.

1.1.2 Goals

Here we present the goals that will be reached once the project is completed:

G.U1 Users can collect, store and manage their health data

G.U2 Users can choose to have their health monitored; if their health is critical, an ambulance will be dispatched

- G.T1** Third parties can ask single users for their health data sharing
- G.T2** Third parties can request access to anonymized data that comes from groups of people
- G.T3** Third parties can subscribe to new data and receive it as soon it is produced

1.2 Scope

1.2.1 World

Our *world* is composed of two main types of actors: users and third parties. Users are interested in monitoring their health parameters and third parties are interested in developing services or researches that exploit the data gathered by the users. **Data4Help** is the service that acts as a bridge between these actors' needs.

Phenomena that occur in the *world* and are related to our application domain are

- physical conditions of our users
- third parties projects
- SOS system that is able to dispatch ambulances

These phenomena exist in the *world*, but cannot be observed directly by our system.

1.2.2 Shared phenomena

In order to communicate with the *world*, our system needs to share some aspects with it. We will list the aspects controlled by the world, but observable by the machine:

- S.1** physical parameters of the users, gathered through sensors on wearable devices
- S.2** third parties requests to the system for the data they need
- S.3** users' location, acquired through GPS signals

On the other hand, the aspects that occur in the machine, but are observable by the world are

S.4 interfaces that organize the gathered data that can be filtered according to time or type of data

S.5 messages for the SOS system, that are sent in case of critical health of a user

1.3 Definitions, acronyms, abbreviations

1.3.1 Definitions

1.3.2 Acronyms

1.3.3 Abbreviations

1.4 Revision history

Version	Log
v.0	First version of RASD completed

1.5 Reference documents

See References for details on the consulted documents.

1.6 Document structure

This document uses the IEEE standards for requirement analysis documents as a guideline towards a clear and logical explanation of its contents:

- Section 1 gives a brief introduction on the project to be developed, by describing its goals and the environment in which it will be released; keeps track of the revision history
- Section 2 describes the world and the shared phenomena, by defining assumptions and constraints; it identifies the main functions of the project
- Section 3, as the main part of this document, is about requirement analysis; it has also sections about interfaces of the system and software attributes
- Section 4 contains the Alloy model that certifies correctness of goals implication by requirements and domain assumptions
- Section 5 lists the work sessions that drove this project's development, ordered by date, as the hour counter of effort spent by each group member

2 Overall description

2.1 Product perspective

Data4Help is a service oriented to data acquisition and data sharing. Its software nature rises the necessity to combine it with another service able to directly retrieve raw data from the *world*. Today we can find for sale multiple wearables that can acquire data from users and make it readable from software side. **Data4Help** users should already own these devices in order to exploit the data acquisition functionality (Section 1.2.2: **S.1**). Once the user registered to the service, its interface will gather the last data collected and organize it in a chart view, that can be filtered by data or type and rendered by the user interface (Section 1.2.2: **S.4**; Section 3.2.1).

It is mandatory for the user's wearable to provide a GPS signal, if the user wants to apply to the **AutomatedSOS** service. GPS will be used to track the user's location in case of health danger and the signal will be shared to the SOS service that already exists in the *world* (Section 1.2.2: **S.3**, **S.5**). This SOS service accepts messages that contain the GPS location of the person in health danger and an emergency log that **AutomatedSOS** generates from the acquired data. The log explains the suspected health danger and the data that passed the defined thresholds.

Third party organization are interested in data gathering. In order to allow them to make requests for specific types of data, **Data4Help** provides a user interface that is in charge of composing their request, to make it understandable by the software (Section 1.2.2: **S.2**; Section 3.2.1). The interface provides all the possible options that the third party can compose in order to provide the closest data request to its needs.

2.2 Product functions

2.2.1 Profile management

2.2.2 Data gathering

2.2.3 Data management

2.2.4 Data sharing

2.2.5 Payment handling

2.2.6 SOS handling

2.3 User characteristics

The following list contains the actors that are involved in the system functions:

User Person interested in the **Data4Help data management** service; he/she is required to register to the **Data4Help** service in order to exploit its functionalities; he/she can also apply to the **AutomatedSOS** service; every user owns an appropriate device for **Data4Help** acquisition service that can monitor at least heartbeat and GPS location
ex. an athlete that wants to monitor his/her physical status during sport activity, an old person that suffers from heart diseases or a sedentary worker that wants to keep track of his health parameters in the working hours

Third Party Entity interested in the **Data4Help data sharing** service; it is required to register to the **Data4Help** service in order to exploit its functionalities; according to the scope of its requests, it may be interested on the data of a particular user or in aggregated chunks of data *ex. the physician of a person that suffers from heart diseases or a statistical institute*

2.4 Assumptions, dependencies, constraints

2.4.1 Domain assumptions

D1 da 1

D2 da 2

3 Specific requirements

3.1 Scenarios:

3.2 External interface requirements

3.2.1 User interfaces

3.2.2 Hardware interfaces

3.2.3 Software interfaces

3.2.4 Communication interfaces

3.3 Functional requirements

3.4 Performance requirements

3.5 Design constraints

3.5.1 Standards compliance

3.5.2 Hardware limitations

3.5.3 Any other constraint

3.6 Software system attributes

3.6.1 Reliability

3.6.2 Availability

3.6.3 Security

3.6.4 Maintainability

3.6.5 Portability

4 Formal analysis using Alloy

5 Effort spent

References

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