POLITECNICO
MILANO 1863

AlGa

Design Document

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2019-2020

Title: Design Document

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Version: 1.0

Date: 10-May-2020

Download page: https://github.com/GabrieleGuelfi/Project_DIMA

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Chapter 1

Introduction

1.1 Purpose

The aim of the present document is to describe the AlGa application with its services, a deeply definition of the main assumptions, the goals and a list of requirements, and the proposed solution. The definition of use cases and the scenarios will provide to highlight the features that the software has to offer to the customers and to better specify the boundaries system.

AlGa is an Android application developed within the course of *Design and Implementation of Mobile Applications* ad Politecnico di Milano, Italy. The goal of this course is to design a "mobile"applications by considering both the problem of designing the user experience, that is, the screens used to interact with the user, and the problem of understanding the actual distribution of the components that constitute the application and their interactions.

AlGa provides electric cars' owners with a simple way to find and use nearby charging stations. The main goal of our application is to help electric cars owner in the entire process of recharging their car. Being able to find charging stations tailored to everybody's needs is the key to meet that goal.

1.1.1 Goals

[**G1**] The application should provide the user with a **clear** overview of the nearest charging stations and their vendor.

[**G2**] The application should offer the user the possibility to order them, in a list, according to specific criteria: price, charging speed, distance, vendor.

[**G3**] The application should make it easy and straightforward to start the

navigation toward any charging station.

[**G4**] Users should be able to check their statistics about time spent charging their car, the total amount of money spent, etc. with the minimum interaction required; statistics can be enriched if the user indicate their owned car

[**G5**] The application should provide an easy way to save the profile of the user, with the possibility to log-in, log-out, delete the account and change personal information like e-mail and the owned car.

1.2 Scope

Electric cars are one of the most interesting technologies of the last years, with a possible bright future. Nonetheless, the public is still reluctant to invest money into this kind of products because of many concerns about the autonomy and the charging system. With respect to thermic engines cars, electric cars require more time to be recharged, have less autonomy in terms of distance and the infrastructure of recharging stations is yet to be completed.This is the context in which applications like AlGa can improve the experience of electric cars owners.

An easy and adaptive way find the best charging stations, according to everybody's needs, can be an important boost to the confidence in this technology.

1.3 Definitions, Acronyms, Abbreviations

Definitions

- **Health data:** some vital parameters of the users, for example heartbeat and blood pressure
- **Runner:** athlete who participate in a run
- **Fiscal code:** a code used in Italy that uniquely identifies every citizen
- **Third party:** a usr like an organization that is allowed to request health data
- **Individual request:** request of data of a single user

- **Group request:** request of data of a group of users, based on some parameters
- **118:** Emergency Medical Service, it's the number to call an ambulance
- **112:** Public-safety Answering Point

Acronyms

- **RASD:** Requirement Analysis and Specification Document
- **API:** Application Programming Interfaces
- **GPS:** Global Positioning System
- **HTTP:** HyperText Transfer Protocol
- **TLS:** Transport Layer Security
- **OS:** Operating System
- **SQL:** Structured Query Language

Abbreviations

- [**Gn**]: n-th goal
- [**Dn**]: n-th domain assumption
- [**Rn**]: n-th functional requirement

1.4 Document Structure

This design document is composed by 6 chapter: The document is organized as follows: Chapter 2 states what the app is about and which are the requirement is must satisfy. Chapter 3 explains the reasons behind the choice of the used technologies. Chapter 4 details the architectural choices for the entire application, while Chapter 5 gives an overview on the application from the point of view of the user, including some screenshots and mock-ups. Chapter 6 explains the use of external APIs, while some business-driven considerations are proposed in Chapter 7. Conclusions are finally drawn in Chapter 8.

Chapter 2

Idea and Requirements

2.1 Product perspective

To better understand AlGa and its model, the following diagram is provided:

Figure 2.1: Use diagram of AlGa.

As we can see, AlGa is designed to help users directly on the road, in the fastest and easier way possible. Statistics useful for the users are another key part of the application: in fact, during the use, a set of useful metrics are collected and then displayed to the user. They can help her or him understand better the way in which they use their car, and fix some problems and/or wrong behaviors which may arise in the process of switching from a traditional car to an electric one. However, they are not strictly necessary to use the app; users can decide to opt-in to this functionality.

2.2 Product functions

According to the goals of the project, a more detailed description of the various functionalities is here provided:

Stations

This is the default screen. It shows a map, centered on user's position, together with the charging stations. The user can select every station to see its properties like cost, position, vendor, etc (Requirement 1). If the user decides to utilize that station, a simple click on the "GO" button will open

the Google Maps application, with the destination already defined on that station (Requirement 3). Moreover, with a simple scroll menu, the user can also visualize a list of the nearest stations, with the possibility to order them by price, distance and speed and vendor (Requirement 2).

Stats

The statistics screen provides the user with data about the use of their car and of the application. That is, the amount of time spent at charging stations, the amount of money spent in energy, the distance traveled and other aggregate information (Requirement 4). Leveraging the possibilities offered by sensors installed on every smartphone, AlGa can collect these statistics in an effortless way for the user.

Profile

The profile screen lets the user customize their account on AlGa. They can choose a simple username, change their e-mail and password, and select their electric car. AlGa offers a list of cars from which the user can choose; every car has some statistics about the consumption, the autonomy etc. This leads to more accurate usage data (Requirement 5).

2.3 User characteristics

AlGa User: An individual who has downloaded AlGa.

Registered User: An AlGa User who has created an account on AlGa platform.

Vendor: A company which offers electric recharging stations.

2.4 Assumptions, dependencies and constraints

Domain assumptions

[**D1**] Users can be identified through a couple email/password, unique for every user.

[**D2**] Users' devices can provide precise and correct data on location.

Chapter 3

Implementation choices

AlGa is implemented in Flutter.

Chapter 4

Architecture

The architecture for the application is a client/server one.

Chapter 5

User Interface

Chapter 6

External services

Chapter 7

Cost estimation

The application leverages the possibilty of Firebase.

Chapter 8

Conclusions

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