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ALFRED

Personal Interactive Assistant for Independent Living and Active Ageing

WP9 – Impact

D9.5 ALFRED Open Platform Website

Deliverable Lead: WORLD

Contributing Partners: TUDA, IESE

Delivery Date: 09/2016

Dissemination Level: Confidential

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This deliverable provides a description of the ALFRED Open Platform website developed in order to extend the ALFRED platform to external developers through technical documentation, pieces of code and example apps. This open approach will contribute to the sustainability of the project as it will allow the community to extend ALFRED even after the project is ended.

SEVENTH FRAMEWORK PROGRAMME

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Executive Summary

One of the main objectives of the ALFRED project is to promote the extension of the ALFRED platform, allowing the joining of new external developers and easing the access to technical information, apps of examples, and detailed documentation.

ALFRED Open Platform aims to provide this support environment to the potential developers. It is a website of reference that provides an overview of the ALFRED project from a technical point of view mentions their main components and addresses to the ALFRED Github repository. Where the apps developed along the ALFRED project, have been copied and are accessible for the developers interested in the extension of this ecosystem.

The goal is to establish a community of ALFRED apps developers, providing them facilities for the development of new apps and its integration with ALFRED platform.

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1 Introduction

ALFRED – Personal Interactive Assistant for Independent Living and Active Ageing – is a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 611218. It will allow older people to live longer at their own homes with the possibility to act independently and to actively participate in society by providing the technological foundation for an ecosystem consisting of four pillars:

- **User-Driven Interaction Assistant** to allow older people to talk to ALFRED and to ask questions or define commands in order to solve day-to-day problems.
- **Personalized Social Inclusion** by suggesting social events to older people, taking into account their interests and their social environment.
- A more **Effective &** Personalized **Care** by allowing medical staff and caretakers to access the vital signs of older people monitored by (wearable) sensors.
- **Physical & Cognitive Impairments Prevention** by way of serious games that help the users to maintain and possibly even improve their physical and cognitive capabilities.

This deliverable provides a description of the second prototype implementation of Task 6.4 Web Based Health Viewer. It specifies the scope of this version and the degree of fulfilment of the requirements to be covered by the component. Moreover, it specifies how to install and execute the different subcomponents implemented. Finally, it will provide an overview of the limitations of the current prototype and an outlook on the further developments.

1.1 ALFRED Project Overview

One of the main problems of western societies is the increasing isolation of older people, who do not actively participate in society either because of missing social interactions or because of age-related impairments (physical or cognitive). The outcomes of the ALFRED project will help to overcome this problem with an interactive virtual butler (a smartphone application also called ALFRED) for older people, which is fully voice controlled.

The ALFRED project is wrapped around the following main objectives:

- To empower older people to live independently for longer by delivering a virtual butler with seamless support for tasks in and outside the home. This virtual butler (the ALFRED app) aims for a very high end-user acceptance by using a fully voice controlled and non-technical user interface.
- To prevent age-related physical and cognitive impairments with the help of personalized serious games.
- To foster active participation in society for the ageing population by suggesting and managing events and social contacts.
- And finally, to improve caring by offering direct access to vital signs for carers and other medical staff as well as alerting in case of emergencies. The data is collected by unobtrusive wearable sensors monitoring the vital signs of ALFRED's users.

To achieve its goals, the project ALFRED conducts original research from a user centred perspective and applies technologies from the fields of Ubiquitous Computing, Big Data,

Serious Gaming, the Semantic Web, Cyber Physical Systems, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project website at http://www.alfred.eu.

1.2 Deliverable Purpose, Scope and Context

The purpose of this deliverable is to describe the main components of ALFRED platform in order to give support, examples and pieces of code to the external developers that want to contribute in the extension of the ALFRED platform developing others ALFRED apps.

1.3 Document Status and Target Audience

This document is listed in the Description-of-Work (DoW) as “public”, as it provides general information about the main components of ALFRED and detailed pieces of code and examples to easy the external developers their contribution to the extension of the ALFRED platform through the development of additional ALFRED apps.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realization of the ALFRED project as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and Glossary”, which is provided in addition to this deliverable. Further information can be found at http://www.alfred.eu.

1.5 Document Structure

This deliverable is broken down into the following sections:

- Chapter 1 provides an introduction for this deliverable including a general overview of the project, and outlines the purpose, scope, context, status, and target audience of this deliverable.
- Chapter 2 describes the main scope of the task by providing general information and a scope of the prototype itself.
- Chapter 3 describes the Open Platform website developed, its organization and the main sections.
- Chapter 4 outlines the Github repository created for made accessible the code of the apps developed along the project execution.
- Finally, chapter 5 summarizes the aforementioned content.

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2 Context and Scope

The following figure shows the model of solution adopted in the implementation of the website that provides support information to the external developers in order to easy the extension of the ALFRED platform.

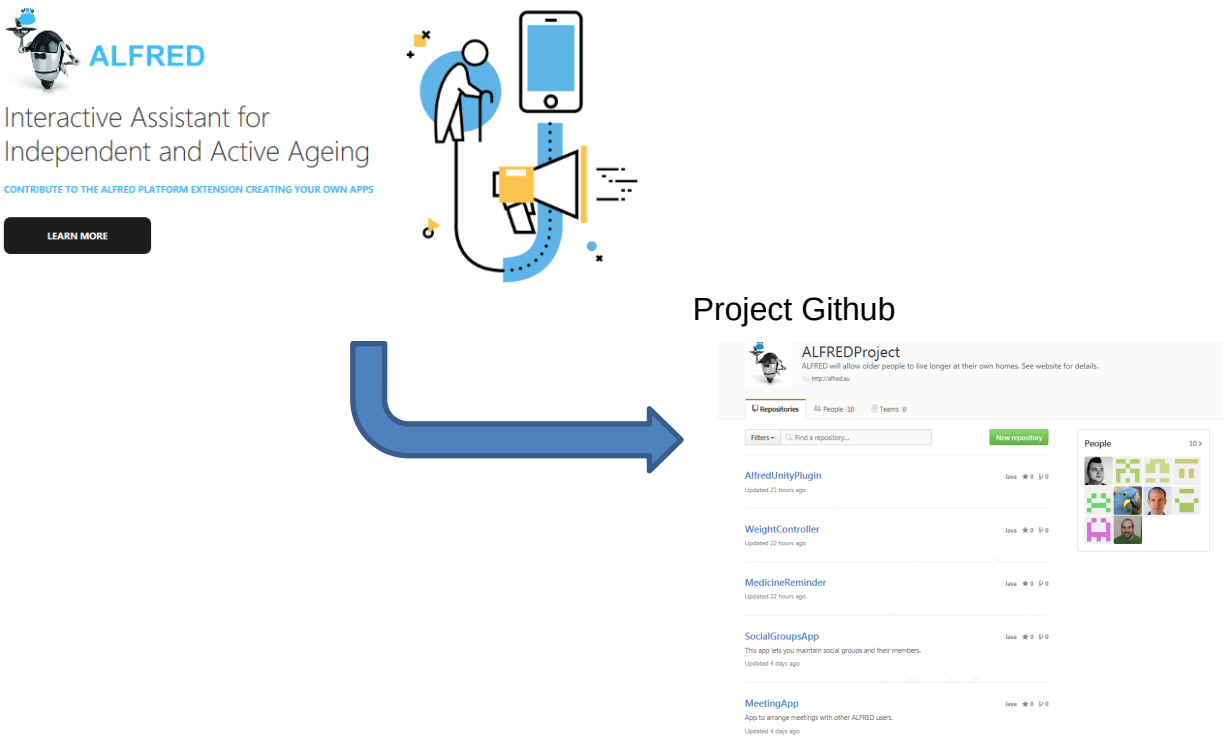

Figure 1: ALFRED Open Platform composition

The two main components of ALFRED Open Platform are:

- The **ALFRED Open Platform website** (OPW) presents an overall of the main components that compose ALFRED platform, their services, architecture, and some reference apps.
- The **ALFRED Project Github** provides the access to the Github repository where the external developers can find the code of the apps mentioned in the Open Platform website, the DDD used in these apps, and Personal Assistant and Personal Assistant Commons, as the essential component for ensuring the right integration of ALFRED apps with the platform.

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3 Open Platform website (OPW)

While the official website Alfred.eu provides an overview of the whole ALFRED Project, Open Platform website is focused on a technical approach, introducing the potential external developers in the ALFRED platform, from the technical perspective in order to ensure the sustainability, even after the project is ended. It is accessible at:

https://devel1.tempos21.com/alfredo-dev/openplatform/index.html

One of the main benefits of ALFRED is that ALFRED is fully extendable through additional apps. Along the execution of previous WP´s some technical documentation has been generated, D2.4 and D2.5 from an overall point of view and D3.5 describing the requirements, interfaces and components provided by ALFRED platform and available for external developers.

3.1 Home and Features

It invites the developers to visit the website in order to know the ALFRED platform, its architecture, the main components and some apps developed during the execution of the project as examples that could be analysed and consulted by the external developers.

Home page states the main objective of the ALFRED project:

"ALFRED will allow older people to live longer at their own homes with the possibility to act independently and to actively participate in society by providing the technological foundation for an ecosystem consisting out of the components showed below"

And it shows the consortium partners involved in the development of ALFRED.

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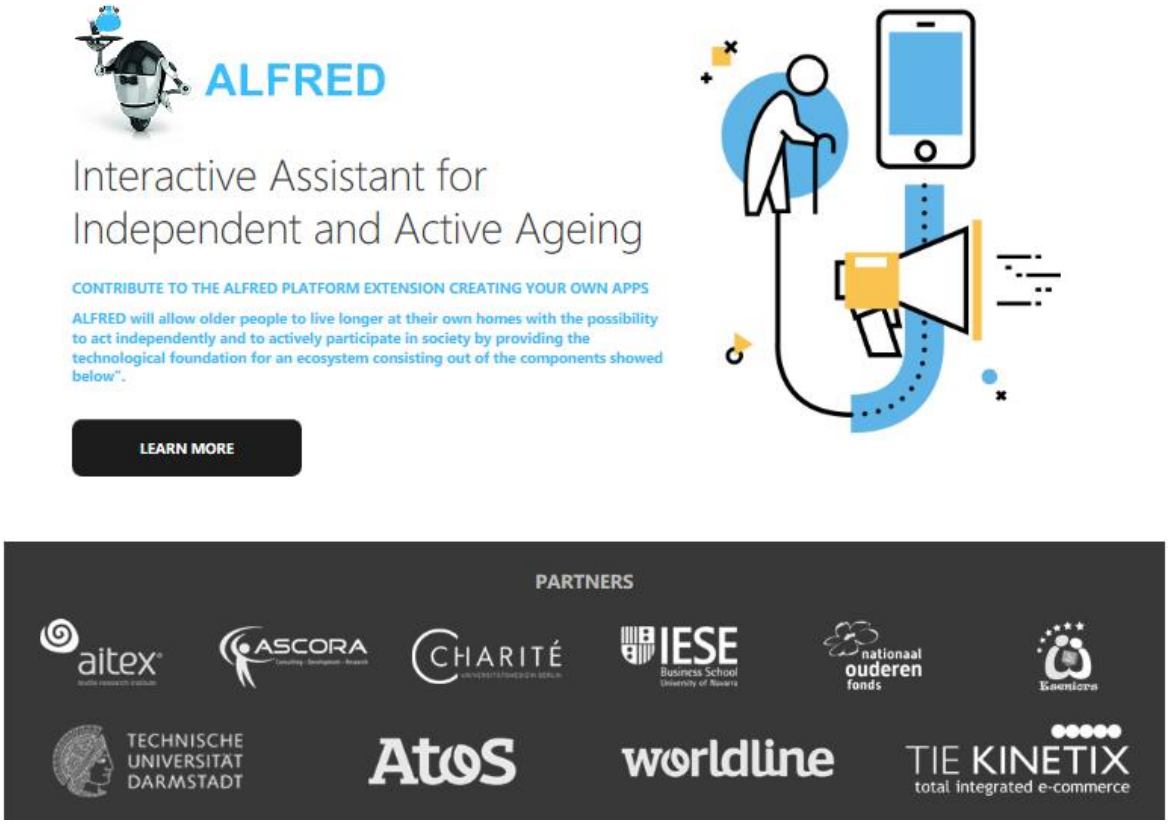

Figure 2: OPW - Home

The home page also shows the main components that conform ALFRED platform, and it provides a shorten description of every components and the resources available in the site.

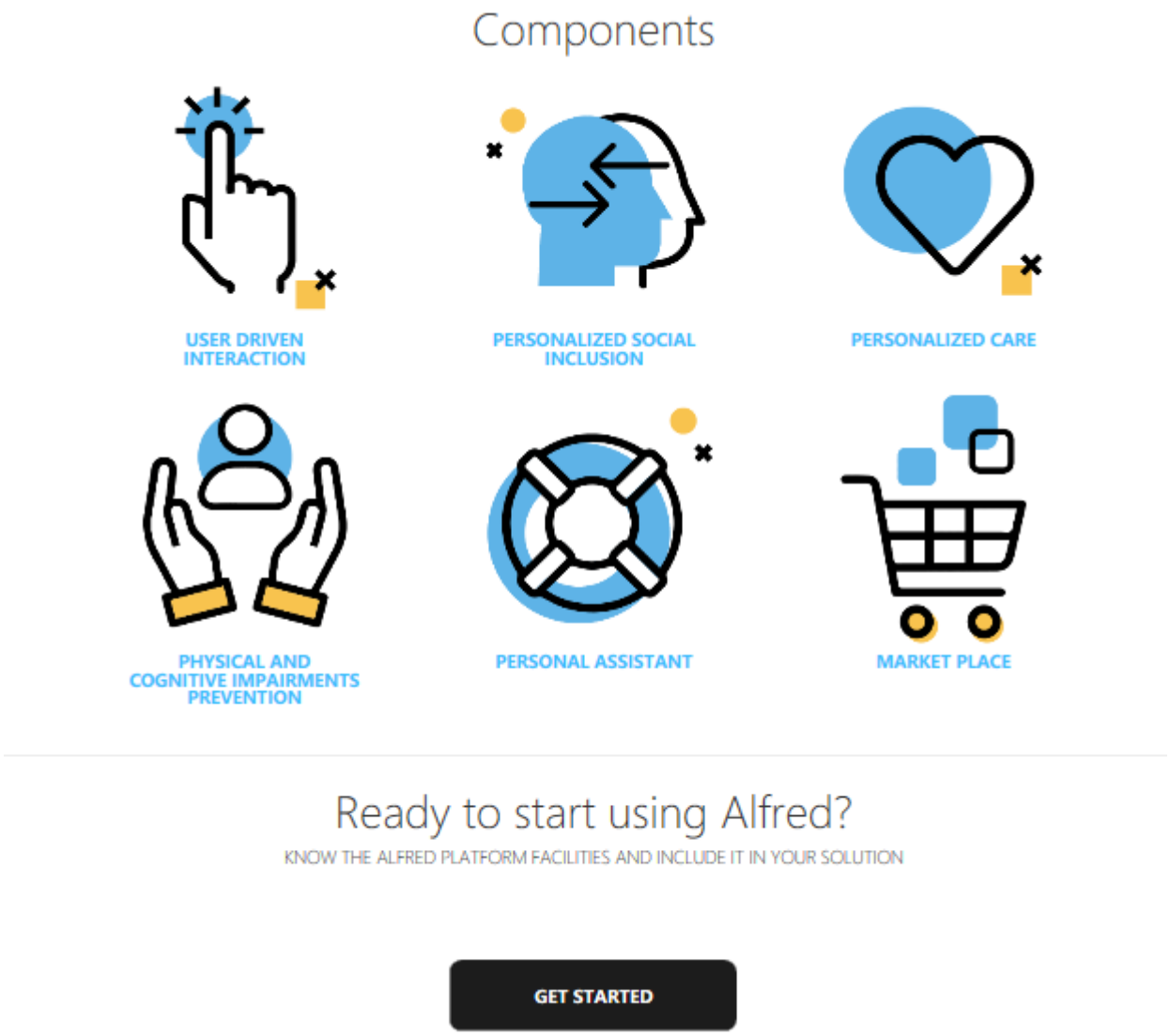

Figure 3: OPW – Home & Components

Learn more or Get Started button, carry the developers to the Features section, where a shorten description of every component is provided.

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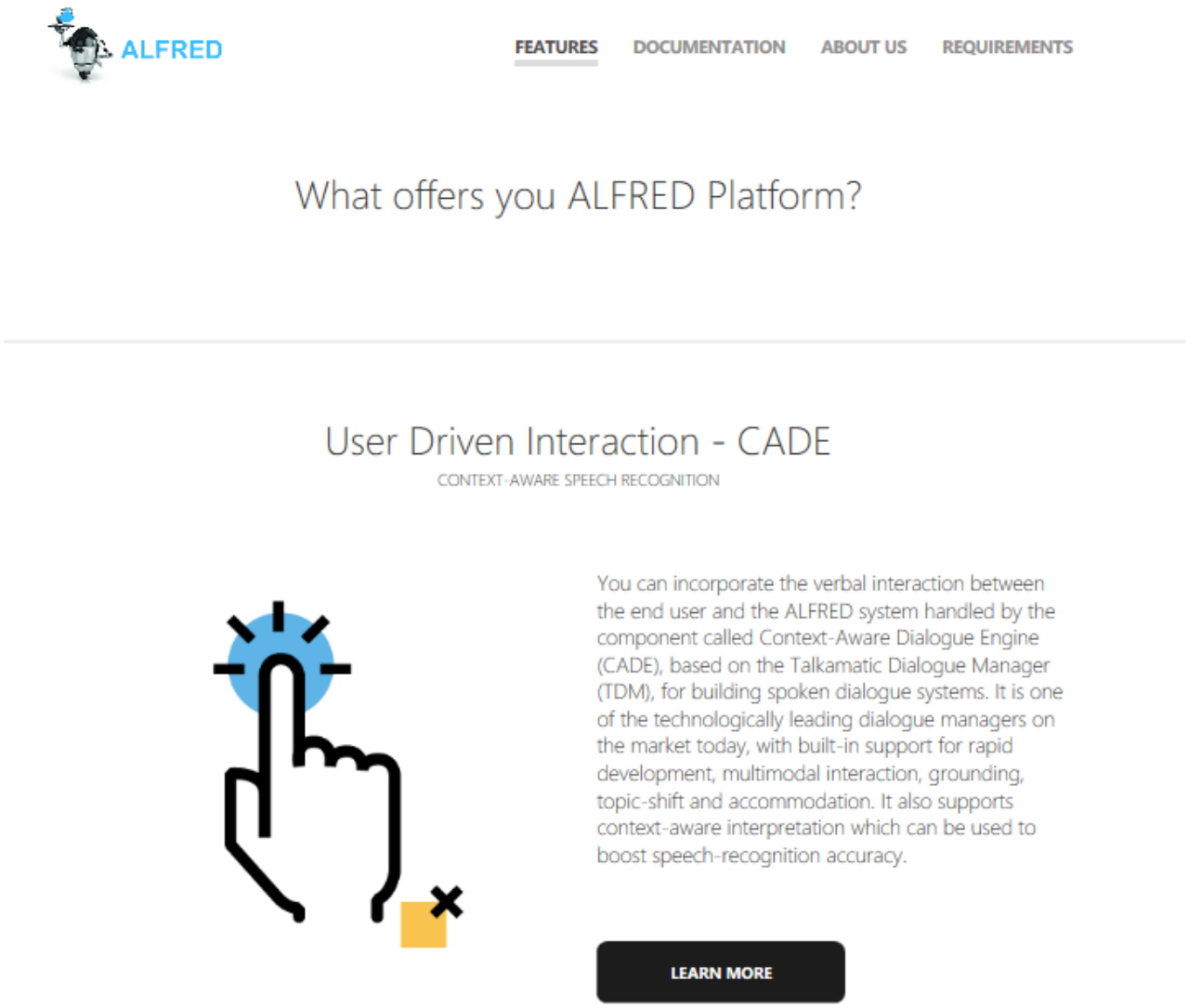

Figure 4: OPW – Features

Main horizontal menu offers next sections:

- Features
- Documentation
- About us
- Requirements

Clicking on the Learn more buttons, the developers can access to the specific area of every component. The same information is accessible through the Documentation menu option.

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3.2 Documentation – Main Components

3.2.1 Get Started

This section gathers all the main components as a relation and offers a vertical menu with overall information of ALFRED platform, as its architecture, the relation of the apps developed during the execution of the project.

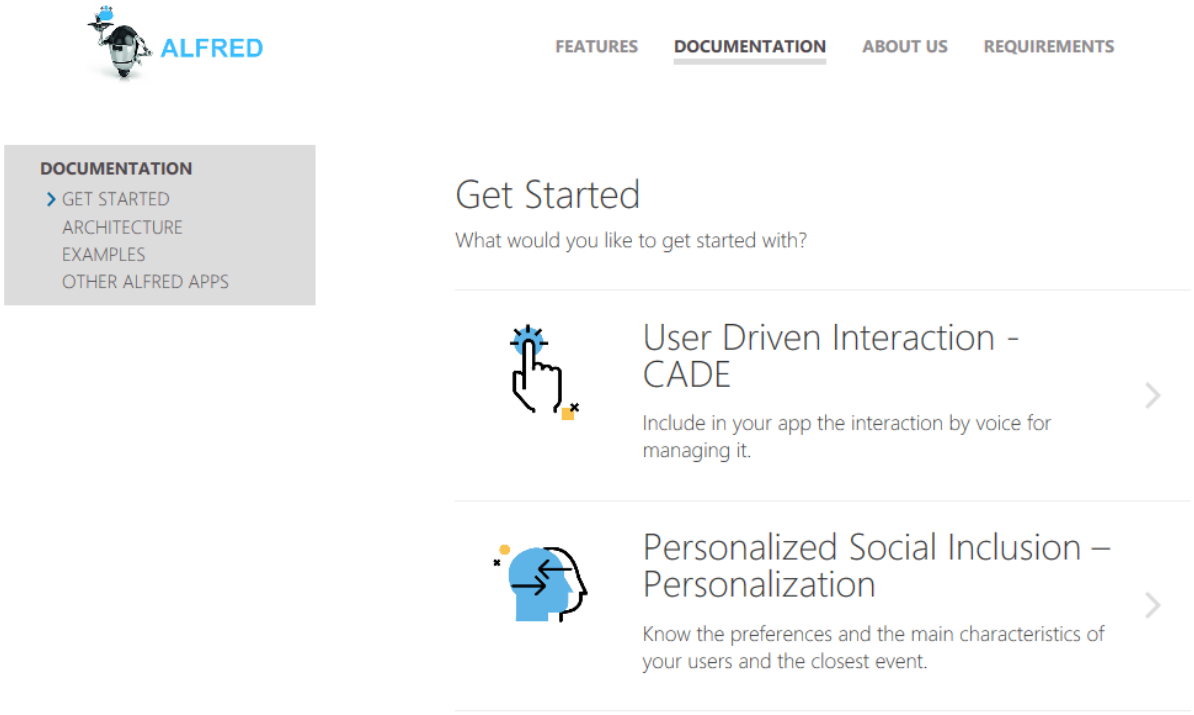

Figure 5: OPW – Documentation – Get Started

3.2.2 Overall Architecture

A graphic with the overall architecture of the ALFRED platform is shown in order to aware the external developers the extension and complexity of the ALFRED ecosystem. More detailed information is provided in D2.4 and D2.5.

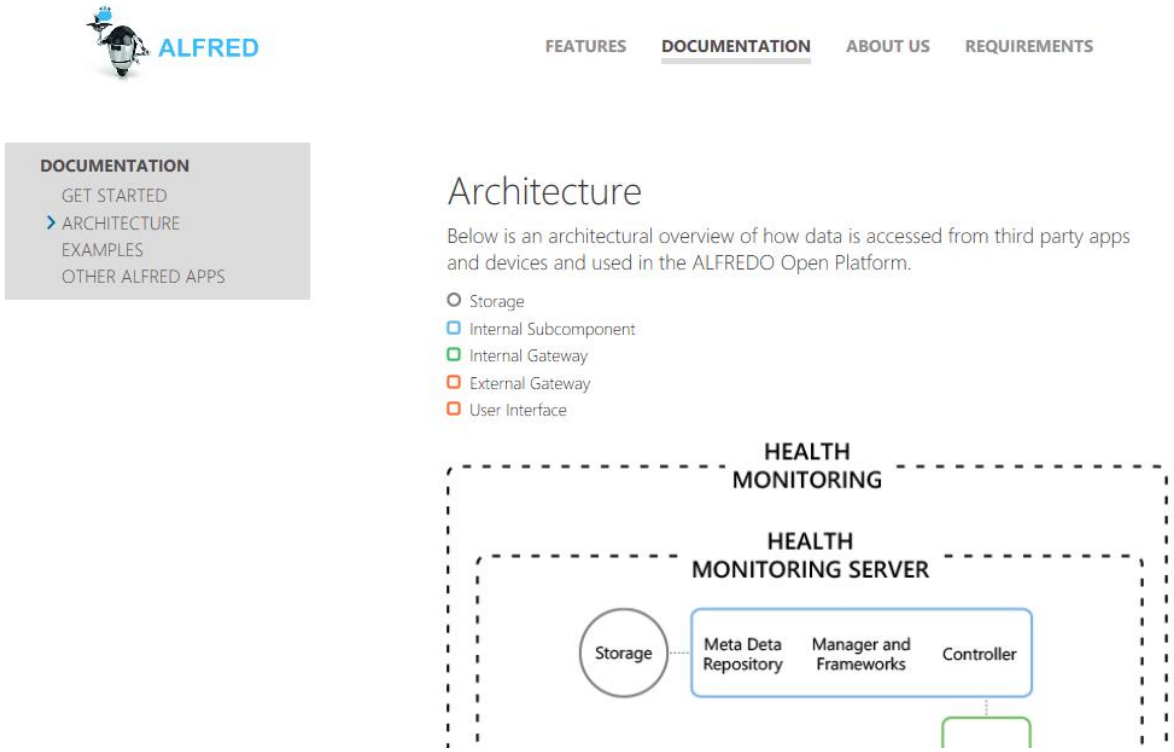

Figure 6: OPW – Architecture Overall

3.2.3 Examples

During last six months of execution of ALFRED project, more than 25 apps have been developed and tested in the different pilots executed with older users.
These apps were focused on the different pillars that support ALFRED and they are documented in the D4.5.2, D5.5.2, D6.5.2 and D7.4.2.
The OPW gathers the relation of all the apps developed in ALFRED platform and tested in the pilots with end users.

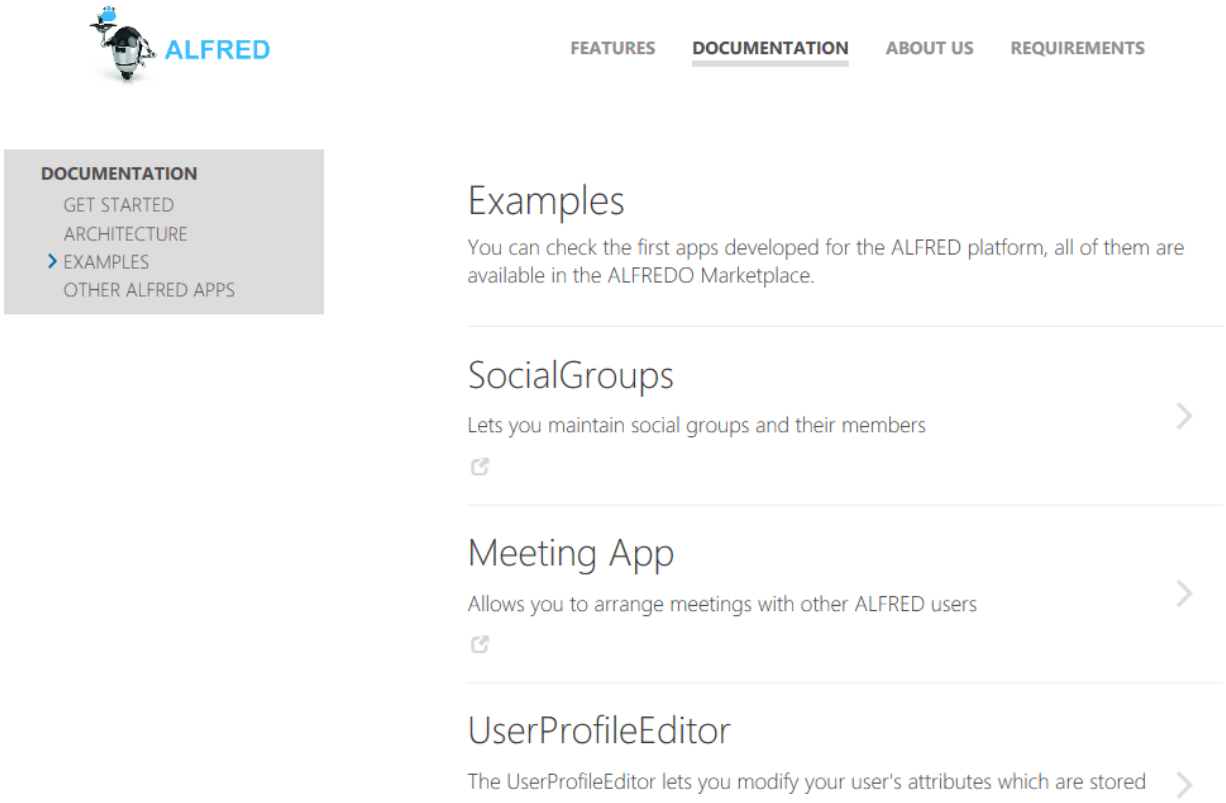

Figure 7: OPW – Examples

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3.2.4 Other ALFRED apps

Some specific apps are mentioned as some specials apps due to these are essential in the ALFRED ecosystem.

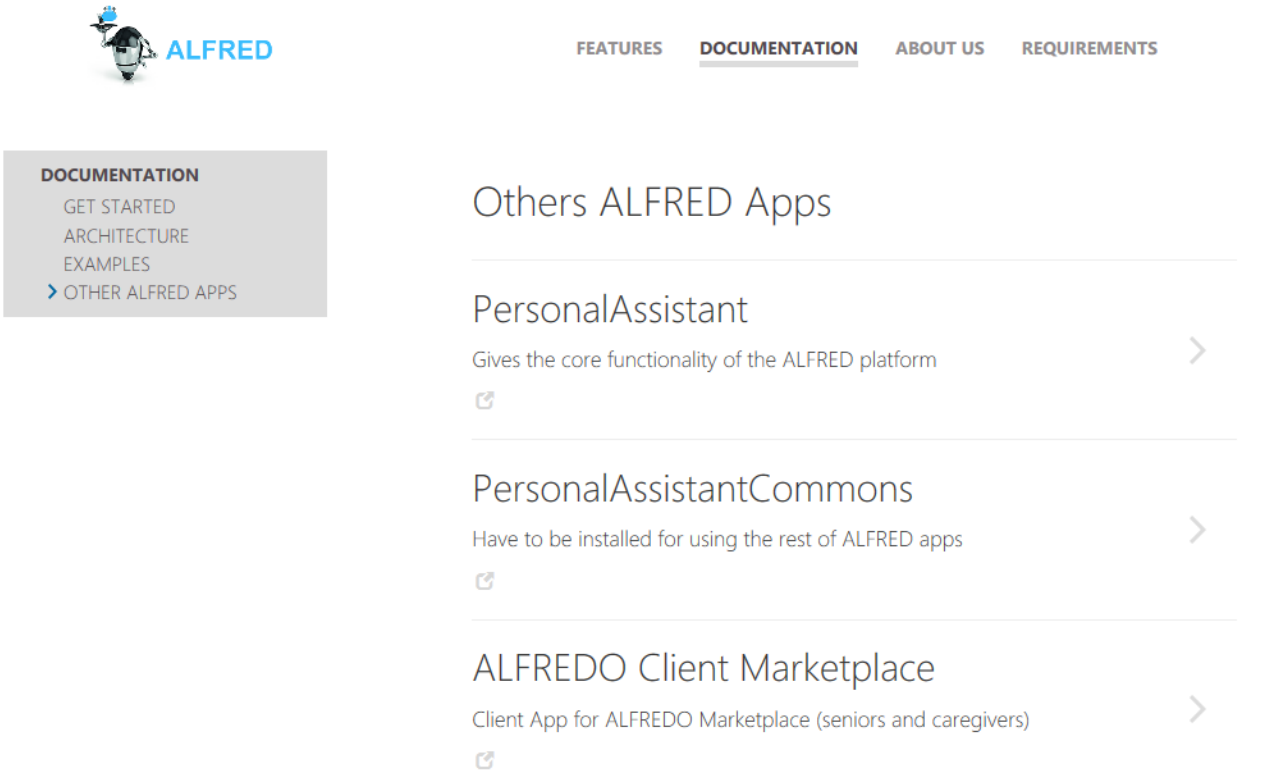

Figure 8: OPW – Other ALFRED apps

- **Personal Assistant:** is the main component for extending the ALFRED ecosystem, through the development of new apps that want to use the services provided by this platform. The **Personal Assistant Commons** library allows the communication between apps and the Personal Assistant (PA) and thus the external usage of all PA (Personal Assistant) components, as the Game Manager, Health Monitor, CADE, Cloud Information Storage, Personalization Manager and the Marketplace. Finally, it provides a microphone button also usable for apps that use a GUI of their own.

- **ALFREDO Client Marketplace** is the component of the ALFRED platform that supports the location of ALFRED apps and eases their deployment. It is is useful for both older end users, and for any developer that want to extend the ALFRED platform with his own apps. Includes a specific marketplace for ALFRED apps, where the final users will find all their available apps using the ALFREDO Marketplace client, and where the developers will able to upload their own apps.

3.2.5 Main Components

For every component, some overview is given, its architecture, and the apps of reference developed in the current version of the ALFRED platform.

A short summary describes the objective and the main characteristics and functionalities for each component. This information is accessible from the GetStarted option.

Although all of these are provided by every one of these components, finally is only through the PersonalAssistantCommons library and with the PersonalAssistant, as they would be accessible for an ALFRED app.

3.2.5.1 Component Overview

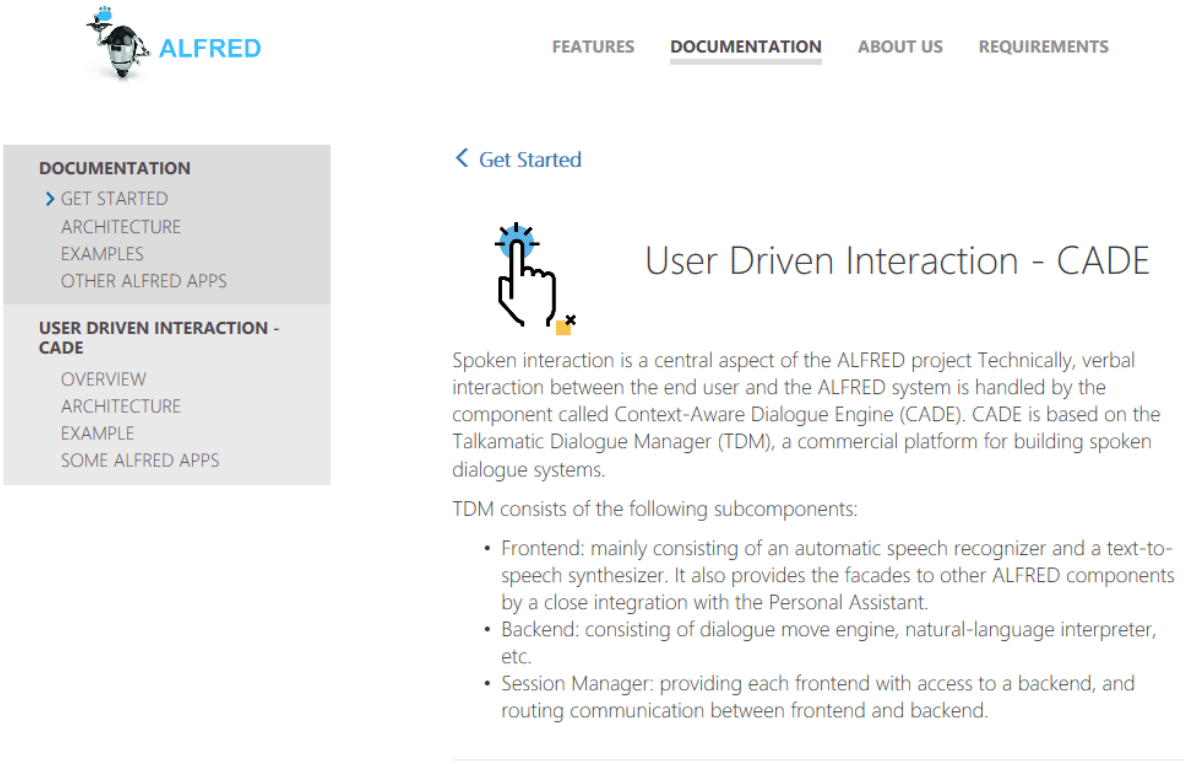

Figure 9: OPW – Component Overview

3.2.5.2 Component Architecture

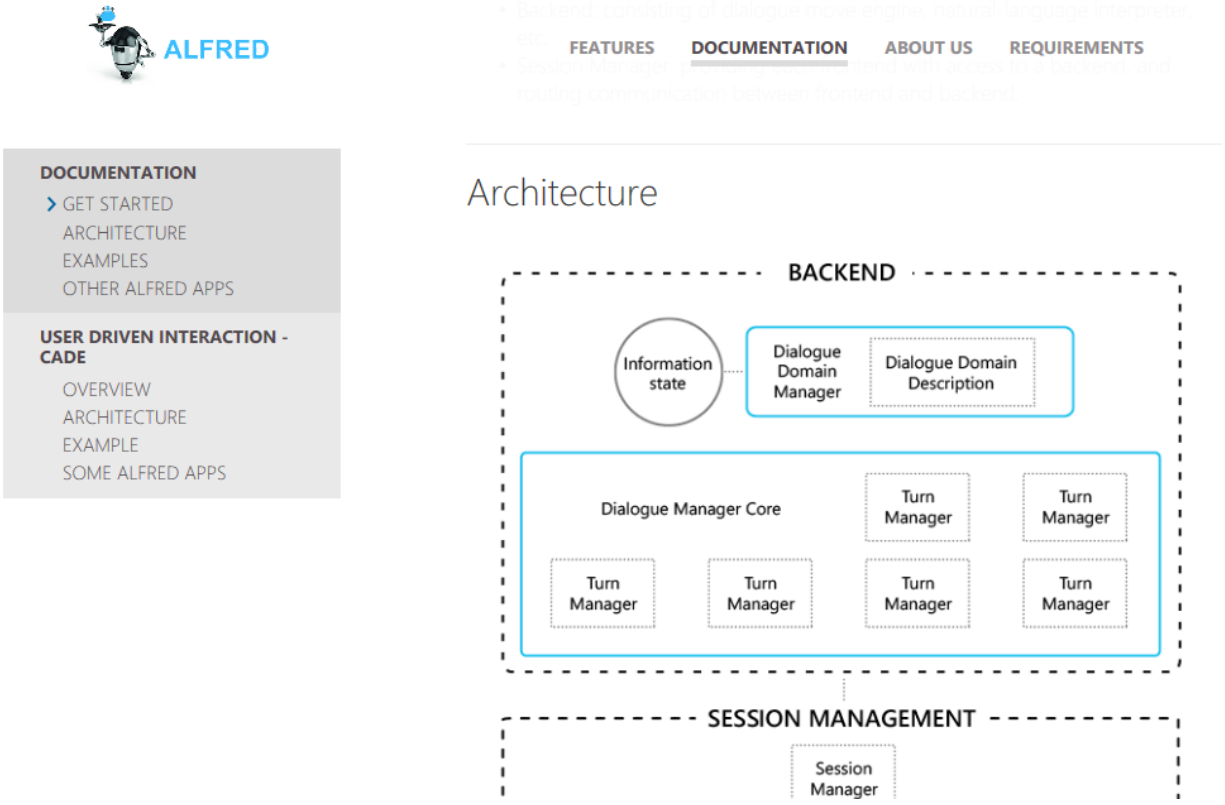

Figure 10: OPW – Component Architecture

3.2.5.3 Component - Apps of reference

Every component has a section with the app of reference developed in the execution of the ALFRED project, focused in this component.

Clicking in a specific app carry to the Github repository to the specific code of this app. Documents D4.5.2, D5.5.2, D6.5.2 and D7.4.2 provide a more detailed information about every one of these apps.

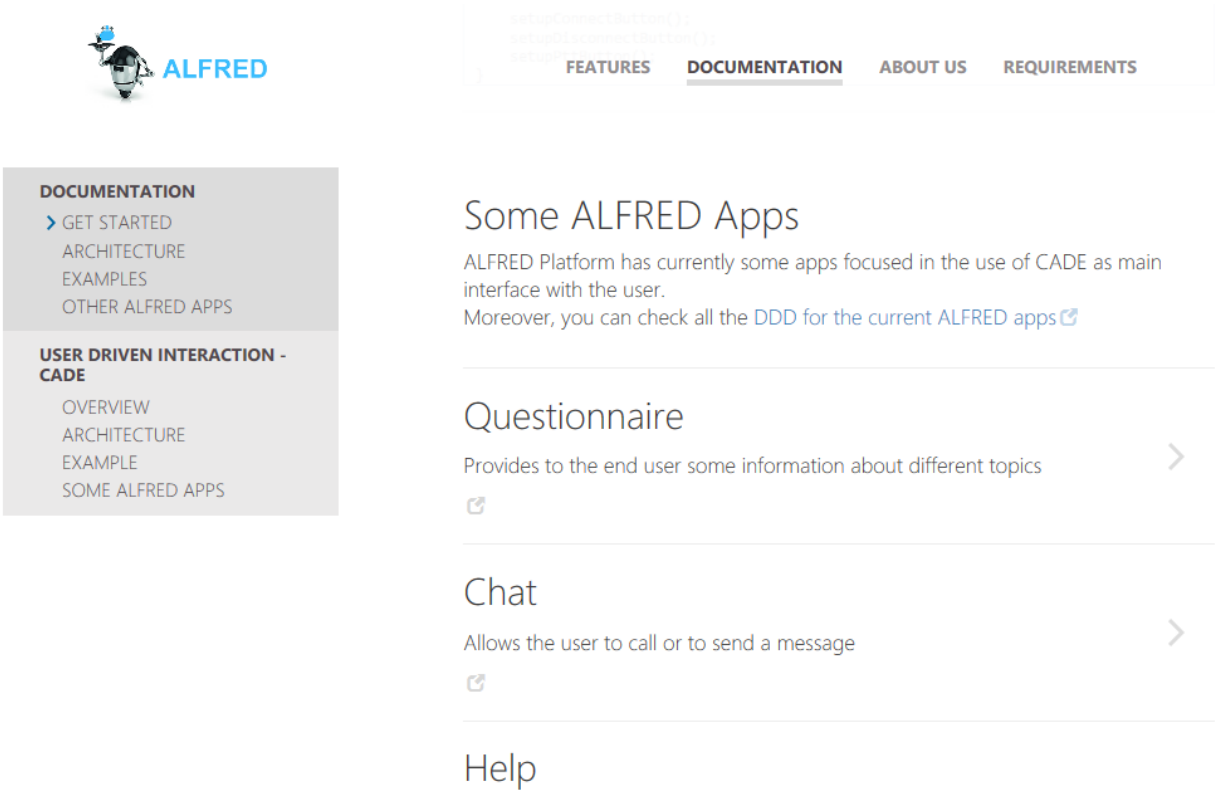

Figure 11: OPW – Component - Apps of reference

3.3 About Us

This section states the context where ALFRED project has been initiated and describes the main objectives to reach with the development of this project.

Moreover, it presents the challenge of extending the current ALFRED platform with the collaboration of new external developers that want to collaborate with the evolution of this solution even later than the project finishes.

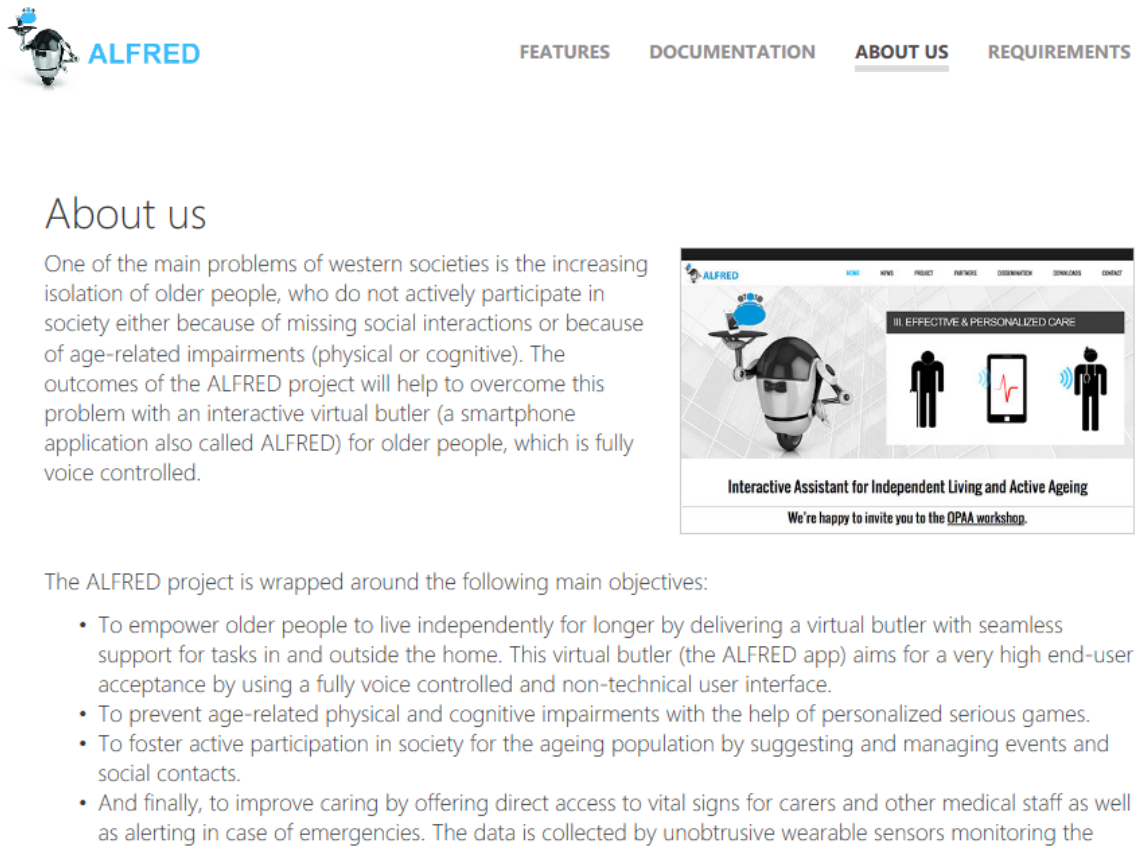

Figure 12: OPW – About Us

3.4 Requirements

It states the starting point, from the development point of view, that the potential new developers should assume and fulfil in order to ensure the quality and reliability of the additional contributions and apps.

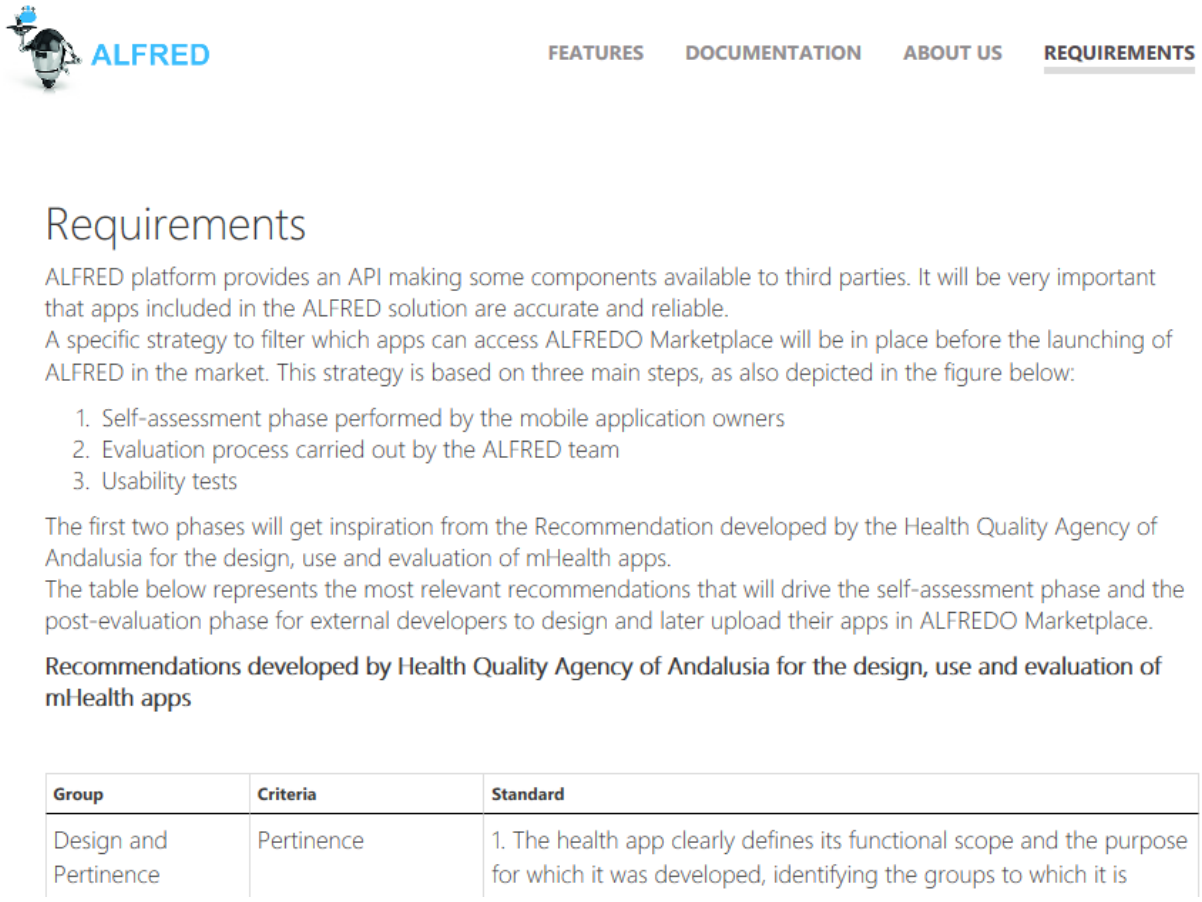

Figure 13: OPW – Requirements

4 Project Github Repository

For third-party-developers, an organization has been created on github.com, a web-based Git repository hosting service, which should host all open, ALFRED-associated projects. These projects are supposed to offer a reference for the developer. The ALFRED organization can be found at ALFRED Project Github (https://github.com/ALFREDProject).

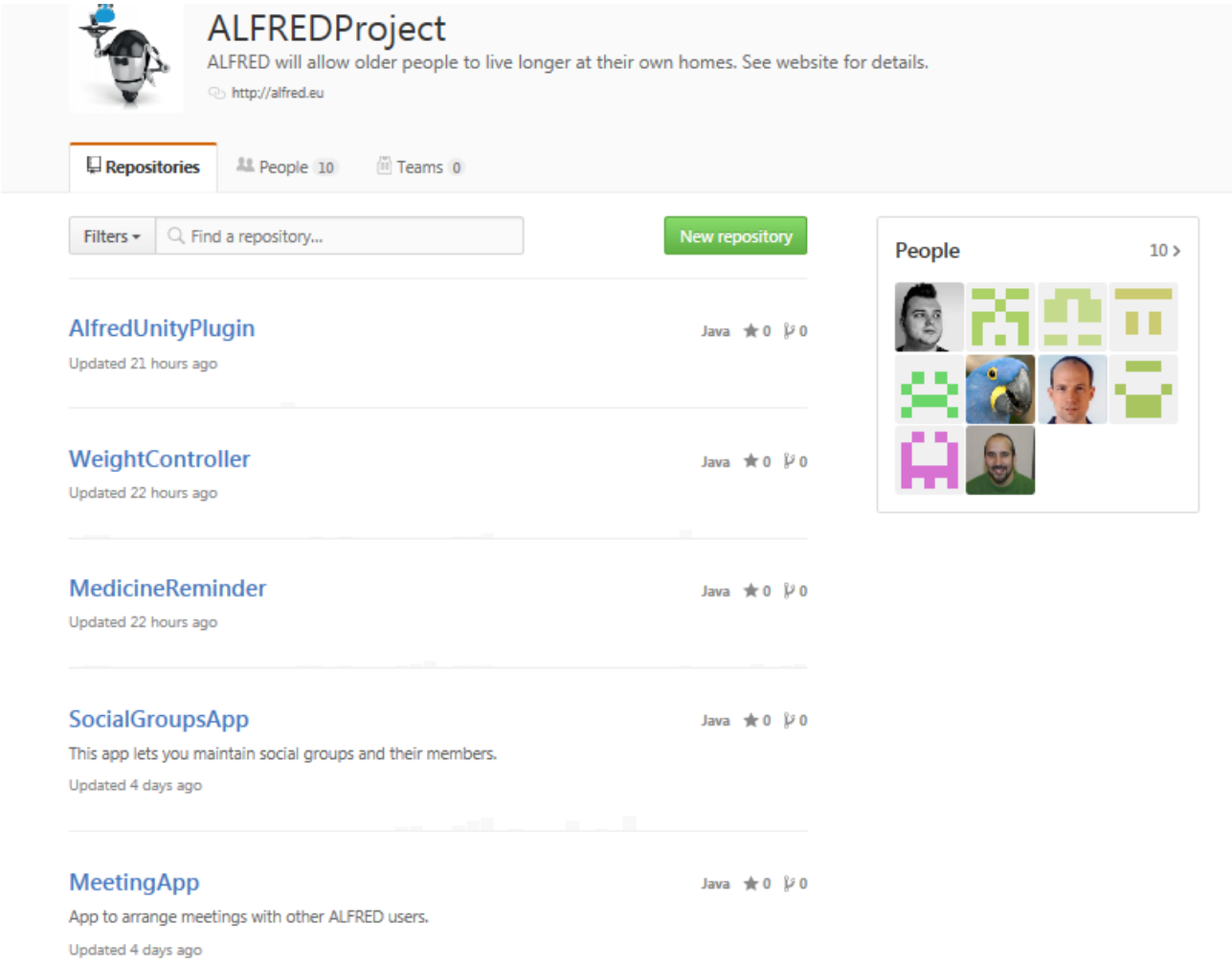

Figure 14: Github Repository – Apps of reference

4.1 Personal Assistant

In the overall architecture, the Personal Assistant forms the central component of ALFRED. It connects all components, and allows an inter-component communication to the Game Manager, Health Monitor, CADE, Cloud Information Storage, and Personalization Manager.

In order to allow communication between a third party app and Personal Assistant, developers need to have the latter installed on their device.

To work with the Personal Assistant, it is mandatory to get the Personal Assistant App on the development device, because all services that the ALFRED ecosystem offers are made available through the Personal Assistant Service.

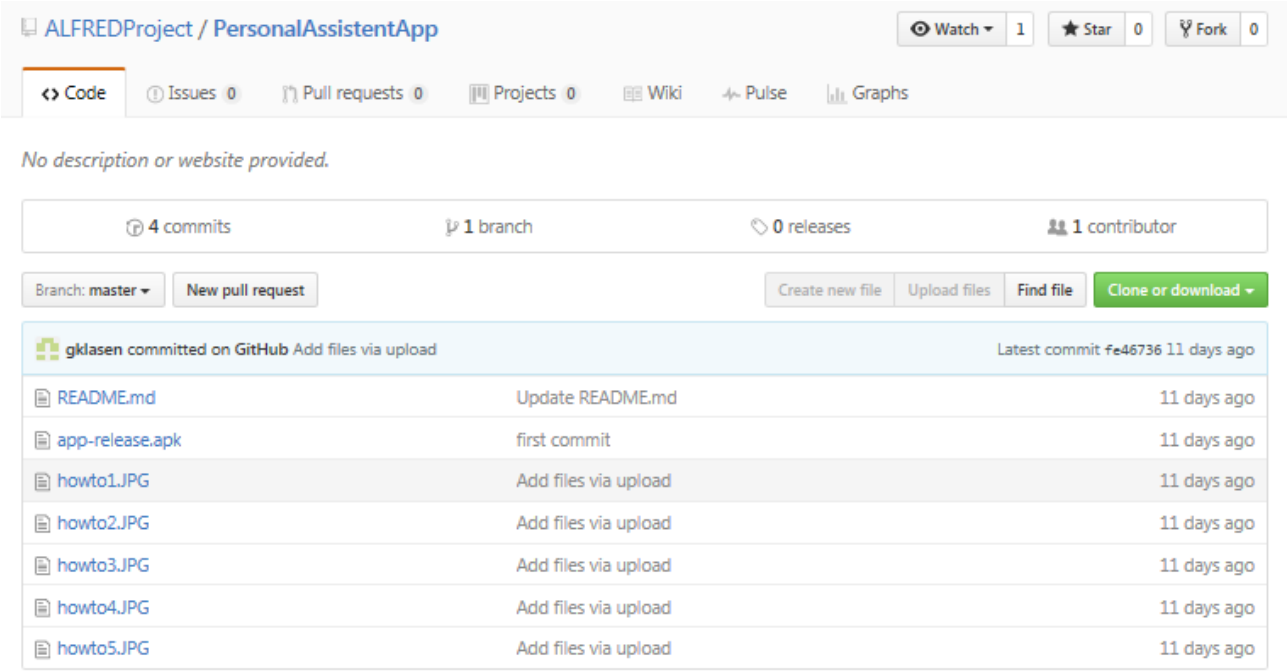

Figure 15: Github Repository – Personal Assistant

Readme.md file for Personal Assistant provides the complete information about the integration others ALFRED apps, and the use of the PersonalAssistantCommons.

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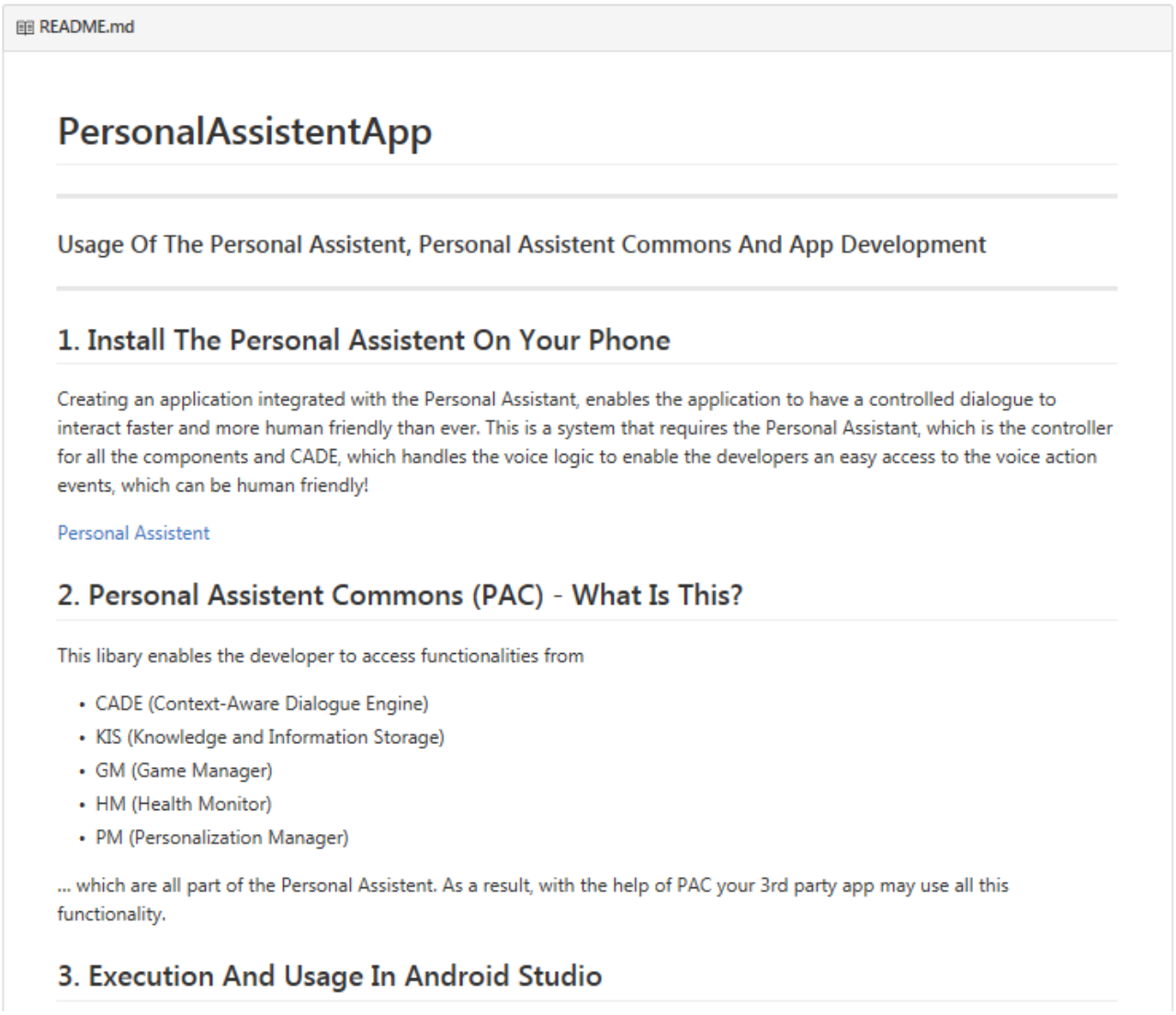

README.md

PersonalAssistentApp

Usage Of The Personal Assistent, Personal Assistent Commons And App Development

1. Install The Personal Assistent On Your Phone

Creating an application integrated with the Personal Assistant, enables the application to have a controlled dialogue to interact faster and more human friendly than ever. This is a system that requires the Personal Assistant, which is the controller for all the components and CADE, which handles the voice logic to enable the developers an easy access to the voice action events, which can be human friendly!

Personal Assistent

2. Personal Assistent Commons (PAC) - What Is This?

This libary enables the developer to access functionalities from

- CADE (Context-Aware Dialogue Engine)
- KIS (Knowledge and Information Storage)
- GM (Game Manager)
- HM (Health Monitor)
- PM (Personalization Manager)

... which are all part of the Personal Assistent. As a result, with the help of PAC your 3rd party app may use all this functionality.

3. Execution And Usage In Android Studio

Figure 16: Github Repository – Personal Assistant - Readme.md

4.2 Personal Assistant Commons

With the implementation of the “Personal Assistant Commons”-project started in D3.5.1, also a repository was added to github, which functions as a “blueprint” repository for third party developers. With this solution, they are not only able to use this template as a base for their own project, but for communicating with the Personal Assistant. It has several functions integrated like the call of the service, the initialization of CADE, and others. These are two key concepts, which can be easily applied on the other APIs available.

The PersonalAssistantCommons is available in the Github repository.

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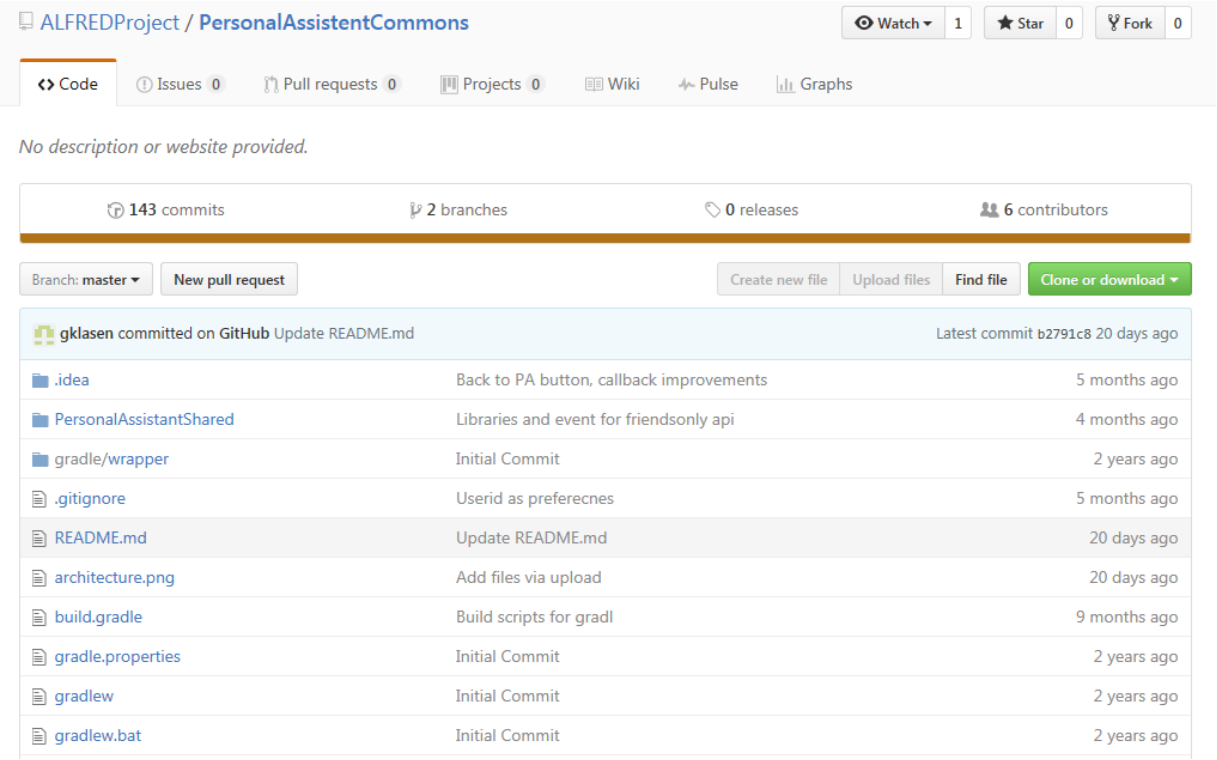

Figure 17: Github Repository - PersonalAssistantCommons

4.3 Dialogue Domain Descriptions (DDD)

Spoken interaction is a central aspect of the ALFRED project. Technically, verbal interaction between the end user and the ALFRED system will be handled by the Context-Aware Dialogue Engine (CADE) component. CADE is based on Talkamatic Dialogue Manager (TDM). CADE also contains design-time subcomponents constituting an SDK (software development kit) for developing the Dialogue Domain Descriptions (DDD). Dialogue domains consist of the following parts:

- An **ontology** defining concepts, entities and actions that the user and the system may reference in questions, answers and requests.
- **Dialogue plans** describing how actions are carried out and how questions are answered. Plans also describe what information is needed in order to carry out the actions or to answer the questions.
- A **language model** or **grammar,** describing words and utterances are used by the user and system. In other words, the language model defines syntax rules and mappings between linguistic surface forms and semantic entities.
- A **service interface** describing how services that the domain depends on are accessed and used, e.g. web APIs or functionality hosted natively on the user's device.
- The domain may also contain **interaction tests** specifying examples of dialogue that are supported, enabling DDDs to be tested automatically.

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In order to show how the DDD for the ALFRED apps has been defined, these are available in the [Github Dialogue Domain Description](#).

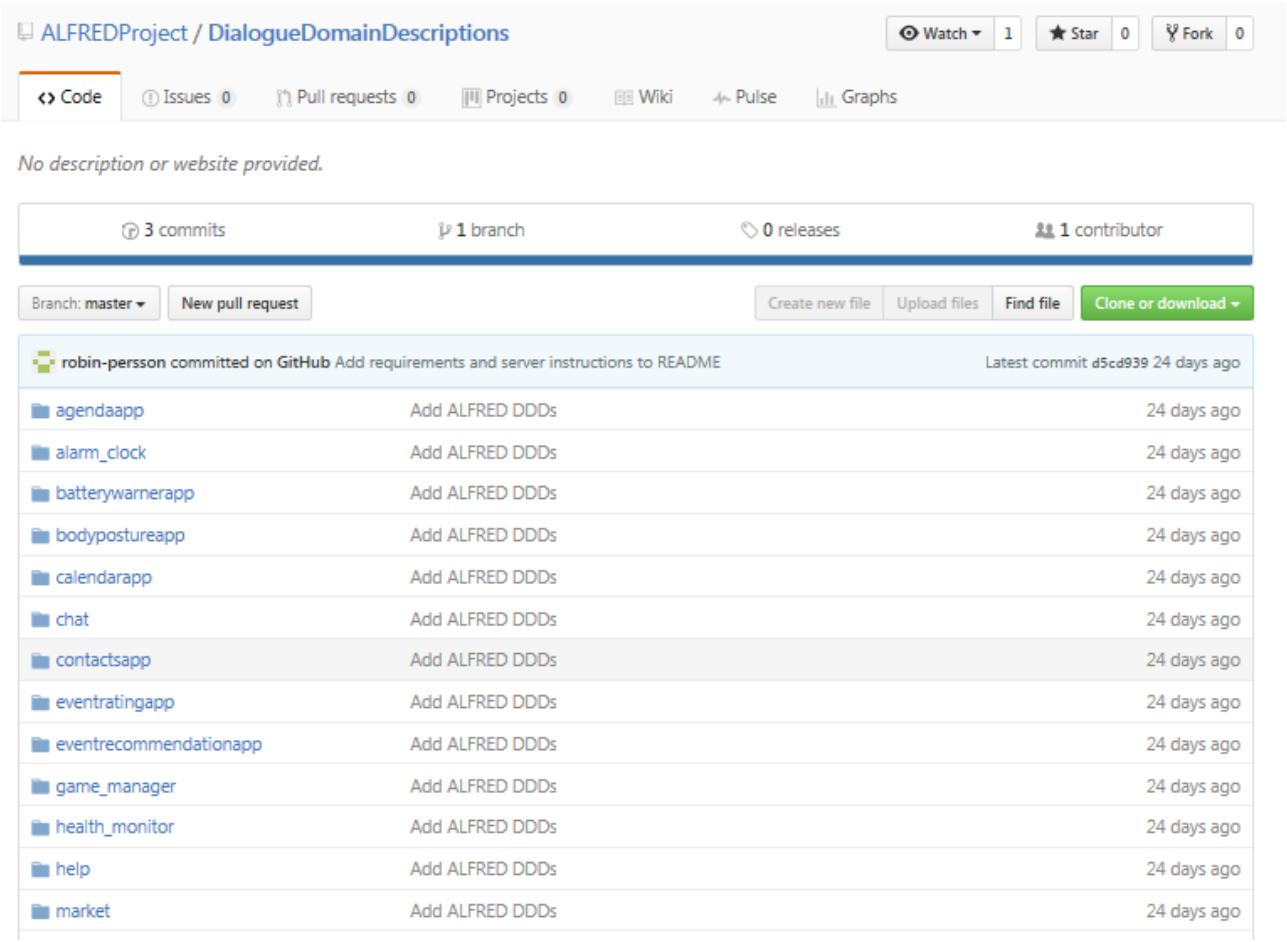


Figure 18: Github Repository - DialogueDomainDescriptions

4.4 Apps of reference

During the ALFRED project execution, more than 25 apps have been developed and added to the organization. All of these are available for the external developers. As earlier was mentioned, these are focused in the use of different ALFRED components.

Below the detailed code of the [SocialGroupsApp](#) is shown.

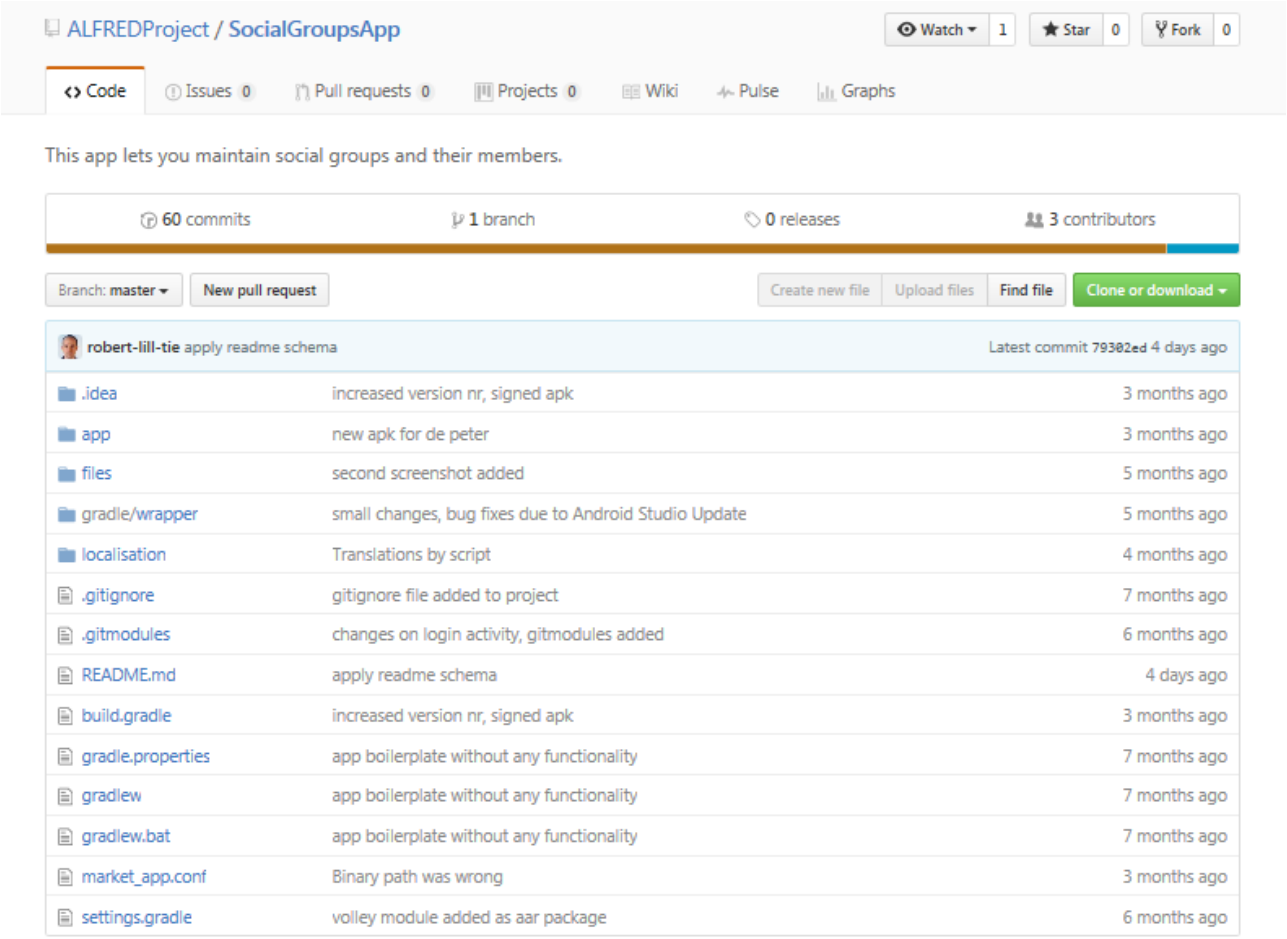
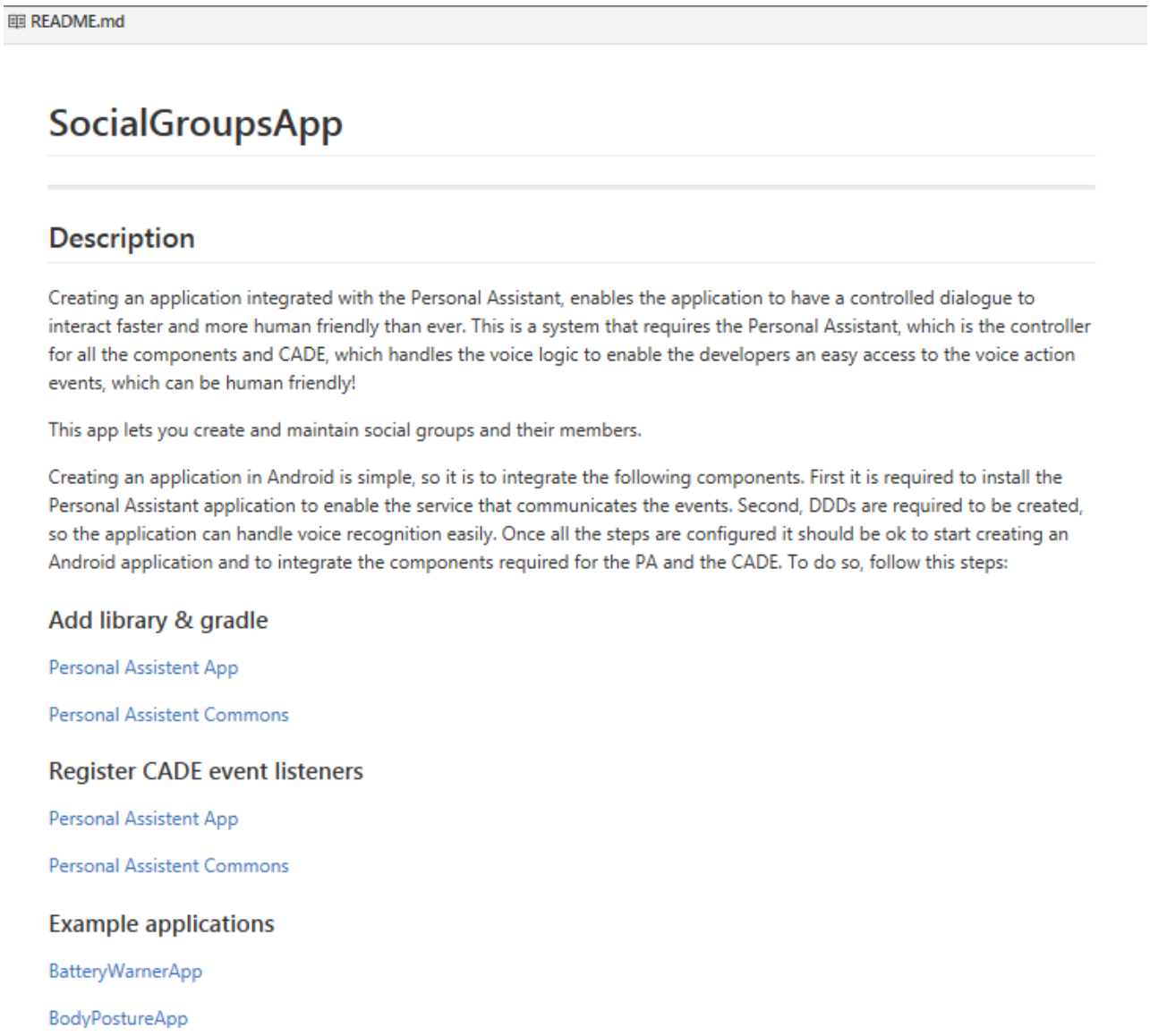


Figure 19: Github Repository – App Code


README.md

SocialGroupsApp

Description

Creating an application integrated with the Personal Assistant, enables the application to have a controlled dialogue to interact faster and more human friendly than ever. This is a system that requires the Personal Assistant, which is the controller for all the components and CADE, which handles the voice logic to enable the developers an easy access to the voice action events, which can be human friendly!

This app lets you create and maintain social groups and their members.

Creating an application in Android is simple, so it is to integrate the following components. First it is required to install the Personal Assistant application to enable the service that communicates the events. Second, DDDs are required to be created, so the application can handle voice recognition easily. Once all the steps are configured it should be ok to start creating an Android application and to integrate the components required for the PA and the CADE. To do so, follow this steps:

Add library & gradle

Personal Assistent App

Personal Assistent Commons

Register CADE event listeners

Personal Assistent App

Personal Assistent Commons

Example applications

BatteryWarnerApp

BodyPostureApp

Figure 20: Github Repository – App Readme.md

4.5 Marketplace Client app

The Marketplace Client app runs on the ALFRED device and communicates with the ALFREDO Marketplace developed along the project execution through the API component. End users will be able to perform the operations to install, uninstall, update, rate and search applications within their ALFRED device, moreover they will access to the ALFREDO Marketplace and consult the new ALFRED apps by categories, names, etc.

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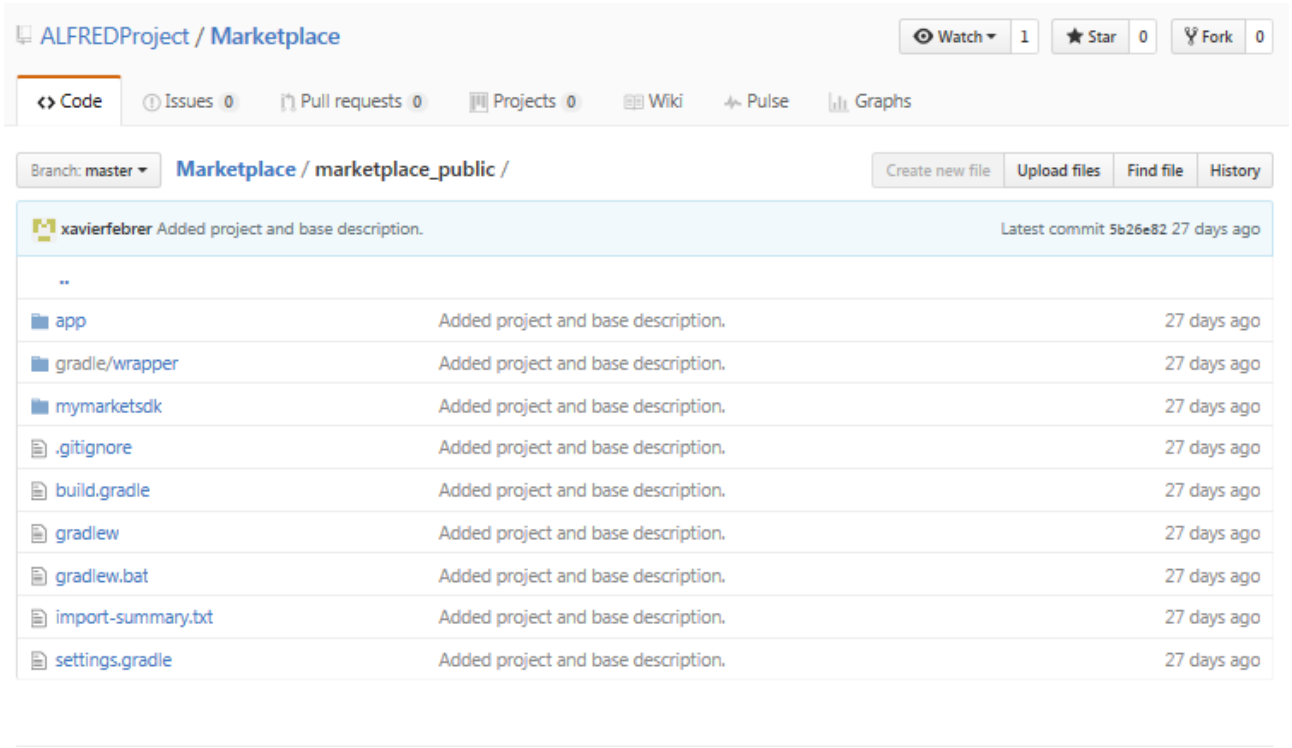

Figure 21: Github Repository – Marketplace Client app

5 Summary

One of the main benefits of ALFRED platform is that ALFRED is fully extendable through additional apps for external developers. During the project execution some technical documentation has been published in the official web site alfred.eu explaining how apps may be developed from a technical perspective.

Moreover, in order to make this concept successful, a specific technical website has been developed accessible for the external developers, the ALFRED Open Platform. This is supported by the Gibhub ALFRED Project. The goal is to establish a community of ALFRED apps developers, providing them facilities for the development of new apps and its integration with ALFRED platform.

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