Virtual Coaching Activities for Rehabilitation in Elderly

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D7.1 Translation to technical requirements (first version) Extended summary

The **vCare** project starts from the assumption that rehabilitation provides an ideal setting for the adoption of a Virtual Coach. Rehabilitation at home, supported by virtual coaches, can improve a patient's transition from clinic to home.

This report first describes the technological solutions on which **vCare** partners have worked in recent years and identifies new requirements to adapt them to the project. First, therefore, the **main aim of this report** is the consolidation of the medical inputs: this helps to set up the main lines for the architecture. Second, the report analyses the current state of Internet of Things (IoT) platforms. An important level of technological fragmentation is envisaged in the IoT field. As a result, the **vCare** consortium will have to make wise decisions to mitigate technological risks. Third, the report presents relevant European projects and initiatives that have worked or are currently working on similar problems. Some technical details from these projects are given when they are available. A **benchmarking exercise** is conducted to show where **vCare** stands out from the rest.

In summary, this report provides **an in-depth analysis of the state-of-the-art** and undertakes **a risk assessment** with regard to technical decisions.

BACKGROUND

The **vCare** project is addressing the rehabilitation process by patients in four different pathologies in neurological and the cardiological medical specialities. It is a great challenge for the project to provide a technical solution that covers all the relevant technical needs while maintaining a level of homogeneity in the solution.

Each of the **vCare** technical partners has already worked in previous European projects and have solutions that fit with specific use cases presented by **vCare**. The **vCare** technology partners start this project, each with a background technology that is intended to be moved forward and extended to achieve the goals of the project.

As the medical research was progressing in work package 1, work package 7 partners started to work on understanding the different potential technological solutions.

LEGACY SOLUTIONS

vCare's partners bring to the project cutting-edge technologies that have advanced through the different technology readiness levels over recent years. See Figure 1 as an example of the technology brought to the project by AIT from Austria.

The following are the most relevant technology solutions for the project:

- MYSPHERA[1] provides an indoors location platform and an IoT middleware based on FIWARE[2].
- AIT[3] contributes an avatar platform that has evolved in different European projects. It will be the key element for the coaching programme.
- TUD[4] offers a technological component to define the clinical pathways in the digital way.
- FZI[5] brings some technological background on machine learning.

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[1] http://mysphera.com
[2] https://www.fiware.org
[3] https://www.ait.ac.at/en/
[4] https://tu-dresden.de/?set_language=en
[5] https://www.fzi.de/startseite/

- Imaginary[6] supplies its rehabilitation games.
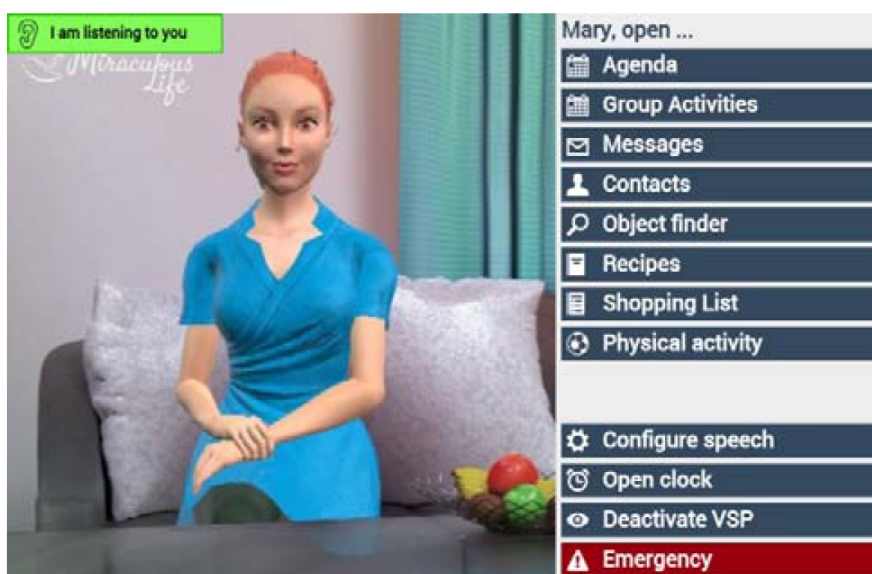- iSprint[7] has experience in the eWall project[8].

Figure 1 - AIT's avatar technology

Together, these solutions will build up an advanced coaching service.

THE IOT FRAGMENTATION

One of the hot topics in this project is about using an Open IoT platform. After an initial analysis, this project is backing FIWARE as most prominent and promising European IoT platform. Although FIWARE has largely been adopted in the Smart Cities domain, it is gradually moving into health and care.

Figure 2 shows the degree of diversity in the current Open IoT platform domain.

Figure 2 - The IoT fragmentation

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[6] http://i-maginary.it/#gallery
[7] http://innovationsprint.eu
[8] https://ec.europa.eu/digital-single-market/en/news/ewall-smart-wall-make-life-easier

MOVING TOWARDS *vCARE*'S TECHNICAL REQUIREMENTS

vCare's work package 7 plays the role of the "mother work package" that provides the first high-level technical requirements for other work packages.

This report provides a specific list of requirements for each of the technical work packages. Using the input from *vCare*'s first work package, D1.2 on the Narratives Booklet for Rehabilitation Assistance, this report starts by analysing the *vCare* use cases. It highlights commonalities that could be grouped together as functional requirements. These requirements will provide a first level of definition. More detail will be offered in each technical work package.

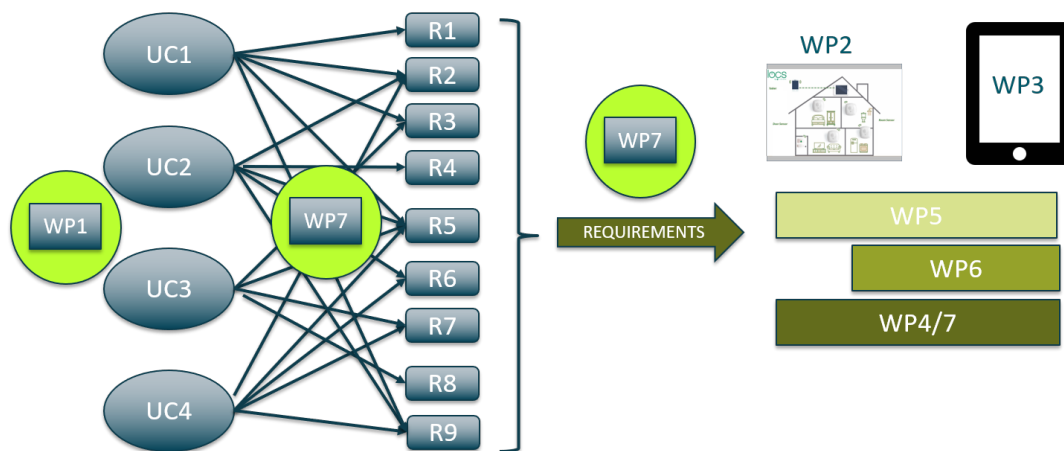Figure 3 presents the approach followed to translate the use cases described in D1.2, and matches them to find common requirements.

Figure 3 - Methodology to derive use cases to technical requirements