

CAPTAIN Objectives



Radically new HCI

CAPTAIN introduces new tangible interaction means, based on Projected Augmented Reality in AAL Environments.

Indoor monitoring

Collection and analysis of emotional, behavioural and physiological data through unobtrusive means.

Personalized guidance

Motivation engine designed to engage users in healthy nutritional and exercise habits, cognitive activities and social interactions.

Physical and cognitive training

Physical and cognitive training through serious games to increase engagement levels.

CAPTAIN open API

A set of open APIs will be released to allow further extensions and adoption of CAPTAIN by third parties, including researchers and private companies.

Stakeholders community

Relying on the living labs' power, CAPTAIN's builds the "CAPTAIN Stakeholders' community".

Agile requirements elicitation

the "Stakeholders' community", will be the only official source of requirements towards continuous co-creation throughout the project.

Real world scenario

CAPTAIN will be tested in three Living Labs (Thess-AHALL, INTRAS Living Lab, 27 Delvalle and AUSILIA) as well as in real homes of volunteer older adults.

CAPTAIN is an idea that came after many years of research and piloting in the Active and Healthy Ageing domain. We attempt to design the future home where smart assistance will be whenever and wherever it is needed, enhancing the usefulness and effectiveness of the personalized recommendations.

Our vision is to turn the homes of older adults into a gentle coach, providing smart assistant whenever and wherever it is needed, based on their activity.

To do so, CAPTAIN uses micro-projects and projected augmented reality to turn all surfaces into tangible interfaces for personalized information and reminders.



Captain Consortium

Coordinated by



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projectCaptain



captain-project



CAPTAIN:

Coach Assistant via
Projected and
Tangible Interface



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Stakeholders Community

The stakeholders community, the only source for user requirements, is built early enough in the project and it is sustained throughout its lifecycle

Algorithms development

Emotional, behavioral and physiological data collection and analysis will be feeding the CAPTAIN e-coach for personalized guidance

Continuous pilot trials for requirements elicitation

By applying agile requirements elicitation, the community of stakeholders is invited to constantly visit the living labs and pilot sites (development sprints), giving feedback and updating the requirements of the product

Continuous pilot trials for requirements elicitation

Deployment in real homes & nursing homes

CAPTAIN will be deployed in real homes across 4 countries and its acceptance as a commercial product will be evaluated in a nursing home

Business Model

To create a viable exploitation strategy

Dec 2017

Kick-off meeting

The meeting took place in Thessaloniki, Greece

Feb 2018

May 2018

Simulation of the envisaged project

Virtual reality and projected augmented reality are used to give the look and feel of the CAPTAIN envisaged product to the elderly people, even before the first prototype, in order to collect feedback

Jun 2018

Sep 2018

New hardware prototype

As a Research and Innovation Action, CAPTAIN works on a new hardware prototype

Oct 2018

Aug 2019

First version with basic functionality

The first version of the system will be deployed to all the living labs and pilot sites so that the stakeholders start interacting with the real system

Sep 2019

Jan 2020

CAPTAIN e-coach integration and release of open API

The system is ready to be deployed in real settings for further real life experimentation

Mar 2020

Apr 2020

Evaluation

The system will be evaluated on its acceptance, effectiveness and economic impact

Sep 2020

Envisaged Outcome

CAPTAIN will foster a truly **user-centered co-design philosophy** with **constant involvement of older adult in the design, development, and testing of:**

- A **smart home appliance** which will embed miniaturised 3D scanners, cameras, pico-projectors, microphone arrays and environmental loudspeakers. It will be used to turn a room into an interactive, tangible interface. Different configurations of the appliance will be designed together with seniors to ensure the device blends with the room decor (e.g. resembling a lamp), to avoid stigmatisation and to enhance end-user acceptability.
- A **software environment** turning the home itself into a projective and very user-friendly interface, capable to capture relevant physiological, behavioural data and user actions, and to provide personalised "virtual coaching", based on a gentle emotional computing metaphor through intelligent comprehension of the context.
- A **publicly available API** (Application Programming Interfaces), compatible with existing IoT platforms, exposing the system's functionality to third-party systems.



Who we are

The CAPTAIN consortium is made of **multi-disciplinary team** which feature:

- Sound experience in all **key technologies** required for the implementation.
- Scientific, business, clinical, economic and policy-level **competence** to deal with all needs of the project.
- Pre-existing developments which will be used as **starting point** of the development.
- Previous experience with **similar initiatives/projects** tasks.
- Competence in the **design of clinical trials and testing** with patients and users
- Access to **key infrastructures**, including **living labs**, to carry out trials with end users in **realistic scenarios**.
- Major involvement in all **EU initiatives on Active and Healthy Ageing and Co-creation** (Ref Site & Partner EIPonAHA, European Network of Living Labs member, Living Lab co-creation approach)
- Strong **coordination capacity** and long **cooperation track record**.

CAPTAIN software



Creation of a projective, tangible and emotional UI interface

Users will interact with CAPTAIN through tangible interfaces. CAPTAIN will transform the living environment into an interactive environment where the senior can interact with the home intelligence using their hands. The interactions will include simple contact interaction, contact area interaction, brightness interaction, object interaction and gesture interaction. The controllers will be very intuitive and an artificial intelligence algorithm will be applied. Also, the interface will integrate voice interaction and control of home devices, as well as, speech interaction with the virtual coach

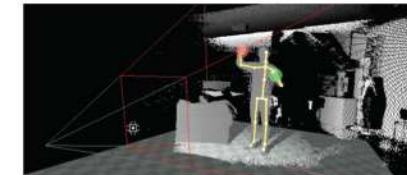
Non-invasive physiological and emotion data collection and analysis



CAPTAIN's psychological and emotion data collection and analysis from video will use facial micro-expression and human body pose analysis compatible with mobile and network cameras based on deep learning to assess how patients are feeling over time. This activity will support the collection of assessment data and how computerized

tools can be used to assist in the management of a person's emotional state. CAPTAIN software will focus on deep learning based algorithms that will run on video streams from network cameras (fitted within the appliance). Data will be provided through standard open API frameworks.

Non-invasive movement and gait data analysis



Movement and gait analysis will rely on the use of range cameras which operate as a real-time 3D scanner. The system is able to extract in real time the position of the persons in the room and of their body parts (i.e. head,

torso, arms, legs) through use of a 3D sensor (the range camera) and its body configuration in order to detect conditions of risks. Real time execution and extraction of the senior's position, posture and looking direction extracted from range cameras will be fed to the CAPTAIN system.

Physical and cognitive training through serious games



The CAPTAIN's physical and cognitive training will be supported by an existing physical and cognitive serious games platform which has been tested with more than 200 elderly participants (healthy and with Mild Cognitive Impairment), exhibiting good efficacy and usability assessment as

well as high adherence to a daily schedule. Designed and developed tailored to the seniors, its architecture introduces standard physical exercise protocols in exergaming software engineering, as well as, standard physical assessment tests for augmented adaptability through adjustable exercise intensity.