



newsletter

What has year 2 involved and what's the future for PRECIOUS in year 3?

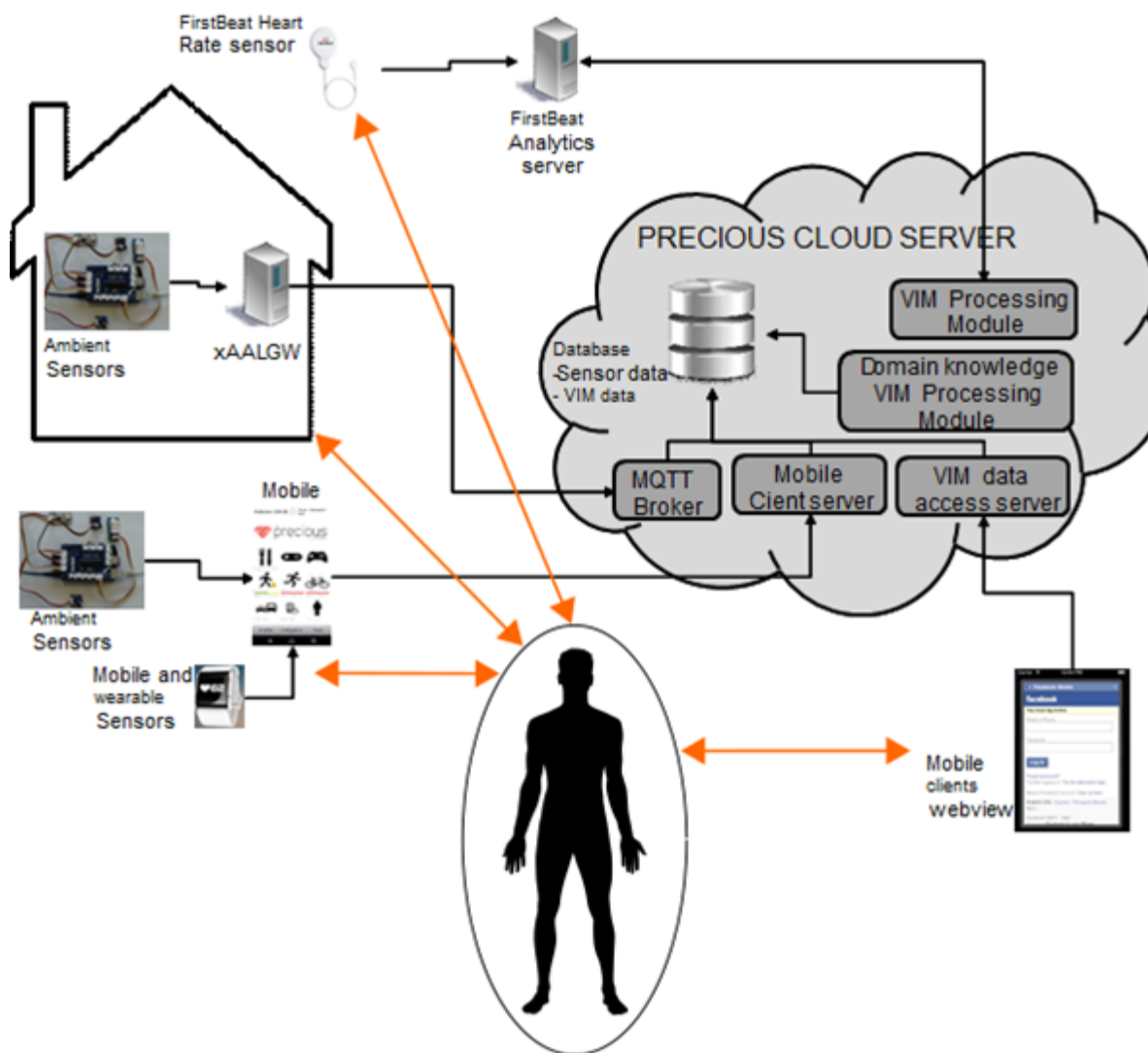
Now that the PRECIOUS project has just completed the second year of its three year duration, it is time to reflect on the activities of the last year and look forward to remaining challenges and research findings from Year 3 of the project. The second year has been both exciting and very demanding in terms of development and implementation of the PRECIOUS foundational concepts of project, such as, motivational aspects, gamification, innovative sensing and monitoring mechanisms. In this fourth issue of the PRECIOUS newsletter we highlight some of the key developments and activities from Year 2. Moreover, we look forward to completion of implementation tasks and system validation activities as we take PRECIOUS to trials with end users in Year 3.

In this issue

- In the spotlight: Is the PRECIOUS system Usable?
- Progress and achievements
- News from the partners
- Recent and upcoming events
- Consortium partners
- Contact us

In the spotlight: WP5 - System Validation

As the PRECIOUS System aims to help people to improve their lifestyle towards healthier behaviour, it is expected to be easy to use in the daily life. To guarantee this, it is necessary to carry out multiple tests to provide end-users with as many PRECIOUS system experiences as possible. Since the PRECIOUS system is composed of various components such as heart rate sensors, environmental sensors and different apps, users have to test each part separately to refine the first prototypes and improve the consistency of the future global system.



The research partners involved in the system validation work package have already planned how they will validate each component.

Institut Mines-Telecom focuses on heart rate sensors usability and acceptability on one hand and on environmental sensors in another hand.

The plan is to recruit users and end-users to experience these sensors and then complete a questionnaire to provide the PRECIOUS team with useful feedback to improve the sensors and associated applications. Some volunteer users will become end-users and take more time to participate in interviews and detail their point of view. This study aims at determining which sensors are appropriate for which individuals. Indeed, as previously studied in the PRECIOUS project, people categories such as students, single workers, family units and retired couples will test different devices. People with type II diabetes will require a particular attention in the recruitment and will constitute a specific analysis factors.

This exciting experimentation period will begin in May and data analysis will continue to September 2016. Let's say that the heart rate sensor devices contest is open!



Firsbeat Bodyguard 2



Suunto Ambit 3



PulseOn

Progress and achievement

WP2- Requirements Identification and Socio-Economics

We have now published an interim report on socio-economic factors that may affect the PRECIOUS system and various potential business models. The aim of this report was to learn from the games industry in terms of business models and the multiple ways they use new business logic to engage players. As part of this report we have investigated whether any of these approaches are applicable to the PRECIOUS system. The report has also allowed us to evaluate the role of underlying stakeholder relationships, and especially, evaluate already existing care taking practices. If you would like to read about this more, please click [here](#).

Further to this we will shortly be publishing an overview of the legal considerations of relevance to the PRECIOUS project so as to inform its development and deployment. Particular areas covered will include; the requirements relating to data protection, medical devices, interoperability, consumer protection and recent developments in this area. Developments in relation to the standards for mobile apps will also be highlighted. This will be published in February 2016 on the PRECIOUS [publications website](#).

WP3- Virtual Individual Model Building Motivation

A PRECIOUS planning meeting was organised in the University of Helsinki for partners involved in the psychological and technical implementation of the PRECIOUS app. Working face-to-face in small groups led to several new ideas and the project took a big leap forward. An updated version of the motivational

service design was approved in the meeting. A detailed service design has been presented in two deliverables completed this autumn: [D3.2 Behavioural Representation](#) and VIM, and [D3.4. Final motivational service design](#) document.



A working group in the Helsinki PRECIOUS meeting October 2015

The PRECIOUS laboratory study conducted in Helsinki has increased the understanding about gamification and motivation. The aim was to examine the learning effectiveness of a serious game for delivering nutritional knowledge. Depending on the trial, the player wins or loses against a computer or a human opponent. When compared to a control condition, winning as well as losing against the opponent affect the avatar outlook, speed and strength, which in turn influence the opportunity of the player to beat the opponent in a successive sports game.

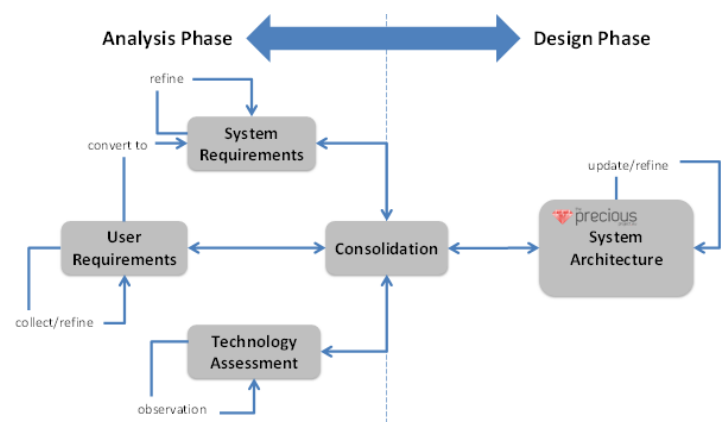
The preliminary results indicate that the three in-game conditions affected the player emotional, cognitive and motivational responses toward a set of food-images (e.g. frontal asymmetry) and knowledge outcomes (multiple choice memory tests). For example, participants self-reported more positive emotions when

winning against the human opponent. In addition to this, witnessing the avatar outlook being affected as a result of a good or bad performance as opposed to no changes increased the player motivation (e.g. frontal asymmetry, approaching tendencies) and smiling activity (e.g. EMG) towards a set of food-attitude images. The findings from the multiple choice memory test suggest that the experience of fun increased the player encoding and retention. All in all, the results from the study suggest that these game conditions elicited a multitude of physiological responses (e.g., user experience), which in turn affected the player motivation and engagement to play the game as well as knowledge outcomes. Although the primary aim of a serious game is to deliver knowledge, the creation of a positive game experience appears crucial for the success of the gamified intervention. Findings from the study are important for the design and development of the PRECIOUS system.

WP4- Systems, Sensors and Feedback Tools

Development of end-user facing systems is generally underpinned by the need to meet and exceed end user needs and expectations. This is more so the case with systems, such as PRECIOUS, with specific health enhancing targets and targets for use of technologies for behavioural change interventions. Therefore, technology developments for usage in this context should be preceded by careful analysis of not only technology possibilities, but also user requirements (on usability, privacy, pervasiveness, etc.), usage contexts and system capability in assisting the end user to achieve (and sustain) their health-related behavioural changes.

In WP4 we adapted a formal process of going from requirements and scenarios in preceding work packages (notably WP2 and WP3) to system architecture specification (see Figure below, as well as extended feature article in May 2015 newsletter). This formality provides an effective way for creating a common picture for a multidisciplinary design team, as well as, documenting the system design decisions for developers, researchers and other stakeholders from outside the consortium.



The latter phases of Year 2 has also seen WP4 building on the system specifications to connectivity platform between sensors and rest of internal processing units in the system such monitoring system (for user activities, environment, food choices, physiological signals etc.), virtual individual modelling system, motivational enhancements and multimodal feedback channels used to interact with the user. Focussing on designing the system in a way that it can be reliable, cost effective, non-intrusive and transparent.

Tangible by-products of the activities above has been a first release of the PRECIOUS integrated system with a centralized PRECIOUS cloud server and a range of prototypes (devices, apps, etc.). These developments allow the consortium to gradually start engaging users in

various settings (in both living labs and remotely) to gain insights on how to further improve the system as well as to carry out trials that derive meaningful research findings.

WP5- System Validation

Experimental plans to validate precious system are now set up. In a first study, we will investigate the usability of three types of heart rate (HR) sensors and their respective linked apps. The objective is to set up an appropriate validation plan to provide us with inputs to guide the system specifications about which HR devices we should use and about how information should be presented to the user (dashboard, notifications, etc.) to design a system as usable as possible.

In another study, the user-interactions with the PRECIOUS apps will be assessed in order to provide immediate feedback to the design of the motivational framework and especially to the development team.

A third study will investigate how the information from the environmental sensors (thermometer, hygrometer, air quality sensor, sound sensor and light sensor) should be collected, notified and presented to improve usability of home living quality monitoring. This will be carried out in the living lab.

In a fourth study about how weight monitoring system should be designed to be as usable as possible will be described. This will aim at identifying how users want to access their weight data (notifications, type of display, frequency, etc.).

Then a fifth field study will validate the self report monitoring for the final system.

A sixth experimentation will study the motivational approach combined with

gamification principles to increase behaviour change towards healthy lifestyles.

Finally, the food intake app tests plan will be carried out to refine how end users wish to monitor and manage some more healthy nutritional habits.

WP6- Dissemination and Exploitation

PRECIOUS successfully continued with our dissemination and exploitation activities! Did you meet us at our joint booth with the QualiFy at the 9th EFAD conference? Don't worry if you missed us, our revamped social media experience and numerous scientific publications (38 in total!) provide a lot of information on our recent advancements. Or maybe we can just meet at one of our numerous presentations? In the last period, 5 project presentations were given in addition to our broad presence at scientific venues.

News from the partners

AALTO University

Charlotte Holmes (from Campden BRI) and Edward Mutafungwa (from Aalto University) delivered a PRECIOUS project presentation to the FP7 QuaLiFY 4th Consortium Meeting on 30th June 2015. The QuaLiFY project worked on personalised dietary advice which links well to the related work on food intake monitoring and motivational feedback being carried out in the PRECIOUS project.

University of Helsinki

The Helsinki PRECIOUS team participated actively in the first Finnish Health Psychology Day held in The House of Science and Letters 30th October 2015. PRECIOUS members were productive in organising the event, delivering several presentations, and participating in the poster session. PRECIOUS service was presented both in the Health Psychology event and in a previous day event for nutritionists [HA3]. During the event, PRECIOUS got positive attention as the Finnish Psychological Society's Health Psychology Division awarded also a Uni Helsinki team member Johanna Nurmi for the best Master's Thesis in Health Psychology in 2013-2015. It is great news that the work behind PRECIOUS is appreciated by the scientific community!

Dr. Ari Haukkala presented the PRECIOUS project in the Finnish Health Psychology Conference, and in the Joint meeting of Finnish society of nutrition science and Finnish Health psychology division, Helsinki, Finland, October, 2015 with the subject 'How to build a theory based mobile app for behaviour change: PRECIOUS project' and 'Diet related app using motivation interviewing principles - PRECIOUS'. There is also a video available for our Finnish speaking audiences! <https://www.youtube.com/watch?v=UHQ4F9Xz82k> [HA1]

Helsinki PRECIOUS team had also presence in the European Health Psychology Society Conference, in which Dr. Keegan Knittle gave the presentation "Targeting Intention, Motivation and Engagement in Physical Activity Interventions (TIME-PAI): A meta-analysis examining effective intervention components". Johanna Nurmi presented a poster "Why do Youth High in Self-Control Exercise More? Motivation Quality and Self-Regulatory Techniques as Mediators". Both presentations generated lively conversation among the participants.

University of Vienna

Personal data safety is very important in e-health. For this reason, UNIVIE has led the development of the super-secure PRECIOUS health sandbox. This sandbox allows app developers to be creative, collaborate with other apps and design modern and good-looking gamified apps, but on the other hand makes sure no data can be transmitted to third parties. The sandbox is currently available in iOS and will soon be integrated with our gamified demo apps: Conquer the City (game), Waltz (game), Arrow Shooting & Calibration (game), Goal Setting Module (gamified), Facial Heart Rate Detection, and many more. Our iOS sandbox will provide the PRECIOUS "face" and common tools to our users, and provide the tools for

developers to create stunning and super-secure e-health apps just with HTML5 and JavaScript.

Institut Mines-Telecom

In the living lab, IMT is conducting an experimentation to analyse the heart rate data obtained from the different heart rate sensors currently candidates for the PRECIOUS system. More precisely data samples from Firstbeat Bodyguard 2 (electrocardiogram), Suunto smartsensor chest belt (electrocardiogram) and Pulseon watch (photoplethysmogram), were compared to the medical reference heart rate sensor: Biopack (electrocardiogram). First results showed that the three sensors provided us with strongly correlated data. Further tests will investigate these reliabilities under intense physical activity and stress conditions.

Campden BRI

Charlotte Homes recently sat on a panel at a UK Innovation Forum event in conjunction with the Knowledge Transfer Network, on Wellbeing and Wearables - Success from Innovation in Nutrition, Healthcare, Devices in London on 27th October. During the session the panellists discussed where wearable technologies have gained traction today and what lessons can be learnt from them, what are the future trends and potential challenges (e.g. technological, regulatory, economic). The discussion was very interesting and the patient centric and motivational approaches of PRECIOUS were listed as key requirements when developing future wearable technologies to aid users improve their health.

Fundació Hospital Universitari Vall D'Hebron

Dr. Pilar Lusilla Palacios was presenting at the 6th meeting of the Polish Association of Motivational Interview (PAMI) in Poznan (Poland) on the 18th October the (http://pttm.org.pl/?page_id=493). The oral presentation was entitled "*MI and shared decision making in chronically ill patients. Is it mHealth a key for treatment adherence?*" Dr. Pilar Lusilla Palacios also attended the Annual Motivational Interviewing Network of Trainers (MINT) Forum in Berlin (<http://www.motivationalinterviewing.org/>), and presented "*Adapting MI to mHealth in the management of chronic health conditions: The PRECIOUS service*". Both presentations are available at http://www.thepreciousproject.eu/?page_id=15 or directly from the author (plusilla@vhebron.net)

EUROFIR

Carlos Ramos presented PRECIOUS at the Digital Health and Care Congress, which was organised by the King's Fund (www.kingsfund.org.uk) and explored the latest approaches, technologies and research emerging from the world of digital health. More information on the congress is available at <http://bit.ly/1JO1ngy>

EuroFIR was also present at the MoniQA 5th International Conference, Porto (PT): Food and Health - Risks and Benefits on Innovative Technologies for Food Quality and Safety Management, held on 16-18th September 2015. In a session on personalised nutrition, food

and health infrastructure and minor nutritional components, chaired by Paul Finglas (EuroFIR AISBL – BE and IFR – UK) and Isabel Ferreira (Polytechnic Institute of Braganca – PT), Carlos Ramos (EuroFIR AISBL – BE) presented The PRECIOUS project.

Finally, the PRECIOUS project was represented by EuroFIR on the 9th EFAD conference with a dedicated booth for the PRECIOUS and the Qualify project (<http://www.qualify-fp7.eu/>). This year, the event gathered more than 350 participants (mostly Dieticians) all around Europe with the main goal to discuss the launch of the “EFAD European Dieticians Action Plan. This was the ideal event to present the PRECIOUS project among a network of health professional related to nutrition.

Recent and Upcoming Events

International eHealth360° Summit, 15 -17 June 2016, Budapest, Hungary

Consortium partners

Co-ordinated by AALTO University, the PRECIOUS consortium includes 8 beneficiaries from academia, research centres and industry. Combined research expertise covers information communication technologies, physiology, nutrition, motivational techniques and cognitive analysis.



Aalto University



Campden BRI



European Food Information Resource



Firstbeat





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