Newsletter no.2 (May 2017-April 2018)

Spring Project Meeting on May 16th

May 18, 2017

The biannual E-care@home project meeting took place on May 16th in Örebro. The meeting was split in two parts; the morning session which was held at Conventum served to provide an overview of the progress made within the distributed research environment. In addition, it provided an opportunity to discuss and agree upon an adjusted workplan in which a new work package focusing on data collection and test bedding will be introduced.

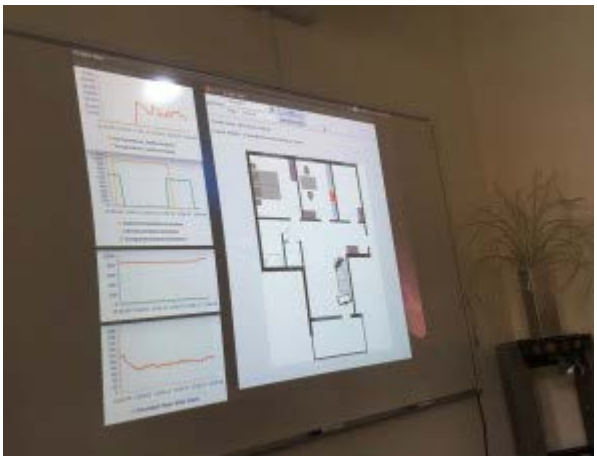
After the lunch break, the meeting location switched to the Ängen Research and Innovation Apartment in which an initial version of an E-care@home system that has been deployed was demonstrated. After being introduced to the apartment and some equipment therein, all participants could see and touch the sensors as well as see the scenario that would be demonstrated by an actor.

During the demonstration, all meeting participants could see what was going on in an adjacent apartment via an interface. Examples of activities included:

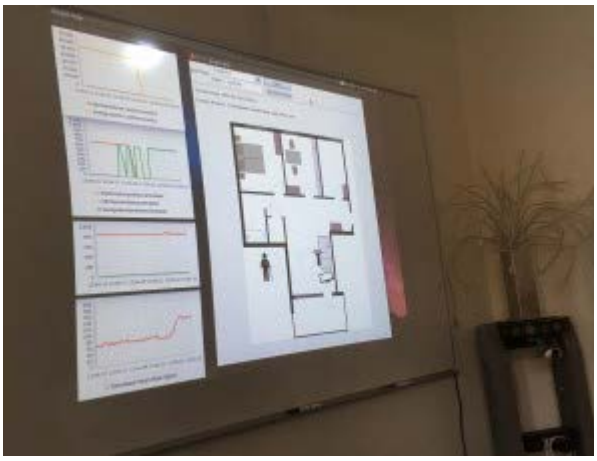
- watching tv from the sofa,
- going to the bathroom with tv on,
- exercising in the sofa which results in a higher pulse but not an alarming situation,
- turning the stove on,
- watching tv with stove on which issues an alarm to the actor,
- actor having an alarmingly high pulse after having forgotten to turn off the stove.

Having watched the demonstration, a fruitful discussion on how the scenario and data collection methods may improve for the next demonstration took place. In particular, the current demonstrator makes use of simulated physiological data while the next demonstrator should include also data coming from physiological sensors.

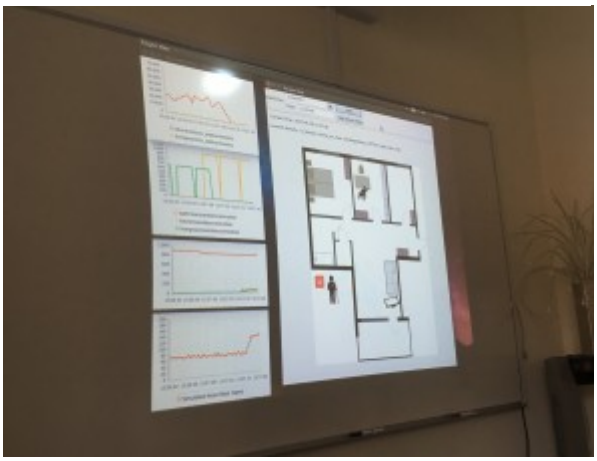
The meeting ended with another discussion on how to proceed from use cases featuring selected primary personas towards system requirements.



Watching TV.



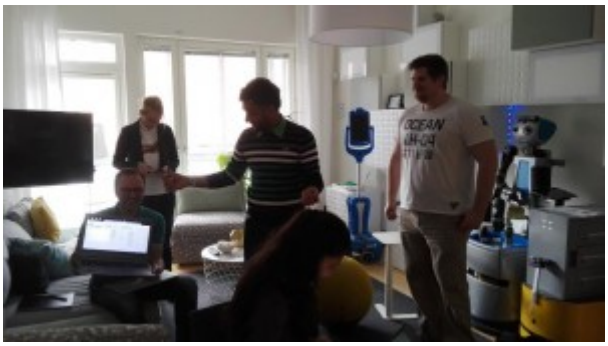
Exercising in the sofa.



Alarming pulse.

Data collection workshop at Ängen

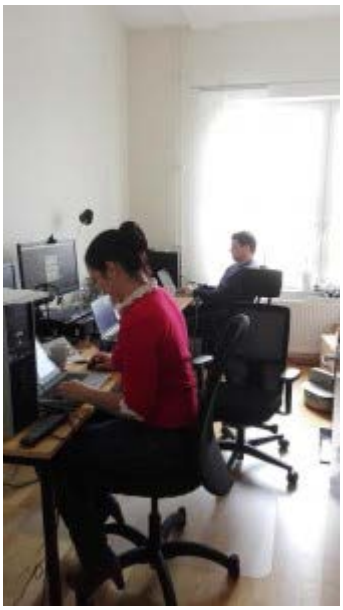
October 10, 2017



In a data collection workshop organized by Örebro University on September 28th 2017, members of the E-care@home team agreed on an extension of the integration of environmental sensors (motion detectors, pressure sensors, etc.) with wearable sensors for health and activity information.

In E-care@home, information from a variety of different heterogeneous sensors is integrated through a database. This allows other components of the E-care@home system to

use this data independent of its source. The aim of the workshop was to include person related data from Shimmer sensor nodes into the set of available information sources and then use this new data to extend our activity recognition capabilities. This provided some interesting issues due to the high sampling frequency of ECG data.



In addition, we addressed several other issues including some problems with motion sensor data from our Contiki nodes, adding the Network Time Protocol (NTP) to the E-care@home database to allow synchronized time stamps, and an extension of the E-care@home Graphical User Interface (GUI) for a data labeling solution we develop using Flic Bluetooth buttons.

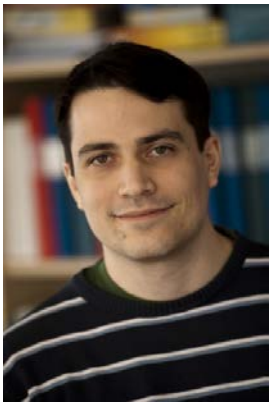
E-care@home at HealthyIoT 2017

November 1, 2017

E-care@home project was disseminated in the 4th EAI International Conference on IoT Technologies for HealthCare, HealthyIoT2017. The conference mainly focuses on the existing and emerging technologies, notions and services of Internet of Things. These can provide many solutions to delivery of electronic healthcare, patient care and medical data management. The conference was held on 24th and 25th October, 2017 in the city of Angers, France. The dissemination was in two folds, in the opening talk by general chair – Mobyen Uddin Ahmed – and through two accepted paper presentations. The accepted papers are titled ’Run-Time Assurance for the E-care@home System’ and , ‘A Heterogeneous IoT-based Architecture for Remote Monitoring of Physiological and Environmental Parameters’.

Nicolas Tsiftes gave seminar for the SPHERE project

January 3, 2018



On June 1, 2017, Nicolas Tsiftes from RISE SICS presented the E-care@home project in a seminar at the University of Bristol. The seminar was given to researchers in the SPHERE project, which is a large e-healthcare project in the United Kingdom. The presentation consisted of an overview of the interdisciplinary work carried out within the distributed research environment of E-care@home, as well as a more detailed presentation of the research on the Internet of Things and sensors carried out within WP1.

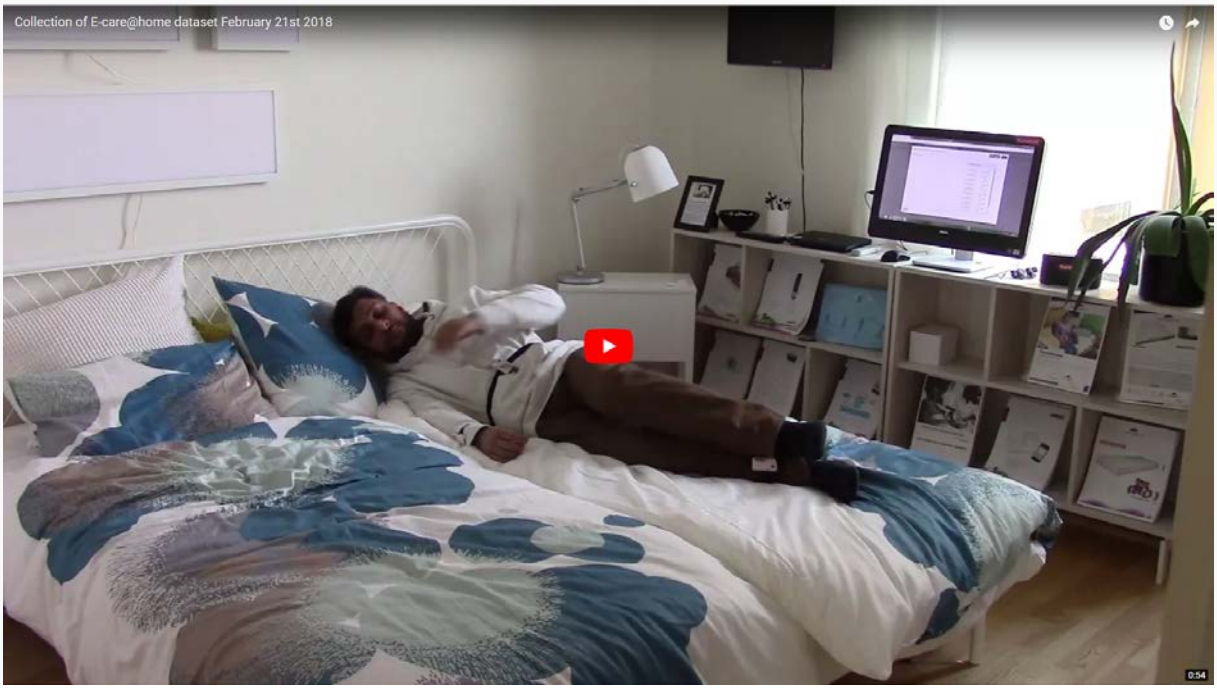
In addition to the seminar, Nicolas was given a tour of the SPHERE House (http://www.irc-sphere.ac.uk/sphere-house), an experimental apartment consisting of a plethora of sensors to monitor people's health and quality of life. The SPHERE House is similar to the Ängen facility (http://angeninnovation.se/) in Örebro, Sweden, which is used as a common platform for experiments within E-care@home project.

Dataset collection at Ängen

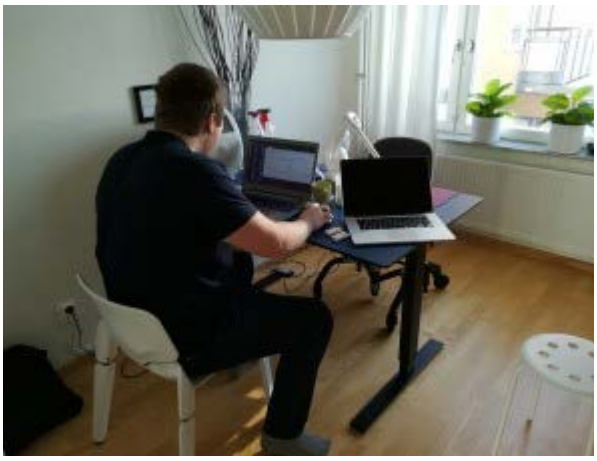
February 22, 2018

On February 21st 2018, WP1 and WP4 organized a workshop at Ängen in order to collect datasets revolving around resting activities. These E-care@home datasets contain elements such as lying down, getting up, sleeping, turning in bed or sitting. A total of 160 datasets (between 10 and 30s each) have been collected and contain data from pressure sensors, motion sensors and shimmer sensors.

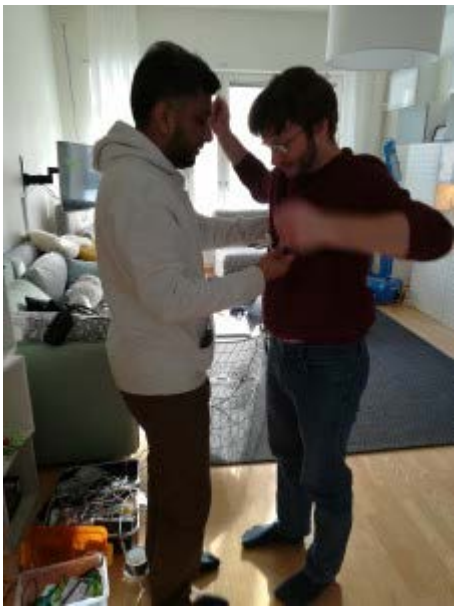
In addition, WP1 worked on a new application layout for the contiki nodes. Work has started on adding new sensors and functionality needed to integrate the IoT nodes with the configuration planner.



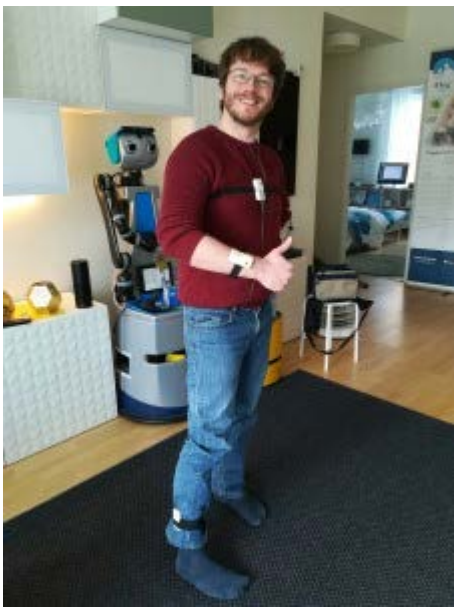
A video from one of the dataset recordings. The video is available on youtube. https://youtu.be/8w9gihIicZ0



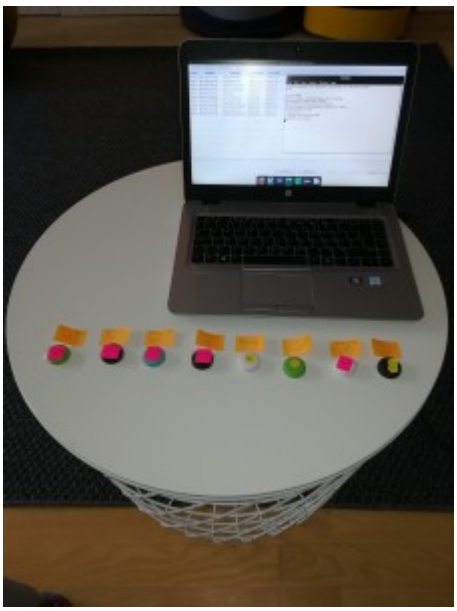
Setting up experiment.



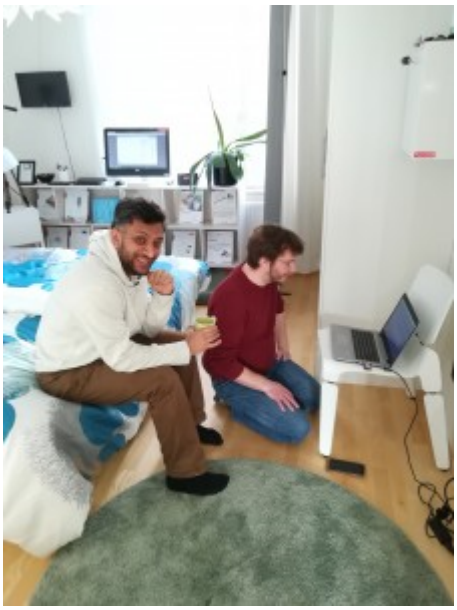
Attaching sensors.



Ready to record data.



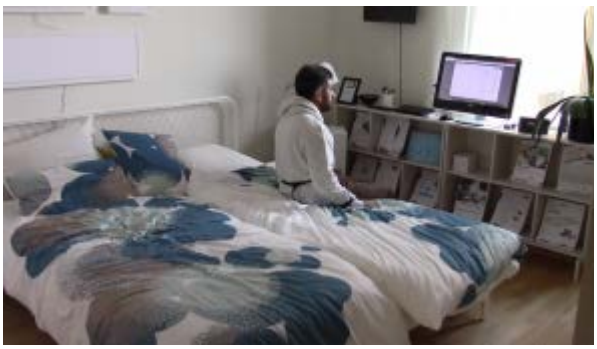
Annotation of data using Flic Smart buttons.



Checking the database.

One of the Shimmer sensors.

Sleeping.



Getting up.

Presentation at AI4X

March 9, 2018

Jennifer Renoux from Örebro University will present at AI4X Health, Mar 13. AI4X is a series of one day conferences on the theme of Artificial Intelligence (AI), its development and application in different sectors in Sweden. The conferences are organized by WASP AI funded by the Knut and Alice Wallenberg Foundation. Örebro University was recently invited to join WASP AI.

The presentation aims at giving a quick overview of the different (past and present) projects related to E-health within AASS. The E-care@Home presentation is focused on illustrating our expertise in reasoning and context-recognition systems.

Relating E-care@home to GDPR

April 20, 2018

May 25th 2018, EU GDPR (General Data Protection Regulation) comes into force. The basis of GDPR, which replaces PuL (Personuppgiftslagen) is that the individual person owns the personal data and others can only process it, i.e. collect, store and process the data, if granted permission from the individual (consent) or have another legal basis for treating the data.

Hence, GDPR covers all the processing of personal data, but some parts are to be supplemented by national law. For E-care@home, which conducts research, it is necessary to be aware of two additional laws: Forskningsdatalagen (Personuppgiftsbehandling för forskningsändamål SOU 2017:50) and the Ethics Assessment Act (Etikprövningslagen 2003:460). The purpose of these two laws is to enable personal data processing for research purposes while protecting the individual's rights and freedom.

In order to strengthen the work on personal integrity, the Swedish government is increasing the budget for Datainspektionen (The Swedish Data Protection Authority) with 30 million SEK. The new name of the authority will be Integritetsskyddsmyndigheten, and in addition to its prior tasks, Integritetsmyndigheten will have a more supportive and advisory role than Datainspektionen has had.

Ringholm bv, a group of European experts in the field of messaging standards and systems integration in healthcare IT, with a basis in Gothenburg, provides an insight on how the new law will have an impact on the use of interoperability standards within the healthcare system:

- Valid consent must be explicit for the data collected and for what purposes the data is used.
- The individual has the right to request erasure of personal data.
- The individual has the right to transfer the personal data from one electronic processing system to another without being prevented by the data controller.
- The data controller should provide data in a commonly used Open Standard electronic format.
- Privacy by design and by default applies.

While there is currently no plan for collecting information about people the E-care@home distributed research environment is designed to perform research on selected fundamental issues in semantic interoperability with a particular focus on:

1) human-machine interoperability, that is to say how to enable users to query and control the IoT infrastructure on meaningful terms that are human interpretable and compatible with e.g. electronic health records; and

2) testing the research results on a technical platform which is embedded in the Internet of Things that provides information with an unambiguous, shared meaning across IoT devices, elderly residents, relatives, health-and-care professionals and organizations and various personal information repositories and the various electronic health records associated with those.

Therefore, GDPR is taken into consideration when developing APIs and databases so as to ensure that information that is stored can be accessed and ported if the system reaches a mature state.

Directive (EU) 2016/680 (GDPR) is available in multiple languages here: http://eur-lex.europa.eu/eli/dir/2016/680/oj

Ringholm bv's additional comments on GDPRS impact on the use of interoperability standards is available here: http://www.ringholm.com/column/GDPR_impact_on%20healthcare_data_interoperability.htm