AAL PROGRAMME

AAL FORUM 2015
FULL PROCEEDINGS

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Full proceedings

from the interactive sessions at the AAL Forum 2015

Introduction

The AAL Programme promotes innovative technological product ideas developed to address the needs of our ageing population using ICT, supporting them until they launch on to the market. These innovations are presented at the annual AAL Forum, one of the largest European events of its kind, and a showcase of AAL innovation as well as a platform for debate and discussion about the challenges faced by all stakeholders involved in this work - from researchers and developers to deployers of the technology and, of course, the users themselves.

As such, at the core of the Forum are the many interactive sessions that take place over the two days, where delegates gather to listen, share, comment and interact - all with the aim of advancing the process of generating great ideas for the AAL market, involving the user in the development of those ideas and getting them to market.

At the 2015 Forum, held in Ghent, Belgium, there were more interactive sessions than ever before, taking place over both days and involving more than 700 delegates. The sessions were categorised into six main themes. These were:

- Rolling out trials
- Education and training
- Connecting supply and demand
- The future of AAL
- Matching older adults' aspirations
- Interoperability resolved

This publication provides a complete overview of selected sessions, outlining the objective of each session as well as what took place during each one. Each offers a fascinating insight into how those involved in active ageing approach the challenges we face and seek to grasp the opportunities these challenges present.

CONTENTS

Session summary: Affective Interaction with Avatars

Carsten Stocklöw[1], Sten Hanke[2], Andreas Braun[1]

Abstract

As emotions play a fundamental role in human communication, this session dives into how the affective capabilities an agent employs can have a strong impact on the quality of interaction and user engagement it provides. Several aspects of affective interaction (e.g. recognition of the user, modelling of the agent's behaviour, and expression via animated expressions) were be discussed during the session.

Figure 1: Sten Hanke opening the interactive session - Affective Interaction with Avatars

Session Rationale

A vital requirement for the acceptance of systems for Ambient Assisted Living scenarios is the natural and intuitive interaction of the elderly end user with the intelligent environment. Avatar-based systems have shown to improve the usability of the system and even help in improving the decision making quality of the end user.

The challenge is that the interaction with human-like avatars is more similar to the interaction with real persons than to a technical device. Thus, it is expected that the avatar should react to the elderly and show suitable moods and emotions. This usability gain can lead to a better acceptance of the overall system and, in general, AAL solutions. Future systems may also use affective interaction for the integration into robots to gain usability benefits in this domain.

The session wanted to create awareness of the need for emotional understanding and emotional feedback for user acceptance. The participants shared their experience with different methods for recognizing emotions and displaying these on an avatar. It wanted to discuss future research directions and the lessons learned from existing projects, in order to improve future field trials.

Interactive Session

The interactive session was held between 10:30 to 12:00 at the Forum. During the 90-minute workshop, there were four short presentations about research projects that made use of affective avatar technologies. Afterwards, the presenters participated in a panel discussion that took questions from the audience. The session was organized by

[1] Fraunhofer Institute for Computer Graphics Research IGD, Darmstadt, Germany
[2] Austrian Institute of Technology, Vienna, Austria

Carsten Stocklöw from Fraunhofer IGD and moderated by Sten Hanke, from AIT.

Talks Summary

Tanja Krammer from exthex presented the user interaction in the project dalia - assistant for daily activities at home. She introduced the project and the developed solution before reporting on the user studies regarding the appearance of a personal virtual assistant, preferred forms of interaction, acceptance of speech input and output, and how to navigate within the different screens of the system.

Andreas Braun from Fraunhofer IGD gave a presentation about the user studies performed in the scope of the project V2me - virtual coach reaches out to me. He introduced the project, describing the different user studies performed during the approach. The focus was on lessons learned and common mistakes that are done during piloting.

Christophoros Chistophorou of CiTARD made a presentation about social networks and ICT-based services in robotic systems created in the SocialRobot project. Piloting was performed in conjunction with two living facilities for elderly persons in the Netherlands and Cyprus. The SocialRobot is a highly versatile platform that is already used by other projects.

Andreas Stainer-Hochgatterer of AIT gave a presentation about the Miraculous Life project that uses an avatar as a facilitator for various services for older adults. The talk outlined the objectives of the project, before describing the use cases that were developed in a user-centered process. The project is currently in a pre-trial stage.

Open Discussion

During the open session the four presenters with the help of the moderator answered several questions that were posed from the audience and discussion about each followed.

A first question was about the realism of avatars - if researchers should aim for maximised photorealism? The response was mixed, that while photorealism is a good in some ways, some users do prefer iconic interfaces. The effect of the "uncanny valley" was mentioned that postulates a bad reception if the avatar is "not quite" photorealistic. Other points raised included the required rendering performance that may require cloud services, which could be limiting, and the importance of proper speech synthesis and dialogue management.

The next question was about user involvement in the design process of an avatar. All agreed that user involvement from the very beginning is crucial, as systems may otherwise fail to attract any interest in the dedicated user group, particularly with older adults, where there is a difficulty in convincing them to use new technologies. The usefulness of the services provided plays a big role in convincing people to use these systems.

A very interesting question was about avatars or robots replacing the human in care work. Delegates agreed that it could be a challenge in the future, but that systems are not quite there yet. There may be a differing viewpoint between caregivers, who may feel threatened by systems that work very well, and users, who may see the value of such systems and may even prefer them to human contact. Everybody agreed that however this is viewed, these systems are a good addition, since no care worker can take enough time out of the day for each single person they care for.

Another question was related to how affective the avatars and systems have to be. Should they be able to detect very fine emotions and display a huge range of emotions themselves, or is it sufficient to just have a small number that are significant, but convey the most important aspects. The responses again were mixed, leading to a potential solution that sees many emotions being be possible, but that the system could scale down, and not react to everything.

The last question was about the cost of the systems. While avatars can be used on the smart phones, tablets or PCs that the user already has, robots need a different infrastructure. However, SocialRobot had one of the most affordable systems with a cost of €8.000, while still providing many services and this was seen as viable.

Session summary: Monitoring people in private spaces. Technological advances and societal issues

Chair: Dr Francisco Florez-Revuelta, Kingston University, United Kingdom

Abstract

Ambient Assisted Living, commonly abbreviated as AAL, plays a major role in helping formal and informal carers to provide support in assisting the person in need while also providing a higher degree of independent living to the person cared for. AAL systems usually make use of an intelligent system that provides a means to interact between a user (carer and cared-for person) and the system itself that can elaborate sensory information to detect events and incidents in a controlled, private environment. Technology is gradually gaining acceptance as a means to complement the work of caregivers by monitoring and assisting people with reduced physical or cognitive capacity in their day-to-day living. Ambient assisted spaces make use of a collection of sensors that collect information from the environment or its dwellers. Binary sensors are employed to detect or record on/off status, temperature, motion, pressure or lighting level. These embedded sensors enable the state or context of the environment to be obtained. Detection and tracking of people can be implemented using infrared ceiling sensors, sensors embedded in the carpet, and radio-frequency identification (RFID) tags or other sensors worn by the users. Other, more complex systems employing audio and video can also be used. These sensors that monitor the people and their interactions with other people or objects allow the recognition of activities of daily living or dangerous situations, e.g. falls. Advances in sensor technology together with the decreasing costs, in particular of cameras, have led to their extensive use as a tool for monitoring public and private spaces. Cameras are now commonly used to monitor environments such as streets, train stations, airports and hospital buildings and are in widespread use in major cities. While monitoring technology for public security and associated research is relatively mature, attention is now focussed on the use of sensing technology as an adjunct to, or combined with equipment and devices to promote independent living (maintenance of health, wellbeing and safety at home). However, this type of monitoring can be seen as intrusive and as violating rights to privacy. This potential loss of privacy is exacerbated by the use of cameras, because of the concern that raw video images could be viewed by unauthorised viewers. Acceptance of such technologies is also low because they create a sense of Orwellian "Big Brother" surveillance. Therefore simpler binary or motion sensors, which provide greater acceptance, are currently used. However, the information they provide can be difficult to interpret and thus services offered are limited.
There are a number of current EU research and innovation projects that focus specifically on the use of sensor-based monitoring technology. For instance, the BREATHE project aims to develop intelligent monitoring vision systems incorporating privacy-enhancing features into a system at the design stage, i.e. privacy by design[1]. BREATHE applies the principles of privacy by design to develop privacy-aware sensing technology as a step towards countering the reluctance to accept these technologies.

Therefore, the main objectives of this session were:

- To present some of the latest developments on technologies for monitoring people in AAL environments, and
- To identify the fundamental ethical issues and healthcare principles that are pertinent to AAL with specific reference to technology in family homes.

The session was very participative with more than 60 participants from a range of different backgrounds, such as engineering, psychology, law and nursing, as well as potential service users. This enriched the session with the different views provided.

[1] Cavoukian, A.: Privacy by Design, https://www.ipc.on.ca/images/Resources/privacybydesign.pdf (last access: 16/11/15)

Programme

The session was divided into two parts. In the first part, there were presentations on different technologies and an open debate on technological advances. The second part focused on ethical and legal issues to be considered when using these monitoring technologies.

The programme followed the following agenda:

Presentation of the session

Part I – Technological advances for monitoring people – Chaired by Juan Pablo Lázaro-Ramos, Tecnologías para la Salud y el Bienestar, Spain:

- "Visual monitoring of people in private spaces", Dr Francisco Florez-Revuelta, Kingston University London, UK
- **Presentation of contributions:**
    - "Unobtrusive monitoring of patients with dementia in nursing home facilities: first results from an experimental set-up", Ms Laura Raffaeli, Università Politecnica delle Marche, Italy
    - "Wize up your mirrors!", Dr Sara Colantonio and Dr Giuseppe Coppini, National Research Council, Italy

- Open debate

Part II – Societal issues – Chaired by Prof Nigel Harris, Designability, United Kingdom:

- **Presentation of contributions:**
    - "CareCamera: Tensions between User Needs and Ethical Issues", Dr Hilda Teglioglu, Vienna University of Technology
    - "Legal considerations on the use of monitoring systems at home", Ms Griet Verhenneman, ICRI/CIR – KULeuven – iMinds, Belgium

- "Pre Trial of AAL and ICT solutions for Informal Long Term Care of Older Persons", Ms Karen Galligan, Trinity College Dublin
- **Round table:** Prof Barbara Pierscionek, Kingston University London; Dr John Dinsmore, Trinity College Dublin; and the other speakers in this Part II,

Conclusions and closing

Part I - Technological advances

Juan Pablo Lázaro-Ramos, coordinator of the BREATHE project, presented the objectives and the programme of the session. He then introduced the BREATHE project. BREATHE is an Ambient Assisted Living (AAL) project co-funded by the AAL Joint Programme (Call 5, 2012) and the National Authorities and local R&D Programmes in Spain, United Kingdom, Ireland and Italy. Since the bulk of care provided to assisted people is carried out by informal carers (i.e. family caregivers and unpaid carers), the main objective of BREATHE is to provide an ICT-based solution to support and relieve the burden experienced by informal carers and improve the quality of life of both the carer and the person who is being cared for. There are three independent channels of interaction. The first one is a web application adapted to the limited ICT (Information and Communications Technology) skills of informal caregivers and with special emphasis on making it appealing and friendly as well as being unobtrusive and not inhibiting on their daily activities. The second one is a smart phone application that allows the informal caregiver to have a ubiquitous access to BREATHE facilities. The last one is the AAL system in the home itself, composed of a group of cameras and an array of sensors installed at the assisted person´s home. It is responsible for collecting information on a daily basis and in an automatic way about the activities of the assisted person. BREATHE assumes that informal caregivers need to have "eyes" in the home of the elderly or assisted person who needs care. Therefore,

the carer has access to the video streamed from the house, as vision is the most basic cognitive process used for recognising a person, an event or an action. Then, the system incorporates different types of video processing to enable varying levels of privacy.

Visual monitoring of people in private spaces

Francisco Flórez-Revuelta, from Kingston University, discussed the limited presence of video-based systems in private environments, compared with the abundance of cameras in public spaces. After introducing different AAL applications in which cameras could be employed, he presented the approach considered in the BREATHE project. BREATHE follows a privacy-by-context paradigm[2.],[3.], which proposes a level-based scheme to access video data (although it could be extended to any personal data) in order to protect privacy. Each level establishes the way in which the video stream is modified and displayed and, therefore, which degree of protection is provided. In this scheme, the appropriate level is dynamically selected according to the context, modifying the raw video before it is displayed.

The context should provide enough information to empower the assisted person to adapt privacy to their preferences, in such a way that allows them to decide who, how, and when their carers can watch them. In an assisted living environment the context may be described by:

- the identity of the subject, in order to retrieve the privacy profile;
- the appearance, e.g. dressed;
- the location, e.g. kitchen, bathroom, bedroom;
- the on-going activity, e.g. having a shower, watching TV, sleeping, receiving a visit; and
- the identity of the observer: the closeness of the assisted person with a particular carer.

Using these variables, an individual can then select in advance a level of visualisation appropriate to any situation, modelled by the context, i.e. giving different permissions to access the video stream to the various different carers in different ways, depending upon the situation within the assisted person's home.

Unobtrusive monitoring of patients with dementia in nursing home facilities: first results from an experimental set-up

Laura Raffaeli, from Università Politecnica delle Marche, presented some outcomes of the UpTech_RSA project, carried out in the framework of the European project WIDER, as a continuation of the UpTech project[4.]. The objective of this project is to design a technology solution, based on unobtrusive environmental monitoring, to support formal caregivers working in assisted nursing homes admitting dementia patients. The UpTech_RSA system consists of a set of sensors, installed in the rooms, which transmit the detected data over radio links to a central node, basically a PC, located at the nurses' lodge. A suitable software application runs on the PC, and provides the operators with a graphic interface showing in real-time the status of each room monitored. The application, which continuously receives and processes data from the sensors, is able to promptly notify the operators of potential dangers, or anomalous conditions, through visual and acoustic warnings. The same notifications are also delivered through an application for mobile devices (tablets, smartphones) supplied to the nursing operators, which allows them to keep active monitoring even when they have to move within the building. This allows the operators to intervene promptly, should any problematic situations occur. The sensors located in the patients' room are chosen to monitor the opening and closing of window frames (standard windows, doors and French windows), in order

[2.] Padilla-López, J.R.; Chaaraoui, A.A.; Gu, F.; Flórez-Revuelta, F.: Visual Privacy by Context: Proposal and Evaluation of a Level-Based Visualisation Scheme, Sensors, 15(6):12959-12982, 2015.

[3.] Padilla-López, J.R.; Flórez-Revuelta, F.; Monekosso, D.N.; Remagnino, P.: The "Good" Brother: Monitoring People Activity in Private Spaces, International Symposium on Distributed Computing and Artificial Intelligence (DCAI 2012), Salamanca (Spain), pp. 49-56, 2012.

[4.] Chiatti, C., Masera, F., Rimland, J. M., Cherubini, A., Scarpino, O., Spazzafumo, L., Lattanzio, F.: The UP-TECH project, an intervention to support caregivers of Alzheimer's disease patients in Italy: study protocol for a randomized controlled trial. Trials, 14:155, 2013

to identify events of output / input from the room; to check the presence of the patient in the bathroom, and the presence or non-presence within the bed. Feedback from the nursing home operators, collected over several months, show that despite the simple technology used, the system provides effective support to staff activities. Feedback from the operators was used to improve the software application, to better meet their needs in real-life operating conditions.

Wize up your mirrors!

Drs Sara Colantonio and Giuseppe Coppini, from the National Research Council, presented a device that is being developed in the SEMEOTICONS project. The main outcome of the project is a multisensory device in the form of a mirror, called the "Wize Mirror", able to read the semeiotic code of the face and detect possible risks of the onset of cardio-metabolic diseases and which comfortably fits the home as a piece of house-ware, but also in pharmacies and fitness centres. By analysing data acquired unobtrusively via a suite of contactless sensors, the Wize Mirror detects on a regular basis physiological changes relevant to cardio-metabolic risk factors. These are summarised into a comprehensive Wellness Index, whose delivery enables individuals to estimate and track over time their health status and their cardio-metabolic risk. In this respect, the Wize Mirror offers personalised guidance towards achieving a healthy lifestyle, via tailored coaching messages.

The Wize Mirror is designed to meet a two-fold objective: stimulating initial adoption and utilisation, by providing a pleasant user experience; and supporting long-term engagement, by helping people to establish new and positive habits. With these aims, the main features of the Wize Mirror are: the provision of day-by-day monitoring in an unobtrusive way; the automatic assessment of physiological conditions via advanced data processing algorithms; and the promotion of sustained behavioural change towards long-term wellness objectives.

Part II - Societal issues

CareCamera: Tensions between user needs and ethical issues

Despite the benefits that surveillance technologies can provide, current and past research has raised several important ethical considerations about their use. Nonetheless, to date no ethical consensus has been found on the matter, possibly because, as some authors point out, researchers usually do not give enough attention to it, often treat it superficially or do not make it a priority[5.],[6.]. Dr Hilda Tellioglu, from Vienna University of Technology, Austria, presented the first steps of an ethical roadmap for those working on the use of such solutions for informal care. It reports on an on-going debate within the project TOPIC – The Online Platform for Informal Caregivers – about a video surveillance solution – named as CareCamera – adopted in response to specific user requirements. These were identified in the fieldwork conducted in early stages of the project to understand user contexts and their inherent needs. TOPIC is a project conducted with a user-centred design (UCD) approach, which involves end-user involvement from the elicitation of the system requirements, through the system design, to its evaluation. The project goals concern the design and development of a set of technological solutions to support elderly informal carers in three different realms: informational, emotional and tangible. In doing so, elderly informal carers have been involved in an ethnographically informed study, based on different data collection instruments – e.g. shadowing observations, in-depth interviews and diaries, among others. One of the outcomes was the observation that video surveillance technologies could indeed reduce some of the burdens of informal carers, especially for carers who need to be absent for some time from their care receivers. Interestingly enough, despite the findings of the study and the trends seen in the literature, there has been great resistance to offer such technological solutions to users. Dr Tellioglu presented the pros and cons of such technologies, comparing and contrasting those competing views.

[5.] Niemeijer, A. R., Frederiks, B. J., Riphagen, I. I., Legemaate, J., Eefsting, J. A., Hertogh, C. M.: Ethical and practical concerns of surveillance technologies in residential care for people with dementia or intellectual disabilities: an overview of the literature. International Psychogeriatrics, 22(7):129-1142, 2010

[6.] Zwijsen, S. A., Niemeijer, A. R., Hertogh, C. M.: Ethics of using assistive technology in the care for community-dwelling elderly people: An overview of the literature. Aging & mental health, 15(4):419-427, 2011

Legal considerations on the use of monitoring systems at home

Griet Verhenneman, from KU Leuven and iMinds, Belgium, introduced three legal brain twisters, related to the differences in legal considerations between health and wellbeing, professional and informal care, and general personal data and health data. She highlighted how the terms healthcare and wellbeing are differently interpreted by EU and US legislation. She mentioned that 46% of respondents to an EU consultation on mHealth said strong privacy and security tools are needed to build users' trust, and half called for strengthened enforcement of data protection rules. She finally expressed the issues on data protection of current systems where data may be transferred outside of the EU.

There were a number of questions. How are big companies marketing pervasive monitoring systems dealing with EU data protection laws? The feeling was that they were not, or were delaying the launch of products where there were issues. Do we need new national or international laws to deal with the regulation of big data? There is always some delay in developing legislation, but the issues are often more about how current law is interpreted and whether it can be applied to regulation of these new technologies. For example, there are international differences in interpretation, particularly around the use of lifestyle or wellbeing data from fitness monitors and whether these are considered to be healthcare data.

Pre Trial of AAL and ICT solutions for informal long-term care of older people

Karen Galligan, from Trinity College Dublin, Ireland, presented the configuration and outcomes of the pre-trials[7] carried out to validate the technology developed in the BREATHE project. These trials took place in Ireland, United Kingdom and Spain, between January and October 2014 in order to assess acceptability, relevance, mode and ease of use. The main outcomes are that 90% of informal carers (IC) and assisted people (AP) find it acceptable or useful for the IC to watch real time video of the AP. There were some considerations about the acceptance related to the rooms where cameras are located, the people accessing the camera, footage storage and situations (e.g. in an emergency) when video can be streamed. The trials also found inter-country differences in the acceptance and it was in Spain that cameras are most accepted. Questions were also raised about different alternatives to ensure visual privacy. However, the preference was that both IC and AP preferred to access the original video without any filtering.

The principle question from this presentation was whether there are any benefits for the assisted person? It is unknown if it will improve the quality of life for the assisted person, but the hypothesis is that it may lead to there being less stress in the relationship, so this was being measured.

Round table discussion

Prof Barbara Pierscionek, from Kingston University, and Dr John Dinsmore, from Trinity College Dublin, joined the other speakers for the discussion on ethical and legal issues related to the use of these technologies.
Prof Harris asked the workshop participants, which of these four characteristics were most important to themselves; autonomy, safety, privacy and health? About 70% felt autonomy was most important and around 30% felt it was health. He then asked the participants to think about this in relation to their own mothers. In this particular case, only 20% felt autonomy was most important, while 50% felt it was health. Participants were asked to consider whether they would feel the same about this in their old age and whether this was a case of double standards.

[7.] BREATHE Consortium: White paper on needs and requirements of AAL and ICT solutions of informal LTC of elderly people, http://www.breathe-project.eu/gallery/17/White_paper_on_needs_and_requirements_of_AAL_and_ICT_solutions_of_informal_LTC_of_elderly_people.pdf

Privacy and the use and ownership of personal data as well as what sort of information would be conveyed and its security were also discussed. The input of carers as well as that of the assisted person was deemed to be of great value and the respect for autonomy of the assisted person paramount.

Two papers were highlighted as being relevant to this discussion. Sorelly and Draper defined privacy as "control of access to [one's] personal space." They felt that remote monitoring by a care agency actually improves privacy, since users need to sign a consent form before the technology is installed. The authors were much more concerned about the issue of social isolation because with remote monitoring, relatives were less likely to make home visits. In a response to this, Weber et al. , noted the difficulty of maintaining informational self-determination in an Internet age, where an individual has no control over what happens to data once it leaves their home. They highlighted the fact that monitoring has a significant impact on autonomy and may limit a person's freedom of expression, since it may mean that they may feel obliged to comply with societal norms.

The crusade for Big Data in the AAL domain

Femke Ongenae, Femke De Backere, Griet Verhenneman, Julie Doyle, Pieter Bonte, Frederic Vannieuwenborg, Ann Ackaert

Abstract

A trend is emerging towards offering AAL services that are truly personalised to the needs and preferences of care receivers and take context accurately into account [1-4]. However, large data sets are needed to evaluate and design these services in such a way that they have added value to the care process. A lot of living lab environments, such as the Flemish Care Living Labs (Zorgproeftuinen)[1] and the Karolinska Living Lab and CASALA[2], have been set up in recent years to enable the collection of such real-life context and profile data. However, these data sets are not readily available to be used for research purposes and the development of novel services. The valorisation and dissemination of context-aware and personalised AAL services could be significantly stimulated by making it easy for various parties to re-use these data sets. However, important questions remain with regard to realising such a smart data sharing culture for AAL services. For example:

- How to express which types of data are available from which living lab environment?
- How do we achieve structured, exchangeable data?
- How to maintain and express the quality and reliability of the data?
- How can these different data sets easily be aligned?
- How can these different data sets easily be shared and accessed, without too much effort or legal constraints?
- How to process and synthesize the data so that it is useful and usable by various stakeholders?
- Can a payment model be set up for usage of the data and thus support the operation of the living lab?
- What about the ethics and privacy related to these data sets?
- Who or what should be the frontrunner in realising this idea? How will this be organised?
- What can we learn from other domains where the sharing of big data sets has been made possible?

To get a step closer towards answering these questions and thus realising a data sharing platform for the AAL Domain, the interactive session "The crusade for Big Data in the AAL domain" was organised. To get some inspiration, the session started with a keynote by Dr. Alasdair Gray about Open Phacts[3]. Open Phacts integrates multiple biomedical data resources into a single open and free access point that can be easily queried by interested parties. As such, Open Phacts is used as a driving force behind a lot of biomedical research. The key messages of this keynote are outlined in Section 2. Next, a brainstorm was organized around five key topics to identify the hurdles that should be overcome in order to realise a similar platform and access point for the AAL Domain. The organisation and outcome of the brainstorm can be found in Section 3. Finally the envisioned future steps are outlined in Section 4.

Keynote: Data integration in a big data context: Open PHACTS case study

Data integration is a key challenge faced in pharmacology where there are numerous databases spanning multiple domains, e.g., chemistry and biology. These information sources range from online databases of proteins, e.g., UniProt[4], and chemicals, e.g., ChEMBL[5], ChemSpider[6] and DrugBank[7], to models of biological pathways, e.g., Reactome[8] and WikiPathways[9], as well as the scientific literature. This data exhibits a lot of variety as the databases are heterogeneous, using different formats and models, and are maintained by various organisations. The databases overlap in scope and thus often record different, and sometimes even inconsistent, representations of the same data. The data also has a large volume and velocity, i.e., new data is constantly being generated. Moreover, there is also a lot of veracity, i.e., the

[1] http://www.zorgproeftuinen.be/en/en/about-care-living-labs
[2] http://www.netwellcasala.org/
[3] https://www.openphacts.org/
[4] http://www.uniprot.org/
[5] https://www.ebi.ac.uk/chembl/
[6] http://www.chemspider.com/
[7] http://www.drugbank.ca/
[8] http://www.reactome.org/
[9] http://www.wikipathways.org/index.php/WikiPathways

accuracy of the data varies greatly across the different databases. As such this pharmacological big data has a lot of characteristics in common with the data being generated within the AAL domain.

To deal with these data integration challenges, the Open PHACTS discovery platform [5] was incepted to provide integrated access to all these data sources through and open and free API. During the keynote, the following topics were highlighted from which the lessons learned could be interesting for the AAL domain:

Architectural design [5]:

- **Relying on Semantic Web standards to allow integration:** The discovery platform is built using Semantic Web technologies such as RDF and SPARQL. Semantic technology allows to not only express the syntax of data, but also its intended meaning. Each data source maintains and publishes its own semantic model. However, Open Phacts does provide a set of guidelines for how the data should ideally be published and assists key data sources to publish (subsets of) their data in compliant formats. Semantic models are also used to model the equivalences, links and relations between these different data sets. This allows the data to be kept in its own, original data source, while still being able to provide user-friendly, integrated access to the end-users.
- **Centralise the data to provide the required performance and reliability:** One cannot rely on the original data sources, which are maintained by third parties, to provide consistent access. Moreover, a lot of queries are posed to discovery platform, which need to be answered in a performant and scalable fashion. Relying on federated querying to the remote data services might introduce too much overhead. To overcome these issues, a linked data cache was provided in the platform. It is a warehouse that temporarily stores the data to allow speedy and reliable access to it.
- **Provide a simple API and user-friendly GUI:** The platform specifies a core API, which are a set of core methods that the applications and end-users can call. This frees them from specifying difficult SPARQL queries themselves. It also protects the platform from being overloaded by bad queries or queries that are too open ended. It also allows the data sources to implement very specific optimisation techniques to handle these queries in a performant manner.
- **Based on real end-user needs:** In order to be able to define such a core API and GUI, one needs to be informed about the intended use of the platform. Therefore, an in-depth study was performed of the business questions of the pharmacological industry.
- **Data quality/correctness assurance:** Although a lot of domain-specific measures were put into place and re-used to assure the correctness and quality of the data, one measure that is also of particular interest to the AAL domain is the Lense approach [6-7]. Data integration in Linked Data relies heavily on defining equality links between resources/concepts. Operational equality is often context-specific, especially in the complex domain considered in science where opinion can depend on the interpretation applied to results. The Lense approach allows to choose the equivalence criteria to apply between data sets. As such, various dynamic views over the data are supported, depending on how stringent or within which context the equivalence relationship is interpreted. To enable the Lense approach, the meaning of the link between two resources/concepts needs to be published together with the mapping. This defines within which context this link applies or gives a justification for the link.
- **Data licensing:** This was an intricate issue that required a thorough study of the different licenses of the original data sources. The framework is built around standard well-understood creative commons licenses. As one size, i.e., one license, won't fit all, it was important to ensure that these licenses are interoperable. It is also pivotal to clearly communicate the expectations to the data providers and end-users
- **Sustainability:** Open PHACTS is a public–private partnership between academia, publishers, small and medium sized enterprises and pharmaceutical companies. The project started as an Innovative Medicines Initiative (IMI) project. The Open PHACTS Foundation was set up, which is a not-for-profit organization aiming at sustaining and maintaining the platform. Companies and organisations can become members of this foundation, which allows them to steer future developments, get technical support, early and prioritized access, etc. Additional funding will also be acquired by applying for new grants and setting up partnerships that develop specific applications by using the API. However, the API itself, will always remain free.

Interactive brainstorm

Brainstorm approach

After the keynote by Alasdair Gray, a brainstorm session was organised. Some impressions of this brainstorm are shown in Figure 1. This brainstorm session was performed by using the GPS methodology[10], which was tweaked to allow it to fit within the duration of two interactive sessions. This methodology was executed in three different steps. During the brainstorm session, several small groups tried to answer the following question: "How do we enable an infrastructure/platform that allows the user-friendly and rapid sharing of Living Lab data?". Five small groups focused on a specific topic within this question in order to keep the scope of the discussion at the different tables feasible:

Privacy and Ethics: This table focused on the privacy concerns when using data originating from the various Living Labs and which measures should be taken to overcome these concerns, e.g., anonymising the data. It also tried to form a view on experiences and lessons learned from other domains pertaining to data privacy and licensing. Attention was also given to the different regularisations in countries. A discussion was also held about the different types of end-users, e.g., researchers, companies or healthcare organisations, and whether the data will be freely available to all these users.

Business Models: The focus of this table was how the envisioned platform can be sustained and funded. Some questions which were discussed are: Which payment models can be set up for the usage of data and support the operation of the living lab? Who or which organisation should be the frontrunner in realizing this idea? How will this be organised, will this be the government or another organisation? How is this done in other domains?

Data Sharing Infrastructure: As the data for the Living Labs should be gathered and consolidated in order to use it when evaluating implementations and algorithms, focus should be also given to data sharing infrastructure. This table discussed how such an infrastructure could be realised from a technological perspective. It also considered how structured and exchangeable data could be achieved, which (data) models could be used for aligning and consolidating the data and which metadata should be attached to the data set, e.g., provenance data, study set-up data, etc. Moreover, this table reflected on the API, i.e., how can these data sets easily be shared and accessed in a user-friendly manner.

Quality and Reliability of Data: To ensure the usefulness of the data, data should be checked on quality and reliability. Questions that were discussed at this table are: How to maintain and express the quality and reliability of the data? What with incomplete and missing data? How can the context in which data was gathered be captured?

Data Usage Results: At the fifth and final table, the discussion focused on what should happen with the results of the data. The discussion focused on whether these results should also be shared and how this could be achieved in such a manner that it is clear how these results were obtained. Moreover, it was also discussed how feedback could be incorporated towards the original participants of the Living Labs such that they know to which studies and results their data contributed.

The first step of the GPS methodology consists of the generation of ideas. Therefore, each participant received a rotation schedule at the start of the session. The participants brainstormed about possible solutions and ideas for 20 minutes before they switched tables and addressed another topic. The table moderator stayed with the topic and explained the results of the previous session to the next group, which made the transition between tables easier.

In the second step, each table decided upon the most promising/interesting three ideas, which then were briefly introduced to the whole group. Afterwards each participant got five stickers to indicate which ideas are most prevalent to pursue to solve the big data issue within AAL.

[10] http://www.flandersdc.be/en/gps

Figure 1: Impressions of the interactive session "The crusade for big data in the AAL domain"

Outcome

During the brainstorm, the participants had each participated in four different tables and topics. In the following sections, the most popular ideas are highlighted from each table, as summarised by the participants into the balloons after the brainstorm.

Privacy and Ethics

The first selected idea of the brainstorm was the creation of a specific privacy label. This privacy label envisions a checklist with concrete measures which should be taken by Living Labs to protect the privacy of the participants. This label should be standardised for all AAL Living Lab environments European wide. When a Living Lab complies with the checklist, it receives the label. Additionally, this label also ensures that the gathering or usage of the data about the participants in the Living Lab complies with a set of specific rules.

The second main discussion at this table focused on data anonymisation and whether this measure will be enough to protect the privacy of the participants. As the collected data is augmented with the context in which it was gathered and the profile information of the participant, protecting the identity of the participant is challenging. If data anonymisation is enough, then the question remains of who is responsible for the implementation of this anonymisation process. Will this be done by the Living Labs themselves, or is this task the responsibility of the data sharing platform? These challenges and questions require a lot more investigation before a truly secure data sharing platform can be set up.

Finally, attention should be given to user control. As the participant is owner of its own data, the user should be capable of having control over the different data sets and the data which is derived from these sets. Proper attention should be given to informing and educating participants in order to make them familiar with the process of collecting the data and how the collected data will be used. Also, templates for informed consent forms should be created.

Business Models

The idea of this table was to discuss on how to create, deliver and capture value resulting from providing, trading or managing Living Lab data via a platform. In other terms, what potential business could be built upon such a Living Lab data platform, and how?

During the different group discussions, it became clear that the scope of this question was too generic, too fuzzy at this point in time and implied too many assumptions to be able to formulate different business models. Therefore focus of the discussions shifted regularly towards topics and characteristics of the platform that need to be investigated and thought of before developing a platform. The following aspects were formulated as preparatory knowledge in order to formulate potential business models (BMs).

- **Data ownership:** Who is or will be the owner of the Living Lab data? This question is crucial knowledge to start thinking of potential BMs! Who the natural data owner is and how this relates to the data creation process needs to be investigated. Is the data owner the actor who generates and creates the data, e.g., the person who uses a sleep tracking device, or the actor who facilitates data capturing, e.g., the company which provides sleep tracking devices?

The data ownership issue is important to clear up as it is likely that the owner will have some sort of responsibility for the quality of the data. Directly related to this is the risk and liability the owner faces. What will happen if (care related) decisions are based on corrupted or incomplete data? Who will be held responsible? At what cost? Etc. Moreover, investigation is also needed into whether all the owners have the right to commercialise the data. Many research facilities, for example, must already make their data available for free. Is it still possible then to build sustainable BMs?

Considering all these open questions, further research is required.

- **Pricing levels:** The question for models to monetise on Living Lab data and the associated potential pricing levels, led to many discussions. Within the discussions, two perspectives could be identified: A) Pricing levels of Living Lab data should depend on the impact or importance of the data in the use case. However, this is very hard to determine in advance (What is the value of a set of Living Lab data?). B) The other perspective claims that pricing levels of these data should vary according to the type of customer, e.g., research centres vs. commercial organisations.

Probably hybrid models will arise if they aren't already there yet.

- **State of the art:** Already plenty of examples exist of companies or organisations building a business case on Living Lab or similar sorts of data. In other sectors data trading is already very common, e.g., trading on user data or telecommunications data. There are also some examples available of the role the governmental bodies play, i.e., facilitators, initiators and even platform providers.

Because of these examples and the many unanswered questions described earlier, many spoke about the need to study these examples in other domains more closely and to learn from existing practices which ideas and set-ups could be translated to the AAL domain. This could serve as starting point to identify viable ecosystems and business models for the actors involved in it.

Data sharing infrastructure

The most recurring topic during this discussion was the importance of a standardised data structure. A standard data structure simplifies the process of exchanging, extracting and combining various datasets, which is often mandatory to perform realistic analyses. An important requirement for the model is that it should be extendable. A proposed option was to create a formal model, for example an ontology, and stick to it. There already exist interesting ontologies that could be reused/adapted to fit our needs, e.g. the Semantic Sensor Network which models various kinds of sensor readings. Most participants were convinced that if such a standardised data structure was provided, people will adhere to the model and use it.

Once the data is in its preferred format, it can be shared towards the end users. It should be straightforward to request data from the platform and provide data to the platform. Therefore, workable interfaces/APIs should be designed. The discussion resulted into two possibilities to provide the data: A) One could opt to provide the datasets as is, and let the end-users combine, process and filter the provided data themselves, or B) extra functionality could be provide by the infrastructure to preprocess the data, compliant with the expectations of the end-users.

To satisfy these needs, the infrastructure should be able to store large datasets and efficiently process them. However, it should be further discussed if all data should be stored indefinitely. Another important question would be if the data can be processed before storing. Can some parts be aggregated? Possible available options are to store only aggregated values, but this is always an aggregation in function of the person aggregating the data. Later on, it might become clear that data is missing due to this aggregation. One could store all recent data in its full form and aggregate and compress historical data. This is of course depending on the available data storage. Keeping in mind that the data production in some Living Lab could amount up to a few gigabytes a minute, data storage quickly becomes a problem. Data sets are often too large to be transmitted constantly over the internet, therefore filtering mechanisms could be provided upon requesting the data.

Most participants were convinced that a multi-layered infrastructure was necessary. One layer to process incoming data streams and another one to efficiently store and process the big chunks of historical data. A proposed solution was the use of the Lambda architecture.

Quality and Reliability of Data

During the discussion on the reliability and quality of the data sets, it became very clear that the AAL domain is in that sense very specific and different from other application domains. It will be very difficult to use a top down approach, such as in health and biomedical research domain, to define what type of data is relevant and how data should be collected.

Setting up a good provenance mechanism for data sets within the AAL domain was a major concern formulated by the attendees at the discussion table. A clear definition of AAL data quality label is not straightforward, as data collected in real-life situations will inherently be noisier than data collected in test lab set-ups. However, depending on the use case you want to analyse, less quality data can be acceptable and lead to acceptable results. It is assumed that a type of Lense approach would be needed in defining the quality of AAL data, depending on several parameters such as the required level of detail, level of fidelity, level of completeness, etc. Trustworthiness of data sets could be labeled based on a peer-review process or a rating procedure, e.g., the peer assessment procedure used by AirBnB. For health applications probably a method of certification for HQD would be needed, including expert review procedures.

As AAL domain data is always intertwined with the actual context in which it was collected, a high level of transparency seems mandatory to be able to re-use big data sets. It should be clear A) WHY the data was collected, e.g., the indented use case and target population, B) HOW the data was collected, e.g., providing detailed information on the type of sensors and test configurations, and C) WHAT type of data was collected, e.g., sensor data, observations or questionnaires. More standardised terminology is needed in the AAL domain and ontology

models for describing the context of data collection would greatly support the transparency of the data sets.
A last topic of concern was how to identify and handle the issue of missing data in AAL data sets. Different types of incompleteness can be defined and need to be managed, e.g., missing metadata or too fuzzy data on specific sensors for your use case. Inference on different data sets could alleviate this problem, but then careful mapping to the context is mandatory. A final remark was that deleting data sets should not be considered in the AAL domain. Even old and incomplete data sets could prove useful for future research.

Data usage results

The discussions at the data usage results table were very broad. However, the participants could agree upon three key ideas, which should be taken into account.

The efficient functioning of a Living Lab depends on finding people who are willing to participate in a study. These people should have a say in how the results are published or communicated towards the broader audience, e.g., in which format will this communication be done? Will this happen at fixed time intervals or will this be done ad hoc? This also entails that there should be communication to the broader community of the specific results. This way, other researchers or developers can learn from this information and make better solution for specific problems.

Next to the communication of the results towards the broader audience, there should be a form of communication towards the end-users or participants of the Living Labs themselves. This could be feedback on the lessons learned or just a way to tell what has been done with the data. To make this feedback more interesting, this information could be gamified.

Future steps

As setting up large scale pilots to collect enough data in the AAL domain for building statistical evidence is very difficult and consumed lots of resources, a clear willingness to build on methodologies for re-use of data sets is present.

However the brainstorm resolved several clear issues and future steps to be taken:

- Important things can be learned from other initiatives such as the OpenPhacts platform and the EnoLL Living Labs community in view of governance of big data sets.
- A study should be conducted into which (types of) data sets have already been collected for the AAL domain and how these are currently be curated and/or maintained. It should also be studied how the identified challenges, e.g., privacy and licensing, are currently being handled by these parties.
- The AAL big data domain differs in nature from other application domains (such as Health and Biomedical research). This implies that ontologies for the description of data collection in the AAL domain could be beneficial.
- Due to the complexity involved and the many issues already identified, further prioritisation and an action plan is needed.
- As a next step taskforce groups could be formulated in the AAL research community to create a momentum and a strategy plan for an OpenAAL data platform.
- Within project context, incentives could be given to AAL projects who are willingly to actively contribute to OpenAAL data initiatives..

As a first step, the initiators of this interactive session, together with interested participants and Living Labs will work out a first strategic plan and search for funding to realise the prioritised actions within this plan. Additionally, research will be performed into setting up a sustainable platform and organisational structure.

References

[1] Varshney U: Chapter 11: context-awareness in healthcare. In Pervasive Healthcare Computing: EMR/EHR, Wireless and Health Monitoring. New York: Springer Science + Business Media, LLC; 2009:231-257.
[2] Paganelli F, Giuli D: An Ontology-based system for context-aware and configurable services to support home-based continuous care.
IEEE Trans Inf Technol Biomed 2011, 15(2):324-333.
[3] De Backere F, Ongenae F, Van den Abeele F, Nelis J, Bonte P, Clement E, Philpott M, Hoebeke J, Verstichel S, Ackaert A, De Turck F: Towards a social and context-aware multi-sensor fall detection and risk assessment platform, Computers in biology and Medicine 2015, 64:307-320.
[4] F. Ongenae, J. Famaey, S. Verstichel, S. De Zutter, S. Latré, A. Ackaert, P. Verhoeve, F. De Turck, Ambient-aware Continuous Care Through Semantic Context Dissemination, BMC Medical Informatics and Decision Making 2014, 14:97.
[5] Alasdair J.G. Gray, Paul Groth, Antonis Loizou, Sune Askjaer, Christian Brenninkmeijer, Kees Burger, Christine Chichester, Chris T. Evelo, Carole Goble, Lee Harland, Steve Pettifer, Mark Thompson, Andra Waagmeester, Antony J. Williams, Applying Linked Data Approaches to Pharmacology: Architectural Decisions and Implementation, Semantic Web Journal 2014, 5(2):101-113
[6] Brenninkmeijer, C. Y., Evelo, C., Goble, C., Gray, A. J., Groth, P., Pettifer, S., Stevens, R., Williams, A. J. & Willighagen, E. L., Scientific Lenses over Linked Data: An approach to support task specific views of the data. A vision. In Proceedings of 2nd International Workshop on Linked Science at the 11th International Semantic Web Conference (ISWC), 12 November 2012, Boston, USA.
[7] C. Batchelor, C. Y. A. Brenninkmeijer, C. Chichester, M. Davies, D. Digles, I. Dunlop, C. T. Evelo, A. Gaulton, C. Goble, A. J. G. Gray, P. Groth, L. Harland, K. Karapetyan, A. Loizou, J. P. Overington, S. Pettifer, J. Steele, R. Stevens, V. Tkachenko, A. Waagmeester, A. Williams, E. L. Willighagen, Scientific Lenses to Support Multiple Views over Linked Chemistry Data, In Proceedings of the 13th International Semantic Web Conference (ISWC), 19-23 October 2014, Riva del Garda, Italy.

Requirements meet solutions: How to successfully transfer stakeholder needs in AAL projects[1]

Markus Garschall , Katja Neureiter , Mona Marill , Christiane Moser , Lex van Velsen

Developing Active and Assisted Living (AAL) products and services is a challenging process. A multidisciplinary team of researchers, developers, user representatives, and other stakeholders are involved in the development process, aiming at designing and implementing solutions that meet the actual needs and wishes of the users. One of the biggest challenges in this process is to make sure that user requirements are successfully communicated and implemented. However, this process is often difficult since the involved parties have different backgrounds, experiences and expectations.

Within the interactive session, discussions took place about how these challenges can be met best for the benefit of future users. The following questions were specifically addressed: What is the best way to deal with multidisciplinary project teams? What are useful methods for communicating user requirements? How can you ensure the implementation of user requirements in the development process? What can be learnt from failures regarding the communication and implementation of user requirements?

The topics were discussed in small groups of 6-8 people. Each participant could join two groups during the interactive session. The main findings and central issues of the discussions are described in the following paragraphs.

Topic 1: Dealing with multidisciplinary teams

During the discussion the tension between benefits (from working in multidisciplinary teams) and the threat of miscommunication due to different backgrounds of group members was discussed. A key success factor that was identified was proper project management. A variety of different issues that need to be considered when working in a multidisciplinary team were raised:

- Diverse tasks: People in different organisations have different tasks outside the project. These may interfere with (the progress of) their project work;
- Different expectations and needs: Different organisations have different views towards research and development projects. Whereas a research institute may see a project as a great way to explore new technological advances, it may be a way to make money for an SME. This leads to different expectations and needs among team members;
- Different perspectives: Different organisations tend to deviate from the working plan.

Workshop participants agreed that it takes some time during the project to see how each team member and organisation find its role within the multidisciplinary team. A list of actions to improve the communication and to align the interests and needs of the different team members was developed.

- Regular face-to-face meetings during which the team members speak out their mind: What are their interests? What are their ways of working?
- Find a balance. As the project manager it is important to find a middle course between the interests of the project and the different interests of the team members. These interests may change over time, and therefore, the balance may need to be adjusted.
- Give people ownership and responsibility for a part of the project plan so that they are forced to take action and collaborate.
- Communication. Ask team members to work closely together to learn enough about each other's subjects so that they can communicate on more or less the same level.

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Topic 2: Useful methods for communicating user requirements

The discussion on methods to communicate requirements when developing AAL solutions revealed a variety of interesting findings as well as challenges. "Focus groups" were mentioned as one of the most well-known methods to gather user requirements. However, the recruitment of the end-user participants was identified as a complex process and it was discussed that it is not always easy to find participants, who bring in different perspectives. Diverse groups that include primary end-users (i.e. seniors) and their caregivers trigger even more fruitful ideas within the system development. However, it was also discussed that it is important to avoid too high numbers of users during one session in order to take into account all the different needs. Face-to-face interviews were identified as another valuable method, but they can easily increase the resources that are needed.

Workshop participants also discussed the importance of use case scenarios. It was pointed out that it is valuable to have "open scenarios" that leave space for users' imagination and creative ideas.

One idea for presenting a system and getting user feedback is to include the stakeholders, who are developing the system (SMEs, developers, technicians, etc.). This way the system creators can give pitches of their systems and the end-users can interact directly with them without any intermediate communicators. By this method the developers directly receive user feedback to improve their products or services and the end-users can see the different services that have been developed for them.

Topic 3: Ensuring the implementation of requirements in the development process

Within the third group it was discussed, how to ensure that requirements are actually addressed and implemented within the development process. Participants shared experiences about how they normally make sure that user requirements are addressed and challenges participants face were discussed.

With regard to the first question "How do workshop participants "normally" make sure that they address the user requirements they have identified at the beginning of the project?", the following issues were discussed:

- Iterative evaluation circles. Most of the participants agreed that they apply iterative evaluation circles, i.e., several focus groups, pilots, and workshops throughout the whole development process. However, it was mentioned that although this approach helps to stay focused on the user it does not actually ensure that their needs are addressed.
- Research through or in design. Hardly anyone was familiar with approaches such as "research through design"[7] or "participatory design"[8] nor had ever applied one of these approaches. One workshop participant stated that these kinds of methods seem to be easily applicable in the area of AAL and have potential to ensure that user requirements are addressed.

[7] see Zimmerman et al. 2007

[8] "PD is an approach that focuses on collaborating with the intended users throughout the design and development process, rather than designing a system "for" them." (Ellis & Kurniawan 2000, p. 264)

- Involvement of different stakeholders. Involvement of all kinds of different stakeholders within the process was considered important. One workshop participant, for example, reported about a project in which they developed an app to support older adults managing their daily life. They included older adults, their formal and informal care giver, and other family members, who are part of older adults' life, but forgot to include the perspective of service givers (e.g., supermarket chains).
- Including potential users in the proposal writing process. With regards to users' requirements one participant raised the idea of including potential users in the proposal writing process. This would allow potential addressees to actually articulate their needs/requirements and could influence the scope of the proposed solution.
- Check points. Another mechanism that was suggested to ensure that requirements are addressed, was so-called "check points". One workshop participant, for example, suggested quantifying requirements (through objective and subjective assessment) to make it possible to "measure" requirements. Although it might be difficult to operationalise qualities such as trust, it might help to make sure that user needs are addressed.

With regard to the second point of discussion, "What are challenges within the process?" the following issues were discussed.

- Appropriate translation of user requirements. Within the discussions, one of the biggest problems was the translation of requirements between project partners. In this context participants discussed that it is important that partners in the project actually agree on requirements that are identified in the beginning of the process. This means that these requirements are not taken for granted. A negotiation process is required in which, for example, the technical partners need to agree on the requirements that these issues are addressed in the development process. Consequently, the negotiation process was mainly discussed with regards to the communication process i.e. the way the requirements are communicated.

Topic 4: Failures and lessons learned from the requirements analysis and development process

With regards to the fourth topic, failures in the requirements assessment, communication and implementation as well lessons learned were discussed. Several issues around working with requirements were identified:

- All too often, there is a conflict between the project interests and the stakeholder's interests. This can lead to different expectations between the stakeholders in terms of the implementation of the requirements and its outcome. The outcome then fails to meet the different expectations. This is also often accompanied by missing trust in other partners.
- Developers often do not communicate with the researchers (who assessed the requirements), if they are unsure about certain requirements and take decisions on their own. Another potential problem can be a missing prioritisation of requirements, which can result in the implementation of unimportant or easy to implement requirements first. Additionally, it can be that technological limitations overrule the requirements.
- Developers can also be stuck with user requirements that are not fitting anymore. This issue could easily be solved with communication and iteration of requirements with all stakeholders, but all too often developers are stuck in their linear (waterfall) thinking/working and are not agile enough.

Participants also reported about successful AAL project that failed to come to the market. For example, by developing a an overly global solution that tries to meet all assessed user requirements, instead of focusing on one feature/function that can more easily be brought to the market. Another example is developing a solution that is very innovative but that is then too expensive. The reported issues related to the last phase of the project, where the often missing transfer of user requirements into business requirements (which should happen as early as possible) and that there is often a problem with intellectual property (IP).

The participants agreed that a good project management could take care of most of these issues, if they are known. Therefore, sharing such experiences with others is very valuable to prevent other projects from failing.

Summary

The discussions within the groups revealed a variety of different topics, some of which were considered important in all the different groups, e.g., stakeholder involvement. Addressing their needs as well as varying interests were, for example, not only identified as a challenge when working in multidisciplinary teams, but also considered as an important prerequisite to ensure the implementation of valuable AAL solutions. In this context, communication between all involved parties was considered important. Thus, tension between challenges and potential pitfalls were identified.

The discussions revealed that the transfer of stakeholder needs is a complex process and that is it not only about applying appropriate methodological approaches but also recognising and accepting different stakeholder needs. Framing conditions such as a proper project management were thus identified as key factors in the development process.

Overall, the discussions allowed participants to reflect upon their experiences, to exchange best practices and to develop approaches to improve the transfer of stakeholder needs.

References

Ellis, R. D., & Kurniawan, S. H. (2000). Increasing the usability of online information for older users: A case study in participatory design. International Journal of Human-Computer Interaction, 12(2), 263-276.
Zimmerman, J., Forlizzi, J., & Evenson, S. (2007). Research through design as a method for interaction design research in HCI. In Proceedings of the SIGCHI conference on Human factors in computing sys-tems (pp. 493-502). ACM.

Living-lab at the AAL Forum 2015, 24th September

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Abstract

During the AAL Forum, a three-hour workshop brought seven older adults (80+) and their carers to speak to six AAL projects. During 15-minute presentations, each project presented its solution including demonstrations where possible. Each older adult answered a series of common questions, after which the speakers spoke with them. The feedback from the older adults was valuable and led to a list of interesting remarks, the most valuable of which came from the questions they asked more than their answers.

Introduction

State of the art and objectives

Many research projects develop new solutions, services, or devices for older adults, for example within the European framework of H2020 and Active Assisted Living[1]. Researchers are often not older adults themselves and, therefore, are not developing the solutions for themselves, except in a small number of projects that are started by a person thinking about their old father or grandmother as a user. In these cases, the projects often stop when the older adults who motivated the project dies or when the funded project ends. There are tens of hundreds of such projects in Europe developing new Communication and Information Technologies for older adults, but there is only a handful of projects that have been active for more than eight years[2]. This is a difficult market. It seems simple to enter, but it is difficult to last long while the market is currently building itself and not yet flourishing.

One difficulty that could explain this situation is that solutions for older adults are designed for older adults, but no older adults are found in the labs of thee researchers. This is why living labs are useful – environments where solutions from researchers can be tested with real older adults. The first living-labs in this area were rooms in laboratories equipped like the house of older adults, where we could invite older adults to play the role of older adults there, to be studied by researchers who may have put sensors in the room[3]. Researchers now make partnerships with professional end-user organisations specialised co-designing projects or testing them in living labs[4]. Steve Jobs often said that it is difficult for lay people to genuinely participate in the innovation processes on the same level as innovative designers and engineers. Jobs claimed that, "People don't know what they want until you show it to them. That's why I never rely on market research."[5]

So living-labs have many pros and cons, but one of them is that their professionalisation has introduced a new difficulty.

Researchers now delegate the interaction with old people to a dedicated professional living-lab. This creates a distance between researchers and older people and so, ironically, introduces a difficulty for researchers to understand older people's real needs and feel like an older person themselves.

To close this gap between AAL projects and the reality faced by older people, a live interactive session was organised at the Forum[6], in which older adults and projects were brought together. The objective was to enable scientific researchers to confront the older people they are designing for and ask them about their realities.

1 AAL-Europe.eu
2 SFTAG.fr
3 LeBellego G., Noury N., Viron G., Mousseau M., Demongeot J., A model for the measurement of patient activity in a hospital suite, Information Technology in Biomedicine, IEEE Trans Inf Technol Biomed. 2006 Jan;10(1):92-9
4 ForumLLSA.org
5 Insight to Strategy (2012) Three reasons why Steve Jobs didn't need market research, https://web.archive.org/web/20140226203318/http://insight-to-strategy.com/archives/184
6 AALForum.eu

This report shows how this event scared some researchers and the very pragmatic issues voiced by older people often destabilised them, leading to good, constructive feedback quickly within an hour.

Silverinnov

Silverinnov[7] is a European organisation with bases in Switzerland, France and Luxembourg. It is working to care for older adults who have a lack of autonomy, in an innovative way and it involves four end-user organisations. Silverinnov manages respite stays during holidays so that older adults and their carers benefit from the break. Throughout the year Silverinnov also coordinates other events at home for the older people, while another original activity is that Silverinnov goes to the hospital with the older adult in case of an accident or when treatment is needed and stays there as the family would do, but in a professional capacity. Doctors from the hospital take care of health, while Silverinnov takes care of the more human-centric and social aspects of hospitalisation. Silverinnov is now developing technologies from its own research actions in its Living Lab environments. The older people it works with are mainly at home in France, and Switzerland, and in its own retirement home in Luxembourg.

Members also co-funded the Autonomalab Enoll[8], Living Lab in 2009 (previously known as Autonom'IS) and then developed its own Enoll VisAge Living Lab.

Method

AAL projects

A selection of AAL projects were selected for presentations: MEDiATE[9], Sonopa[10], KoopAS[11], Alfa[12], Lily[13], Hovimestar[14i]. Many other projects attending to the Forum did not accept the invitation to present to our panel of older people for various reasons such as that they could not make or install a demo in front of them, they were unprepared for a presentation to older adults in the defined conditions or they do not target the older adults we had present. These projects were NITICS[15], Dalia[16], iHomeLab[17], Activ84Health[18], Assistant[19], Expact[20] and, for unknown reasons, a selection of others: ProMe[21], Stayactive[22], Acto Gate[23], , GeTVivid[24], AIT-Mpower[25]. This stresses the difficulty projects face to demonstrate their solutions. Speakers who have accepted to play the game should really be thanked. We take this opportunity to thank the speakers who accepted the challenge!

Esther.A

Esther lives in an apartment in Paris with her son. She is about 90 years old. She goes out of her apartment alone, about once a day, and she cooks independently. She owns a simplified tablet. She speaks French and is originally from Tunisia. Despite the continued presence of her son, she suffers from loneliness.

Claude (son of Esther)

Claude lives with his mother and helps with everyday tasks, especially with shopping. He uses new technology and is about 65 years old. He speaks English and is curious about new technology. He is an active member of a large association for the Wellbeing of children in Africa.

Moïse

Moise is in a wheelchair, is about 80 years old and speaks English. He does not have any computer. Four years ago he had a cerebral vascular accident that completely changed him, since then he lives with his brother. He is always ready to help others and still wants to fend for himself.

[7] Silverinnov.eu
[8] OpenLivingLabs.eu
[9] AAL-MEDiATE.eu
[10] Sonopa.eu
[11] Koopas.de
[12] AAL-Alfa.eu
[13] Lily-AAL.eu
[14] Hovimestari.com
[15] Nitics.Eclexys.com
[16] Dalia-AAL.eu
[17] iHomeLab.ch
[18] Activ84Health.be
[19] AAL-Assistant.eu
[20] Expact.eu
[21] Pro-me.eu
[22] Stay-active.net
[23] Actgo-gate.eu
[24] GetVivid.eu
[25] mPower-Project.eu

Tsipora

Tsipora is more than 80 years old and has been active for 20 years with a humanitarian association. She visits hospitals, and like travel, cinema and theatre. She is the wife of Max. As a couple they help each other stay independent and they are both curious about new technology.

Max (husband of Tsipora)

Max is about 85 years old and speaks a little English. He likes cinema and theatre and to visit new cities. As a couple, each person completes each other for autonomy and both are very curious about new technology.

Louise

Louise is about 65 years old. She works within a home support structure, providing accounting and management services for seniors. She lives in Paris and speaks French. She uses a smartphone and a computer a little.

Guy

Guy provides a case management home support service in France and Switzerland. He is nearly 65 years old and speaks French, Arabic, Hebrew, English and Spanish. He loves new technology and is an activist of for "Ageing Well".

Questions

Before the event, projects were asked for a list of questions they wanted to ask the older adults. The questions were collected into a shared list of common question across all projects, allowing for comparison. These questions were: Have you understood the solution? Have you tried the solution? How original do you find the solution? What is the most interesting part of the project for you? What should be improved for you to adopt the solution? Does the solution make sense for older adults (or carers) generally? Does it make sense for you? Would you be ready to buy it? Would you like to test it in your home? How much would you pay for it?

Furthermore, during the presentation of each project, speakers were able to ask the older people questions, and the older people could also ask the speaker questions.

Results and Discussion

Next came a list of remarks from older adults, made in the order of the presentations. As some presentations were on closed topics, some of the remarks addressed several projects even if they were prompted by one specific presentation. There was only a short presentation for each project as more detail can be found on their websites.

"Mediate" was presented by Damien Nicolas. This project provides a framework to coordinate carers. Perhaps because it was a conceptual presentation with no demonstration, or perhaps because it was the first presentation to be made and concentration was not fully engaged, this project was less well understood than the others despite being the only one made in the native language of elders. The communication aspects among carers and older adults have been recognised and appreciated.

"Sonopa" was presented by Christina Jaschinski. This project provides a social network and monitoring activity system. The group of older adults and carers were familiar with tele-alarm systems in which the older person has to press a button to call for emergency help. They understood the differences between those systems and Sonopa and appreciated the fact that alarms can be sent without requiring the pressing of any button. This case was presented using a video. It was also appreciated that this was a 24/7 surveillasystem nce that extends human care. No demonstration was carried out during the presentation. The older people were happy that activity data could be tracked by their carers and family. They would like to know, however, who is accessing their information, so that they could be reassured that they have carers to take care of them in case of emergency.

The "KoopAS" project was presented by Tina Meissner and Helena Schweigert. This was one of only two projects that provided a demonstration. The project offers a tablet application with six services such as entertainment games, communication video services, a news feed and a shopping list including home delivery, all designed to be easy to use for older people. Each service is accessible by pressing its corresponding icon. The design of the icons and use of colour spontaneously made two people unhappy. The demonstration worked well; the older adults had a short video call with a social worker in Germany and the older adults appreciated being able to touch and see the product in their hands. Handling the product, even if the text is written in a foreign language, is much more effective for helping people imaging using a product than screenshots. The autonomy given to the older person by the solution was appreciated. The solution fits the expectations of the older people and the messages were clear. For some people, the interface on the tablet looked too complex. Someone asked about being able to dictate a shopping list instead of needing to write it, while another, who could only one hand, said he appreciated that the tablet could be used with only one hand.

The "Alfa" project was presented by Eric Schlangen and her colleague. A working tablet was presented to the group. It was a tablet for older adults just beginning to show signs of Alzheimer's and it focuses on providing an events-of-the day structure to the older person's day on a screen. Two older people present have worked with Alzheimer's patients and they agreed that it could help. The simplicity of the solution was appreciated, as was the fact that carers could interact with the tablet at distance to add events, for example. When it is time for a daily task, carers wondered how intrusive the message that popped up would be and how different levels of the messages were managed. Going into submenus was too complex but the fact that a video could auto play to announce an event with the voice of the carer was appreciated. Furthermore, the carers would expect to receive some feedback about the older adult's activity, for example to say if they had seen a message.

"Lily" was presented by Pekka Ala-Siuru. This is a project that delivers a set of services to link older adults with themselves and with services providers. More specifically, what was presented and gained the attention of the group was the fact that the solution uses wireless tags in the home, typically, one at the front door, some in the kitchen and some on the medicine cupboard. Interacting with the smart phones of visitors, the system allows the logging visitor's activity. Details included when they made their visit, for how long, who they are, and gave an idea about their activity in the home such as if they closed to the medicine cupboard. All carers and elders appreciated the fact that

a journal of activity by the older person was known by this system, and stored. Even if the idea that the storage of this information could have bad connotations had been suggested to them, the use case in which the data would have been stored for a month, allowing an informal carer to know what happened during the last month attracted the interest of the group.

"Hovimestari" was presented by Vadim Kramar. This project used a tablet with tiles and services for older people. Vadim Kramar explained how the service would valorise and help elder to feel needed by society and useful to others. The idea made sense to the older adults. Most of them felt that they already felt active and useful but agreed that more services could exist in that direction and appreciated the suggestions. Being an older person and a carer simultaneously really made sense.

Most of them felt that they already felt active and useful:

Older adults want to be trained to use these systems without them needing to ask for help. They don't want to feel that they need to beg for help. Help with these technologies should therefore be planned automatically in advance.

Many systems plan to send alerts to older adults, but carers are scared that they will miss the alerts. They must be distinct from a simple SMS, highlighted or using a cascading alert procedure.

Who will sell the system and tablet and who will provide the after sales service were questions also asked, The solutions should integrate these questions when designed. During its experiment, KoopAS uses a social worker to select older adults they already knew, and to animate the network. This seems to be a solution.

Most solutions help contact between older adults and carers and rely too much on the existence of carers, who do not always exist as well as on their availability.

Even if solutions have been designed to be simple, older adults are often scared by their complexity. One of the older adults, Esther, on the panel already uses a tablet - the VisAge screen from Camera-Contact that she has used every day for more than a year. She explained to her colleagues that although tablets seem complex, they are very pleasant and simple to use and can propose interesting things to do automatically, speaking, showing photos and playing social games etc.

None of the older people in the group had any idea of prices for the presented solutions. They are well supported by carers, and they rely on them to select and bring these devices to them. Carers did have a slightly more precise idea about the monthly cost for the solutions. In terms of where older people would go to find these solutions to use, all said that they would ask their carers or children to do that for them.

Comments

The presentations and questions were translated from English into the native language of the older adults present. This was not a problem; on the contrary, the repetition of the message, once in English lightly understood, and once in the other language was appreciated. The translation also allowed for the transcription of a language used by researchers to a language understandable to older people with technical terms explained or contextualised so the audience could understand.

Most of the presentations started with the projects explaining who they were, how they included older adults in the design process of their solutions and how they experimented with ideas. This stage did not lead to any questioning from older adults. The older adults did appreciate learning what other older adults in other countries were doing that was similar to them.

It was the practical use cases that came later on in each presentation together with demonstrations that prompted the most interesting questions and interactions.

The older people were very happy to provide feedback. For example, during another Forum session the previous day, a 65-years-old French-speaking man said: "I am 65 years old and until now no one has ever asked me anything about what I need or expect." Seniors expect to be consulted and this process can in itself be a way to make them adopt new behaviours and use innovative solutions.

We were encouraged by speakers, older people and attendees and in the future hope to reproduce the workshop with new ideas to improve the experience for all. Improvements include giving to elders envelopes of money, €10k for example, at the end of the workshop to buy one of solutions that they wish to test out in their own homes. Conceptual Powerpoint presentations should also be forbidden so that the focus can be on demos and tutorials.

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Demand and supply – bridging gaps using an Open Market Consultation – Experiences from the STOPandGO project

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Abstract

Consortium partners of the STOPandGO project[1] (Sustainable Technology for Older People – Get Organised) perceive an Open Market Consultation (OMC) as a very convenient and necessary instrument for finding out what the market can offer and to engage with the supply chain. However the lack of experience and, in some cases, the legislation makes it difficult to implement. Co-creation of public services will become normal practice in the near future and an OMC is a vital element of co-creation. A key element of OMCs is the possibility of the organisations interacting.

Introduction

Know the market – perhaps the single most important lesson from successful Public Procurement of Innovation (PPI) examples [1]. Public procurement of innovation occurs when public authorities act as a launch customer for innovative goods or services. These are typically not yet available on a large-scale commercial basis and may include conformance testing [2]. PPI aims to 'close the gap' between cutting-edge technology and processes and the public sector customers or users who can benefit from them [1]. STOPandGO is a PPI Pilot project co-funded by the ICT Policy Support Programme (ICT PSP) of the European Union (CIP ICT PSP 2007-2013).

The goal of STOPandGO is to produce and validate reference material that will support the development of coherent procurements across Europe regarding the provision of innovative healthcare and social services enhanced by technology for older adults. This material will be validated and improved by piloting a procurement process of innovative solutions along seven localities in four countries (Italy, Spain, United Kingdom and The Netherlands) in Europe and will benefit around 5.000 people in total for a budget of about 17million Euro.

Beyond the diversity of the local paths towards integrated care that are available throughout the STOPandGO pilots and in Europe, the project will identify shared features in the services that can trigger organisational innovation in the models of care and foster patient empowerment. Innovation will be fostered by bringing available technological innovation into the care processes.

The STOPandGO procurement process is not focused on a particular technological component, but on the integration and in the simultaneous improvement of the models of care and cure, to provide care and cure services augmented by a coherent set of interoperable technological components, with a consequent convincing new stratification of the users, satisfying at the same time the managerial, organisational, clinical and technological perspectives.

An overview of the innovations that the STOPandGO project focuses on: 1) Procuring services enabled by technology instead of 'just' innovative technology itself; 2) Procuring based on performance/functional specifications, (partial) payment on achievement of agreed key performance indicators; 3) Focusing on organisational changes needed to offer the services; and 4) Provide the possibility to up-scale promising innovative solutions. Taking into account that innovations are often offered by small- and medium-sized enterprises (SMEs) and have mostly only proven effective in small scale pilots. Focus is on incentivising cooperation and SME engagement.

Innovating public services are needed for public administrations to address the growing demand with limited budgets and to continue to offer high quality services that provide added value to its users. When it comes to procuring innovation, questions like, what is feasible?, what can the market offer?, who knows that?, and how to

[1] http://www.stopandgoproject.eu

evaluate the options? arise. In order to get answers to these questions an important tool is co-creation. This is currently mostly being used in PPI-PCP, but it will become normal practice in the short future, and open market consultation (OMC) is an essential part of it.

Within the STOPandGO project we explore the possibilities of conducting an open market consultation in the different localities that are part of the project. In the workshop that took place during the AAL Forum 2015 in Ghent we shared some initial experiences and had an animated discussion with the participants in the workshop.
The reason for organising a workshop at the AAL Forum was the fact that PPI is seen as an important instrument by the European Commission and we wanted to share our current experiences with this instrument with an audience that works in a related field. Furthermore in AAL projects there is a large involvement of innovative SMEs and they could benefit from the new public procurement directives, which have been adopted in January 2014 by the EC and have to be transposed by the member state into national law by January 2016, and that offer better possibilities for SMEs to put in bids [3].

Open Market Consultation

Conducting an open market consultation (OMC) is extremely important as it is a method to assess the readiness of the market to satisfy the demands of innovation proposed by procurer and consequently to elaborate offerings to meet them adequately. Furthermore companies themselves are best placed to know what potential alternative solutions exist, or are close to market readiness, because they are at the heart of developing new technical solutions. Finding appropriate ways to engage with the market, whilst respecting company confidentiality and ensuring transparency can greatly assist a procurer in knowing what is possible. Make sure to also look beyond your regular suppliers and engage with small- and medium-sized enterprises (SMEs). Many of the most innovative solutions come from small sized companies [2].

Each procurer involved in the STOPandGO project will hold an Open Market Consultation (OMC) prior to the actual tender processes taking place. The purpose of the consultation is: 1) to inform about the tender process, in order to achieve the widest participation of interested parties; 2) to learn about quality and technical characteristics of the proposed solutions on the market; and 3) to allow interested parties to provide comments and suggestions considered useful for the contracting authority in preparation of the tender.

The purpose of the workshop at the AAL Forum 2015 was to share experiences and ask for feedback and active participation from the audience on the following topics:

- How to set up an OMC and to keep on involving the market;
- Insight into how the OMC can take place even with legal limitations;
- A matchmaking exercise that could be part of an OMC when procuring services.

This was done by presenting three example cases from the STOPandGO project.

Example case from NHS Eastern Cheshire CCG (United Kingdom)

Through participation in the STOPandGO Project, NHS Eastern Cheshire CCG and its UK partners organised an event entitled Caring Together to transform health and wellbeing through technology-enabled care. This event took place on 12 June 2015 with attendees from the private, public and charity sectors of the market place, along with members of the general public, who collectively engaged in discussions and debates on the use and benefits of telehealth in the treatment of people with diabetes across Eastern Cheshire.

The event aimed at gaining a deeper understanding of how technology can enable better service delivery to people with diabetes and how in turn such persons will be empowered to more effectively manage their own health. The event provided a platform for technology organisations to demonstrate their offer to a wide audience.

Breakout sessions were held across the event comprising of three interactive workshops following the presentations:
1. Standards required to deliver technology-enabled care services
2. Commissioning and procurement in Eastern Cheshire
3. Data sharing challenges, solutions and governance requirements

For the remainder of the event, roundtable discussions took place focusing on three hypothetical scenarios concerning people with diabetes. Across the event, technology organisations were able to showcase their products and solutions to the attendees through demonstrations and to discuss with delegates how the products and solutions could be utilised to deliver improved outcomes for patients with long term health conditions, in this instance diabetes.

This open consultation event successfully delivered its objective of bringing together representatives from health and social care, as well as local people, with technology providers and innovators to look at how innovative technologies can inform future services and help people to better manage their health and wellbeing.

As a direct result of the event, NHS Eastern Cheshire CCG held a diabetes integrated care workshop which took place in July 2015. The organisation will use information gleaned from both events to hone an invitation to tender, which will be aimed at seeking market interest in providing an integrated diabetes care model, which incorporates the STOPandGO project.

Quote from Dr Bowen, the clinical chair of NHS Eastern Cheshire CCG: "The event connected clinicians, the public and commissioners of health and social care with supplier and innovators in technology-enabled care, and provided an opportunity to work together to test the art of the possible in the future design and application of technology-enabled care".

A full report of the event held is available on the Eastern Cheshire website [4].

Example case from ASL Roma D and ASP Catanzaro (Italy)
In order to conduct an OMC these two Italian procurers disseminated a semi-structured online questionnaire in Italian and English. The decision to use a questionnaire was taken for two reasons; 1) to increase the possibility to interact with a large group of potential providers and 2) it is an instrument that is easy to use for procurers with stronger cultural and legal constraints.

The following structure was used for the questionnaire:
- Characteristics of the organisation
- Indication of specific aspect of interest to the organisation
- Experience in the domain
- Proposed delivery models and service level agreement (SLA) for each service and product identified
- Requirements and standards qualifying products and services
- Suggestions for the procurement process

The complete questionnaires of ASL Roma D and ASP Catanzaro are available online [5,6].

Example case municipality of Helmond (The Netherlands)
The municipality of Helmond plans to procure innovative ways to improve the support network of older adults with dementia. Expected outcomes are: 1) Easier organising, 2) More leisure time, 3) Feeling supported, 4) Feeling secure, 5) Improved freedom, mobility, and 6) Increased involvement from the neighbourhood.

Questions for the open market consultation are:

- How might technology provide an answer to the outcome based specification? What is available in the market?
- What do you have to offer yourself in response to the challenge?
- What do you need from others to be able to respond to the tender?

The latter two questions can be used during matchmaking events. Due to the fact that within the STOPandGO project services enabled by technology are procured there most likely won't be a single organisation able to offer the total package. Therefore during the OMC matchmaking events can be used to form consortia.

Experiences STOPandGO project

This section highlights some of the experiences already gained by the procurers in the STOPandGO consortium. As each of the procurers follows a local time-line not all procurers have already conducted an OMC. Therefore these experiences will be updated after all the procurers have concluded their OMC.

Procurers see the local open market consultation as a valuable instrument. Among other things it leads to a better understanding of the real potential of available technology and whether or not the available solutions are in-line with the ambitions of the procurer. Procurers also report a lack of experience and culture to carry out this consultation. Therefore the STOPandGO project provided an opportunity to gain experience in involving the market in a procurement process. Even if this might seem as 'just' some initial steps it is a major change in mindset.

The exact implementation of the OMC differs due to local conditions. For example in Italy there is the fear of the launch of procedures that could be detrimental to the principle of transparency and the protection of competition is a major barrier to the adoption of this instrument. This fear is also found at legislative level. This is demonstrated by "Comparative survey on the transposition of the new EU public procurement package" in which the approach proposed on this topic by Italy is more restrictive than others. In other countries like the Netherlands, preliminary market consultations are allowed and frequently done. In Italy the market consultation requires the publication of a prior notice and should be based on a public hearing.

Market engagement has been ensured by organising events, using communication channels, or by having the consultation via an online questionnaire. For example the Eastern Cheshire CCG event, held on 12 June 2015, was a fantastic landmark event in engaging with suppliers and in helping to share and refine our aspirations as part of STOPandGO. Of particular value were the experiences of people with diabetes and those who care for them, along with the insights of health and social care professionals. Ongoing communication is taking place as a result of the event described above. ASL Roma D and ASP Catanzaro published the prior information notice for the open market consultation and published, in English and Italian, the questionnaire to collect feedbacks and suggestions by the market. For that the same approach proposed by the centrals of purchasing, at both national (Consip) and regional level, was adopted. This approach is based on the announcement of the interest to launch a tender on a specific topic and the provision of a questionnaire to disseminate information on the ongoing initiative among potential interested parties, to collect information about the reaction of the market, to verify the readiness of potential providers to satisfy the procurers' demand of innovation.

The readiness of the market to satisfy the demands of innovation proposed by procurers is another critical element of the STOPandGO project. As innovation often comes from SMEs, within the project it is important to find a way to increase the amount of SMEs that put in bids. Since STOPandGO is specifically targeted at services, those services most likely will be offered by a local service provider. However the enabling technology can come from any company in Europe. Our focus is on incentivising cooperation and SME engagement. This has an effect on the tender

documents, e.g. part of the documents must be available in English and the procedure to put in a bid must not be so complex that SMEs simply won't bother to put in a bid. Furthermore the consortium will seek for possibilities to integrate into the website a possibility for companies to express their interest in joining a group that will put in a bid for a specific STOPandGO tender.

Challenges

There currently is a lack of previous experiences and culture on the interaction between procurers and the market. As a consequence there is a risk of low capacity for supply chain engagement and a weak reaction by potential providers, with limited responses to online questionnaires. In order to minimise this risk within the project several dissemination channels are used to spread the words about the upcoming procurement, and live events should be organised whenever possible.

There is a need for ongoing assistance in making consortia to put in a bid. A number of SMEs have already indicated interest in a tender but can only provide part of the solution. Unless the STOPandGO partners find a way to get them involved in a consortium approach, e.g. via a lead partner role of larger companies, they will not engage. One solution could be to get different interested organizations together in a room and get them talking. Via that method some innovative, complete bids could be generated. It is vital for the project to facilitate access to innovative SMEs and for them partnership is mandatory. Besides physical meetings we also need to look at on-line possibilities to not lose the European dimension.

Participants at the workshop indicated the following additional challenges/questions that can affect the OMC:

- Do you conduct an OMC for every procurement? And if you do, will people remain to attend these events and fill in questionnaires?
- How do you select industry to invite?
- Who you invite also defines the direction of feedback and might do the same for the tender specification
- Wouldn't an OMC be a big lobby? At the end of the day participants would want to win the bid. A solution could be to split the OMC in two phases, the first phase about further defining the unmet need and a reality check on what is feasible, and a second phase that focuses on acquiring solutions
- How to make sure that innovative ideas from SMEs are not taken on board by bigger companies that in the end win the bid without involving the particular SME that came up with the idea?
- If you use questionnaires you take the risk that the responses will be more related to an inventory of available solutions and less targeted towards cooperation and innovation. Interaction is vital for co-creation.

References

[1] Procurement of Innovation Platform (2014) Guidance for public authorities on Public Procurement of Innovation, 1st Edition, Druckerei Kesselring GmbH, Emmendingen.
[2] Definition of PPI from: http://www.innovation-procurement.org/about-ppi/ (consulted on 25-11-2015)
[3] Official Journal of the European Union (2014) DIRECTIVE 2014/23/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the award of concession contracts. Volume 57, 28 March 2014.
[4] Full report 'Caring Together to transform health and wellbeing…delivered through Technology Enabled Care' event on 12 June 2015. https://www.easterncheshireccg.nhs.uk/Downloads/About-Us/STOPandGO%20Event%20Report%20FINAL.pdf
[5] ASL Roma D questionnaire: http://www.aslromad.it/Comunicazione.aspx?PK=1700
[6] ASP Catanzaro questionnaire: http://www.asp.cz.it/?q=node/2677

Interoperability defined by its raison d'être

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Abstract

The objectives of this interactive session were twofold. First, it aimed to communicate scientific insights and research results regarding in-depth interoperability [1] [2], which go far beyond today's understanding of interoperability as an ability to communicate. It concerns the ability of systems to cope with requirements that were unknown when they were conceived, designed and developed. Second, the session aimed at confronting these scientific insights and research results with the healthcare domain. The session proved too short to achieve the first ambition beyond drawing the attention to the existence of an advanced body of knowledge concerning "design for the unexpected" and "resilience in large flexible systems".

However, the session revealed specific demands from the healthcare domain. Liability is a key concern and, in the past, the healthcare community has shown a "flipping attitude" towards e-health in this respect. The community switches, rather abruptly, from a distrust mode into a mandatory one, especially regarding health insurance. This renders the above-mentioned body of knowledge even more relevant. When ignored, choice-rich e-health systems will become mandatory, as soon as they succeed in recruiting critical user mass, and rapidly become the legacy systems (in the worst connotation of the word legacy). When acknowledged, choice-lean e-health systems will keep options open, allowing novel developments in healthcare to be absorbed as they become available, and maximise the potential for serving large user masses.

Introduction

The session addressed in-depth interoperability in e-health and beyond. The starting point for the session was the following:

In practice, standards and interoperability – even when they exist on paper – too often fail to deliver what they are expected to:

"... once interoperability is reality, the market uptake of AAL services can be reached."

Until today, time remains somewhere in the future, and at the moment looks like it will stay somewhere in the future indefinitely. Therefore, we must be missing something; we are not (yet) doing it right.

This session looks into defining interoperability by what it aims to achieve and by what it promises (but seldom delivers). Next, fundamental insights in the mechanisms that prevent interoperability – as defined in this session – are put forward and discussed.

In a nutshell, systems are designed and developed with specific, expected usage in mind. Except for very simple systems, they perform poorly (or not at all) as soon as interoperability requires them to function in an unanticipated and unexpected manner. Hence, approaches to design for the unexpected will be presented and their contribution to an interoperability that delivers will be discussed.

This report shortly provides pointers to the existing material on designing systems for in-depth interoperability. Next, it discusses the requirements beyond this ability to accommodate unforeseeable demands, which are specific to the e-health domain. Finally, conclusions are presented.

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Design for the unexpected

During the session, research results were presented that impact the ability of systems to interoperate beyond a superficial plug-and-play. Two main insights have been presented:

- From research on complex adaptive systems, the concept of an autocatalytic set was presented and how this translates into the e-health setting: critical user mass was shown to be essential. As soon as systems become even moderately complex, adequate user mass becomes a critical issue. There is a so-called valley of death in which systems are too complex for their user mass.
- Design for the unexpected was the second element in the discussion. Developers of e-health solutions will over-rely on assumptions on how their systems will be used and under which circumstances. Design for the unexpected reveals how to develop useful functionality, services and ICT infrastructures with maximised abilities to cope with unforeseen conditions.

More details on such research results and insights can be found in [1, 2]. It was an underlying objective for the interactive session to translate the insights from the above research into health care cases and situations. The session proved to be too short for this ambitious objective. During the session, the following healthcare and/or e-health cases were discussed:

- Hearing implants. Among others, personalisation, telemetering and therapy agenda handling were covered.
- Personal alarm. Here, the importance and predominance of liability, ownership and service adequacy was uncovered.

These discussions revealed that healthcare needs more than just the ability to interoperate. Accordingly, the remainder of this text focuses on what e-health does require in addition to these existing scientific insights.

Liability

In healthcare applications, being able to provide an e-health service is insufficient. When a patient receives a wrong dose of his or her medication, when something is detected late, etc. the issue of liability pops up. Building solutions by means of combining interoperable (existing) systems needs to cover this issue.

Looking at recent history, the first observation is the transition (in the USA) concerning electronic medical records (EMR), Here, liability shifted from distrusting a new technology (i.e. if a hospital was using ICT, it had to make sure that it did not cause any mistakes) to mandating the use of such ICT. Today, insurance companies will consider the absence of these e-solutions to be a liability. Apparently, there is no middle ground. Initially, anything new has to prove itself to be trustworthy. Subsequently, it becomes mandatory.

Looking once more at recent history, a second observation is that the healthcare community has an intuitive approach to risk, which probably is shortening lives and causing avoidable suffering. ICT Systems, e.g. for e-prescriptions, have to work perfectly before they can be introduced and used. Aviation safety has a more evolved approach, which they needed when detecting safety issues when hundreds of expensive aircraft were already in operation. They provide the professionals with adequate procedures and training to cope with such imperfections. In healthcare, vested interests are less aligned and the complicated discussion of safety matters results in blockages and delays of the introduction of novel e-solutions until every details is taken care of. Here, the status quo (keep working as in the past) typically receives too much credit concerning safety. However, this is unlikely to change any time soon.

For the present discussion, this means that liability is to be accounted for because many participants have this intuitive attitude concerning risk and liability. This is exacerbated by parties defending their (financial) vested interests or position/status by exploiting the complex nature of these discussions (i.e. pretending not to understand another person's argument, causing the discussion to end in confusion is a highly effective method to block and keep the status quo). Healthcare faces the interplay of justified concern for the patient and high stakes (financial and otherwise), which results in liability remaining a dominant concern.

Interoperability needs to address the liability aspect. Here, history reveals that successful handling of liability issues will occur through this abrupt change of view by the healthcare community and, especially, the healthcare insurance. Interoperable systems will be distrusted until they (i.e. a relatively small number of solution providers) become virtually and practically mandatory.

Discussion and conclusion

Merging the scientific insights and the outcome of the discussion in the interactive sessions, the e-health community is experiencing decisive times. Possible, plausible futures are:

- Interoperability remains an elusive objective that is rarely achieved as understood in the discussion in the interactive session. The consequences are poor e-services at high costs.
- A number of systems, designed for the expected, achieve a sufficiently solid reputation to become mandatory as discussed above (section 3 on liability). Unfortunately, they only deliver their services under narrow conditions, which might have looked perfectly reasonable when these systems were designed many years ago. This is how legacy comes into existence, with all its negative connotations. Veteran ICT consultants strongly advise to keep such systems at a safe distance from your core business. In other words, it is OK for invoicing but not for the actual healthcare activities.
- Developers learn how to design for the unexpected. This results in a structural decomposition when designing e-solutions, maximising the potential for large user masses. In other words, it facilitates not only interoperability in the sense that systems are able to cooperate. It also favours the design of subsystems that, when deployed, gain experience rapidly and massively, which is key for reliability.

Overall, healthcare has its own specific requirements concerning interoperability (i.e. liability) as well as opportunities (i.e. mandatory when accepted on a given scale). Designing for the unexpected, providing in-depth interoperability, brings added value in two manners. It favours large user masses, speeding up acceptance. And much more importantly, it prevents mandatory subsystems from imposing harmful constraints of the kind associated with legacy systems. Finally, concerning how the healthcare community and their legal sub-community look at liability, recent developments are aiming to modernise this [3].

References

[1] Valckenaers and Van Brussel, "Design for the Unexpected," Butterworth-Heinemann, November 2015, store.elsevier.com/product.jsp?isbn=9780128036624

[2] Farid, "Designing Multi-agent Systems for Resilient Engineering Systems," Lecture Notes in Computer Science, Volume 9266, pp 3-8, 2015.

[3] Mireille Hildebrandt, Smart Technologies and the End(s) of Law, Novel Entanglements of Law and Technology, 2015, Edward Elgar publishing, ISBN: 978 1 84980 876 7

Results of the 3rd Workshop on Bringing Together Indoor and Outdoor Mobility Solutions

Christoph Stahl, Lotte Cornelisse, Sebastian Fudickar, Ben Loke, Christina Ohm, Luigi Palopoli, Andreas Rumsch, Falko Schmid, Hans Slijp, Sandra Suijkerbuijk, Hans Theuws

Aim and Topics

The 3rd Workshop on Bringing Together Indoor and Outdoor Mobility Solutions[1] continued a series of events that started in 2013 at the AAL Forum in Norrköping, Sweden, with the aim of allowing projects of the AAL Joint Programme's 4th call[2] on Mobility sto hare their ideas and results.

ICT-based solutions for increasing the mobility of elderly people in activities of daily living are dedicated to help answer two simple questions: "Where am I?" and "What is the route to my destination?". Whether the assistance is given by a helpful app running on a portable device, or by a robotic device that additionally provides physical support, all solutions must address one or more of the following topics:

- **Route planning and accessibility:** Given the actual and the desired position of the user, how do we plan a feasible route that considers barriers, path conditions, and physical effort, i.e. a path that is completely accessible? How do we plan the route to account for certain points of interest?
- **Navigation and interaction design:** How to present maps and route information to elderly users? Current off-the-shelf solutions don't consider their special requirements, such as diminished vision and hearing, but also the cognitive load of map-based user interfaces is rather high.
- **Transportation modes and transitions:** How do we allow for different modes of transpor, e.g. as a pedestrian on foot, with a rollator, in a wheelchair, using public transport? How is a seamless transition between these achieved?
- **Security and orientation:** How can we assist users when they get lost, the technical assistance fails, there is an emergency or they need further orientation - in the case of slight dementia, for example?
- **Seamless indoor and outdoor positioning:** Satellite Navigation and inertial sensors are widely available in mobile devices today and facilitate outdoor localisation up to a certain degree of precision. Indoor localisation solutions require more sophisticated sensor equipment.
- **Environmental representations and maps:** Seamless indoor and outdoor navigation requires map representations suitable for hybrid modelling of indoor and outdoor route networks along with relevant impediments, landmarks, and points of interests.

Paper Presentations

The first session focused on navigational assistance in indoor environments and was chaired by Andreas Rumsch. The first speaker, Luigi Palopoli, presented a paper by Alessio Colombo, Daniele Fontanelli, Axel Legay, Luigi Palopoli and Sean Sedwardson entitled "Efficient customisable dynamic motion planning for assistive robots in complex human environments". Their work focuses on people with diminished physical and mental abilities who require physical mobility assistance in indoor environments. Such users often find it challenging to navigate in crowded or unfamiliar environments. The authors presented a motion planning algorithm for robotic walkers that is able to intelligently deal with crowded areas, personal preferences (stay close to a toilet, avoid certain rooms) and temporary obstacles. The paper from Colombo et al. has recently been published in a special thematic issue on mobility[3] in the Journal on Ambient Intelligence and Smart Environments (JAISE, Volume 7, Issue 5, September 2015, IOS Press), which has been edited by Christoph Stahl, Bernd Krieg-Brückner, Wolfgang Zagler and Björn Gottfried in order to support the dissemination of mobility-related projects.

[1] http://mobility-workshop.schwartz-stahl.de
[2] http://www.aal-europe.eu/get-involved/calls/call-4-mobility/
[3] http://content.iospress.com/journals/journal-of-ambient-intelligence-and-smart-environments/7/5

The second talk was given by Christina Ohm who presented joint work with Manuel Müller and Bernd Ludwig on "Displaying Landmarks and the User's Surroundings in Indoor Pedestrian Navigation Systems", which has also been published in the special issue. Their research project aims to design and implement scalable an indoor pedestrian navigation system that uses landmarks to guide the user. Even though it is well-known that referring to salient objects in navigation instructions is considered to be the most effective way to communicate any route instruction, there is still a lack of scalable solutions, especially for indoor environments. Ohm et al. compared mobile map representations to a reduced graph-like interface. Results show that users with a good sense of direction perform significantly better with the abstract graph-like interface in terms of task completion time, especially if the current navigation scene provides highly salient landmarks.

The third presentation was given by Hans Thews, a product manager and market researcher at Noldus InnovationWorks, on "TrackLab, a solution for indoor and outdoor tracking and movement analysis". TrackLab[4] is an open platform which can take inputs from a range of tracking technologies (e.g. GPS, ultra wide-band or video-based), both indoor and outdoor, including accelerometer data for activity quantification. An example is a smartphone with the E-MOSION app, which tracks the location with GPS for outdoor tracking, and an accelerometer-based tracking device on the foot for indoor tracking. A variety of visualisations are available and TrackLab also calculates statistics quantifying movement and searching behavior. For many chronic health conditions, sufficient exercise is crucial to combat symptoms. The tracking can be used, for example, to study the exercise taken by the subject, and the reports generated can be used to give feedback to researchers. Secondly, the integration with other software makes it possible to send an alarm signal to caregivers, for instance if an Alzheimer's patient strays outside of the grounds of where they live.

The second session, chaired by Christoph Stahl, covered navigational aid in outdoor environments. First, Hans Slijp presented results from the project "IMAGO: Image-guided navigation for visually impaired people" that have been published in the JAISE special issue together with Stephan Jonas, Ekaterina Sirazitdinova, Jan Lensen, Deyvid Kochanov, Humaam Mayzek, Tjeu de Heus, Richard Houben and Thomas Deserno. IMAGO aims to develop an inexpensive and unobtrusive navigation method for blind and visually impaired people. Navigation is performed using structure from motion and image-based localisation techniques. Route models are created as 3D point clouds through image acquisition along the routes and feature extraction. Similarly, the navigation is based on feature matching between current images and the 3D route model. Additionally, haptic feedback can be used via a smart cane to reduce auditive feedback. The proposed system yields a high positioning accuracy, with 80 per cent of samples being located within 1.6 m. Thus, the system is usable for pedestrian navigation, especially for visually impaired people.

Sandra Suijkerbuijk and Lotte Cornelisse together presented their "Results of the AAL-project Happy Walker after two field trials". The project Happy Walker had already been introduced during its starting phase in the first workshop at the AAL-Forum, 2013. They were now able to present the completed development and the results of the field trials of the navigation support system Happy Travel with two target groups: (i) elderly people and (ii) people with mild dementia or Mild Cognitive Impairment (MCI). Happy Travel offers specific navigation support for people with mild dementia, which, for instance, includes the function "deviation from route" as a specific security feature.

Finally, Andreas Rumsch gave a talk on "Using the iWalkActive Navigation App" that is part of the walker with e-drive, which received the AAL Award in 2013. The navigation respects the needs of the targeted users who are mainly the elderly. Important criteria are usability and barrier-free navigation. Using the app needs multiple steps: entering or selecting the destination, confirming the calculated route and starting the navigation. It has been found in field trials that selecting a destination is not a problem if the number of options is low and symbols are used. Entering a destination as text by a virtual keyboard is challenging for untrained users, as are confirming the calculated route and starting the navigation. People said they would need training to learn the app, but then they would probably be able to operate it. Rumsch further found out that during navigation the instructions are not accurate enough in every situation. Reality is sometimes represented in the digital maps in such a manner that a user interprets the situation in a different way.

[4] http://www.noldus.com/innovationworks/products/tracklab

Interactive Session: Guidelines for the evaluation of mobility assistance in urban settings

AAL projects usually follow a User-Centred Design approach, which involves field trials with users in urban settings outside a lab environment. The goal of this workshop was to share experiences of specific problems that may arise in this context. In the third session, the participants discussed typical issues that should be considered early on during a project, ideally when a new project proposal is written, or at least before the actual experiments take place. This report provides a summary of the results of our discussion and a general checklist and guidelines that should help future projects to overcome typical mistakes and challenges, making field trials a success. The discussion was structured into three sections: i) working with elderly participants, ii) urban environments, and iii) ethical issues.

Working with elderly participants

AAL projects usually develop products and services for elderly users, so it is essential for the success of the project to let them participate in co-design and evaluation activities. However, for research projects in computer science it is more typical to evaluate systems with students. Working with elderly participants requires much more effort, from establishing first contact to training and interaction design:

- How to find users who represent the intended target group
- It is common to have end-user organisations in the consortium that have direct access to elderly clients. However, staff don't often have engineering degrees, and must be trained how to use prototypes for field trials. Prototypes should be easy to maintain and robust. If the prototypes are not ready or break, the end-user organisations cannot contribute to the project as planned.
- About 20 per cent of older people are interested (some even enthusiastic) about new solutions and technologies (also known as early adopters), and any user participation should focus on these people first.
- Generally, for a User-Centered Design approach, a long-term relationship with the users is desirable, and the older people should participate throughout the whole iterative development process. Elderly participants usually have very individual abilities regarding:
    - Cognition, i.e. learning new user interfaces, reading maps
    - Vision and hearing
    - Physical fitness, i.e. walking distances
    - Motor skills, i.e. performing touch gestures on mobile devices

- Issues of elderly users with touch screens
    - Capacitive touch screens are sometimes known not to respond to elderly users' fingers - use special gloves or devices that support stylus input
    - Iresistive touch screens also work as an alternative, but with lower quality - drag-and-drop gestures are more difficult to perform, for example
    - Elderly users have difficulties with tap-and-swipe gestures (no quick finger movements)

- Training in the use of mobile devices takes time for the participants
    - 15 minutes is not enough for many older people to understand completely new concepts and learn gestures. A minimum should be half a day with, ideally, the lessons being repeated the next day.

- Who is the trainer is really matters
    - Elderly people seem to like to talk to younger people
    - Caregivers are more empathetic
    - Doctors are considered to be authorities

- What to train
    - Virtual keyboard (how to enter text, confirm), basics of the hardware buttons, on-off, volume, etc.
    - Basics of the operating system (how to start apps, use WiFi, etc.)

- The user interface of the app itself - don't rely on "self-explaining" icons, colors, symbols, etc.
- Professional mobility trainers help users learn to orient themselves with disabilities. Involving these people could help to define specific new mobility solutions and identify potential user groups for such products.

- Negative product experience spreads quickly today in social networks (i.e. in the context of younger disabled persons)
  - Training is part of the sale of the product and helps avoid negative experiences.
  - People sometimes find new ways to use things other than what was intended by the designer.
  - The iCane took seven years of research and development and a lot of user involvement has been necessary.

Urban Environments

The choice of test routes should involve use cases that are both realistic and motivating for the users, but also include typical situations that are challenging for navigation systems, such as areas of poor GPS reception, and involve typical shortcomings of maps, i.e. multiple levels or underground areas.

- Test route characteristics
  - Congnitive difficulty depends on the number of decision points and the degree of choices per decision point (forward, back, left, right, up, down)
  - Salient landmarks make route descriptions easier to understand, so think of situations with i) many and ii) few available landmarks.
  - A benchmark route would be useful to compare different mobility solutions or projects against each other, perhaps in a contest.

- Weather conditions
  - Rain can be problem with mobile devices, it can cause damage to electronics and affect interaction with the touchscreen.
  - Protect the prototype against water and provide alternative input options
  - Consider the seasons (ice, snow and extreme heat) in the proposal and schedule development/evaluation cycles accordingly to avoid them.

- Time of the day is important in a city environment to ensure you avoid large crowds. A good time for studies is before shops open in the morning
- For indoor environments, it can be a help to rent large, empty office spaces for experiments that involve tracking and wayfinding
  - Ubisense, for example, is a very accurate indoor positioning technology, but expensive to buy and set up

- Consider social issues as well as technical issues: social issues are not easy to predict and can only be experienced in real situations with other users.
  - What behavior (interaction with devices, e.g. speech input) is socially acceptable in public spaces, in public transport for example? This is important if technology is to be accepted and used.

Ethical Issues

In the Horizon 2020 programme, the European Commission has given ethical issues a high priority - involving vulnerable patients in studies, for example, as well as privacy and data protection issues. All the activities carried out under Horizon 2020 must comply with ethical principles and relevant national, European and international legislation. AAL Projects that include field trials with elderly users must carefully explain in detail how they deal with ethical issues.

- A big question is how to provide open access for datasets from user studies (e.g. video recordings and GPS traces from field trials) while preserving the privacy of the participants.
- It would be helpful if the EC could provide solutions or frameworks for how to record, maintain, publish and destroy data from experiments.
- It would be helpful if the EC could define standard protocols and procedures to follow in projects. At the moment, researchers must find their own solutions. for this.

Be the judge: how to assess innovative playful interventions as a non-expert. The JamToday GameScope

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The area of applied and serious games offers new and innovative solutions to a range of challenges in the health care domain. Yet at the same time for many healthcare professionals, this area is new, not very visible and, for some, difficult to access. This poses a barrier for potential use and for development of new solutions, when these professionals should act as clients of emerging applied and serious games companies. How can we prepare these professionals to be well-educated clients, understanding game design principles? Games are becoming the next big medium, just as television was in the past. It is important that all sectors understand the potential for applied game-design to the services they offer.

JamToday (www.jamtoday.eu) is a newly established pan-European Network that explores the potential of applied-games in different thematic areas. It seeks to support the development of game-based prototypes through so-called game jams. JamToday's approach to game design is based around the idea of 'applied games'. In 2015, the theme addressed by JamToday was "Adopting healthier lifestyles". JamToday is the first European network specifically organising game jams for applied games. In this way, JamToday aims to make the processes at stake in the creation of applied games more transparent by providing the necessary know-how and expertise and by bringing together the different people who are involved in the process of designing and deploying game-based approaches to the field of application. In so doing, we aim to bridge the gap between applied games and their fields of application. JamToday also provides a framework for evaluating and transferring the games to these environments.

Based on a thorough literature review and consultation with experts, JamToday has developed a framework with validated methodologies and tools to harness the potential of applied-games from design to deployment and evaluation. Consisting of 25 original partners from 11 countries, the JamToday Network seeks to provide a replicable model to provide concrete answers for the introduction of applied games into the field of application. The JamToday Network seeks to provide a replicable model to bridge the gap between game professionals and professionals from the context of use.

At the AAL Forum, JamToday presented the JamToday Game-Scope a tool aimed at non gaming experts to validate/ evaluate the potential of game prototypes and to learn to critically analyse a game prototype and discuss elements that make a good concept. The Game Scope tool is composed of 20 cards with game design question one should asks oneself to evaluate the potential of a specific game to solve a concrete problem. Guided by 20 questions, the players will evaluate the quality of a game or game concept. Players each take turns and pick a card from the stack. The question on the card is then read aloud. Participants should take some time to discuss the answer with each other. The card is then put on the board on the section that corresponds to the choice players have agreed on:

YES/ NO/ DOUBT/ NOT RELEVANT

The target group are commissioning parties that want to develop a game or have had a game developed by a third party, students and teachers from the game design field.

The rationale behind the creation of Game Scope is the fact that the majority of potential commissioners for applied games have limited experience in playing games. This lack of personal experience often translates in limited 'game literacy'. This makes it very difficult for clients to judge the quality of applied games, game prototypes or game

company pitches. Game Scope was developed to empower this generation of users/clients to support them in their decision making and offer them guidance and support.

The main aim of the tool is to manage the conversation about an applied game or game prototype. Indeed, without personal experience/understanding of applied-games, conversations about game prototypes by clients and commissioners are often dominated by their personal beliefs, prejudice, and media-informed opinions about applied games. At the same time, they face difficulties relating to the language used in the game design community to describe and articulate the working and quality of a game design concept.

Game Scope aims to provide the users and clients with an accessible entry in the discourse in the game design field, avoiding at best the jargon intrinsic to any expert domain. In using the JamToday Game Scope, users are prompted to debate the nature or meaning of a particular question. This perceived ambiguity is part of the function of Game Scope. By discussing the meaning of a question or part of the question, the participants share their knowledge and opinions and acquire more ownership of the language used.

At the AAL Forum, a workshop was organised with a group of 30 participants that in group have worked with the GameScope to evaluate the potential of a given game to learn new words. The group was divided in six different teams that provided positive feedback on the usefulness of the cards for non gaming experts to get a better understanding of game design processes and game design thinking.


Do you want to test/participate in/a AAL-pilot solution ?
Yes, because
It's of personal interest
I can learn something
I get a gift / treat
out of curiosity
I can help/ solve a problem
NO, because
It's too much of a risk
That's not for me yet
It will be too exspensive for me
It takes too much time
I am too old, not anymore for me

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