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# Social Interaction Screen – Soziale Netzwerke für ältere Menschen erschließen

## Social Interaction Screen – Making Social Networking Services Accessible for Elderly People

Social Interaction Screen\_Social Networking Services\_Ambient Assisted Living\_Elderly People

**Zusammenfassung.** Digitale Soziale Netzwerke haben das Potential die soziale Interaktion älterer Menschen mit Familie und Freunden zu unterstützen. Aufgrund altersbedingter Einschränkungen und technischer Barrieren erweisen sich die verfügbaren Benutzerschnittstellen aber häufig als zu komplex und folglich für die Mehrzahl der älteren Menschen ungeeignet. Ziel dieses Beitrages ist die Vorstellung einer ganzheitlichen Lösung zur Schaffung eines einfachen Zugangs zu Sozialen Netzwerken für ältere Menschen. Die Lösung vereint dabei Beiträge zu einer angepassten (Tablet) Hardware, einer angepassten graphischen Benutzungsschnittstelle sowie einer angepassten Middleware zum Zugriff auf die Sozialen Netzwerke.

**Summary.** Social Networking Services could strengthen social ties between elderly people and families and friends. Due to the implications of aging and technical barriers existing user interfaces prove to be too complex and therefore not appropriate for most of the elderly. The goal of this paper is to present a holistic solution to enhance accessibility to Social Networks for elderly people. The solution combines an adapted (tablet) hardware, an adapted graphical user interface, and an adapted middleware for accessing the Social Networks.

### 1. Introduction

Social interaction, mobility and an independent lifestyle are key for a healthy and enjoyable ageing. The last years have shown the potential of the Internet and Social Networking Services (SNS) to support personal well-being and social connectedness of elderly people (Bragh and McKenna 2004).

Researchers are facing complex challenges when introducing SNS to older adults. Among the issues that have to be addressed to open the world of Social Networking Services for elderlies are the computer skill prerequisites to take advantage of the Social Web (Czaja et al. 2006). Learning the use of computers and the Internet before they are able to socially interact and communicate with members of online communities can be challenging for elderly people (Xie 2006). Although the number of older adults using the Internet is continuously growing

(Schwaderer and Wieland 2012) research indicates that they still have difficulties to adapt to modern technology (Czaja et al. 2006).

In the project Social Interaction Screen (SI-Screen) we are currently addressing these issues in building a device that supports elderly people in accessing activity awareness information from different SNS, and thereby improving their social interaction. The holistic solution we are developing does not only address graphical user interface issues, but also covers hardware design and middleware issues. In this paper we present the different aspects of the solution. To motivate the solution we first address current barriers to SNS usage and (technical) requirements in Section 2. Then we present our Social Interaction Screen (Section 3) and finally in Section 4 we provide some results from the first prototype validation performed in Germany and Spain.

### 2. Barriers to Access Social Networking Services

Understanding the needs of elderly people is a complex challenge as the study of older generations in retirement age is influenced by numerous variables. Including demographic change, personal characteristics such as age and education, attitudinal factors like computer anxiety as well as cognitive abilities required to learn technology-based tasks (Hawthorn 2000; Czaja et al. 2006).

For building a device that supports elderly individuals to stay in contact with friends and family by making it easier to access activity awareness information from different Social Networking Services, we first looked at our focus group and at the problems they have with current Social Networking Services. In the following, we present a summary of our find-

ings based on our interviews with elders in Germany and Spain (Popp and Vidal 2011; Peris et al. 2011).

## 2.1 A closer look – the Social Interaction Screen Socio-Technological Typology

While the number of older Internet participants ((N)Onliner Atlas 2011) shows, that some elders are able or willing to deal with the shortcomings of current computer solutions, we found that we need more information about our focus group. Perhaps the retired computer freak is not the user we should focus on, as he already has the required skills to use a computer and the services of the Internet.

For this purpose, our partners performed interviews in Germany and Spain (Popp and Vidal 2011; Peris et al. 2011) investigating the personality, preferred social and leisure activities as well as the technical affinity and attitude towards Information and Communication Technology (ICT) of potential users. The analysis of the interviews resulted into a classification of eight personality types presented as Socio-Technological Typology in Figure 1.

interest in ICT and social activities. We do not want to address the Computer Freak and the Net Animal, since they are experienced computer users, and are happy with the existing tools. We also do not want to address the Passive, because it is hard making a convincing argument to those with no interest.

Following the practice of user-centred design (UCD), we created a persona for each personality type in focus for investigating the essential user requirements. Each persona represents a fictional character corresponding to the characteristics of the personality types in focus together with their social relationship to family and friends, their life-events and the individual benefits from SNS.

## 2.2 Implications of aging and User Interface Barriers

Having chosen the focus group, we started to look more closely on the user interface barriers to derive usability preconditions to be considered during product development in order to provide sufficient additional advantage to elderly users.

memory and learning (Hawthorn 2000). Due to the progressive visual impairment affecting sensitivity to contrast, colour, glare and rapid shifts in brightness. Hawthorn (2000) recommends preventing fast changes of text, red-green colour tones and fast animations. Instead designers should concentrate on simplicity, clarity and consistency of the graphical user interface. Further, Hawthorn (2000) points out that the usability of a computer mouse might be a barrier for older users.

When comparing these design requirements with the feedback of our elderly interviewees in Germany and Spain (Popp and Vidal 2011; Peris et al. 2011), we identified the current computing hardware as the main barriers for the elderly when accessing SNS. Existing user interfaces of SNS clients for displaying social awareness streams like desktop or mobile computers are mainly designed for people sitting in front of their computers several hours a day or accessing their mobile devices quite extensively (Burkhard et al. 2011). The downside of this fact is that these user interfaces are inconsistent and complex in design, and therefore not appropriate for most of the elderly.

Following Kelley and Charness (1995), we have two alternatives to lower the barrier for elderly people. On the one hand, we could improve the training programs and encourage elderly people to learn the required skills. On the other hand, we could re-think the user interface design of computing hardware and software. We have chosen the second alternative. In particular, we eliminated the complexity and inconsistency of the user interface by reducing the amount of features and technical choices.

## 2.3 Social Networking Silos

The user interface is important for making a solution useable, but it is not sufficient to limit improvements to hardware and graphical user interface. In the interviews we learned that there is another field to be addressed to make it easy for our focus group to be on Social Networking Services.

While younger generations often maintain their social ties through web platforms like Facebook or Google+, elderly people virtually meet with friends that are usually members of online sup-



**Figure 1:** Socio-Technological Typology – deriving personas and their individual characteristics. Source: Innovationsmanufaktur, 2012. Derived from Popp and Vidal (2011) and Peris et al. (2011).

Looking at the different types of users, we decided that our primary focus group should be Snoopy, Familizer, Shy Guy, Bon Vivant and Social Animal, showing

Often the aging process after retirement is associated with a general physical decline in visual and auditory perception, psycho-motoric abilities as well as

port communities dedicated to the elderly and their personal interests. The difficulty is that users of one web platform are not able to easily participate in the community of another platform – and our user group even hesitates to create one account at all.

The frustration is that every SNS user that wants to socially interact and communicate with persons being members of another web platform has to register and re-provide his personal data to the corresponding operating company (Fitzpatrick and Recordon 2007). Moreover, on every platform end users have to re-establish and maintain their personal network and are confronted with different web site designs and vendor-specific functionality. The findings conclude that elderly people having access to SNS will be presumably locked into a single web platform as the effort of maintaining two separate personal networks is significantly high (also see Yeung 2009). Making it possible to interact with members on one Social Networking Site without creating an account on the site would be a big benefit for our focus group.

### 3. Designing Social Networking Service Access for Elderlies

In our project Social Interaction Screen (SI-Screen) we are aiming at supporting the initiation of social interaction by making activity awareness information from Social Networking Services available to our focus group. In the remainder of this section we will present how we are addressing the user interface and silo issues discussed in Section 2. Regarding the user interface, we found that we first have to deal with the hardware device itself (see Section 3.1), and then the graphical user interface has to be adapted (see Section 3.2). Regarding the silo issue, we first have to address how to connect to different Social Networking Services without dealing with the details (Section 3.3) – and finally, how to get rid of the remaining administrative tasks by separating use and administration (Section 3.4).

#### 3.1 Hardware Device

In the interviews we learned, that the different needs of our focus group start at the level of the hardware. The elderly participants reported about general problems to operate a personal computer (Popp and Vidal 2011; Peris et al. 2011). In Germany for example, a Shy Guy said “I have a new notebook, but do not know how it works!” and a Social Animal complained “I think I will never understand it.” In Spain the Snoopy group was overwhelmed by the complexity of the instructions and the excess of computer functions (Peris et al. 2011). Moreover, interviewees have difficulties handling the mouse as input device and asked for easy handling preferably by only one button (Popp and Vidal 2011). When we asked the elderly participants about desired input devices, some preferred the keyboard and mouse others the input by touch screens (Popp and Vidal 2011; Peris et al. 2011).

In our intent to build a customized hardware specifically designed for elderly people, we created elisa, the elderly interaction & service assistant. Elisa is a Social Interaction Screen realized as tablet device with focus on aspects like ease of use, portability and security. The basis of the hardware design of our partner Porsche Design Studio (PDS) presented in Figure 2 is an 11-inch tablet computer surrounded by a leather-covered frame. The intention for the leather material is to reduce anxiety of sterile compounds of technical devices (Ganz et al. 2012).



**Figure 2:** Social Interaction Screen – the elderly interaction and service assistant (elisa) tablet computer. Source: Porsche Design Studio, 2012 (also see Burkhard 2012).

Apart from the soft framing for the grip zone, PDS also considered a softly

shaped back part combined with a solid stand providing a suitable angle for safe two-hand-interactions. An additional rubber handle attached to the back as well as a carry-on sleeve allow safe transport and protective storage of the tablet. And due to the integrated magnets the tablet can be mounted on walls and pedestal swing-arms. All in all, the combination of the leather-covering of the device together with authentic materials of glass and aluminium for the sturdy stand and the handle bar should convey the feeling that damaging sensitive and precious technology is not possible (Ganz et al. 2012).

#### 3.2 Graphical User Interface

Although mobile applications (apps) for tablet computers are great for integrating external partners from an economical perspective, separating features into various applications with inconsistent layouts is often not graspable (Burkhard et al. 2012). Moreover, current tablet solutions are limited to single users, only. As a consequence, we are replacing the standard graphical user interface (GUI) of the tablet operating system with a fully customized user interface for multiple elderly users.

Our intention is to provide a unified and integrated view across different social communities. For validating our concepts, two layout variations have been elaborated by our partner helios.bz (see Burkhard 2012).



**Figure 3:** Content-centric layout with article content streams offered in magazine-style. Source: helios.bz, 2012 (also see Burkhard 2012).

The content-centric layout (Figure 3) has a clear emphasis on displaying content streams according to the elderly users' interests. The user is invited to browse through the available content, discover topics, and share his findings with people in his per-

sonal network. In the context of the currently displayed content the user is presented with the possibility to discover local events and interest groups.



**Figure 4:** Person-centric layout with activity stream and timeline. Source: helios.bz, 2012 (see Burkhard 2012).

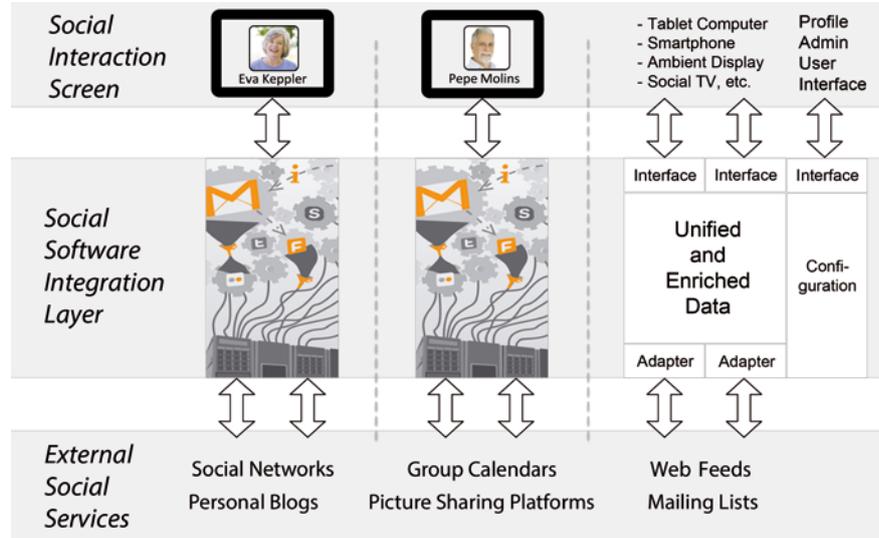
The person-centric layout (Figure 4) emphasizes on the social interaction with family and friends. The user is invited to browse through status messages, activities and shared content like personal photos. Depending on the personal interests, the GUI additionally presents information from peers sharing the same interests.

Independent from the layouts, we are taking the individual personality and technical affinity of elderly people into account. Novices will start with a small set of functionality and simple taps on interactive elements. Over time, the elderly user will discreetly discover new functionality and can voluntarily learn new gestures like swiping by digital tutorials. More advanced users can always pre-select the functionality they would like to use.

### 3.3 Social Software Integration Layer

To address the silo issue, we introduced the Social Software Integration Layer (SSIL). The SSIL is a middleware running on a server computer in the Internet that helps the application software of the Social Interaction Screen to give multiple users access to awareness information from SNS without the necessity to apply for a user account. With the permission of active SNS members the SSIL aggregates their user profile data, activity and content streams to be consumed by the elderly users.

The SSIL is based on the CommunityMashup data integration solution (Lachenmaier et al. 2012) enabling multi-user multi-device access to external



**Figure 5:** Social Software Integration Layer making SNS accessible. Derived from Lachenmaier et al. (2012).

social networking websites, social content sharing platforms, group calendars as well as website feeds of local communities (Figure 5). For data exchange purposes, the CommunityMashup Android Framework (Lachenmaier et al. 2012) for mobile devices securely connects to the user-specific CommunityMashup service endpoint ensuring restricted access to personal data.

### 3.4 Admin User Interface

One of the desired improvements, suggested by our interview participants, is the possibility to have remote assistance when technical issues arise (Popp and Vidal 2011; Peris et al. 2011). For this purpose, the Profile Admin User Interface (Figure 5) provides persons of trusts with access to the administration website of the SSIL to help with configuration tasks such as linking the personal profile of an elderly user with existing SNS and e-mail accounts.

Moreover, the Profile Admin User Interface enables members of SNS to share their activity awareness information. As a consequence elderly users can participate in multiple SNS communities without having to be a member of the platform. This possibility is available for SNS providing web-interfaces with open authentication protocols.

Thus, with the help of their family, friends or support staff elderly people can get rid of the remaining administrative tasks by separating use and adminis-

tration. In case elderly people are already familiar with technical configuration, they are still able to perform the administrative tasks on their own. So on the one hand technical details are transparent to novice elderly people. But on the other hand control still remains with end user with advanced computing skills.

## 4. Validation of the First Prototype

In the first validation, Barberà et al. (2012) presented the elisa hardware concepts on paper and the GUI design as clickable mock-up application to 10 elderly interviewees in Germany and 10 in Spain. The hardware and user interface designs were very well perceived. Most of the participants would like to enjoy the same functionality on their own PC or laptop and some would even consider to acquire an additional elisa tablet besides their computer. A majority of the participants would prefer to use the tablet by placing it with the stand on the table. Even though most interviewees feel more comfortable using the tablet in their home environment, all participants stated they would take the portable tablet out of home especially for a trip. The maximum tablet weight accepted is about 600 Gramm (Barberà et al. 2012).

The elderly participants found the idea of having an integrated view across SNS and the remote assistance very attractive.

The majority preferred the content-centric layout over the person-centric layout as they would feel more familiar with the design. The interviewees also demanded a consistent logical structure by dividing content into three separate columns, provide more comprehensible navigation and add visual aids for orientation (Barberà et al. 2012).

## 5. Conclusion and Outlook

In this paper we first presented results of an interview study on barriers to effective use of Social Networking Services by elderly people. We identified different aspects of the user interface and the lock-in of Social Networking Services as the main barriers. On this basis of this analysis, we elaborated a portable tablet hardware and graphical design prototype with respect to the needs of elderly people.

To overcome the barrier of Social Networking Site silos we introduced the Social Software Integration Layer integrating distributed online communities based on the CommunityMashup solution. Finally, by extending CommunityMashup with the Profile Admin User Interface we are able to relieve administrative tasks from elderly users by reassigning technical configuration to an assisting person of trust.

With the valuable feedback from our interviews with the potential customers on the tablet hardware concepts and visualization designs, our next step is the implementation of the interactive user interface that will be tested on the physical full-size model of the tablet hardware.

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