The Smartphone – a Mobile Companion for Older Adults

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Abstract. This paper develops an understanding of the areas in which the authors believe the adoption of smartphones may significantly impact the life of older adults, namely: i) prevention of isolation, ii) promotion of autonomy and quality of life and iii) improvement of health condition. In this context, Fraunhofer Portugal is developing Smart Companion, an Android customization for older adults, which already addresses the first area and will, in the near future, focus on the remaining ones.

Keywords: Smartphones, Older Adults.

1 Background

Nowadays population is aging rapidly and should reach historical levels in the next years. Recent projections foresee that by 2060, 30% of Europeans will be 65+ years old [1]. This demographic change is shaping a new society with fewer young people and an ever-growing number of older adults [2]. This reality urges one to think about the needs of seniors in order to understand how to improve their life in a society so far tailored for younger people's needs.

The aging process is responsible for changes in the perception, cognitive and motor systems [3]. Nevertheless, if properly stimulated, it is possible to slow down or decrease the effects of some changes in these systems. Modifications in the body are not the only ones to occur; the number of friends also tends to decrease [4]. While younger adults grow large social networks with the objective of finding a mate, older adults concentrate on the most satisfying and humanly rich relationships striving for an emotional balance [5]. If we consider that most older adults live alone [6], one quickly understands how the loss or the geographical separation from loved ones can minimize the opportunities for social interaction.

Despite the growing number of seniors, technology is still mostly designed to suit younger users' needs and characteristics. Besides, even though seniors are receptive to technology [7], in most situations they avoid it because its objective is not clear to them or because it ignores their characteristics and is, therefore, impossible to use [7].

Studies [8] suggest that touchscreens can remove barriers that in the past have kept older adults from starting to use computers. For example, unlike the mouse or the keyboard, touchscreens enable the direct manipulation of the user interface [8], which may ultimately enable a more natural and intuitive interaction. Touchscreen enabled devices, such as smartphones, are becoming widespread. Trends suggest that in the near future, the already large market of smartphones, will be the dominant status quo. With time, these devices should reach seniors as well. When that happens, these devices have the potential to nurture the integration of older adults in the information society, for instance, by giving them access to services available on the Web.

The next section, describes how the authors believe smartphones may benefit seniors' lives. However, that will only happen if their characteristics and goals are met.

2   Benefits of the smartphone for the older user

Smartphones may positively impact older adults' lives in a number of different areas, namely: i) prevention of isolation; ii) promotion of autonomy and quality of life; and iii) improvement of health monitoring and condition.

The smartphone can prevent isolation by fostering interaction opportunities with friends and family remotely. It can be argued that although traditional phones already support phone calls, videoconference and text messages, their current user interface design has, so far, prevented many senior users from using them. According to the results of a questionnaire the authors applied to a group of 35 seniors (aged 58 - 91, average of 71), 82% of them were able to start a call, but only 29% were able to send a text message or read a received one. These results show that current user interfaces are far from adequate to older adults' characteristics and therefore prevent them from easily achieving their objectives.

As far as the promotion of autonomy and quality of life is concerned, the authors consider there are several unexplored opportunities regarding seniors' daily routines. Activities such as checking the weather can be performed without an Internet connection, however one needs to wait until the next weather forecast is broadcasting. With the necessary design adaptations, applications of this type (e.g.: calendars, to-do lists and medication reminders) have the potential to offer seniors a set of much more convenient tools.

Concerning health, with the appropriate applications, the smartphone has the potential to detect falls and to monitor the physical activity of the individual [9] as well as to detect abnormal activity in the lungs or in the heart [10]. From a prevention point-of-view, the smartphone can also be used for cognitive stimulation, for instance, through the use of games and charades.

3   Smart Companion – a Mobile Companion for Older Adults

The Smart Companion (SC) is an Android customization which aims at being a companion permanently available to support seniors in their daily activities through a number of tools, from messaging to music players applications.

The design and development of the SC followed an iterative design approach; therefore (re)designs took place according to the results of evaluations with end-users: 35 users of a day care centre from Porto.

The authors evaluated different dimensions of the user interface, namely: content, graphic and interaction design as well as the information architecture. About 40 tests were conducted with an average of six participants per test. The outcome of these tests provided directions regarding, for example, the minimum readable font size (25px for a 800x480 screen resolution), the type of icons older adults prefer (strongly related to their mental models), the minimum spacing between buttons and the behaviour they expect buttons to have. It also became clear that the user interface should be strongly sequential and that special attention should be given to using expressions that relate to the universe of the user. Users' informal feedback also confirmed the receptiveness of the SC and its several applications.

4   Discussion and Future Work

Smartphones have the potential to support older adults in areas such as: i) prevention of isolation, ii) promotion of autonomy and quality of life, and iii) improvement of health

condition. Nevertheless, in order for this leap to occur, user interfaces have to respect the characteristics of seniors and to be adapted to their goals and needs.

SC includes a number of applications that aim at the prevention of isolation; in the future, applications for the two remaining areas should also be considered, through systematic cycles of analysis, design and evaluations with end-users.

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