
Designing Interactions for the Ageing Populations

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Abstract

We are experiencing two revolutions: ubiquitous digital technology and world-wide population aging: digital devices are becoming ubiquitous; and older people are becoming the largest demographic group. However, despite the recent increase in related CHI publication, older adults continue to be underrepresented in HCI research as well as commercially, further widening the digital divide they face and hampering their social participation. Therefore, the overarching aim of this workshop is to increase the momentum for such research within CHI and related fields such as gerontechnology. For this, we plan to create a space for discussing and sharing principles and strategies to design interactions and evaluate user interfaces for the aging population. We thus welcome contributions to empirical studies, theories, design and evaluation of user interfaces for older adults. Concretely, we aim to: map the state-of-art of senior-centred interaction research, build a multidisciplinary community of experts, and raise the profile of this research within SIGCHI.

Author Keywords

Older adults, user interface design, cognitive models, empirical studies, accessibility, cognitive psychology, gerontology, gerontechnology

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Introduction

Both developed and developing nations are experiencing rapid ageing of their populations: those age 65+ years old are expected to comprise 27% and 15% of these nations' population, respectively, by 2050 [3, 5]. Although issues related to older adults are receiving substantial attention in other areas of research e.g., Gerontology, Accessibility, Cognitive Psychology, the HCI community might contribute more. Ageing is associated with a multitude of biological, cognitive, and social changes that impact the use of technology [4]. Age also brings new opportunities, which well-designed user interfaces could support, such as increased spare time, strengthened family connections, and new learning and travel opportunities. However, the digital revolution has not adequately considered the needs of the ageing populations. Two trends have been observed in this new era, which threaten the relationship between technology and the older adults: (i) size of the digital devices, over the time, has been decreasing (from Desktop to Tablet, from Smartphone to Smartwatch) and (ii) after the IoT revolution, sensor based devices become ubiquitous. Due to decline in sensorimotor abilities, older adults may have difficulty accessing and using those devices. Although older adults constitute an increasing proportion of the population, the majority of research on HCI, as well as industrial companies, focuses almost exclusively on younger adults. As a result, even though digital device ownership among older adults has significantly increased in recent years [2], device adoption level for is still low (for example., smartphone ownership in the US is at 42%% for old adults as of

2017, whereas 92% of young people aged 18-29 are smartphone owners [2]). Consequently, older adults may be losing the possible benefits and opportunities from this growing digital era [1, 4, 6].

This submission builds on a successful workshop at CHI 2017 in Denver [15] by extending its context from mobile-only into all-encompassing interaction. *The goal of this workshop is to discuss suitable design and evaluation strategies of user interfaces in digital devices as well as to coordinate efforts, raise awareness of HCI as it affects older adults and to rethink designing and evaluating senior-centred interfaces.*

Focus Areas

This workshop focuses on discussing different user interface design methodologies, which will help older adults to access current digital technologies. For example, "mobile device" is one of the prominent current and future forms of mobile computing, including phones, tablets, and wearables. Mobile devices' ownership rates for older adults are increasing [2], yet there are very less concrete principles for designing for older adults [1, 4]. Absence of guidelines risk marginalizing older adults by increasing the barriers toward their digital participation. Further, evaluating both the usability and the social and personal benefits of older adult friendly mobile interfaces is challenging and not well supported by existing HCI [6]. Overall, we think that by providing easier access to information through digital devices, older adults can be better involved in and their *Quality of Life* will be enhanced.

Workshop Goals

CHI is one of the most multidisciplinary research communities. In recent years it has made tremendous progress in supporting many marginalized user groups

(e.g. low literacy, developing countries, accessibility) or in addressing critical societal needs (e.g. sustainability, inclusion). We believe it is now timely to more systemically investigate how, as a community, we can leverage such advances in research and design and better support the safety, health, social, or digital inclusion needs of older adults. While recent years have seen an increase in such research activity at CHI, it has mostly materialized in the form of isolated publications. Yet there is increasingly-strong evidence that HCI researchers are getting interest in this topic. This is exemplified by the very large attendance (more than 50 participants) to our first Special Interest Group (SIG) on Older Adults, held at CHI 2016 [13], or by the numerous submissions received by recent workshops such as Re-imagining commonly used mobile interfaces for older adults in MobileHCI 2014 [11], and 2nd Workshop on Designing with Older Adults: Towards a Complete Methodology in MobileHCI 2015 [12] or the first-ever international symposium on Interactive Technology and Ageing Populations [14], held in October 2016. In continuation to that, we conducted a workshop on Designing Mobile Interactions for the Ageing Populations at CHI 2017 [15] which attracted people from areas like Gerontology, Accessibility, and Psychology other than HCI. All the recent events were co-organized by the proponents of this proposal. Capitalizing on this recent increase in interest, this workshop aims to reach three goals as follows:

Enriching the Research Repository

In our CHI 2017 workshop, researchers from various fields participated in synthesizing and collating findings from different disciplines, and *discussed* efficient, effective, usable, and easy-to-adopt technologies and more appropriate methods. This workshop, will enrich

the repository by broadening discussion about interface design *in digital devices*.

Continuing Community Building

Senior-centred research and development is currently conducted in academic and industry research labs in a rather disjoint manner. Emulating last year, this workshop's goal is also to link the SIGCHI community with researchers and practitioners across academic disciplines (such as the Gerontology, Cognitive Science, Psychology, Cognitive Neuroscience) and industries who are actively working or having interest toward understanding older adults' technology use. For future collaborations, mailing lists and post-CHI activities (e.g., a symposia/summer school) will be established.

Raising Awareness

Interactive technologies for seniors is a significant market of interest for industries, expected to grow from US\$ 2 billion to an estimated US\$ 30 billion in the next few years [7]. This is a natural reflection of the size of this user group (in the US, about 45 million seniors today to 67 million expected in 2050, according to Table 4 in [8]). Yet interest in HCI is still relatively small (less than 1% of all CHI 2015 accepted submissions across all tracks can be categorized as focused on older adults). This workshop aims to raise awareness of the challenges and research opportunities in this field.

Workshops Themes

We suggest several relevant themes for guiding the participants' position papers and discussions during the workshop.

Current Issues

Older adults face many problems while accessing user interfaces in digital devices. This topic will focus on discussing issues related to human factors, perception,

memory, and motor movement of older adults, and how these issues affect the design of senior-based UIs.

Opportunities

Various models of technology acceptance suggest that adoption is facilitated if users, especially older adults, see a value from starting to use that technology. As such, we will initiate discussions on identifying opportunities to sustain some of the current activities that older adults engage in, and on determining how to better support these activities through appropriately-design interactions or user interfaces.

Social benefits

Many seniors live increasingly isolated, not only physically, but also without a strong social network [16]. This is expected to become increasingly critical, as the adoption rate of new technologies that could support social connectivity decreases with age (especially in retirement). We will discuss design opportunities and challenges to facilitating social connectivity and social participation (e.g. in family life) by older adults.

Models and Design

Various theories (perceptual, memory, cognition, motor movement related) and design principles (e.g., participatory design, ability-based design [10]) have been proposed to develop user interfaces for older adults. This topic will focus on discussing the state-of-the-art models and design principles for user interfaces of older adults. For example, as current mobile interfaces tend to follow a “one design for all” approach, the model parameters can be further tuned to cover individual differences among aged people and ability-based design and optimization principles can be

implemented to find the effective senior-based user interface design.

Evaluation Methodologies

Evaluating senior-based user interfaces still face many challenges, particularly in accurately understanding the preferences, habits, and adoption challenges of older adults with digital devices [4]. For example, there is growing evidence that younger adults' help their grandfather or grandmother to learn and encourage to use technology [9]. More accurate questionnaire and ethnographic studies are required to understand people's behavior to interact with different digital devices more clearly (e.g., using remote switch to turn on digital appliances). This topic will focus on discussing the existing evaluation methods, to discuss how suitable is the current methods to judge the efficacy of the user interface design, and identify future research opportunities.

Applications

Digital devices open up many new possibilities and opportunities for older adults. This topic will discuss what some potentially useful applications for older adults are. For examples, text-entry methods on mobile devices can enhance the usability of messaging applications. Games and social VR applications have the potential to improve the wellbeing of older adults. We will conclude with a list of future opportunities for applications.

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