Designing Interactions for the Ageing Populations – Addressing Global Challenges

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Abstract
We are concurrently witnessing two significant shifts: digital devices are becoming ubiquitous, and older people are becoming a very large demographic group. However, despite the recent increase in related CHI publications, older adults continue to be underrepresented in HCI research as well as commercially. 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 (UI) for the ageing population. We thus welcome contributions of empirical studies, theories, design and evaluation of UIs for older adults. Building on the success of last two year's workshops, we aim to grow the community of CHI researchers across borders interested in this topic by fostering a space to exchange results, methods, approaches, and ideas from research on interactive applications in support of older adults that are reflective of international diversity that is representative of CHI.

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

Introduction

Both developed and developing nations are facing rapid ageing of their populations: people aged over 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 UIs 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 ageing populations.
Two trends have been observed now, which threaten adoption and use of technology by older adults: (i) size of digital devices, over the time, has been decreasing (from Desktop to Tablet, Smartphone to Smartwatch) and (ii) after the IoT revolution, small, sensor-based devices have become ubiquitous. Due to normative decline in sensorimotor abilities with age, both trends disadvantage older adults' access to those devices.
Although older adults constitute an increasing demographic segments, the majority of research in HCI, as well as by technology 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 53% for older adults as of 2019, whereas 96% 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 2018 [16] We aim to enrich our collective knowledge and body of practice by fostering an inter-disciplinary sand international space of idea sharing and community building. New for 2020, we strive to include HCI researchers whose work is applicable to older adults and is representative of geographic and cultural diversity within CHI and specifically the socio-economic and cultural contexts surrounding broad categories of older adults. For example, this may include those working on interactive AI systems or voice assistants, or those studying the empowering technologies within the Global South. *The goal of this workshop is to discuss suitable design and evaluation strategies of UIs in digital devices as well as to coordinate efforts, raise awareness of HCI as it affects elderly and to rethink designing and evaluating senior-centred interfaces.*

Focus Areas

This workshop focuses on discussing different UI design methodologies (as in ways of investigating design/use), 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 device ownership rates for older adults are increasing [2], yet there are fewer concrete principles for designing for older adults [1, 4]. Voice assistants (e.g. Alexa) are advertised as helpful for seniors, yet they are not designed for seniors. to be culturally and personally relevant to specific groups. Further, evaluating both the usability and the social and personal benefits of older adult friendly mobile and other intelligent interfaces (e.g., conversational UI, IoT interface, AI systems) is challenging and not well

supported by existing HCI [6]. Overall, we think that better access to information through digital devices will provide elderly more opportunities for social connection and an enhanced sense of belonging in digital society.

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). It is now timely to more systemically investigate how we, as a community, 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 becoming interested 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. As a continuation, we conducted a workshop on Designing Mobile Interactions for the Ageing Populations at CHI 2017 [15] followed by the workshop on Designing Interactions for the Ageing Populations at CHI 2018 [16], which attracted people from diversified areas like Gerontology, Accessibility, and Psychology. 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:

Enriching the Research Repository

In our CHI 2018 workshop, researchers from various fields participated in synthesizing and collating findings from different disciplines, and d*iscuss*ed efficient, effective, usable, and adoptive technologies and more appropriate methods. In this workshop, we will enrich the repository by providing more implications 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 disjointed manner. Llike last two years, 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 (e.g., Amazon Alexa, IoT systems) 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 (16% of population [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, with a renewed focus on elderly across the globe in diverse socio-economic and cultural contexts.

Workshops Themes

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

1. Current Issues

Older adults face many challenges while accessing UI 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.

2. 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-designed interactions or UIs.

3. Social benefits

Many seniors live increasingly isolated, not only physically, but also without a strong social network. This is expected to become increasingly critical, as the adoption rate of new technologies that could support social connectivity [18] 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.

4. Models and Design

Various theories (perceptual, cognition, motor movement) and design principles (e.g., participatory design, ability-based design [10,17]) have been proposed to develop UIs for older adults. This topic will focus on discussing the existing models and design principles for UIs of older adults. For example, as current mobile interfaces tend to follow a "one design for all" approach, model parameters can be further tuned to cover individual differences among elderly and ability-based design and optimization principles can be used to find effective UI design for older adults.

5. Evaluation Methodologies

Evaluating senior-based UIs 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). In developing countries, older adults face issues in dealing with cashless transactions on mobile devices. This topic will focus on discussing the existing evaluation methods, to discuss how suitable is the current methods to judge efficacy of the UI design, and identify future research scopes.

5. 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 apps.

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