Chapter 1

Challenges in Developing Applications for Aging Populations

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ABSTRACT

Elderly individuals can greatly benefit from the use of computer applications, which can assist in monitoring health conditions, staying in contact with friends and family, and even learning new things. However, developing accessible applications for an elderly user can be a daunting task for developers. Since the advent of the personal computer, the benefits and challenges of developing applications for older adults have been a hot topic of discussion. In this chapter, the authors discuss the various challenges developers who wish to create applications for the elderly computer user face, including age-related impairments, generational differences in computer use, and the hardware constraints mobile devices pose for application developers. Although these challenges are concerning, each can be overcome after being properly identified.

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INTRODUCTION

An aging population presents several challenges in ensuring that our infrastructure can support the needs of elderly people, enabling them to live healthy, independent, and productive lives. According to the United Nations Population Division statistics, at the end of 2009, the elderly population reached 737 million, accounting for 10.8% of the total worldwide population. In the year 2025, it is projected that the elderly population will account for 15% of the total population (Majumder, Rahman, Zerin, Ebel, & Ahamed, 2013a; United Nations, n.d.). As the elderly population increases and people continue to live longer, more people will require help with various aspects of daily living and disease management. Doctors and caretakers may need to monitor the wellbeing of more elderly individuals, while keeping the costs of enacting such monitoring low. Elderly individuals, who may be suffering from aging-induced ailments, may also take measures to remain active and social.

These are all concerns that computer applications can assist with. Applications like email, video telephony, web browsers and reminder management services are able to support and enrich the daily lives of older adults. However, often these applications can be difficult to use for the elderly individual. In general, when developers are creating usable applications for the elderly they need to consider three main types of challenges: sensory-based challenges, challenges arising from cognitive decline, and generational differences. Mobile application developers need to consider these challenges as well as additional mobile specific challenges, such as interface constraints and the size of the device.

Aging is often accompanied by a decline in sensory abilities. Vision loss is relatively common in most older populations, afflicting individuals who are over the age of 60 more prominently (Phiriyapokanon, 2011). In addition, roughly 30% of adults over the age of 65 (Mahncke et al., 2006) have some form of hearing loss, which can interfere with face-to-face communication and make using the telephone more difficult. Vision and hearing loss attract the most attention, but one’s sense of smell and taste diminish with age as well. In addition, sensory decline is not consistent across the elderly population; some users may experience no significant decline in one sense, and others may experience an impairment of multiple senses, which can be an especially challenging scenario.

Cognitive and motor skills can also decline with older age. Cognitive decline may also afflict elderly individuals in varying ways; older patients with cognitive impairment can develop difficulties in remembering and correctly adhering to instructions, causing activities such as cooking and driving to become dangerous. Elderly individuals may also find that older age and accompanying illnesses (such as arthritis) can impair their motor abilities, making precise movements painful and more difficult (Nunes, Silva, & Abrantes, 2010).

Elderly users also may have less experience with or fear using computers, which can affect how they expect a computer to work, or what sorts of expectations they have regarding computer use. Elderly users may also take longer to perform certain activities, and to read instructions and textual information (Coyne & Nielsen, 2001; Nielsen, 2013). They also can be reluctant to do something they think will cause system failure. Introductory classes may also help reduce fear of using computers (Morris, 1992), but unfortunately many retirement homes provide very limited or no access to personal computers.

Mobile computing devices offer additional opportunities for the elderly adult user, who may look to using mobile devices to track activity and health parameters on-the-go. In fact, it has also been projected that by the year 2014, public and private healthcare providers could save between $1.96 billion and $5.83 billion in healthcare costs worldwide by utilizing mobile health application technologies for health