
Extending the Private and Domestic Spaces of the Elderly

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Abstract

This paper discusses 3D Virtual Worlds as systems for extending the traditional social spaces of the elderly. First, we highlight some weaknesses of existing systems. Then we briefly review the potential of 3D Virtual Worlds. Finally, we propose a system for use by elderly people.

Keywords

Virtual Worlds, Immersive Technology, Sociotechnical Systems, HCI, Gerontechnology, Aging.

ACM Classification Keywords

H.5.1. [Information interfaces and presentation (e.g., HCI)]: Multimedia Information Systems---artificial, augmented, and virtual realities.

General Terms

Design, Human Factors, Theory.

Introduction

Technology and its advances give us many opportunities for enhancing our lives. Yet, there are still design issues especially with systems for use by the elderly, which consequently fail to meet needs and expectations. In turn, this leads to lack of usage and adoption among the elderly.

One reason for the failure is that frequently, design is very much technically driven and focuses on other age groups than the elderly as design targets. Another reason for failure is our vague understanding of elderly people.

The purpose of this paper is twofold. The first is to show some weaknesses of existing systems. The second is to present 3D Virtual Worlds as systems with the potential to overcome some of these weaknesses and to enhance the traditional social spaces of the elderly.

State of the Art and Issues

Current technological advancements promise very exciting opportunities for providing support and a higher quality of life for the elderly. To this end, several types of systems (e.g. health/telehealth systems, ambient technologies etc.) exist that seek to address different areas in the lives of the elderly. The focus of this paper is on social systems that enable elders to maintain connections with family and friends, and offer them leisure activities.

When it comes to designing solutions that offer social support to the elderly, Lindley et al. [6] argue that technologies for elders are often built on assumptions and theories, sometimes implicit, about their social connections. Some approaches understand elders as a socially isolated group that needs to strengthen connections with family. Others conceive them as a group that may benefit from being monitored, or as a group who have a special role to play in the lives of their grandchildren.

A number of studies highlight results that disagree with some of the assumptions made about social relationships during design. For example, in a study by Mueller et al. [7], a large-screen display was deployed as part of a design project in a retirement home for the elderly. Although it was expected that this would help foster social interaction among the residents, the results were otherwise. Preferences in socializing with other residents influenced the acceptance of activities offered during the study.

Another study by Neufeldt [8] sought to investigate the social impact that cooperative gameplay with the Nintendo Wii could have on the elderly. Also set in a retirement home, the results were again largely unpredictable. Unlike similar studies with the elderly which had been mostly successful, many of the problems faced centered on usability issues relating to input devices. Indeed, a few studies (e.g. [9] and [10]) have argued against the categorization of the elderly as a single group with equal abilities.

A few relatively successful systems such as instant messaging and voice over IP exist for use by the elderly. However, these systems are isolated and rely on a general framework of design rather than addressing the individual needs of a particular group. For example, they may not appeal to elderly users who prefer multi-modal interaction with multiple members of their family. Another system, Social Media For All (SOMFA) [2], aggregates web content such as online news for display on Television. Yet, this solution may not be ideal for users needing two-way interaction between distant locations. Thus we need a solution that integrates the features of isolated systems and appeals to the needs of the elderly.

The Potential of Virtual Worlds

Virtual environments have existed for some time now. However, it is only in the last few years that a number of online world-like environments (e.g. World of Warcraft, Kaneva, and Second Life) have cropped up on the internet. They continue to gain popularity for interactive use and, quite recently, for research and design. The increased attention is due in part to advancements in socio-technical aspects such as Web 2.0 which in turn have led to an increase in opportunities for elderly users.

In addition to a number of other benefits, Damer and Bruckman [4] suggest that advancements in online virtual worlds present a new frontier for cooperating communities because users are able to navigate through digital spaces, communicate with other users, build structure, teach, learn, and engage in a variety of collaborative activities. Similar sentiments are echoed by Bainbridge [1] who points out that developments involving virtual worlds offer the possibility of new kinds of research in social and behavioral sciences, whilst raising interesting challenges for computer and information science.

As a platform, 3D Virtual Worlds support advanced realistic voice chat (in addition to text chat and instant messaging) featuring 3D mapped voice along with speech gestures [3]. Also, 3D Virtual Worlds offer new ways to navigate multimedia content such as streaming audio and video collections. They also allow for browsing information and document collections in 3D virtual spaces. Users can engage in virtual tourism, play multi-player games, buy, sell and advertise virtual and real life goods and services. Underlying all these functions is a futuristic mode of interaction.

Proposed Design

3D Virtual Worlds are an example of current technological advancements. They provide a rich set of integrated tools that offer massive potentials for enhancing the traditional social spaces of the elderly. In particular, 3D Virtual Worlds like Second Life for example, are suitable because researchers have full control over the environment which can be built, managed, operated, and controlled unlike any other environment.

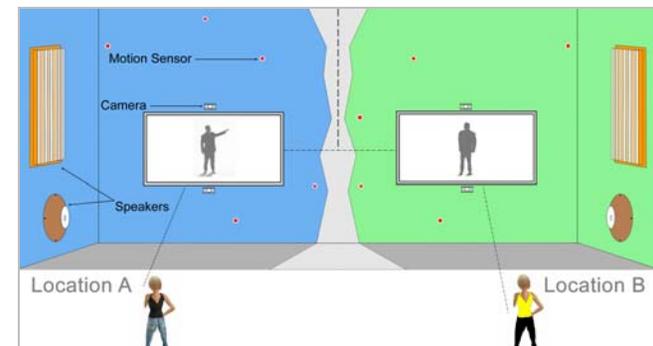


Figure 1: An abstract low fidelity prototype of our multi-user system with its basic input-output components.

Virtual worlds could be used to entertain the elderly, especially those with physical disabilities. They could also help them combat social isolation and loneliness. Using a combination of large screens, special joysticks, eye-tracking control, voice navigation, and motion-sensitive controllers, Boulos [3] suggests that virtual worlds can be suited to provide accessibility not only for the elderly in general, but especially those with physical disabilities.

We propose to design an integrated system using Open Simulator. Software features will include voice and speech recognition, natural language processing scripts (for intelligent Virtual Agents), and eye or motion tracking software. The hardware components will include large screen displays, microphones and speakers, and eye or motion tracking devices. Because the elderly have different capabilities in using devices such as keyboards and mice, our focus will be on innovative input devices that require less physical effort to use.

Conclusions and Outlook

Designers often seem more interested in making technological products as general as possible [5]. However, user groups such as the elder are different, have different abilities, and lead different forms of life. New designs are often motivated by hypotheses about the nature of relationships of the elderly, and it is through their deployment that we have actually come to learn about the strength of these assumptions. The next steps in our research will involve high level prototyping within Open Simulator and a full featured requirements analysis.

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