Reminiscence Systems

Maurice Mulvenna
University of Ulster
School of Computing and Mathematics
Faculty of Computing and Engineering
+442890366591
md.mulvenna@ulster.ac.uk

Huiru Zheng
University of Ulster
School of Computing and Mathematics
Faculty of Computing and Engineering
+442890366591
h.zheng@ulster.ac.uk

Terence Wright
University of Ulster
School of Art and Design
Faculty of Art, Design & Built Environment
+442890267320
t.wright@ulster.ac.uk

ABSTRACT
This paper discusses the role of reminiscence systems, used to support reminiscing work. It is intended to provide an overview of the area of reminiscing research and to define the technologies that are used in such research. Recommendations on future directions in reminiscence systems research are provided.

Categories and Subject Descriptors
H.1.2 [**User/Machine Systems**]: *Human factors, Human information processing, Software psychology*.

H.5.2 [**User Interfaces**]: *Evaluation/methodology, Graphical user interfaces (GUI), Input devices and strategies (e.g., mouse, touchscreen), Interaction styles (e.g., commands, menus, forms, direct manipulation), User interface management systems (UIMS)*.

General Terms
Design, Human Factors

Keywords
Reminiscence systems, Reminiscence therapy, Inclusive interfaces.

1. INTRODUCTION
In Europe by 2050, it is estimated that one-third of Europe's population will be over 60. The number of 'oldest old' aged 80+ is expected to grow by 180% [6]. For example, in 1951, there were 300 people aged 100 and over in the UK. By the year 2031, it is estimated that this figure could boom to 36,000 [2]. Life expectancy has been rising on average by 2.5 years per decade in Europe. This growing number of people with significant leisure time available, often socially isolated, who will live for longer, may benefit from the therapeutic stimulus offered by reminiscing activities, either individually or offered via networked services.

2. THE CONTEXT FOR REMINISCING
As we age, we gather a large number of life experiences, many of them signifying important life stages, for example, as our family grows, as we impact on the world, and as the world impacts on us. An old photo, of sentimental value, can mean everything to a person, becoming imbued with tremendous significance and often-talismanic importance. These artefacts, whether a location, person or event, or indeed a photo of such an artefact, become the stuff of reminiscing, fuelling what is viewed as a therapeutic process, that, when managed, offers benefits [8][12], but can reinforce feelings of isolation and depression when unmanaged.

As people age, they accrue more life experiences, but they also increasingly face old age alone, especially in developed economies, as the demography of the post-war (1939-45) period impact on societies today. The 'baby boomers' of the post-war period are now of retirement age, and this increase in numbers of older people is putting increasing strain on social and health services. It is projected that within the next fifteen years, over 70% of UK households will comprise of people living alone, where a majority will be elderly people. This large body of people, each of who may 'own' many sets of shared experiences, has no real facility to use material for reminiscing or share these and to enjoy the therapeutic benefit arising from sharing.

Reminiscing includes a range of activities and traditional tools aimed at stimulating thoughts, feelings and memories of times gone by. For example, these could be recalling significant cultural issues, events, old friendships or places. Reminiscing can help elderly people to improve health and wellbeing. The impact of reminiscing therapy as an intervention has been demonstrated for a range of populations; primarily for people with dementia.

3. REMINISCING RESEARCH
Reminiscing includes activities and the use of traditional prompts aimed at stimulating feelings and memories; e.g., the use of multi-sensory triggers to stimulate recall [7]. The majority of research in reminiscence systems has been carried out to assist people with dementia and related illnesses [1][13]. The impact of reminiscing therapy as an intervention has been examined; e.g., Wang [14] demonstrated how it was valuable and beneficial to people with dementia although Woods et al. [15] found inconclusive evidence of the efficacy of reminiscence therapy for dementia in a Cochrane Review. However, it has been shown that reminiscence in general, but especially life review, are potentially effective methods for the enhancement of psychological well-being in older adults [3] and the therapeutic potential of place-based reminiscence has been proposed as an avenue in enhancing the quality of life for older people in long-term care facilities [4], sometimes using remote reminiscing facilities [9].

4. REMINISCENCE SYSTEMS

We define *Reminiscence Systems* (RS*)* as the use of technology to support reminiscence work. While this may include basic tools such as paper-based prompt cards, generally RS technology is considered to encompass the use of information and communications technology (ICT). The use of ICT in RS has evolved as computing technology has developed in sophistication and usability.

The use of multimedia in RS was arguably the first stage in the growth of research in RS supported by ICT, and there are a significant number of research projects and publications highlighting such work [10]. It is natural, perhaps that reminiscing work, which uses visual and hearing senses (as well as other senses) could be enriched with multimedia material encompassing photographs, videos, audio recordings, music as well as historical material from newspapers, for example.

The multimedia paradigm also lends itself to extending the concept of *memory books*, used in traditional reminiscence work, where a carer or family member compiles a personal scrapbook with images and pictorial mementos of a person's life. Using multimedia, the RS can animate the material thus making it more attractive and attention holding than a paper-based scrapbook. However, since the process of creating a memory book is itself a process rich in reminiscing opportunities, care must be taken not to replace this type of work with a more mundane and less user-centred multimedia authoring process.

In order to make RS as accessible as possible to reminiscers (and their carers), the interface of such systems must be as usable as possible. This is particularly important where the user is not a computer user normally (as is currently often the case for carers) and/or for when the system has to provide cognitive support, for example to people with dementia. Touch screen devices are becoming increasingly used in RS for people with dementia as the primary mode of interaction, obviating the need for mouse and keyboard combinations. Touch screen devices, used as a direct input device have been highlighted as requiring little or no training for users [11].

Arguably the next opportunity in RS research and development, building upon touch screen access to computers with rich multimedia content, is the potential for the Internet to create new ways for reminiscing to be supported. It may be argued that bespoke, standalone RS will be replaced by highly networked systems that source multimedia material from the 'web 2.0' computing 'cloud' of User-Generated Content (UGC), where 70% of total web content is envisaged to be generated by users in the next few years, on sites such as Flickr, Vimeo, YouTube and using Application Programming Interfaces (API) to social networking sites such as FaceBook. Dix [5] has noted that if Moore's Law continues to hold for 70 years it would be possible to store a continuous record of a life on a single grain of sand.

We believe that there are three main modalities of use for RS. Firstly, the use of an RS by an individual; secondly, more than one person (may be a person and their carer, for example) sharing reminiscences in the same physical space; and thirdly, shared reminiscing where people are physically remote from each other but inter-connected by the Internet.

5. CONCLUSIONS

This paper has described recent reminiscing research activities, in particularly from the perspective of supporting technologies and defined reminiscence systems. The different types of technology supporting reminiscence work are described from the use of multimedia and touch screen technology to the growing importance of UGC and Internet-connected systems for reminiscing. Finally three modalities of use for reminiscing systems are described.

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