Chapter 34
Using Narrative with Avatars and Robots to Enhance Elder Care

Lundy Lewis
Southern New Hampshire University, USA

ABSTRACT

Elderly care is of increasing global concern. The aging population is expected to increase two-fold by 2050. It is anticipated that there will not be enough caregivers to assist the elderly very soon, and thus, researchers are looking at various technologies and potential applications that will help alleviate the problem of elderly care. This chapter examines one such assistive technology: conversational agents in the form of avatars or robots as an aid to decrease loneliness and depression among the elderly and increase the cognitive function and quality of life. The authors discuss the state-of-the-science of research prototypes and commercial off-the-shelf systems. They propose a novel concept and design, and the authors discuss the ethical ramifications of senior citizens possibly bonding with inanimate objects as if they were human companions.

INTRODUCTION

Socialization through narrative and story-telling is important for elder care and quality of life. The elderly enjoy reminiscing and communicating. They enjoy being reminded of past experiences and having conversations with other interested parties such as family and friends about their life history or particular life events. However, there are common reports of frustration that caregivers who are around on a daily basis do not know the elderly person in the way that families do and thus cannot engage in such meaningful conversation. Further, with staff turnover, it is difficult for a single staff member to get to know the patient well enough to provide meaningful conversations about the older person's life history or to generally bond with the patient. And further, due to advances in healthcare, a better understanding of living healthy, and birthing trends, in the next few decades there is expected to be a large number of elderly patients but fewer professional caregivers, thus reducing the amount of time that caregivers can

spend with individual patients beyond the provision of essential services. This prediction holds for all developed countries, most notably for Japan.

To make matters worse, young students in psychology, sociology, nursing, and related disciplines are less interested in elder care than in areas such as child development and disability management. For these reasons, a current interest among researchers and entrepreneurs is to develop ways to allow the elderly patient to enjoy narrative, conversation, and reminiscing without requiring human accompaniment but yet without diminishing the quality of conversation, e.g. by using avatars or robots rather than human caregivers. The idea is worthy of pursuit, but it is a hard problem. A good resource that explores how avatars and robots will be used in the next ten to fifteen years is (Robots+Avatars, 2014). In particular, the resource (Robot-Era, 2014) provides information on research in robotic systems and intelligent environments for the aging population.

Many people will argue that human touch is essential and indispensable for elderly care, where by "human touch" we mean proximity and sympathy with another human being. Others will argue that even if one were able to substitute human touch with some technological device, it would be unethical to do so.

This chapter will explore socialization through narrative from perspectives of both technological possibility and ethical ramifications. In particular, this chapter discusses the possibilities of technologies such as avatars and robots to provide the service of narrative and human touch effectively, i.e. to provide an experience that is at least as acceptable, albeit not identical, to traditional family-oriented conversation.

A challenging question from a technology perspective is how to structure personal knowledge regarding the patient's interests and experiences into an avatar or robot, called *knowledge representation* in the Artificial Intelligence community. A second challenge is how to extract knowledge and insert it into the structure, called *knowledge acquisition*. Clearly, the apparatus must know about some of the patient's history and local or global events occurring during the patient's lifetime and be able to converse interactively with the patient about them. A possible approach is that the elderly person or her/his family could work though exercises in which participants answer questions regarding past experiences. This could be assisted by family, care staff, or students on placement. Answers to the questions could be compiled into a composite view of the person's experiences.

A benefit of this approach to knowledge acquisition is that the process itself may enhance family involvement and personalized care that does not require additional resources or specialized skills. In addition, the same knowledge could be inserted into a humanoid robot whereby the robot converses with the elder person, laying aside for now the question of whether the approach is ethical.

Beyond the knowledge of personal experiences, there could be a standard, public ontology for various geographical locations, events, or time periods that the patient would know about, and to which the avatar could appeal when engaging the patient in conversation. As an example, for a patient in the United States, an ontology describing basic facts about the assassination of President John F. Kennedy and the appointment of Lyndon B. Johnson to the presidency could be a standard ontology or knowledge store. Or, an ontology that contained geographical and temporal facts and relationships about Atlanta Georgia might be useful. An avatar could then use this knowledge to converse with the elderly person in a meaningful way.

Consider a possible embodiment of the avatar to be a cyber-relative of the patient. The patient would be interacting with a representation of a cyber-relative in the form of an avatar, where the avatar has the appearance of the real relative and has knowledge to converse about things relevant to the patient. However, the approach raises ethical concerns, e.g. is the patient being deceived and if so, is it morally right? Do we have a moral obligation not to deceive humans? Does the answer to this question depend on

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/using-narrative-with-avatars-and-robots-to-enhance-elder-care/180612

Related Content

Pipeline Programs Supporting Underrepresented Pre-Health Students
Lillian R. Sims, Carol L. Elam, Joslyn D. Isaac, Jane F. Mbeng Akoand Ima M. Ebong (2022). *Handbook of Research on Developing Competencies for Pre-Health Professional Students, Advisors, and Programs (pp. 366-388).*
www.irma-international.org/chapter/pipeline-programs-supporting-underrepresented-pre-health-students/305107

Knowledge in Action: Fostering Health Education through Technology
Theresa J. Barrett (2016). *Handbook of Research on Advancing Health Education through Technology (pp. 39-62).*
www.irma-international.org/chapter/knowledge-in-action/137956

Narratives of Curriculum Design
Jennifer Lynne Bird (2020). *Using Narrative Writing to Enhance Healing (pp. 129-156).*
www.irma-international.org/chapter/narratives-of-curriculum-design/242501

A Smart Card Based Software System for Surgery Specialties
Nektarios Konstantopoulos, Vasileios Syrimpeis, Vassilis Moulianitis, Ioannis Panaretou, Nikolaos Aspragathosand Elias Panagiotopoulos (2017). *Healthcare Ethics and Training: Concepts, Methodologies, Tools, and Applications (pp. 394-409).*
www.irma-international.org/chapter/a-smart-card-based-software-system-for-surgery-specialties/180593

The Clinician as Educator: Redefining the Medical Educator's Role and Toolbox
Barbara A. Schindler (2020). *Handbook of Research on the Efficacy of Training Programs and Systems in Medical Education (pp. 345-355).*
www.irma-international.org/chapter/the-clinician-as-educator/246637