Chapter 3

A User-Driven Approach to Developing Ambient Assisted Living Systems for Older People: The SOPRANO Project

Andrew Sixsmith
Simon Fraser University, Canada

Sonja Mueller
empirica Gesellschaft für Kommunikations und Technologieforschung, Germany

Felicitas Lull
empirica Gesellschaft für Kommunikations und Technologieforschung, Germany

Michael Klein
CAS Software AG, Germany

Ilse Bierhoff
Smart Homes, The Netherlands

Sarah Delaney
Work Research Centre, Ireland

Paula Byrne
University of Liverpool, UK

Sandra Sroll
University Stuttgart, Germany

Robert Savage
Simon Fraser University, Canada

Elena Avatangelou
Exodus, SA, Greece

ABSTRACT

This chapter describes some of the results of the EU-funded SOPRANO project to develop an Ambient Assisted Living system to promote active ageing and ageing-in-place. The chapter outlines SOPRANO’s experience and application research approach to ensure that end-users are involved in all stages of the research and development. A number of key areas for application development were identified and developed as a set of use cases (or descriptive models), for example for medication reminding, and to support exercise. These use cases were further refined through visualization and iterative prototyping techniques with end-users to ensure usability, usefulness and acceptability for users. The SOPRANO prototype system is described together with future plans for deployment in demonstration sites and field trials.

DOI: 10.4018/978-1-61520-825-8.ch003
**INTRODUCTION**

The challenge of an ageing population requires innovative approaches to meet the needs of increasing numbers of older people within society (Sixsmith & Sixsmith, 2008). In particular there is a need to move from a health and social agenda that emphasizes dependency to one that promotes active ageing and creates supportive environments to enable healthy ageing in the settings where older people live. Emerging information and communication technologies (ICTs) such as “pervasive computing” and “ubiquitous computing” have considerable potential for enhancing the lives of many older people throughout the world and helping them to “age-in-place” (Sixsmith & Sixsmith, 2008). Ambient Assistive Living (AAL) refers to information and communication technology (ICT) systems, products and services that integrate sensors, actuators, smart interfaces, artificial intelligence and communications networks to provide supportive environments for frail and disabled older people (AALIANCE, 2009). AAL has been an important emerging area of research over recent years involving collaboration between domain experts (health sciences, rehabilitation, gerontology and social sciences etc.) and technical experts (engineering, computing science, robotics, etc.). Research and development (R&D) within AAL has aimed to develop applications and systems to facilitate independence (AALIANCE, 2009) such as activity monitoring to detect potential emergencies; reminder devices for supporting and encouraging mobility and activities of daily living; monitoring activity patterns as indicators of change in cognitive and physical status; and smart interfaces to help people control their everyday environment. This chapter will review some of the initiatives in the area of AAL and will describe the user-driven approach adopted in the European Union (EU) funded SOPRANO project to ensure that technological development is usable, useful and acceptable in the everyday life context of older users. The chapter presents the results from initial requirements capture and prototype development and testing. The paper concludes by discussing the benefits of the user-driven approach and plans for system demonstration and large-scale field trials.

**BACKGROUND**

**Initiatives and Challenges in AAL**

The Ambient Assisted Living Joint Programme of the European Union (AAL Joint Programme, 2009), set up in June 2008 with support of 23 member states of the EU, has an overall objective to use ICTs to improve the quality of life of older people. The budget of AALJP is in the order of 55-60 million Euro per year (2008-2013) to fund the development of innovative ICT based solutions to extend the time older people can live independently at home, and at the same time to support European industries to develop competitive products and services.

Specific objectives are to:

- Allow people to “age-in-place” by increasing their autonomy, self-confidence and mobility.
- Support health and functional capability.
- Promote active and healthy lifestyles.
- Enhance security, prevent social isolation and maintain the support network of the individual.
- Increase the resource efficiency and effectiveness of health and social services.

AALJP is perhaps the most extensive systematic initiative worldwide in the area of AAL and represents a major commitment to, and belief in, the potential of using technology to support older people at home. There are also other major initiatives around the world (see, for example, Sixsmith, 2008) making AAL a significant emerging focus for research within engineering and computing science. However, despite its potential, the impact