Chapter 2
Smart Home Related Research

2.1 Introduction

This chapter presents the existing research works related to a smart home monitoring systems and elder care assistive technologies. The methods designed and developed for the AAL set-up of various tasks are compared and deliberated comprehensively to provide a better understanding.

The preliminary research database search was undertaken in the year 2011. The following key databases: Scopus, Discover, Web of Science under the Massey University Library related to computer science and information systems were searched. These databases were selected as they cover the technological issues in the design and development of smart home monitoring systems related to the elderly’s home environments. Several keywords such as “elderly” and “smart home” were searched to retrieve information related to the smart home environment functionalities for the well-being monitoring of the elderly.

It was understood that the term “Home” is a natural environment surrounded by personal belongings, a sustained place to stay, live independently, a retirement village place or a health-care service integrated accommodation (Merriam-Webster) (Merriam-Webster). It was also observed that inhabitants do not like to make alterations to their houses for investigation purposes. Few researchers have selected to use purpose constructed intelligent homes affiliated with research laboratory such as “CASAS Lab-Washington State University” (Cook D. J., 2012) (Cook D. J., 2012), “iSpace Lab-University of Essex” (Rukzio, Leichtenstern, Callaghan, Holleis, Schmidt, & Chin, 2006)(Rukzio, Leichtenstern, Callaghan, Holleis, Schmidt, & Chin, 2006), “Smart Home-Duke University” (Duke University)(Duke University), “Domus Lab” (Gallissot, Arfib, & Valls, 2010)(Gallissot, Arfib, & Valls, 2010) . These setups were also considered as home environments wherein people were adjusted to live in these smart home settings. The health center environments rarely provide inhabitants with substantial physical home setting environments; hence, the well-being monitoring studies of the elderly performed in nursing hospitals and clinics were omitted in the present research study. According to “Medical Subject Headings” (MeSH) definitions the term “older people”, were categorized under the age group of 65+
years and the age group between 45-64 years were termed as middle aged people. Thus, the literature search includes any participants aged above 65 years was considered for our methodical research review.


2.2 Elderly People and Independent Living

The age span of humans has increased over the last decade and elderly people (aged over 65 years) are estimated to rise by 2050 to 19.3% worldwide (Gavrilov & Heuveline, 2003) (Gavrilov & Heuveline, 2003). The elderly population who spend most of their time at home is growing rapidly (Muhlhausen & Tyrrell, 2013) (Muhlhausen & Tyrrell, 2013). For the 21st century, the life expectancy is projected to grow for individuals 46-89 years to 66-93 years (World Development Indicators, 2012) (World Development Indicators, 2012). The population of aged people (retired group) is going to escalate by 24 percent to 32 percent (National Institute on Aging, National Institutes of Health, World health Organization, 2011) (National Institute on Aging, National Institutes of Health, World health Organization, 2011). The age group above 75 years is predicted to double from 8.5 percent to 17 percent in the next three decades (ageuk.org.uk, 2014) (ageuk.org.uk, 2014).

As per the United Nations(UN) forecasts, major deterioration in the child population and fertility rate have resulted in a greater population of elderly people compared to children (UN Documents Gathering a body of global agreements, 2012) (UN Documents Gathering a body of global agreements, 2012). The ratio of a child to elder i.e. 15 to 65 years would come down from 9:1 to 4:1 in 2050 (UN Documents Gathering a body of global agreements, 2012) (UN Documents Gathering a body of global agreements, 2012) (Kinsella & He, 2009) (Kinsella & He, 2009). The estimated trend would result in a drastic decline of aid from younger people operating from home, and healthcare for older people. The following conditions prevail over industrialized nations: raise of disease and disabilities a growing trend of the annual cost of Alzheimer diseases alike increasing from $33 billion to $61 billion suggests a greater health risk for elderly people (Changing the Trajectory of Alzheimer's Disease:A National Imperative, 2010) (Changing the Trajectory of Alzheimer's Disease:A National Imperative, 2010). Rapid increase in healthcare demand and costs a greater section of public spending now goes to healthcare, which consumes 13 percent of national income.