Abstract. Collecting smart environment experimental data in a real situation and sharing the data are necessary to make the technologies used in the smart environment more practical. We have developed a data analysis tool for the real-life experiment data collected in a smart home environment. The subjects of the 16-day experimental data were a couple of husband and wife in their sixties. The data analysis tool as well as the collected data with the consent of the subjects are open for the purpose of research and development. In this paper, we introduce how the data were collected and the outline of the data analysis tool to promote interdisciplinary research and standardization activities in the field of smart environments.

Keywords: Smart home, real-life experiment data, data analysis tool, real world deployment.

1 Introduction

Our society is facing two major issues: an aging issue and a global warming issue. For the former issue, we have to develop and deploy technical solutions to assist the elderly and to support their weakening in physical and memory abilities. On the other hand, the latter issue has come to the fore recently and has been recognized as urge action to decrease greenhouse gas emissions is needed in order to realize a sustainable society.

Advance of information and communication technologies (ICT) including sensor networking contributes to solve both of these issues. Smart environments where various kinds of sensors are embedded ubiquitously are able to detect real-world information including human behaviors and such information is often referred as context. Based on the information or context, services are constructed according to their respective purpose: to control actuators such as networked consumer appliances in order to increase convenience of usage or in order to save energy consumption, to notify people of wasteful energy use, to tell geographically distant extended family members about an unusual event that happens to
an independent family member or establish a communication path between the extended family members and the independent family member.

Previously, plenty of efforts have been spent to establish fundamentals of research and development for realization of context-aware services on the basis of ICT. Therein experimental test beds are one of the important factors to promote the research and development and many trials have been done all over the world. As far as we know, the following test beds or projects are listed up; the Aware Home at Georgia Institute of Technology [1], the Housing group at MIT (the Massachusetts Institute of Technology) [2], Sensing Room at the University of Tokyo [3], EasyLiving project at Microsoft Research [4], the University of Florida’s Mobile and Pervasive Computing Laboratory [5], MAVHome project at University of Texas at Arlington [6], DOMUS laboratory at the University of Sherbrooke of Canada [7], UbiHome [8] and Active Home at Information and Communications University of Korea [9]. These test beds and projects contributed to the field of smart environments from the level of network architecture to the level of human-computer-interaction (HCI).

The research and development should be promoted not only by the efforts from researchers but also by collaboration with real users. Although it takes time and cost to collect experimental data in a real situation, they are necessary to make the technologies practical. The real situation means a natural and ordinal scenario and space where users can behave as they like. There are three Japanese projects whose results are open. The first one is the WTH (Welfare Techno House) where research on a smart environment and welfare tools for elderly or handicapped people was carried out [10]. People in the WTH were observed by using infra-red sensors and sensors to detect the status of doors and windows. Especially the activity of sleeping and toilet was detected well. The second one is an experiment carried out by AIST (Advanced Industrial Science and Technology) at the smart house Ikeda where one family spent their life for one month [11]. Their behaviors are recorded by 167 sensors of 15 kinds and are classified into 12 kinds of life actions automatically. The last one was the UKARI (Universal Knowledgeable Architecture for Real-Life appliances) project conducted by NICT (National Institute of Information and Communications Technology), 6 companies and 10 universities. In the UKARI project, they built a real-life test bed, called the "Ubiquitous Home," for home context-aware service experiments [13]-[15] and real-life experiments to collect the real situation data were conducted several times.

What is needed for the smart environment research to go further in the direction of practical use is to share the real situation data. Making the data open will produce new results. One is that there is a possibility to bring out new findings by analyzing base on an interdisciplinary viewpoint. The other is that we can clarify what is common and what is different among the groups of age, gender, nationality, race and so on. For the purpose of sharing the real situation data, we have developed a data analysis tool and started to distribute a set of real situation data. In this paper, we present the real-life experiment data and the data analysis tool.