

Pattern design for the development of ubiquitous emergency notification systems

Sainz de Salces, Fausto
Departamento de Informática
Escuela Politécnica Superior
Avda. Universidad, 30, 28911
Leganés, Madrid
Telephone number,+34 916245935
fsainz@inf.uc3m.es

ABSTRACT

In this paper, the foundations of a research in course are described. The development of a set of design patterns for its use in the area of emergency notification to be used among older people that live independently seems like a step further in the development of technologies for smart homes. The advances in mobile technology and its use by elderly people, at home and outdoors, means that notification about emergencies in the area can be improved dramatically. However, it is necessary to develop a tool to help in the design of efficient interfaces that are easy to use for the senior citizens.

Categories and Subject Descriptors

H.5.1 [User interfaces]: *User-centered design, evaluation/methodology, Input devices and strategies (e.g., mouse, touchscreen)*

General Terms

Measurement, Performance, Design, Reliability, Experimentation, Human Factors, Theory.

Keywords

Elderly population, emergency, notification system, multimodal interface, ubiquitous, intelligent homes emergency.

1. INTRODUCTION

Providing effective alert communication in emergency situations is vital to reduce the number of victims. Reaching this goal is a challenge due to user's diversity: people with disabilities, elderly and young people, and other vulnerable groups. There is an evident need for designing an emergency-alert notification system that effectively delivers information to all these groups at any time in any place. As a first step towards a more general research, and considering the need of elder people to remain in their homes for longer, the study will investigate the development of pattern designs for the communication of emergencies use in a home environment. Designing the home of the future, integrating communication devices, is not an easy task. It is a challenge that includes consideration of home dwellers' opinions, preferences and tastes. In the case of elderly residents the need to comply with their needs is even greater to assure the use of whatever digital

system we try to implement.

2. ELDERLY AT HOME

The elderly population in the world is increasing rapidly and consequently so is demand for new technologies that allow them to live independently. Home dwellers, and especially disabled and elderly people, can be provided with services, such as remote operating appliances, home entertainment and other communication services, that can bring comfort to these previously disadvantaged groups [1]. Technology in the home environment can help people take control of their domestic life by enabling them to work from home, helping them with their home management, and also be alerted if an emergency is happening in the area. Ahead of us lies the opportunity to incorporate assistive technology into portable, ubiquitous devices in such a way that they are not perceived as "crutches" but as standard helpful features in newly developed objects inspired by emerging technology.

Difficulties in operating appliances as well as in performing other daily chores are part of the effects - both sensory and cognitive - of growing older. An elderly independent person can also greatly benefit from the development of alert systems in a domotic environment for the communication of emergencies or emergency situations. The dweler can be informed about emergency situations that are happening in the area and also be informed on how to proceed.

2.1 Technology

The increase in the use of technology and the development of new portable devices that can be used at a closed range from the home This newly developed devices deliver such information should do it in an appropriate manner, at the right time.

Current and emerging wireless networks are likely to result in a widespread use of mobile services. If the different wireless networks are going to be developed for the achievement of high rate data transmission then it is possible that emergency notifications can be inscribed in domotic systems as another added functionality [2].

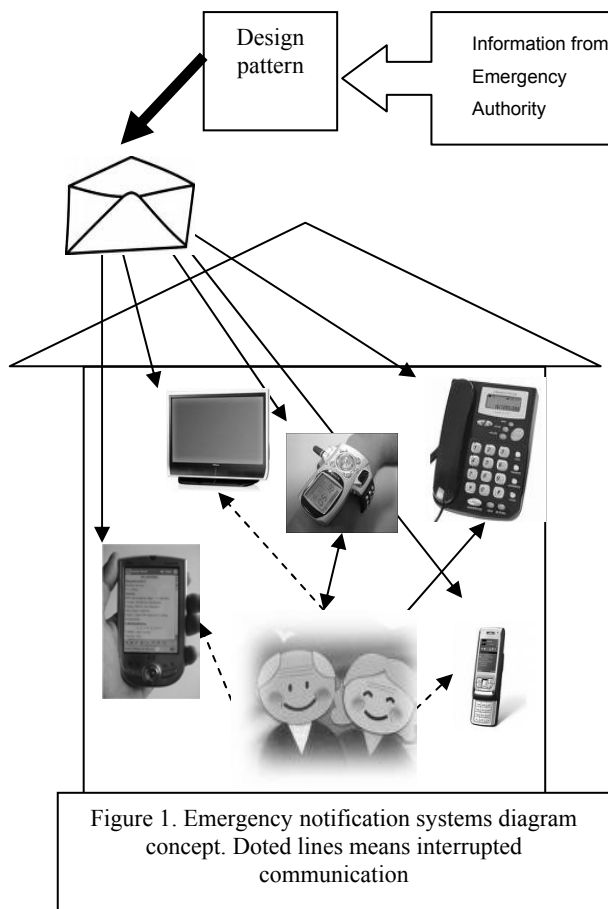
On the other hand the development of technology, such as G3 and G4, does not imply its adoption by consumers [3]. Therefore when considering the different options to inform dwellers about an emergency we must think very carefully to make sure the message reaches its destination.

These services will eventually be adopted by the elderly population and their benefit in quick communication is undeniable. Communication will not be reduced to interaction among people, devices will also communicate with us and among themselves. As well as being able to control the home

through various devices that are portable, or even wearable, others that are embedded in the environment will deliver information of a different nature: from leisure activities to the notification of an emergency in the area (see Figure 1).

2.2 Multimodality

Multimodal interfaces can minimize the effect of any sensory loss experienced, whether it is due to circumstances (while in bed at night), temporal (as a result of accident or illness) or permanent, and help in getting all the information to the subject. They are easily attainable with new portable devices. To assure the reception of information and taking into account the diversity of this group of potential users it is proposed to use multimodal interfaces. In the case of the elderly and disabled the use of multimodal output is, sometimes, the only option available to them. Multimodal interaction is a viable option to communicate with small portable devices such as mobile phones, PDAs or new hybrids.



3. INFORMATION SOURCES

3.1 Design patterns

Design patterns are an attempt to describe successful solutions to common software problems. A design pattern describes how to solve a recurring problem in the area of application also describing the reason why the pattern is used to tackle the problem and how to do it.

The development of a set of design patterns for its use in the area of emergency notification [5] for its use among older people that live independently seems like a step further in the development of technologies for smart homes. The use of design patterns is limited to the design process, and more specifically to the concept design process.

The patterns in development are informed from three main areas of knowledge:

1. HCI for elderly. Providing essential information on how to create easy to use interfaces for the elderly and their particular needs.
2. Ubiquitous computing. Informing about the characteristics and possibilities of small portable devices and more traditional fixed ones
3. Emergency Information and communication. Supplying the patters with information on how to manage information related to an emergency and how to help communicate it.

The development of design patterns for their use in the design process is a clear advantage in the process. However it is also very important to involve users in the design and evaluation process to make sure the final product is satisfactory.

3.2 Ubiquitous computing

Specific design issues have to be address in the area of ubiquitous computing communication as the adaptation of such systems would allow for the generation of a system that can alert elderly people, at home and outside (if they are carrying a mobile device) on an emergency situation. Readiness and preparedness is essential in emergency situations and the fact that a fragile group such as the elderly or disabled are prepared in advance could save precious time and save their lives.

It is also important to consider the possibilities oponed by the communications capacities among digital apparatus, which means that the user is informed of the event through the nearest device, or devices. It is then possible that pervasive computing will help decide which device is the closer one, or if there is no one using it at the moment, and inform the user about the emergency, also providing instruction on how to proceed. The use of different technologies that are able to track where the resident is at any time on the dwelling and delivering the information efficiently by using multimodal output media is an esencial part of the idea.

4. ACKNOWLEDGMENTS

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