

User identification in Interactive Television: a senior oriented decision matrix

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Abstract

The technical upgrades in TV distribution networks (comprising digital transmission, integration of a return path and improvements in set-top-boxes - STB) have been allowing a more customizable way of watching TV. In spite of these enhancements, the personalization of interactive services is frequently based on the STB identification rather than on the viewer itself. As each STB can be used by multiple unidentified viewers (with different profiles), this type of personalization cannot fit the viewers' preferences. When senior viewers are at stake, an automatic user identification system seems to be preferable than a classic process based on user ID and a corresponding PIN. In this work we seek for a technological approach to perform a seamless identification of senior viewers in order to enable them a personalized iTV experience. A first group of exploratory interviews have been carried out leading to the development of a functional prototype. With this approach a set of identification technologies were presented to a large number of participants supporting a set of usability tests. The tests results showed, as was predicted on the literature review and exploratory interviews, that there is a complex trade-off to consider when electing the most appropriated identification system.

Introduction

Watching TV is a daily activity for most of the human beings. In recent years, with the advent of new TV broadcast systems such as Digital Terrestrial Television (DTT) and IPTV, this activity is changing. Some of these broadcast systems introduced a return channel which has the potential to provide a high level of content personalization [1]. In this technological scenario, the multiplicity of interactive TV (iTV) services faces a constant increase. Despite these enhancements, when multiple unidentified viewers are at stake, the user experience lacks in terms of personalization since it is not completely adjusted to the viewer. This limitation can be overcome if the TV provider knows who is really watching TV, then being able to offer interactive services more suitable to the viewers' profile, such as: personalized ads, automatic tuning of favorite channels, audio description automatically adjusted, health care or communication assistance. To accomplish this it is of paramount importance to improve the TV provider infrastructure with a reliable **Viewer Identification System (VIS)**.

In the particular context of this work, we are special interested in the development of a **VIS** targeted to senior viewers, thus it is important to understand their needs and motivations when in front of the TV set. The literature review opened a first set of concerns, such as the ones addressed by Mariana Orbist [3], that lead us to an ethnographical approach sustained by a set of exploratory interviews and a set of usability tests amid senior citizens.

Target Audience

As time passes and people get older, some important changes occur at physical and psychological level. Elder people tend to[2]: have difficulties to adapt to new environments, usually feel lonely and spend a significant amount of time watching TV motivated by feelings of relaxation; entertainment; and companionship. Elderly are also often associated to the retirement period. However, life expectancy is increasing all over the world, reflecting in a longer period where retired persons guaranty a high level of their quality of life. This situation is often related to a set of activities and goals that keep elders physically and mentally active, pushing the life expectancy further. Gerontechnologies play an important role to push life expectancy further by stimulating civic participation, physical activities, and cognitive exercises. Thus, considering that elders spend a remarkable time watching TV, that they are comfortable using it due to the maturity of technology and tend to have a relaxed and prolific life, there are multiple advantages in the development of Gerontechnologies supported on interactive TV systems.

Research process

We defined a research process (Figure 1) with a first set of five exploratory interviews to help in system design. The experience gathered from this first contact also helped us to tune the interviewing style. Taking in consideration the sociological and technical literature review and the data collected on this phase, a prototype was developed to support a following set of usability tests. In these tests we gathered opinions concerning the different identification processes presented in a tangible prototype.

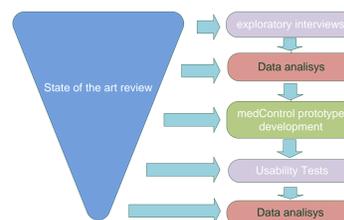


Fig.1 Research process

Exploratory Interviews

In order to assure a relaxed environment in the interviews a preliminary phone call to each interviewee explaining the process and the motivations of the work was made; and all the interviews were carried at elders' houses. Concerning iTV user identification, we described a set of options to the interviewees: i) ID card; ii) Fingerprint reader in remote control; iii) Personal code; iv) Voice recognition; v) Identification bracelet; vi) Mobile phone with Bluetooth activated; vii) Face recognition. These interviews revealed that without a prototype it turns difficult to seniors clearly identify the advantages of an automatic identification system in interactive TV context. Due to this constraint, they tended to disperse their answers.

medControl Prototype

In order to present the users with a layer of services that benefit from the **VIS**, the prototype was built on top of the *medControl* service. This module (Figure 2) is a medical reminder developed under the research project iNeighbourTV (PTDC/CCI-COM/100824/2008) targeted to seniors.



Fig.2 medControl Interface

The medControl trigger alerts on top of the TV screen when the senior viewer needs to take his pills. Figure 2 illustrates its interface that displays the daily medical agenda (in the central area) along with the user identification in the top of the agenda. Over this iTV service a multi-modal **VIS** was developed and used in the interviews (Figure 3). This multi-modal system comprises the ability to perform viewer identification through: i) PIN insertion using the remote control; ii) Bluetooth pairing with the user mobile phone; iii) RFID tag reading.

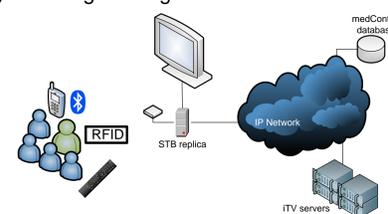


Fig.3 medControl prototype

Selected findings from usability tests

The collected data from usability tests allowed us to find that: i) The spectrum of answers about the **VIS** was considerably

wide making not possible to clearly identify a trend (Figure 4). To most of the interviewees all the solutions could work depending on the help and explanation about it; ii) Within the youngest participants (that were also more comfortable with ICT) there is a clear willingness to accept a regular **VIS** based on a PIN code. One of the interviewees (a 56 years old interviewee) referred the possibility of use the same profile wherever she is, using a PIN; iii) It was also possible to identify a light trend to the face recognition method, probably explained by an indirect feeling that this is the easiest system to use; iv) it seems that fingerprint reader and Bluetooth were not considered as possibilities for the **VIS**.

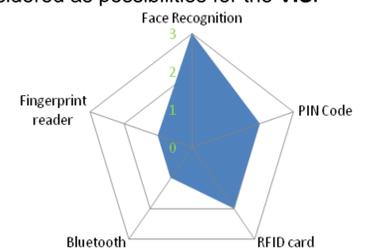


Fig.4 Preferred identification system

Decision Matrix

Since it was impossible to clearly identify a trend regarding the **VIS**, in the forthcoming research phase we will design a multi-entrance decision matrix based on a set of variables like: i) user's technological experience; ii) iTV functionalities; iii) level of physical disability of the viewers; iv) cost of the solution and technical viability; v) identification effectiveness; and vi) identification reliability. This matrix will allow us to identify the most suitable **VIS** in a specific context of usage. Figure 5 depicts a draft version of this matrix.

		User Impairment					
		None		Low		High	
Evaluation Factors	Services	Evaluation Factors		Evaluation Factors		Evaluation Factors	
		Efficiency	Reliability	Efficiency	Reliability	Efficiency	Reliability
Cost	Agenda	Identification System 1					
Report	Personal EPG	Identification System 2					
Usability	Volume control	Identification System 3					
Reliability	Audio description	Identification System 1					
Agenda	Personal EPG	Identification System 1					
Personal EPG	Volume control	Identification System 2					
Volume control	Audio description	Identification System 3					
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