Characteristics of Elderly Viewers and Their Automatic Identification in iTV Health Services

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INTRODUCTION

Television has undergone many socio-technological changes since its beginning in the fifties. Apart from some inherent technological factors like the transition from black and white to color and the digitalization of both audio and video components, the merge with the Internet helped television to be driven towards an interactive dimension with a high level of customization. The viewer happened to be able to enjoy from a viewing experience enhanced by several components, like a social layer, allowing him to be more engaged with other buddies by voting, rating, recommending or chatting about a TV program; or the provision of additional content, eventually personalized to be appropriated to his profile and context of use. This technical framework is also favorable to the appearance of innovative interactive TV (iTV) applications namely in the area of health information and telemedicine (Blackburn, Brownsell, & Hawley, 2011). However, this more customizable experience lacks of an automatic identification process of the person/s that actually is/are in front of the TV set through which iTV applications are provided. Despite significant advances in the area of interactive television, the automatic identification of viewers, especially in a non-intrusive way, is still a research area with many unsolved topics.

The theme that this chapter addresses is especially relevant since elders are major consumers of television representing a very sizable chunk of people that can benefit in a daily basis from iTV services and applications designed with the aim to promote active aging and life support. Just to mention a short example of e-health and telemedicine services provided through iTV, one can refer to reminders automatically displayed over the TV image whenever the senior has a pill to take, a scheduled medical appointment or a diagnosis to perform. However, for these and other similar services to be effective, they need to be personalized, that is to say the e-health iTV application needs to clearly know who is in front of the TV set. The automatic identification of viewers, especially in this age group, has a particular role in a personalized and targeted usage of these services, acting as a facilitator and enhancer of the user experience. For example, if the iTV application knows exactly who is watching TV, it can seamlessly pass information about the health condition of the senior to their relatives.

However, due to a broad range of physical, sensory, cognitive and digital literacy characteristics inherent of the elderly, it was foreseen that the definition of the most suitable viewer identification system (VIS) would be dependent of the actual user/viewer profile. Actually, the viewer identification method can be based in several technology options, e.g. a fingerprint reader placed in the remote control, a wearable tag, an RFID card, a facial or a voice recognition system, making it necessary deciding on the best approach for each possible viewer profile.

The presented research was carried out in order to leverage the design of a decision matrix that, using the aforementioned characteristics of the senior's profile, computes the most suitable viewer identification method. The identification system will allow a more personalized experience and will create a set of new possibilities concerning telemedicine applications as, for example, seniors' health condition tracking by their caregivers (relatives, doctors, nurses, etc.) or remote medical consultation. The methodology used to build the matrix was based on multiple sets of interviews and evaluation sessions with elderly viewers in a longitudinal prototyping process. We started with a set of exploratory interviews that allowed a better understanding of how seniors face iTV technology. After, it was implemented a fully functional prototype (allowing to test a particular set of identification technologies), that was evaluated by elderly participants, to find a clear trend about the preference of identification technologies.

Despite these tests were a step forward (since they allow to corroborate that viewers' characteristics can influence their preferences about the identification technology) they were not totally conclusive mainly due to the fact that only a subset of the identification technologies was tested.

That led us to a next cycle of experiments aiming to improve our research. The abovementioned characteristics became the inputs of the decision matrix, leading to a new set of tests to start filling in its cells. These tests were based on a wizard of oz prototype that allowed participants to experiment all identification technologies referred in this research. All these tests with seniors were made at their homes preceded of the evaluation of their functional characteristics (the ones identified in the first test and that can influence viewer's preferences).

The article ends reporting the main conclusions and examples of the matrix usage and identifying some next steps of this work.

BACKGROUND

One can say that the personalization of the viewing experience started in its simple form with the introduction of the remote control, easing the user ability to select the desired TV channel. After the remote control, Video Cassette Recorders, DVD players, along with the dissemination of other complementary devices, also improved the personalization of the user experience. However, nowadays with all existent interactive features, TV operators can offer a truly personalized iTV (interactive TV) experience, namely if they provide their STBs with an automatic viewer identification system. However, operators must be aware that watching TV tends to be a relaxing activity and thus the identification system should be effortless and eventually transparent to the user.

Personal identification is actually used in varied sectors such as ICT, banking, border control or law enforcement. They rely, at least, in one of the following means:

- Something that people carry (identity card or token);
- Something that people know (password);
- Some physical characteristic of people (for example some part of the human body).

In recent years, based in these concepts, several methods to perform TV viewers' identification have been proposed. The following examples intended to illustrate a few of these methods and to refer part of the academic work in the area:

1. RFID tags (Jabbar, 2008);
2. Image processing systems (Hwang et al., 2007) (Mlakar, Zaletelj, & Tasic, 2007);

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