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Empathic Television Experiences with Second Screens

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Abstract

The television remains a central hub in the home environment. We believe that in order to maintain its central role future TV's will need to incorporate empathic features. These will be delivered by interacting with other personal devices in the home and services in the cloud. This position paper illustrates the common as well as the individual views of several Belgian partners working around a common scenario in the ITEA2 'Empathic Products' project.

Author Keywords

Empathic Products, second screen, smart CRM, Smart TV, scenario, emotion detection

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Human Factors, Experimentation, Design

Introduction

This paper describes some ideas on empathic television experiences as envisioned by the ITEA2 Empathic Products consortium in Belgium. The paper describes an empathic TV experience scenario. The following section

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27 April 2013, Paris, France.

Karen, 30,

I-TV family profile [1]:

She teaches Dutch and English languages in a high school nearby. Karen is an active Facebook user. She uses it to stay tuned with all of her friends. For her interaction via Facebook is, and adds to, spending quality time. She enjoys TV shows like *'The Voice of ...'*, *'So you think you can dance'* and series like *'Grey's Anatomy'*. She enjoys watching them even more if she can share these moments with family and friends. Whenever a program includes voting, she participates, although she hates it when a candidate of her choice has to leave a contest.

Figure 2 Persona Karen

Peter, 32,

TV-commentator profile [1]:

He is a marketing manager at a company that manufactures casual clothing and lives together with Karen. Peter is an active Twitter user, enjoys dialoguing with friends but also with the wider community. While watching TV he often uses his tablet to discuss the show's topics in a wider forum.

Figure 1 Persona Peter

outlines some ideas on how empathic technology can be validated in such an environment.

Scenario

During a weekday, Karen (see Figure 2) comes home from work at around 5pm. She then already did her grocery shopping for evening dinner. The moment she is home she switches on the TV. It starts up immediately on her favorite channel *'één'*. The TV stays tuned to *'één'* while she is doing some householding and preparing dinner. Karen is not always in viewing range of the TV. The TV reacts to this by dimming light and sound volume in order to increase her comfort and reduce her energy bill.

When her partner Peter (see Figure 1) arrives home, he sets the table for dinner and watches the 7 o' clock news while having dinner with Karen. After some household chores, Karen sits down in the couch. She takes her tablet and starts browsing her Facebook timeline for updates. Peter sits in a comfortable chair and quickly checks his emails and next day's schedule on his smart phone. They spend the rest of the evening watching TV.

While Peter is busy on his smart phone he receives a reminder about the show he wants to watch, *'Iedereen Beroemd'*, will start shortly on the channel *'Canvas'*¹.

Earlier that week, after being triggered by a trailer on TV, Peter had bookmarked the show with a 3D hand gesture. The bookmark led him to the show's dedicated app, which he installed and used to set up the reminder.

Peter mentions to Karen that he would like to watch the upcoming talk show. He now starts up the app via the reminder message which triggers a welcome message on the TV with recommendations. The show Peter had marked is amongst the alternative and complementary choices. Peter and Karen decide to watch the show. Peter selects it via the app. The TV switches to *'Canvas'* where the show is about to start. This is the start of a relaxing evening.

Before the show, the app gives information on other friends that have activated the app. Peter tells Karen who of their friends is engaged too. The show starts. Based on his profile the app invites him to activate the meta-channel function. It allows Peter to browse background information. At some specific points in the show, it also assesses Peter's emotional feeling about the current content. Peter enters his emotion and can compare his choice with other participants' choices, which can be visualized on a map. It also allows him to share images and movies, including captures he can later on bookmark by making a circular gesture with his hand. Peter enables the meta-channel and starts contributing to the show.

Suddenly Peter gets up and leaves the room. He does not take his phone with him. He forgot to bookmark the time he left, which he could have done with a simple wave gesture. When he returns he picks up the phone. The app asks him if he wants a video update of what he missed up to now. Peter declines and starts browsing the feeds posted while occasionally looking at the TV. From time to time he posts a reply. After a while the system notices that Peter is no longer engaged with the program. The app launches some triggers to regain Peter's attention 'on the 2nd screen. Peter becomes

¹ 'Canvas' and 'één' are channels of VRT, a public broadcaster.



Figure 3 Screenshots of posture capturing software optimized for sitting postures using depth camera.

active again. After the show ended he continues to comment, he also checks how he is ranked in the list of 'most liked' comments (this could also be a topic in the next show) and he reviews his bookmarks to share them with his friends and Karen. Peter then closes the app, kisses Karen goodnight, leaves the room and goes to bed.

After Peter told Karen that some of their friends were engaged with the show too she opens the app on her tablet. The app shows her that several of her friends have started up the quiz-along function. Karen participates by tapping the tablet (or waving) as quickly as possible when a target person or object is spotted.

While quizzing, she can continuously keep track of the answers and scores of her friends. Seeing the answers of her friends is fun. It makes her feel really close to them. She can also comment on her friends' answers with 'likes'. Karen also appreciates the app's 'what is what' function. She can just gesture when she sees an interesting program attribute and the image is immediately on her 2nd screen, where she can then tap on the objects within the image. It allows her to get additional information on the program attributes such as furniture and the clothes the guests wear. She often discusses such attributes with her friends. A nice feature is that the app allows her to share pictures (as 'grabbed') and information about these attributes easily. She made a vote and knows that tomorrow she will be able to see whether her preferred topic made it to the next show. At the same time she will receive a preview of this show.

At the end of the show Karen ranks 2nd in the quiz. She's satisfied with that, especially because she scored

higher than her friend Ellen. Still enjoying her high score, she is now fully paying attention to the app. At that moment the app launches the recommender on TV. Karen's attention is caught. She decides to watch an episode of 'Grey's Anatomy'. After about 10 minutes Karen stands up, she takes her tablet along which immediately starts streaming the show she is watching on TV. From as soon as she is out of sight of the TV, the panel and sound are dimmed, the tablet takes over (this would not happen in case Peter was still watching TV). When she returns to the living room the TV automatically takes over again. After about 15 minutes Karen starts to drowse. When this is noticed, the program is paused and after a few minutes the TV screen and sound as well as the app are automatically turned off while the show is further recorded.

Envisioned supporting infrastructure

To realize this system we investigate scalable solutions for second screen devices, the usage of depth cameras for interaction and user emotion and intention detection in the living room (based upon [2], see Figure 3), usage of Smart TV platform capabilities and a supporting CRM systems.

Figure 4 illustrates the envisioned architecture. Produced television shows are enhanced with meta-data by the television producer. The meta-data and the show are subsequently distributed through separated channels and can reach the TV and second screen apps. External services including e.g. a posture detection service, apps associated with television shows or remote control apps can use this meta-data (and produce their own) to enhance their offerings.



Figure 4 Envisioned infrastructure

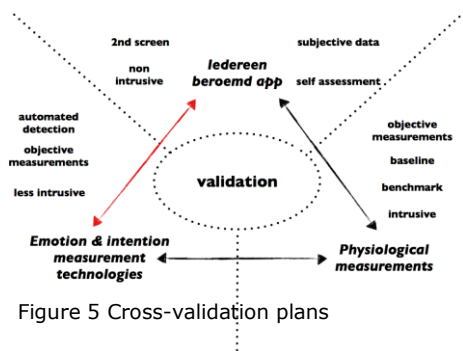


Figure 5 Cross-validation plans

Cross-validation of empathic technologies

In the first phase, the core idea is to experiment with different layers of 'empathic' data in an ecological valid setting in order to assess the validity of these data as well as the newly developed 'interaction' technologies described in the scenario. Therefore, the scenario will be fully simulated in an experimental 'living room' environment set up at VRT premises.

During the validation experiments we will focus on the triangulation of different types of 'emotion' data collected via different technologies. TV viewers will indicate their emotion via the dedicated 'Iedereen beroemd' self-assessment app. The subjective data resulting from this manual self-assessment exercise will be cross-validated with two types of automatic emotion detection systems.

The first automatic system consists of physiological measurements (such as galvanic skin response). Emotion data will be modeled out of the raw physiological data. As this way of measuring emotions is quite intrusive and cumbersome, it only serves as a baseline condition within our experimental test setup.

The second automatic system consists of measurements with automatic emotion & intention measurement technologies such as face reading, posture analysis, eye tracking, ... As these technologies are less intrusive or even non-intrusive they could be integrated in future TV scenarios.

With this experimental setup we aim to answer at least four types of research questions:

- To what extent does the 'subjective' data correlate with the 'objective' data? How can we interpret the 'subjective' data?
- How valid and reliable are the non-intrusive/non-physiological measurement technologies?
- How do users experience explicit and implicit interaction with TV through associated second screen app and gestures/postures?
- What future TV scenarios could be developed using implicit interaction (emotion, intention)?

Conclusion

This paper outlined our vision for future empathic TV interaction including visions on remote control, engagement through second screen and recommendations. We also discussed a preliminary architecture and planned validation effort.

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