Understanding and supporting cross-platform usage in the living room

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ABSTRACT

Nowadays users can choose TV and video content from diverse broadcast and online sources. The Internet many functionalities, such as communication, sharing and other information services, enrich the TV experience. The convergence of media is not only visible in the broader functions of one device, e.g. broadcast and online access through a media center system, but is also reflected in the interconnectedness of different devices. In order to understand the design dimensions for further Social TV applications, we conducted different empirical studies, including a diary study, interviews and creative workshops. The results indicate that several forms of parallel and convergent media use have already been established. We identified flexible switching of devices and services related to television and video content. While the empirical results also confirmed limitations of isolated applications and services, we will present a technological infrastructure that supports Social TV in a more integrated and flexible manner. Furthermore, we will describe two use-cases that show the potential of interconnected design concepts.

1. Introduction

Television is one of the mainstream media sources in the living room. It is used as a source of information and as an established medium for relaxation or entertainment, consumed alone or with friends or other household members. Traditionally scheduled via broadcast, new technologies and devices enable a fast and easy access to additional rich-media content and video on demand services have become more and more important within the last few years [31]. By accessing audiovisual content through the Internet or recording television shows with personal video recorders (PVR), users are free to choose when they want to watch. While new technologies allow for a more flexible and personalized form of media consumption, it could be argued that the social character of television has decreased. However, despite having the option to choose TV content individually, users are still guided by the watching behavior of others, e.g. by watching recorded content the same day it was broadcasted on television or sharing contents with friends and then talking about it [3]. The exploration and the support of social intercommunication in television environments is an emerging field of research in academia and industry [9].

Several solutions such as Google TV, Boxee and Miso, combine TV and the web, by offering integrated social services. Various techniques and functionalities enable the user to share content and to communicate with others over a distance. As one of the

key aspects, research around Social TV explores the social character of television concerning specific details. Related work has started to focus on exploring the design area of television, e.g. by integrating an online channel for communication via text chat [1]. Others have explored the pros and cons of text and audio chat [18], the influence of the program genre [13] and the use of additional personal devices [7]. As television and media contents can be delivered to several platforms, such as the PC, mobile devices and the TV set, the design area is huge. Therefore, current work has a strong focus on bridging aspects between several devices [7,23,28].

In reference to such device-bridging approaches that are characterized by more integrated services, many questions regarding valuable and useful concepts in an interconnected Social TV environment remain unanswered. From an empirical point of view, it is important to understand the current practice of multi-device media usage within domestic contexts. From a technological point of view, we need to identify the way in which newly integrated concepts should be designed, in order to offer additional value to the users.

In this work, we will describe our integrated research concept, in order to understand the practice of parallel and convergent media usage in domestic environments. For this reason, we set up a Living Lab, with 27 participants from 16 households, as a means of promoting participative user integration, as well as to conduct long-term evaluation studies. As a first step, we conducted a field study with the goal of exploring the every day media usage of our participants, which was done by having them keep a media diary. As a second step, we organized creative workshops where we discussed integrated social media concepts in groups. We present the results of that design sessions and new implications

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for design. In order to address the identified requirements for an integrated cross-device usage, a flexible SocialMedia architecture should overcome the limitations of stand-alone solutions. The presented framework enables universal access of video and TV content on different devices. Social services can also be integrated flexibly by connecting with a community server. In order to show the potential of our framework, we will also present two use-cases for cross-device usage (bookmarking and recommendation). We will then highlight the value of universal access and seamless interaction that comes with more integrated scenarios.

2. Related work

In HCI research, the home environment has become a major point of interest. Home media, such as television, Internet, and (online) radio, have received considerable attention in each area. However, only few attempts have been made to treat interactive home services and devices as an integrated concept. O'Brien et al. have pointed out that "sharing at home is a cooperative activity. [...] Household technologies simply need to fit into this pattern of activity" [29]. This signals both the importance of integrated home technologies and the consideration of established social patterns of use.

2.1. TV-centric systems

Watching television has changed in several respects, as new technology has changed what was once a simple broadcast medium. Television is embedded in a process that Barkhuus and Brown [3] describe as the video media lifecycle. They investigated the changing practice of watching television among early adopters of personal hard-disk video recorders and video on demand (VOD) services. They found that watching TV involves an active process of choosing content from the TV guide, playing back the chosen content from a stored collection, fast-forwarding and pausing during playback. The TV lifecycle also includes collecting an archive of shows, and sharing and discussing those with others. Studies from Bernhaupt et al. [4], Obrist et al. [26] and Tsekleves et al. [33] report on ethnographic insights related to the role of television and other types of media in daily life. Bernhaupt et al. [4] identified trends regarding personalization, privacy and communication. Watching TV was identified as a main activity that participants liked to share with others. Tsekleves et al. [33] also highlight the meaning of the TV set as a shared display for collaborative access to different kinds of content. Based on their pre-study, they developed a mobile application that provides the participant with the possibility to choose from different media on the personal device and to display them on the TV set. The possibility to share photos and videos this way was very much appreciated by the users.

The unified-EPG [28] is a good example of the combination of PC and TV, in order to handle the ever-increasing amount of media content. The result of the in-situ evaluation showed that the participants liked the idea of the unified EPG, as it combines different media sources (TV, PC, radio, external hard disk, etc.) and offers an easy and unified access to content on the TV set. Participants were able to handle the huge amount of multimedia content this way. The PC was favored over other devices for organizing the content, as it is more comfortable than the TV. Another study showed that using the handheld device as a second screen in an interactive TV environment enriches the experience of watching TV [7]. In particular, the second display was used for previewing and viewing content and to access enriched information, which was the most valued usage. Huang et al. [18] empirically explored the activity of chatting while watching television. They found that the precise realization of a supporting tool for communication has a huge influence on the user acceptance. In their study, participants preferred text chat rather than voice chat because of its less interrupting character. Geerts et al. [13] report on how the program genre of a TV show influences the communication behavior of users. They found that discussion and recommendation are closely related to the genre, while e.g. news and soaps stimulate discussion while watching, and movies and documentations stimulate the discussion afterwards.

2.2. Cross media systems in general

Other works discuss the integration of various devices in a more general matter. Rodden et al. [32] focus on the interplay between interactive services/devices in households and built a jigsaw-like toolkit for the user to configure the services in the home by connecting components and thus composing various arrangements through the coupling of pieces. An IPTV platform developed by Obrist et al. [27] supported local communities. Rhub, a group-socializing tool developed by Heyer et al. [17] enables cross-channel communication by transferring text-messages to several applications on mobile networks and the web. Participants from their study used the tool mostly for ad-hoc coordination rather than chatting. Prata et al. [30] presented an approach to generate dynamic cross-media learning contexts from iTV and then made it accessible from several types of devices. Kane et al. [20] explored cross-device web usage on PCs and mobile devices – a more integrated approach that has the potential to improve the usability of the mobile web. Pipet [24] is a cross-device photo-sharing tool that enables a physical interaction style.

The goal of our research is to gather evidence about user requirements and preferences for an integrated social media system to be applied in future design and development. While the exploration of user requirements for such integrated systems is not trivial, we strongly valued empirical methods. In order to cooperate with potential users for an extended period of time, we set-up a Living Lab with 16 households. Within this work, we will present our results on current media usage within those households. We also conducted several mock-up and design sessions and will present a framework for a more flexible TV-centric cross media infrastructure and will describe more integrated use cases.

3. SocialMedia project

The term 'social media' has become very popular within the last few years. In the context of Web 2.0, Kaplan and Haenlein define social media as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" [21]. Even if this definition is commonly accepted, social media should be considered from a broader understanding of content that includes user-generated as well as professional-generated content, which social options can reference, e.g. in form of comments, ratings or chats.

Based on this assumption, with the SocialMedia project we want to develop a cross-platform framework to foster and integrate communication between different domain-specific functionalities. Generating and sharing content in different media environments and between different devices should become more user-friendly with the help of technological support. The central issues in the research project SocialMedia are:

- From the user's point of view, which kinds of cross-platform usage, media convergence and communication options are useful?
- Which tools, concepts and usage scenarios can support the user's needs?