Evaluating Viewer-Side Enrichment of Television Content

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Abstract

The research area of interactive digital television is in the midst of a significant revival. Unlike the first generation of digital television – which focused on the concerns of producers and broadcasters, and limited the end-user impact – the current generation of digital television research is closely linked to the role of the user in selecting, producing and distributing content. This paper presents the rationale for evaluating new interaction paradigms with television content: micro-level navigation and selection of content, direct recommendation of (pieces of) content, and enrichment of content while watching. The rationale is composed of four steps: system design, business analysis, prototype implementation, and user studies.

Keywords

Interactive digital television, content enrichment, direct recommendation, non-intrusive experience, user generated content, public and private spaces

ACM Classification Keywords

H.5.1 [Multimedia Information Systems]: Audio, Video H5.2 [User Interfaces]: Input devices and strategies, User-centered design, Theory and evaluation methods.

Introduction

Traditionally, the end-user has played a passive role when accessing digital media; the user is expected to consume content, not to interact with it. Our research focuses on providing simple tools for manipulating and sharing television content as a non-intrusive [1] social experience. This active role, which we call couch-top interaction, consists of [2]:

- Micro-level navigation and selection: allows a user to activate particular content sequences of interest

- Content (re)organization: allows a user to manage the content selections (e.g., delete or reorder)

- Direct recommendation: allows the user to forward content sequences to his peer-group

- Content augmentation and enrichment: allows the user to add local content as augmentation of the base content and to share it with his peer-group.

The motivation of our research comes from current work on social television. Current research in the topic [3][4] focuses on connecting television watchers using, for example, chat or voice messages. Couch-top interaction builds on their results and includes advanced content-related functionality.

The contribution of this paper is the definition of a rationale for evaluation and development of couch-top interactivity. This rationale is divided into four steps:

1. System design: design and implementation of a full featured system. The system design has been reported in [2].

2. Business analysis: focus group analysis of the functionality. The analysis is used to measure the interest generated by the couch-top interaction.

3. Prototype implementation: a first implementation, based on the business analysis, for user studies.

4. User studies: usability evaluation of the prototype implementation.

Business Analysis

In order to gather the reactions on the viability of user experience, Gradient/LUTIN organized a panel with six professionals involved in interactive video and service providers. The panel was organized in Paris and the developers of the system acted as mere spectators, so they could not "defend" their system.

Three creative/interactive sequences concerning the concept and possible services of couch-top interaction initiated the meeting. After each sequence, the experts were asked to fill in the questionnaire, answering different questions concerning Acceptability, User Interface and Business Models. The results helped us to focus the actual priorities and functionality that the system should provide.

The results obtained from the session provided us valuable feedback. First, the attendees predicted a success of such functionality as an added-value service over competing products. Moreover, they encouraged the development of the system "as soon as possible" (within the next 24 months). Finally, they identified as the most relevant players consumer electronic manufacturers and service operators, depending on the idiosyncratic business models in each country.
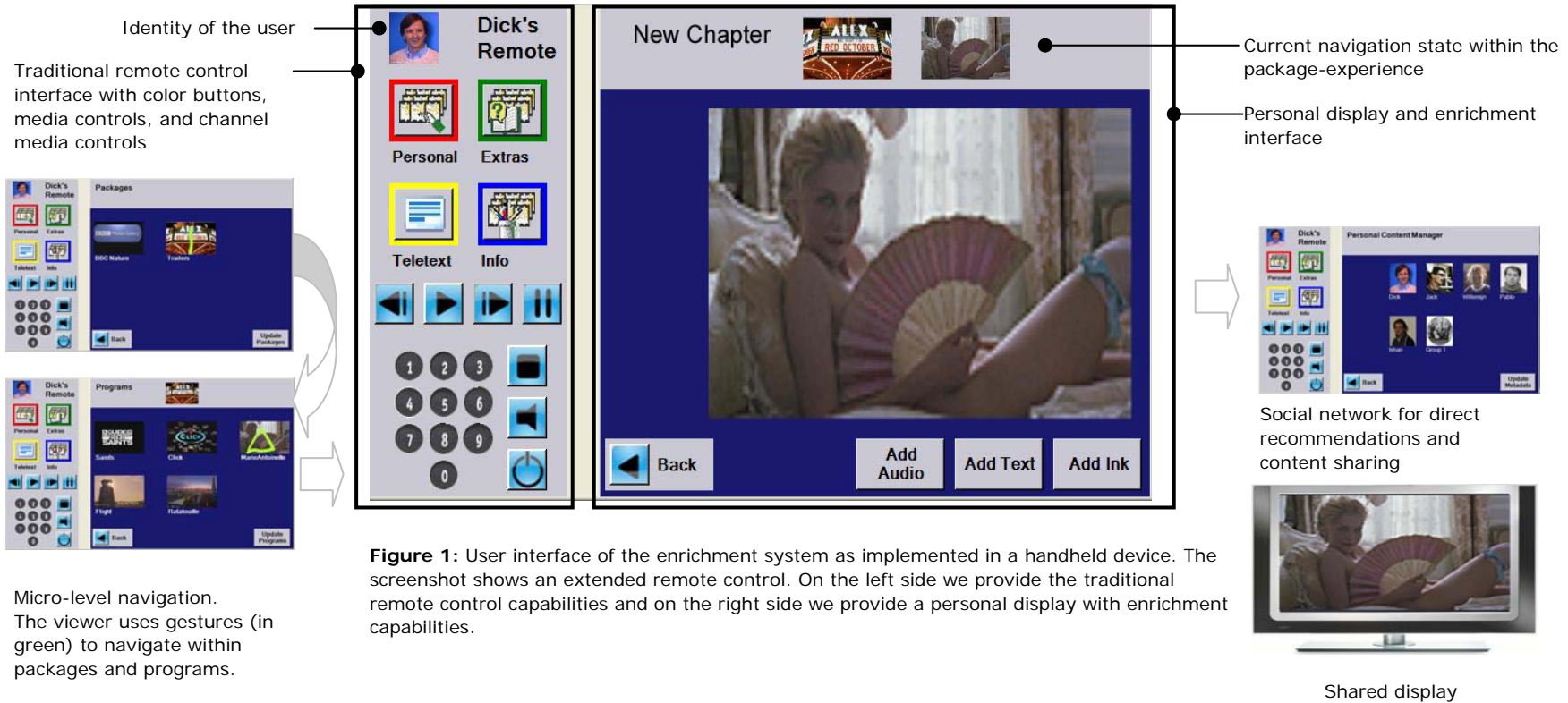
Prototype Implementation

After the business analysis a prototype implementation of the system was developed in order to perform user studies. Figure 1 provides a number of screenshots of our implemented prototype. The figure shows several views of a control interface that allow various interaction functions to be accomplished using a tablet device. Our intention is to have each user have a personal remote device, which allows personalized

information to be obtained from the local media server. Program content can also be forward to members of a peer-group as logical links. Users are also able to extend content with personal augmentations.

The functionality provided by the prototype includes micro-level navigation (private navigation of personalized content), direct recommendation (social networked communities), and content enrichment. Based on the business analysis, instead of providing the users with a full-featured functionality, we restricted

content enrichment to chaptering creation and manipulation as illustrated in Figure 1 (main picture). Thus, the users were able to create chapters (delimit sequences of programs), personalize the poster of the new chapter, manipulate the poster (e.g., voice annotation or ink annotation), and share it with his networked community.

Figure 2 shows a sketch for providing the peer-sharing functionality. This is the first design for the final implementation of the system.

Identity of the user

Traditional remote control interface with color buttons, media controls, and channel media controls

Current navigation state within the package-experience

Personal display and enrichment interface

Social network for direct recommendations and content sharing

Shared display

Micro-level navigation. The viewer uses gestures (in green) to navigate within packages and programs.

Figure 1: User interface of the enrichment system as implemented in a handheld device. The screenshot shows an extended remote control. On the left side we provide the traditional remote control capabilities and on the right side we provide a personal display with enrichment capabilities.
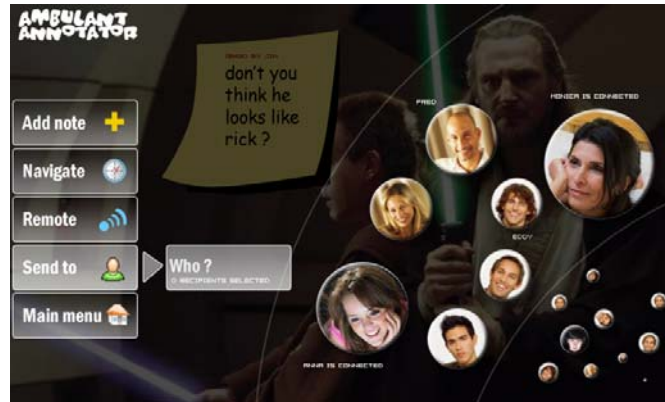
Figure 2: Sketch for the Sharing Functionality.

User Studies

Following the rationale presented in the Introduction, the next step was to perform user studies. The user studies were carried out by the University College London in the UK. They consisted of twelve sessions; each session was composed of three users that evaluated the current functionality of the prototype system.

The results of the user studies were encouraging, since the users widely accepted the proposed functionality. More detailed information about the results of the sessions will be reported in following publications.

Conclusion

Our work focuses on a human-centered multimedia system, in which the user gains control over the content he is consuming and has the possibility of interacting with his networked community. This paper describes the rationale for designing, implementing, and evaluating our system. The first results obtained from the business studies and user studies further encourage our view on a peer-connected living-room, in which social interaction (content enrichment, content sharing, and content recommendation) will become part of the traditional viewing experience.

Future work includes further analysis of the system and the implementation of the final system. This system will have a major impact on the way people consume and share interactive media.

Acknowledgements

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