Enriched Multiscreen TV Experience

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ABSTRACT

We present a *multiscreen toolkit* that is being developed in the LinkedTV project. The project researches and develops solutions for seamless integration of television and Web content, providing an enriched audiovisual experience. The multiscreen toolkit enables using devices like tablets as a 2nd screen in combination with television. The toolkit not only extends the interactive capabilities of television, but also enables versatile prototyping of multiscreen applications using HTML5 technologies. Our demonstration consists of a 2nd screen application implemented with the multiscreen toolkit which supports (1) viewing of time-based and spatial enrichments related to a TV program on mobile devices and (2) social interaction between viewers while watching a program.

Categories and Subject Descriptors

H.5.2 [**User Interfaces**]: *Prototyping, Interaction styles, Graphical user interfaces;* H.5.1 [**Multimedia Information Systems**]: *Video;* C.2.4 [**Distributed Systems**]: *Distributed applications.*

General Terms

Design, Human Factors, Experimentation

Keywords

Interactive television, multiscreen, second screen, social video

1. INTRODUCTION

Smart TV sets and mobile devices such as tablets have become part of our everyday media consumption, and multitasking with different devices is common.[1] Web technologies such as HTML5 are also used increasingly in providing new ways to engage with television content.[2] The LinkedTV project researches and develops new ways to integrate television and Web content seamlessly, providing enriched and interactive television experiences (http://www.linkedtv.eu). In the LinkedTV platform, enrichments related to a program are generated based on automatic video analyses and harvesting of related Web content. These temporally and spatially labeled enrichments are integrated together with interactive and social features in a non-intrusive user interface using a 2nd screen solution.

Our demonstration shows ongoing technical developments related to the interface design, which are continuation to prior LinkedTV work.[1] We present an HTML5 based multiscreen toolkit developed by Noterik (http://www.noterik.nl), which enables development of interactive television applications that operate across devices and screens. As an example, we show a

2nd screen application built with the toolkit, which enables both viewing of enriched television content as well as social interactions between viewers. The television content used in our demonstration is a news program called "rbb AKTUELL" by one the LinkedTV consortium members, Rundfunk Berlin-Brandenburg (http://www.rbb-online.de).

The core themes related to our technical demonstration, which is targeted to both designers and developers, include the following:

- How to support presentation of enriched television content in non-intrusive ways using multiple screens, such as television and a touch screen tablet
- How to support interaction between viewers with multiple screens
- How to build a multiscreen toolkit, which enables flexible design and testing of multiscreen applications

2. DEMO SCENARIO

The idea of the LinkedTV platform is to automatically enrich television programs with various types of related information and media content from the Web. The program related information that is provided to the viewer should be relevant to the viewer's interests as well as to the type of program (e.g. news). The enrichments and interactive features should be also presented such that they do not intrude while watching the program. With these aspects in mind, we can depict a general scenario for our demonstration:

Laura starts to watch a television program and opens a 2nd screen application on her tablet. The application shows her personalized dashboard where she can join the program and obtain related information. As the program runs on the television, the enrichments related to it are displayed on the 2nd screen. Laura can explore them, or just watch the program, as the enrichments are also available for later viewing. She can also bookmark items related to the program, or share them with friends.

Figure 1 below elaborates the scenario further and gives an overview of some of the interactive features that are available in the 2nd screen application built with the multiscreen toolkit. A video runs on the main screen (top), while additional information is shown on a tablet (bottom left). The enrichments are show in layers (e.g. "People"), and items related to current video moment are highlighted. It is possible to view the related information in detail, bookmark it, share it, or to push it to the main screen using drag and drop (bottom right). The user can also adjust with settings what kind of information is shown, and on which screen it is shown (e.g. information layers can be turned on/off, and it can be adjusted how and where program related information or social items are displayed).

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[1] See for example the following studies:
http://razorfishoutlook.razorfish.com/articles/forgetmobile.aspx,
http://www.google.com/think/research-studies/the-new-multi-screen-world-study.html

[2] See for example: http://www.hbbtv.org, http://dashif.org

MAIN SCREEN

SHARING & BOOKMARKING

RELATED INFORMATION

Figure 1: Overview of the 2nd screen application built with the multiscreen toolkit.

3. INTENDED DEMO AUDIENCE

The demonstration is intended for concept/interaction designers and technical developers.

Concept/interaction designers: We are interested in showing the multiscreen toolkit to designers in the area of interactive television and social video applications. We would like to discuss possible further extensions to our toolkit, which enable flexible prototyping of concept and interface ideas.

Technical developers: We want to show the multiscreen toolkit to developers working on advanced HTML5 and multiscreen applications. We would like to discuss technical aspects of multiscreen application development as well as open sourcing of the multiscreen toolkit.

4. TECHNICAL DETAILS

The demonstration will show the 2nd screen application described above, which is one example of a multiscreen application that is being developed using the multiscreen toolkit. The aim of the toolkit is to allow rapid prototyping for multiscreen applications, where the developer can focus on implementation of his idea without having to deal with issues regarding, for example, synchronization or communication between the multiple screens.

The front-end of the demo is built for web browsers using HTML5, JavaScript and CSS technology in order to allow support for a broad variety of devices. Special attention is given to mobile devices (iOS, Android) to support touch-based gestures for the interactive interface. Setting up the connection between the different devices is made available using the DIAL protocol.[3]

The front-end is build on top of an existing cluster-based platform called Springfield[4], which links together a variety of RESTful web services where audiovisual content is stored automatically, processed and made accessible for streaming. The audiovisual content is segmented into both temporal and spatial fragments[2] and linked to annotations, all generated by the LinkedTV platform, which enables versatile enrichment on different dimensions of a video.

For the multiscreen toolkit, additional extensions are written for Springfield in Java. They will not only handle the sharing, communication and joining of applications, but also provide a way to push adaptive designs to client in order to abstract the client side code.

5. FUTURE WORK

The 2nd screen application demo will be released in June 2013, and is intended at this phase mainly for the LinkedTV consortium partners, who can use it in multiscreen application design within the project. The application and the multiscreen toolkit serve as a basis for the LinkedTV application and interface development during the last project year. We also hope to develop the toolkit further so that it can be easily deployed for quick prototyping of multiscreen concept and application ideas more widely. Further research will be done in the areas of how we can use parts of the toolkit in the upcoming HbbTV 2.0 framework for both single and multiscreen solutions, and how the DAIL protocol[5] can be used when viewers are watching together in multiple locations to share/send apps. User trials will also be conducted in the LinkedTV project, which provide further feedback on the multiscreen interface design.

6. ACKNOWLEDGMENTS

7. REFERENCES

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[2] Troncy, R., Mannens, E., Pfeiffer, S., and Deursen, D. van. 2012. *Media Fragments URI 1.0 (basic). W3C Recommendation.* Available at: http://www.w3.org/TR/media-frags/.

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[3] http://www.dial-multiscreen.org/dial-protocol-specification/DIAL-2ndScreenProtocol-1.6.4.pdf?attredirects=0&d=1

[4] The platform is developed by Noterik and will be available in open source in the future.

[5] http://www.dial-multiscreen.org