

Co-Browsing Dynamic Web Pages

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ABSTRACT

Collaborative browsing, or co-browsing, is the co-navigation of the web with other people at-a-distance, supported by software that takes care of synchronizing the browsers. Current state-of-the-art solutions are able to do co-browsing of “static web pages”, and do not support the synchronization of JavaScript interactions. However, currently many web pages use JavaScript and Ajax techniques to create highly dynamic and interactive web applications. In this paper, we describe two approaches for co-browsing that both support the synchronization of the JavaScript and Ajax interactions of dynamic web pages. One approach is based on synchronizing the output of the JavaScript engine by sending over the changes made on the DOM tree. The other approach is based on synchronizing the input of the JavaScript engine by synchronizing UI events and incoming data. Since the latter solution offers a better user experience and is more scalable, it is elaborated in more detail. An important aspect of both approaches is that they operate at the DOM level. Therefore, the client-side can be implemented in JavaScript and no browser extensions are required. To the best of the authors’ knowledge this is the first DOM-level co-browsing solution that also enables co-browsing of the dynamic interaction parts of web pages. The presented co-browsing solution has been implemented in a research demonstrator which allows users to do co-browsing of web-applications on browser-based networked televisions.

Categories and Subject Descriptors

H.5.3 [Information interfaces and presentation]: Group and Organization Interfaces – *Computer supported cooperative work.*

General Terms

Algorithms

Keywords

Co-browsing, shared browsing, collaborative computing, Web4CE, collaboration

1. INTRODUCTION

The browser is turning into a ubiquitous platform for providing users access to data, services and applications. The browser is moving into the direction of a thin client computing platform in the PC domain and also gained importance in the mobile domain and will be present on networked TVs (based e.g. on Web4CE [1]) in the near future. Conjoined with the trend of the increasing amount

of web-based multimedia services, a browser-based IPTV platform [9] is the logical next step.

The solution presented in this paper has been developed for a browser-based TV platform based on Web4CE, but applies equally well for PC and mobile browsers. We see the browser-based TV platform not only as a possibility to bring well-established internet services and new TV related services to the user, but also as an opportunity to enable new types of services and user experiences. One aspect here is to enable the user to share content and experiences with their family and friends at distant locations from the comfort of their couch. Examples of experience sharing are watching pictures together (as depicted in Figure 1), watching online video clips together, doing online shopping together or playing games together.



Figure 1 Two couples watching pictures together

Bringing synchronous experience sharing to the user can be done in two ways. A first way is to develop new multi-user applications developed with multiple users in mind. But this would only be done for a small amount of web applications and will not include the vast amount of available web applications already out there. A second way is to develop a generic mechanism for synchronizing existing “single-user” web applications between two or more browsers. There are many “single-user” web applications for which synchronous sharing is an interesting option. Watching pictures together on Flickr¹, using Google Maps² for planning a trip together and choosing a movie together on a movie theatre web site, are some examples. To avoid the adaptation of all these single-user services, a generic co-browsing mechanism for synchronizing single-user web applications between two or more browsers is needed. As indicated in Figure 2, a generic co-browsing mechanism provides a low development cost solution for sharing many interesting applications together.

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¹ <http://www.flickr.com>

² <http://maps.google.com>

