Gathering Tabbed Browsing Behaviour as User Feedback on the Adaptive Web

Martin LABAJ*

Slovak University of Technology in Bratislava
Faculty of Informatics and Information Technologies
Ilkovičova 2, 842 16 Bratislava, Slovakia
martin.labaj@stuba.sk

Everyone's daily activity is gradually more and more being supported on the Web, if not entirely performed through its means – it includes everything from grocery shopping, through education, employment, communication, learning, to entertainment. An adaptive system is a system "which can alter aspects of its structure, functionality or interface in order to accommodate the differing needs of individuals or groups of users and the changing needs of users over time" [1] and in fact, such aforementioned systems supporting each and every aspect of human daily activity are starting to become adaptive or becoming even more adaptive than before.

Any web system firstly needs knowing the individual users through their actions in order to facilitate the adaptation. In our work, we focus on observing, logging, analysing and utilizing both implicit and explicit user feedback both within the boundaries of a web based system, e.g. an adaptive learning system, and on the open Web across heterogeneous systems. Apart from explicit feedback questions presented to the user at the appropriate moments during his or her work as a means for obtaining better and more extensive explicit evaluations, and apart from focusing on the lowest level of implicit interactions – individual fragments of web documents, one particular area of our research lies in observing user's movement across web pages – the parallel browsing.

The parallel browsing is also called tabbed browsing or simply tabbing based on the mechanism most commonly used for having multiple web pages opened at once – the tabs, which prevail over using multiple windows – and as such, it represents user actions on the Web more accurately than simpler, linear browsing models, where each page visit is considered to replace any previously visited (most recent) page. Users actually perform tabbed browsing in a multitude of scenarios, including [2]: keeping bookmarks of pages opened in tabs to read later, comparing multiple pages, looking for information amending those presented on the current page, pre-loading multiple pages (e.g. search results), or even using tabs as to-do lists.

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* Supervisor: Mária Bieliková, Institute of Informatics and Software Engineering

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Before we can analyse and model this behaviour [3] and use it for means such as modelling the user, improving domain models, or recommending resources to users, we need to observe and capture it. There is an important trade-off between using a script embedded in web pages served by a single web application (or a group of web applications) and observing users' web browsers seeing their every move across any web application, not only those application that we control.

In the former approach, using the tracking script, such as those we described in [3], we can easily observe every user of our web application without any additional engagement from their side, but only the visits to, and switches between, those pages stemming from a limited set of sites is observed. Nevertheless, it can still provide valuable information about user's movement within the observed web application and we previously used this approach to recommend learning objects relevant to questions or exercises being currently visited in an ALEF adaptive learning system[1].

The latter approach, observing the user's browser, for example through an extension[2] in a way we described in [4], we see user's every step across various web applications, even when the user leaves our web application to look for additional information in other web systems, but we see only actions of a limited group of users who choose to participate in the study by installing a browser extension or installing modified network settings to route their traffic through logging proxy. However, a web application which we control, such as the aforementioned learning system, can be used as a primer for user base to voluntarily participate in a browsing study [4] by motivating its user base to install a tracking extension. We previously used such data for automatically enriching learning content with links to external resources.

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References

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[2] `http://brumo.fiit.stuba.sk`