Lightweight Collaborative Web Browsing

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ABSTRACT

Collaborative navigation systems provide a useful way for virtual groups to share information through the web. However, the common set of features of these tools is not enough to offer a more face-to-face browsing experience. To fill in the gap, this paper presents a collaborative web browsing proposal, which integrates flexible session management, the maintenance of shared production spaces, and efficient communication facilities. The proposal relies on a collaboration ontology that provides a well-defined conceptualization and common vocabulary. To demonstrate the feasibility of the approach, the OCEAN prototype was developed and tested.

Keywords: Collaboration, CSCW, E-Learning, Groupware, Ontology, Web Browsing

INTRODUCTION

The variety of ways by which people interact have dramatically changed in recent years. The conception of new teamwork paradigms has encouraged the creation of innovative collaboration technologies. This fact has led to the dynamic collaboration scenarios faced nowadays. Amongst these recent paradigms, there is one called collaborative web browsing (co-browsing) paradigm. Such paradigm consists in allowing distant users to jointly browse Internet content, for instance, web pages.

Several application areas can take advantage of the co-browsing paradigm. For example, web search, which is one of the most common online activities, is often undertaken in shared-computer context (Amershi & Morris, 2008). Educators have also verified the added benefit of co-browsing for teaching as it fits nicely into the theory of constructivism, allowing students to learn by exploring and sharing their own ideas and knowledge (Aneiros & Estivill-Castro, 2005). In fact, in different domains, co-browsing systems have been commonly used, such as: (1) e-learning systems, to handle online lectures and presentations (de Santos et al., 2009; Brooks, Hansen, & Greer, 2006; Gerosa et al., 2004);
(2) helpdesk applications, to support users in guiding others through desired tasks (Dieberger et al., 2000); (3) e-commerce environments, enabling users to recommend products or to negotiate purchases (Sosign Interactif, 2008; Gerosa et al., 2004); (iv) lightweight alternative for desktop sharing tools, to enable sharing of web-based content (Hoyos-Rivera et al., 2006; Esenther, 2002); and recently, (v) feeding social networks with browsing recommendations (de Santos, Sana, & Oliveira, 2009; Maintainers, 2008a).

This paper introduces a co-browser named OCEAN (de Santos, 2010) that, besides supporting basic co-browsing functions, offers additional important functionalities, mainly related to a lightweight architecture for users’ communication and the maintenance of collaborative session awareness. It is worth mentioning that one of the main advantages of this approach concerns the introduction of document annotation facilities, which are useful to express thoughts and to get the focus of attendees on what the presenter wants to highlight. For example, while accessing online lecture materials, text notes and draws over the content can help students to remember the key points of that lecture, or even favor new discussions (Chong & Sakauchi, 2001b).

The conceptualization behind OCEAN is captured by an ontology regarding the collaboration domain, proposed in (Oliveira et al., 2007). This ontology provides reusable domain knowledge and a common vocabulary (Guarino, 1998) used to optimize the OCEAN conceptualization process, decreasing the overhead on domain knowledge acquisition.

The remaining of this paper is structured according to the following organization: the next section presents the OCEAN proposal. The proposal is then formalized, presenting conceptual models. The following section describes how this proposal is designed for supporting its features and the OCEAN prototype is presented. The approach adopted in OCEAN in comparison with related work is discussed.

THE PROPOSAL: CHARACTERIZING MAIN FEATURES

Web browsing is traditionally an individual activity, where a person uses a web browser (e.g. Mozilla Firefox, Microsoft Internet Explorer) for accessing published hypertext documents. However, browsing can actually be seen as a social event (Gerosa et al., 2004), where users share browsing content (de Hoyos-Rivera et al., 2006). In this scenario, we introduce OCEAN.

OCEAN was mainly founded on the 3C Model. First proposed by Ellis, Gibbs, and Rein, (1991), this model classifies collaborative applications, also known as groupware systems, regarding three processes: coordination, cooperation and communication. We subdivide this session according to the 3C Model, presenting OCEAN’s characteristics regarding each of these processes.

Coordination

In the context of collaboration sessions, coordination appears to be a major aspect for keeping control or management. Commonly, management is made by imposing constraints in order to control participants’ activity. On one hand, a massive set of coordination rules turns the service bureaucratic, making the collaboration a daunting task. Usually, such systems establish exclusive roles to participants, limiting his/her actions in the entire session. On the other hand, not imposing any restriction could also be harmful for the quality of the session, since it could cause rework and loss of information. Therefore, the point is to find balance, allowing users to collaborate in a certain manageable freedom state (Wang & Haake, 1998; Schmidt & Simone, 1996).

In this regard, OCEAN introduces a flexible mechanism for managing co-browsing sessions. This mechanism is divided in two coordination levels. The first deals with subgroups of participants, where each of these subgroups
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