Web annotations systems supporting collaboration

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1. Introduction

The Internet has paved the way for collaboration by letting users easily share objects and access to information, e.g. documents. Nowadays, the World Wide Web (WWW) has progressed beyond the capacity to display static information so that interactivity among members in a group can be supported. The possibility to communicate at a distance has increased and novel ways of collaboration have ensued.

In 1996 the WWW was a “hot” technology. A project run in that time intended to develop a help system on the Web give as a result the possibility to make Web annotations to per-selected Web documents (for details see Rodríguez 1999). The studies performed concern with the achievement of collaborative tasks mediated by computers by small or middle size (2-15 people) groups. I have developed a set of computer programs that these groups have used to discuss and develop shared Web-documents or Web sites in the frame of collaborative writing. In this way collaborative writing has been the main field for my studies. We has focused on supporting the need for communication that participants might have while working asynchronously, and on designing and studying this communication in the form of a text-based dialogue.

The central questions that we are examining in this study are:

1. How do small and middle size groups collaboratively discuss, annotate and communicate around Web-documents and Web-sites?
2. How is asynchronous text-based communication used in a shared space by co-authors?

Finally, this study deals with the design of Web-based collaborative tools in the light of these issues.

A number of case studies have been carried out, and the tools have been developed using the results of observation on the users' interaction with the systems. The studies indicate that the WWW can successfully be used for sharing documents and discuss their content. Also, asynchronous text-based communication was shown to be an effective medium for collaborative writing. The development of the prototypes has given general experiences on the development of collaborative web-based tools. These experiences suggest that such tools should be designed in collaboration with the users. A method for the design of such tools has emerged from these experiences.

2. Previous research

The World Wide Web is a great repository of digital documents and support different multimedia formats. Writing for publication on the WWW is becoming increasingly frequent and tools that facilitate the production of documents that can be shown on the Web are now very common. In fact, most word processors include the feature “Save as HTML”, that is, in a format supported by the Web. In 1993, Mosaic a browser developed by NCSA could make an annotation to a document found on the Web. Mosaic was capable of handling both personal or group annotations. Today, surprisingly, none of the current most popular Web browsers offers an annotation feature as Mosaic did. As a result. documents on the Web commonly can only be passively read by third parties. However, some systems have been developed to

allow Web annotation e. g. CoNote (Davis and Huttenlocher, 1995), CritLink (Yee, 1998), ThirdVoice, WebCT, Ceilidh (Huges, Jake, and Okelberry, 1998), Annotea (Kahan & Koivunen, 2001), Virtual Notes (Koch and Schneider, 2000). Vasudevan and Palmer (1999) note that Web-based "annotations systems are constrained both in capability and efficiency by the limitation of the Web" infrastructure, and that HTML is limited as a layout language for annotation; for example there is no way to render annotation on the sidelines of a Web page. In an interview study with collaborating writers, Kim and Severinson-Eklundh (1998) found that co-authors need a better network infrastructure, that co-writing is usually performed asynchronously and in small groups, and that one co-author usually maintains the document during the whole writing process. They also found that mostly no dedicated tools for collaborative writing were used by the co-authors. These premises and the rapid expansion of the WWW as a network are the points of departure of my thesis.

3. The Web annotation systems in brief

The tools that we have developed are:

1. The DHS[1]. The system is oriented to support two common collaborative writing activities. 1) discussion of the content of a document and 2) annotation intended to change the text of a document. This system has been used and evaluated in 9 case studies by 132 participants mainly in an educational environment. 693 annotations that hold 80992 words have been made using the system. Longitudinal studies (three years) using these tools were carried out in an educational environment. The methods used to evaluate the system were interviews, survey, and the data submitted by the users while the system was in use.
2. Col.laboració. The system is oriented to support communication among co-author during a collaborative task and to share the document being written. The system has been used for the realization of eight collaborative writing tasks within grouped 2-9 co-authors. 261 annotation that hold 19120 words were submitted by the participants. The system has been evaluated in filed studies in which participants have worked in co-located and distributed mode. The evaluation of the system has been supported by interviews and survey. Also the comments added by co-author using the system have been analysed.
3. Col.lecció: This system works as the common feature of web browsers; book marking. One of the main novelties of this system is that it allows for web annotations to bookmarks within a group. This system has been used as a communication tool in two case studies within an internationally distributed group of 6 people. 237 annotation that hold 34465 words were submitted by participants in the period of 18 month. The task was the redesign of a on-line magazine and a Web-based tool.

3.1 The DHS

The Domain Help System (DHS) project started in 1996. The original idea was to develop a new help system that could present information according to an iceberg model of information. The idea of this approach was that initially only a minimum of information is presented, namely that information which an experienced user could request for, and consecutively more information is available on demand. Like an iceberg the system shows only tips of information, but there is an entire mountain of information to be access as we descend deeper (Gustafsson et al. 1997). An important requirement for this project was that a user should be able to easily add knowledge items to the system while he/she was interacting with it. We

1.The DHS was originally a project started at Centrum för användarorienterad IT-desing 1996 at the Royal Institute of Technology of Sweden

therefore decided to have a simple representation of knowledge items in the form of written comments or annotations.

The DHS lets users share Web documents and make comments on them. The comments are also shared by the users. A domain, in the DHS project, is a site on the Web that divides the Web browser into four frames which display 1) a hypertext link list, 2) the content of the most recently activated link in the form of a document, 3) the comments users have made so far on that document, and 4) a button that pop-ups a comment-input window. The documents held by the system are included in the domain by the domain's editor. Comments could be related to the content, the formatting, the design of the document, or even be a response to a previous comment. After entering the system, users can select any document from the index-frame. When the user selects a document (clicking on its link), the content-frame and the comment-frame are updated immediately. The content-frame displays the content of the just selected document and the comment-frame displays the comments made so far on it.

To add a comment on the current document, (the one that is displayed in the content-frame) the user has to click on the "Add comment" button. This will open a separate window (see figure 1) in which users can write their name or nickname and the text of their comment. This window allows users to paste the original text in an input area, so that they can have access to the original text and edit it When the comment is submitted the Add comment windows is closed automatically, and the comment is appended immediately to the comment-frame. After this, all members of the group have access to the comment whenever they select the corresponding link.

Email messages are sent automatically to the author(s) of the document when a comment is made to it. The comment is attached to the email and it is labelled in such a way that the receiver could recognise that the message is sent by the DHS system. Also, a comment counter tag is placed beside the links in the index-frames to indicate how many comments had been made when the session started, for example: Document-A (3 comments).

3.2 Col•laboració

Collaborative writing is a common practice in work places and academic environments. The possibility to exchange documents through the Internet has paved the way for collaboration among co-authors. To date, the tools available for collaborative writing have largely been limited to email and commenting support. However, communication, co-ordination and sharing information are factors of vital importance to succeed in a collaborative writing task. The World Wide Web provides a network infrastructure that can support those needs of co-authors. The perspective followed in the design differs from past studies focused on writing strategies, co-authors' roles or document control process (see e.g. Posner et al. 1992).

It is important to bear in mind that in the system Col•laboració the term document is treated in a particular way. A document is defined in this study as follows:

A document is a set of HTML files related to each other. Each HTML file represents a distinct self-contained portion of the document called section. A section, being a separate file, can be added, changed, or deleted independently of the other sections. Merging the sections produces the document as a whole.

Col•laboració presents the document to co-authors displaying the titles of its sections which are hypertext links that show the section's content. It also allows co-authors to work on different sections simultaneously. It should be stressed that the system is not designed for the transcription of the document

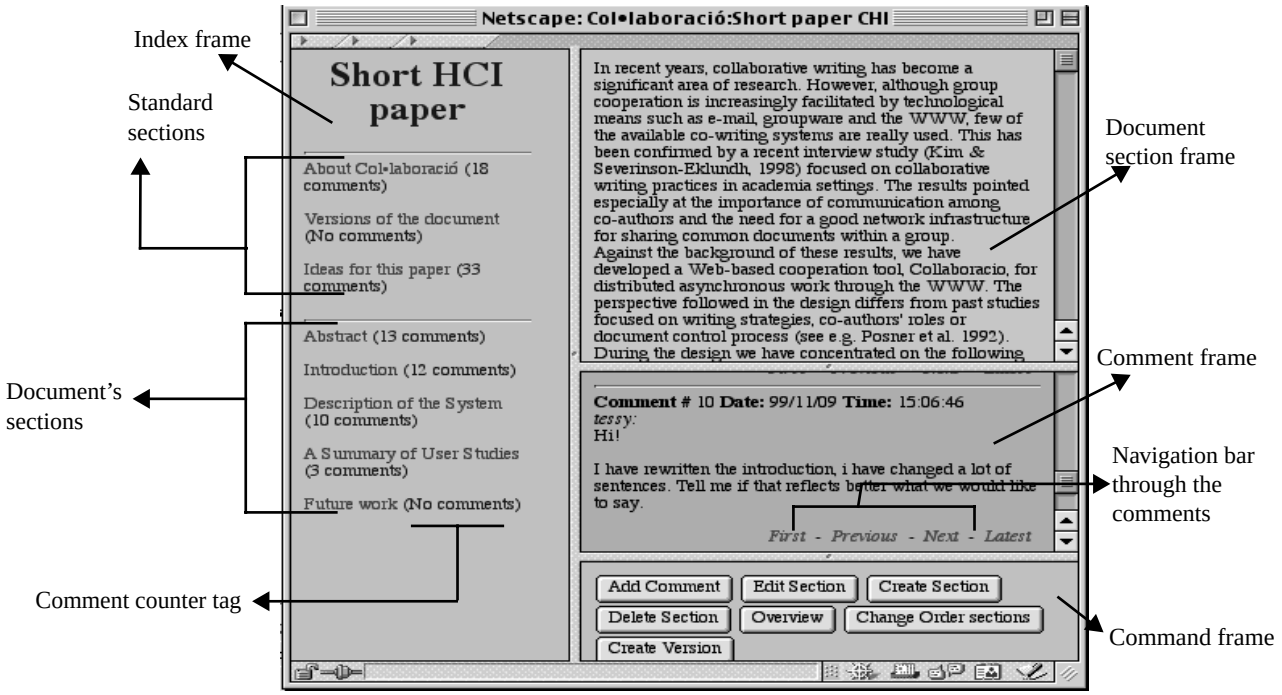

FIGURE 1. The screen layout of the document-development module.

to be produced. Rather, it supports sharing of the document and the discussion among co-authors that the production of the document might demand.

3.3 Col•lecció: Collaborative bookmark on the WWW

This application is based on the idea of a web browser's bookmark feature but with a collective characteristic. The general idea is that member of a group form a collection (Col•lecció) of links that will be shared immediately within a group. Members of this group can make comment on these links. These comments will be also shared within the group. The interface is very simple. The select-item frame shows the list of the links that have been collected so far. When a link is selected (click on it) the URL associated to that link is opened in the information-top frame, comments on that link are shown in the information-middle frame and the Command frame is filled with three button-commands: Add URL command, Add Comment command. It also calls a window with a HTML-form where you can write you name and comment. Delete URL command.

Benyon and Höök (1997) argue for an alternative way of navigation on the web known as social navigation. Social navigation is the process of using information from other people to finds things on the web. Today, the number of home-based applications, applications for communications, communities, etc. is increasing very fast. This implies that social navigation ideas are going to find wider use, Wexelblat (1998).

A collective bookmark implies a “collective web information space” that will be used by members of a group. Information recommendation and filtering are two main issues that can be done with Col•lecció. Information filtering in this case is not related only to the sole user but to the group. Adding a URL to the link collection means:

1. The user who adds the URL is automatically recommending that URL to the group;

2. The user is filtering the added URL from other URLs he/she has probably found;
3. Creating a shortcut to a web page the users think will be frequently used;
4. Creating a pointer to a web page, that is, no need to remember or no possibility of forgetting the URL.

Furthermore, the possibility that Col•lecció offers of making comments on the URL is exactly a personal recommendation. The comment could contain relevant information about the web page. For example, say that the URL corresponds to a web-based dictionary; a user could have already interacted with it having an "opinion" about it. Suppose, also, that the user could comment whether the dictionary is oriented to native speakers or not. Such a comment would inform other users if it were worth interacting or not with the dictionary.

Forsberg, Höök, and Svensson (1998) define some characteristics for social navigation according to which Col•lecció could be classified as a direct social navigation tool where the advice–giver intended to share information. The advice-giver in Col•lecció is one particular person (or agent), known to us or a member of a group of users that are similar to the navigator in terms of interests, profession, knowledge, or task.

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