

HCI and CSCW in the Context of Digital Libraries

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ABSTRACT

We describe work conducted to explore issues related to human-computer interaction (HCI) and computer-supported cooperative work (CSCW) in the development of digital libraries. In this context, we have designed and prototyped environments that facilitate collaboration among distributed users while still responding to their specific individual needs and preferences. The results of the work include operational interfaces for large information spaces and collaborative environments for an actual digital library which is part of a large federation of digital collections.

INTRODUCTION

Over the past four years, the Digital Libraries Group at Universidad de las Américas-Puebla (UDLA) has developed a system architecture for a digital library that addresses the needs for communication, collaboration and information management among a highly distributed community of users [1, 9]. We have termed this initiative *U-DL-A* (University Digital Libraries for All). Various collections are currently under construction in the context of *U-DL-A*, including digital repositories of all the theses produced by the university's graduates, the correspondence of the President of Mexico for the period from 1876 to 1910, and the publications produced by the university.

We have been exploring a variety of personal and group interfaces and environments to place the digital collections' wealth at the user's disposal. Local and remote patrons have access to library services that allow them to conduct a wide range of individual and group research activities, from recording and sharing newly discovered information, to keeping track of changes in data or metadata of interest, to discussing with experts about objects in the collections and the ways they are organized.

U-DL-A INTERFACES AND SERVICES

The key user interface concepts in *U-DL-A* are those of *personal* and *group spaces*. A personal space is a virtual place in the digital library from which a user has access to and organizes library materials according to personal needs

and preferences. A personal space features frequently used information units, personal agents that perform routine tasks in the library, and various library maps generated dynamically as a result of the user's traversals of information spaces. In addition to pointers to information directly added by the user, personal spaces also contain materials (or pointers to materials) generated by user agents according to user profiles. Personal spaces are initially defined according to user roles (e.g., professor, student, administrative employee, etc.), but are refined as the user becomes familiar with the library.

Similarly, a group space is a virtual place where library users meet to share information and discuss study or research issues. Users and their authorized agents can carry materials from their personal space to any of the group spaces in which they participate and vice versa. Group spaces can be created dynamically to accommodate the changing needs of the users to share newly found information or discuss specific topics. Participants of group spaces may include regular users, avatars who represent users in different roles, or agents that can volunteer potentially useful information or actions.

ACCOMPLISHMENTS

Various components of personal and group spaces have been developed. Some components are ready to be incorporated into regular user activities, others are at different stages of development, from preliminary prototypes to usability testing. Salient features of our most recent developments are highlighted in what follows.

MiBiblio [4] is a graphical interface that represents a personal space by providing a room metaphor in which the user can add, remove and manipulate commonly used library materials or agents working on routine activities. Users can have one or more rooms in their personal spaces (or rooms) in each of which they can handle objects or processes pertaining to specific domains or specific activities.

UVA (*U-DL-A Visualization Aid*) is a set of tools that allow users to visualize and navigate through large information spaces [7]. UVA relies on the hierarchical

structures commonly used to organize library materials and dynamically builds 3D representations of such structures. Using this simple yet powerful interface, the user can manipulate, navigate and search an otherwise unwieldy information space.

Zeus [5] is an environment devised to facilitate the revision and annotation of digital theses and dissertations. Zeus implements a highly personalizable interface that facilitates student-committee communication through color codes and simple conventions that are easily agreed upon. After it undergoes the revision process and gets final approval, a thesis is included in the digital repository.

Viajerus [2] is a facility provided by U-DL-A to assist users in querying distributed collections in a transparent fashion. Viajerus receives user queries and dispatches mobile agents to digital libraries that participate in a federation. Mobile agents gather information from each node and sends it back to the user.

Syrex is an agent-based recommendation system for U-DL-A users. Syrex [8] produces recommendations about existing or newly acquired library materials based on previous usage (content-based recommendations) and on selections by other users with similar profiles (collaborative recommendations).

EGA (Spanish acronym for Learning Group Spaces) is our first implementation of group spaces [6] in U-DL-A. In EGA, every user is represented by a movable image in a shared room so participants are aware of other users in the room. Users may engage into multi-party synchronous communication (text-based in our current implementation) and minutes of every meeting are available at all times.

ONGOING AND FUTURE WORK

We are currently working on a Jini-based implementation of a distributed framework that integrates all U-DL-A services and interfaces [3]. Robustness and usability tests are being conducted for each of the components of U-DL-A which should result in refinements and new applications and areas of opportunity. We believe U-DL-A will have great impact on information-intensive scholarship activities and collaborative activities in general. U-DL-A will serve as a valuable testbed for exploring major issues in HCI, CSCW and Digital Libraries.

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