MiBiblio: Personal Spaces in a Digital Library Universe

Lourdes Fernández, J. Alfredo Sánchez, Alberto García

Library of Universidad de las Américas-Puebla
Center for Research in Information Technologies (CENTIA)
Sta. Catarina Mártir, Cholula, Puebla 72820 México
+ 52 22 292257 {lulu, alfredo, alberto}@mail.udlap.mx

ABSTRACT
This paper describes MiBiblio, a highly personalizable interface to large collections in digital libraries. MiBiblio allows users to create virtual places we term personal spaces. As users find useful items in the repositories, they organize these items and keep them handy in their personal spaces for future use. Personal spaces may also be updated by user agents.

KEYWORDS: Personal Spaces, Personalization, User Interfaces, Agents.

INTRODUCTION
Libraries are enclaves in which a large volume of useful information is organized and made accessible to wide user communities. As in other institutions of higher education, at the University of the Americas-Puebla (UDLA), Mexico, the library has become a key resource for students, faculty and the general public. With about half a million titles, the library holds materials including books, magazines, maps, and historical archives in various formats. Recently, several projects have been initiated to build digital collections and provide users with a wide range of digital services. These projects have been structured as a digital library initiative named University Digital Libraries for All (U-DL-A).

Access to the collections has evolved from the classic physical card catalog to on-line interfaces available on the Web (see http://biblio.udlap.mx). However, much work is needed to enable a more advanced utilization of the available information resources. U-DL-A is focusing on the exploration of issues in the development of digital library environments that facilitate collaboration among distributed users while still responding to their specific individual needs and preferences. The project builds upon ongoing work on the definition of architectural components for distributed

digital libraries [3, 10] as well as work on user interfaces for managing large information spaces [9]. The initiative is expected to produce operational interfaces and personalized collaborative environments for an actual digital library which is part of a large federation of digital collections.

In this context, this paper focuses on MiBiblio, an effort to provide highly personalized environment for using both physical and digital collections.

THE APPROACH OF MIBIBLIO
Each digital library user has different necessities and preferences. Digital libraries can play a very active role in customizing user services and making an otherwise complex dynamic collection manageable. We have introduced the concept of *personal spaces.* Personal spaces are digital library areas defined by users to organize information that is required to perform information-intensive activities or relevant to their individual preferences and needs. They include information units that are used frequently, tasks performed regularly within the library, personal information agents and different maps of the library generated as a result of navigating through collections.

A personal space contains references to information added directly by the user, but also materials generated via agents' recommendations according to the users profiles. We have developed information and recommendation agents based on content and collaborative filtering [2].

One of the most used services in the library is the reserve area. Here, instructors put materials related with their courses, including personal notes, articles and books. Digital Reserve materials have been added to personal spaces. Default reserve items are provided in personal spaces according to user roles (e.g., professor, student, researcher, administrative employee, etc.) and personal profiles, but can be refined by users as they become familiar with the digital library's resources.

Traditional libraries typically offer materials organized according to widely accepted schemes, such as the classification system of the Library of the Congress of the United States. In a digital library, however, this is but one of an infinite number of possible ways to organize collections. In fact, each user could have one or more classification schemes from a personal point of view. Managing multiple classification schemes increases the complexity of personal spaces. In order to cope with this problem, we are developing tools for visualizing very large information

spaces which will allow users to navigate the collections in a easy and intuitive way. We have been working on a three-dimensional viewer of overlapping hierarchies [1] which will facilitate the visualization and contextualization of complex information spaces.

U-DL-A participates in the Networked Digital Library of Theses and Dissertations [5]. In order to retrieve information from multiple nodes (in response to specific queries or according to user profiles), we are developing a mobile agent class. Each user will be able to generate multiple instances of these agents delegating specific information retrieval tasks [8] to them. Agents will be able to travel to different collections in which they are authorized to operate and then they will integrate results, which will be added to the corresponding users' personal spaces. Our current implementation of mobile agents is based on the Aglets platform [6].

Communication between the various available services and personal spaces is enabled by a simple communication protocol [3] we have implemented using CORBA, KQML and Jini in a highly distributed digital library architecture. We are now considering self-financing mechanisms for these services so they can be made available to the general public.

Figure 1: MiBiblio interface.

Figure 1 illustrates the interface of our current prototypical implementation of personal spaces. In this case, information gathered by the user and user agents are represented graphically as books in bookshelves. Cartoon characters selected by the user represent mobile and recommender agents. We presently are working on robustness and usability tests and we expect to release a public version of our interface later this year.

RELATED WORK
In DLITE [4] users have *workcenters* where they can perform different tasks and access distributed information systems transparently. DLITE allows users to reuse results of some of its services as input for others by dragging and dropping objects in a graphical interface. Users can keep their individual environments from session to session and share it with other users.

CONCLUSION
Personal spaces will allow library users to customize a vast information universe to suit their personal necessities and to construct a virtual space which will reflect their personality [7]. We posit that personal spaces will make users feel they define and control the interface to the library and they receive highly personalized attention even though thousands of users may be accessing the library at the same time. In this way, we expect the quality of library services and user satisfaction will improve significantly.

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