INFORMATION SCIENCE PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com
ITB11008

This chapter appears in the book, *Design and Usability ofDigital Libraries: Case Studies in the Asia Pacific* edited by Yin-Leng Then and Schubert Foo © 2005, Idea Group Inc.

Chapter VI

Implementation of Next Generation Digital Libraries

Ee-Peng Lim
Nanyang Technological University, Singapore

San-Yih Hwang
National Sun Yat Sen University, Taiwan

Abstract

To implement the next generation digital libraries, one has to examine both the data *and* functional *aspects of the digital library requirements and understand the existing available technologies. In this chapter, we outline the major implementation issues of next generation digital libraries and review existing standards, tools and related research topics. Due to new kinds of content and metadata, as well as domain- and task-specific usage, the next generation digital libraries will need to handle the representation and storage scheme of metadata and content. Unlike the brick-and-mortar libraries, there are new challenges in metadata harvesting, search and retrieval that require standardized protocols to be adopted across different digital libraries. Finally, some advanced digital library services are also discussed.*

Introduction

In recent years, there has been a flurry of new efforts developing different kinds of digital libraries that meet the needs of a wide range of users. Some of these efforts simply involve turning the conventional online catalog search systems into some Web-based systems. The other efforts, which are also the main focus of this chapter, require the development of both novel *content* and advanced *services* for users with information needs that could not met by the *brick-and-mortar libraries* [see Chan (2004) for a good discussion on how a university library embarks on a digital library development effort to manage digital content contributed by its users.]. We call these the *next generation digital libraries*. In this chapter, we will review some of the implementation challenges faced by the next generation digital libraries, and provide some pointers to the standards, tools and methods that address these challenges.

Like any other software application, we can dissect a next generation digital library system into two main components: the *data component* and *functional components*. The data component refers to the digital content and other information managed by the digital library. This mainly includes a collection of raw data content and the corresponding metadata. User profiles covering the user identities, interests and usage patterns are also part of the data component when such information is required to provide personalized services to the library users. The functional components refer to the range of services provided by the digital library system. Other than the standard search and retrieval facilities, new services are often required in a next generation digital library for the following reasons:

- New operations are required to cope with the visualization and manipulation requirement of new types of digital content. For example, the usual text and attribute based search and retrieval facilities are inadequate for a collection of map images or music audio files.
- When the use of a digital library is closely coupled with user tasks, for example, e-learning, new services that provide seamless integration of digital library accesses with user tasks will be required. For example, an e-learning system may require a digital library to flexibly organize reference materials by course topics in order to facilitate learning.
- Due to advances in Web and media technologies, the next generation digital libraries are likely to manage massive amount of digital content. If there are no effective methods and tools to help users locating the relevant information, users are likely to be overloaded with too much information, causing the *information overload* problem.