

Chapter V

Interactive IR in Digital Library Environments

Overview of Digital Library Environments

History and Background

For centuries, people have been used to printed materials. The emergence of the Internet brings dramatic changes to millions of people in terms of how they collect, organize, disseminate, access, and use information. Researchers (Chowdhury & Chowdhury, 2003; Lesk, 2005; Witten & Bainbridge, 2003) have identified the following factors that contributed to the birth of digital libraries:

1. Vannevar Bush's pioneering concept and idea of Memex. Vannevar Bush (1945) wrote a classic article, "As We May Think," which has had a major impact on the emergence of digital libraries. In the article, he described his Memex device, which was able to organize books, journals, and notes in different

places by linked association. This associative linking was similar to what is known today as hypertext.

2. The advancement in computer and communication/network technology. The computer was first used to manage information. In the 1960s, the emergence of remote online information search services changed the way people access and search information. By the 1980s, people could remotely and locally access library catalogues via Online Public Access Catalogues (OPACs). The invention of the CD-ROM made it easy and cheap for users to access electronic information. Most importantly, Web technology started in 1990, and the occurrence of Web browsers afterwards have enabled users to access digital information anywhere as long as there is an Internet connection. Web search engines offer an opportunity for millions of people to search full-text documents on the Web.
3. The development of libraries and library access. Since the creation of Alexandrian library around 300 B.C., the size and number of libraries have grown phenomenally. A library catalogue goes from a card catalogue to three generations of online public access catalogues started in the 1980s. Library materials include mainly printed resources to multimedia collections, such as images, videos, sound files, and so forth. Simultaneously, the information explosion in the digital age makes it impossible for libraries to collect all of the available materials.

Several pre-Web digital library efforts began at the end of the 1980s and beginning of the 1990s. These include Project Mercury (1989-1992), the TULIP Project (1993-1995), the Chemistry Online Retrieval Experiment (CORE), and the Envision Project (Fox & Urs, 2002). The Digital Library Initiative 1 (DLI1), a \$24 million program from 1994-1998 funded by National Science Foundation (NSF), Defense Advanced Research Projects Agency (DARPA), National Aeronautics and Space Administration (NASA), and other agencies, was a major US research development initiative. DLI 1 focused on technical issues, mainly to advance the technology to collect, store, and organize information in digital forms. Digital Library Initiative 2 (DLI2), which offered \$44 million in funding, is sponsored by the NSF, DARPA, National Library of Medicine (NLM), Library of Congress (LC), National Endowment for the Humanities (NEH), NASA, and Federal Bureau of Investigation (FBI) in partnership with the Institute of Museum and Library Services (IMLS), Smithsonian Institution (SI), and National Archives and Records Administration (NARA). DLI2 (1999-2004) expanded the scope of inquiry to include the social, behavioral, and economic aspects of digital libraries (Fox, 1999; Fox & Urs, 2002; Chowdhury & Chowdhury, 2003).

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