International Journal of Engineering Research And Advanced Technology(IJERAT)
ISSN: 2454-6135 [Volume. 02 Issue.12, December– 2016]

DIGITAL LIBRARIES

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ABSTRACT

There has been a global explosion in the number of scholarly documents generated in recent times. This has led to development of digital libraries, which exist with the traditional ones. Digital libraries facilitate information extraction using automated algorithms and systems. This paper presents an introduction to digital libraries.

Key Words: *Digital libraries, electronic libraries, digital repository*

INTRODUCTION

Libraries have served as repositories of human knowledge and play a crucial role in developing society. A library is dear to a learning community and is the key to its academic strength. A digital library (DL), also known as electronic library, is a collection of digital objects stored in electronic form and a means of accessing and organizing them. It is a library without walls.

The phrase "digital libraries" was first used by the National Information Infrastructures initiatives and the U.S. national political discourse in 1991 and 1992 [1]. Digital libraries are important tools for all professions. People who use and benefit from DL include students, teachers, librarians, computer scientists, publishers, politicians, and other entities. For those in academic institutions, DLs address the needs of their missions: teaching, research, and service.

TYPES OF LIBRARIES

Libraries can be classified into three categories [2]: traditional libraries, digital libraries, and hybrid libraries. Traditional or conventional libraries operate through printed collections. Digital libraries refer to the collection of digital objects which include text, visual, audio, and video materials. The term 'hybrid library" refers to libraries that have both physical and electronic collections.

Like traditional libraries, digital libraries have the goal of organizing, distributing, and preserving information resources. They require less physical space than traditional library. Traditional libraries spend a lot of money paying staff and rent. Other advantages of digital libraries include increase accessibility to users, no physical boundaries, round the clock availability, and user-friendly information retrieval [3]. The number of digital libraries is increasing. They can vary in size and can be maintained by individuals, organizations, or institutions.

DL DEVELOPMENT

Thousands of digital libraries are being developed around the world and it costs millions of dollars to develop them. There have been several projects and fundings that focus on developing DLs. For example, the National Science Foundation funded several DL projects in the U.S. Developing DLs requires infrastructure, software, and factoring usability [4].

Infrastructure: A central issue in developing DLs is the availability of Internet-based technologies to enable users to access information. DL requires technology to link the resources. The technologies which have made DLs a reality include digital computers, digital storage, computer networking, and presentation technologies [5], Technology is used to connect multiple DLs in a way seamless to the user.

Software: Software that run digital libraries are available free of charge. These open source software include Greenstone, DSpace, and Fedora. While DSpace and Federa are more sophisticated, Greenstone can run on standalone computers. The Greenstone software is an open-source product that is freely distributed for developing digital library. Using the software, anyone can build a DL [6]. Other software include EPrints, Omeka, and Invenio.

Usability: Given limited resources, tough decision must be made on which materials to digitize. How can one decide whether a digital library is good? Usability is the

extent to which a product can be made easy to use. Usability properties of digital libraries include simplicity/ease of use, comfort, user friendliness, readability, relevancy, and visual presentation [7].

BENEFITS AND CHALLENGES

Some regard the digital library as a service, an engineering problem, and a political challenge. New tools and technologies are required to handle the increasing volume of digital publications. In order to realize their full potential, DLs must address some technical, informational, and social challenges.

The general problem of linking diverse content provided by individual DLs around the world is called *interoperability*. This may involve technical interoperability (hardware, networks, data types, and protocols), informational interoperability (language, metadata, semantics, and user interfaces), and social interoperability (rights and responsibilities) [8]. Every country should develop its own policy for developing digital library.

Digital libraries face the problems of intellectual property and copyright, because the copyright laws for digital information are still in the making. There is a lot of non-copyright material. Some publishers restrict the use of digital materials (such as e-books) by libraries.

Developing countries suffer from digital divide or technology gap in the society. These countries can claim varying degrees of interconnectivity. To build digital libraries meant for universal use, an international effort must be made to develop DLs that are multilingual. A multilingual digital library is one that has all functions implemented simultaneously in as many language as desired [9]. It would not make sense to have a collection in German or Chinese while its supporting text and navigation buttons are in English.

CONCLUSION

In this age of information explosion, users seek digital information rather than printed materials. The library of the future is a space without walls in which resources can be accessed anywhere by the user. Universal access to digital information is the goal of digital libraries.

There has been a tremendous interest, research, and development in DLs. Conferences on DLs have been sponsored by the Association for Computing Machinery (ACM) and IEEE Computer Society since 2001. DL courses and labs are being offered to develop future library professionals [10]. Major studies on DL focus on how digital libraries transform learning, education and research. As we overcome the problems of interoperability and multilingual collection, we move closer to a global digital library.

D-Lib Magazine, International Journal on Digital Libraries, and The Electronic Library are important sources of information on DL.

REFERENCES

[1] D. Bearman, "Digital libraries," *Annual Review of Information Science and Technology*, vol. 41, no.1, 2007, pp. 223-272.

[2] T. Singh and A. Sharma, "Research work and changing dimensions of digital library: a review," *Proceedings of the 4th International Symposium on Emerging Trends and Technologies in Libraries and Information Services*, 2015, pp. 39-42.

[3] "Digital library," Wikipedia, the free encyclopedia, https://en.wikipedia.org/wiki/Digital_library

[4] H. Francis, "Digital libraries: opportunities and challenges for the English-speaking Caribbean," *Information Development*, vol. 24, no. 2, 2008, pp. 143-150.

[5] E. A. Fox and S. R. Urs, "Digital libraries," *Annual Review of Information Science and Technology*, vol. 36, no. 1, 2002, pp. 502-589.

[6] I. H. Witten et al., "Digital libraries for creative communities," *Digital Creativity*, vol. 15, no. 2, 2004, pp. 110-125.

[7] A. Koohang and J. Ondracek, "Users' views about the usability of digital libraries," *British Journal of Educational Technology*, vol. 36, no. 3, 2005, pp. 407-423.

[8] E. A. Fox and G. Marchionini, "Toward a worldwide digital library," *Communications of the ACM*, vol. 41, no. 4, April 1998, pp. 29-32.

[9] E. Vassilakaki and E. Garoufallou, "Multilingual digital libraries: a review of issues in system-centered and user-centered studies, information retrieval and user behavior," *The International Information and Library Review*, vol. 34, 2013, pp. 3-19.
[10] R. A. Audunson and N. Z. Shuva, "Digital library education in Europe: a survey," *Sage Open*, Jan.-Mar. 2016, pp. 1-17.

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