



Five Laws Of Library Science And Emerging Database Technologies For Libraries

KEYWORDS

Database, Database Management System, Digital libraries, ICT.

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ABSTRACT *The library and information centres, around the world have acquired an advanced status in terms of implementation of information communication technology (ICT), as a result which they have now become centres of excellence in information delivery. The present paper is an attempt to provide an outline of the emerging database technologies that are facilitating the libraries to provide their services in a quicker, effective and more efficient manner. The five laws of library science propounded by Dr. S. R. Ranganathan are still relevant and prevalent today in the sense that they have acted as guiding principles for developing the digital/ electronic databases for efficient management of libraries with the help of information technology. The internet databases, the web databases, digital/ electronic libraries, multimedia databases, mobile databases and spatial databases have all proved that these are essential to enhance the existing status of library and information centres.*

1. OBJECTIVE

- (i) To study the relevance of Ranganathan's five laws of library science in the modern digital library era.
- (ii) To introduce library professionals with some of the database technologies being efficiently used in library and information centres for managing the information.

2. INTRODUCTION

The traditional role of library and information centres has been to provide books, learning material and information sources to its readers. The libraries which were once considered to be static in nature have now become live and have reached at the doorstep of the user, being functional 24x7 breaking the barriers of time and walls. This new 'avatar' of libraries have become possible only because of technological advancements in ICT, digitisation of information sources, online availability of information and information resources. Web technologies 3.0 and 4.0 facilitated the direct user access to electronic resources. The technology has also changed the users' behavioural pattern in receiving and retrieving the information. The modern libraries have in fact become interactive libraries rather than static and dumb libraries of the past.

The databases, internet, World Wide Web (WWW), digital contents, archives and institutional repositories of library products have paved the way to make the five laws of library science truly relevant in the modern digital library era. Even today the libraries are performing the same traditional functions but based on ICT. The librarians in their new role have to devise methods where they are able to manage, filter the vast information base, pertinent to needs of the end user by means of developing in-house databases and making these available to other libraries also through networking and sharing available over the internet.

RANGANATHAN'S FIVE LAWS AND DIGITAL ERA

The five laws of library science laid the theoretical foundation for the management of library and information centres around the globe. In fact these laws acted as the guiding principles for the scientists and engineers who were and are the flag bearers for the technological developments. It is emphasised here that all the technological developments which are now being implemented in the libraries might have been developed keeping in mind the future libraries which would act as service agencies and would serve the information seekers as per the five laws of library science. Five laws of the library science can be justified in the modern context as following:-

- Law 1) Books are for use : Online resources are available when and where needed.
- Law 2) Every reader his book : Effective use of E resources prove that wherever the relevant material is available in the network that can be accessed.
- Law 3) Every book its reader : WWW, Networking, Sharing and library Consortia.
- Law 4) Saves the time of the reader : Multidimensional key word searching options.
- Law 5) A library is a growing organism: No barrier of time and boundary, thus making access possible from any access point in the world.

3. EMERGING DATABASE TECHNOLOGIES FOR LIBRARIES

The efficient management of data or information is the most important objective of any organisation or service agency like a library. The success of the library in today's time of information bombardment now depends more upon the ability to acquire accurate, reliable information sources within time, with the help of existing technology. The specifically designed databases are of a great help to attain such a success.

Database system is a tool that simplifies the management of data and information and hence helps to extract the useful piece of information by acting as a repository of information within the organisation's information system. Database management system (DBMS) is a collection of interrelated data and a set of programs to access those data. The collection of data are usually referred to as database, e.g., in a library traditional catalogue or online public access catalogue (OPAC) or web OPAC are all databases encompassing the information about the information sources in the particular library or all those libraries which are working together in a network. The primary aim of any DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.

Data and information are closely related in the sense that information is processed, organised or summarised data. The collection of related data when put together communicates useful and meaningful representation to the user becomes information. Some of the most popular and reliable databases that are being used in different kinds of libraries in combination or singular are as under :-

3.1. INTERNET DATABASES

Internet is an interconnected group of networks which are managed independently of each other and supports the cer-

tain technical standards necessary for interconnection called the transmission protocol/ Internet protocol (TCP/IP). Internet has resulted into growth of World Wide Web (www) technology which facilitated the direct user access to databases. The libraries which earlier were using simple catalogues to showcase their collection are slowly switching over to OPACs and Web OPACs. These web interfaces have made available a variety of services and information in different formats. The variety of services that are being provided by the modern libraries are – electronic mail, discussion and chat groups, file access, searching tools, web interfaces, E learning and many more. Discovery (browsing, information retrieval and downloading), Communication (messages posted on online bulletin boards, information transfer, information processing, E mail, chat groups) and Collaboration (electronic collaboration between individuals or groups including resource sharing and screen sharing) are some of the categories of internet applications being used in the libraries.

3.2 WEB DATABASES

The WWW is the most powerful collaborative-networked information system or is the system of interlinked hypertext multimedia documents containing text, images, audio, video and animation etc. It is different from internet in the sense internet functions as a transporter and web is an application that uses those transport functions. The web is a system with universally accepted standards of storing, retrieving, formatting and disseminating information through client/ server architecture. With ever-changing technologies incorporating new qualitative improvements in the existing ones, we have now moved into the times of web 4.0. Web 1.0 was Read only web where the information was to be updated from a single desk and it was providing only the asked information and no further links were provided. Web 2.0 was considered as a Read and Write web which was more about user communication and interaction. Web 3.0 which is also called semantic web allowed collaboration of different contents. It provided more linkages and tagging of information and information sources. It was considered as a universal medium of exchange of data, information and knowledge.

Tanner (2008) furthers the definition of web 3.0 as Web 3.0 = Every human + Every device + Every information + Every technological advancement.

Web 4.0 fully facilitated the use of Rich Media (multimedia) which is fast catching up with today's generation and becoming more popular through mobile devices. People now stay connected with the outer world of business, commerce, trade, politics, education, learning, technology, infotainment and much more. Web 4.0 is known as the age of rich media.

Technically, web is based on Internet Service Providers (ISPs), Internet Protocol address (IPs), Hypertext Mark-up Language (HTML), Uniform Source Locator (URLs), Multipurpose Mail extension (MIME) data types. The most widely used web browsers are Microsoft's internet explorer and Netscape navigator. The most popular use of web is to search and filter data. When a particular website is being browsed using a search engine, the web enabled data is accessed.

The slow speed of the internet, accessing to relevant data in peak hours, reliability of information and internet, security are a few problems associated with web based databases.

3.3 DIGITAL LIBRARIES

The information when stored on computers and which is accessible only through and on computers is called a digital library. The collection of information sources are stored in digital formats and retrieved over networks. A network connects the computer to personal computer on the user's desk.

It can be defined as a managed collection of information, with associated services where the information is stored in digital format and is accessible over a network. It helps users

to interact with library directly, to store collection of material on electronic storage medium and provide services in a crisp, quick and efficient manner. Archives and repositories which store large collections of information are organised digital libraries for long-term preservation of materials.

The need for digital libraries was felt to make better delivery mechanism of library services as compared to traditional library system. Digital libraries in fact are a medium to enhance the status of existing library services. The information which earlier was available to a few privileged ones or the professionals, is now accessible to an even a common user irrespective of any professional membership. However it is an open and debateable issue whether the digital world is ever able to replace the printed world of information.

E BOOKS / E JOURNALS DIGITAL LIBRARY: The availability of good and economic database soft- wares made it possible to build Online collections of scientific journals and electronic books. One of the first major attempts to build a campus digital library was MERCURY ELECTRONIC LIBRARY at Carnegie Mellon University (1987-1993) with a textual database and page images of journal article in the field of computer science. CORE was a joint project by Bellcore, Cornell University and OCLC and the American Chemical Society from 1991- 1995. The displayed page when printed had the same design and layout as of the original paper print. Elsevier Science Publishing's TULIP project followed Mercury and CORE. Machine Readable Catalogue (MARC) in late 60's by OCLC formed the basis of shared cataloguing among many libraries.

Low cost computing technologies after 1990's stimulated and expanded the cause of digital libraries with cheaper electronic storage media, better computer displays, congregation of rich media, high speed networks, portable/ mobile computers and 3G and 4G mobile technology.

The database for digital libraries consists of data and metadata. Metadata is data about data such as bibliographic details, which identifies an item to the outside world, providing all possible information pertaining to the document for its access. Digital material, digital object and digital documents are the general terms used for items in a digital library. The potential benefits of a digital library is that it brings library at the door of the user, searching and browsing becomes easier and quicker with the help of a computer, information is available all the time in an updated version and can be shared.

3.4 MULTI MEDIA DATABASES

Multimedia databases store and provide information on a variety of media such as Images (pictures, photographs, drawings and more), Video clips (movies, home videos, news, sports), Audio clips (speeches, phone, songs), textual data (books, journals) etc. Content based retrieval, locating a particular video or audio clip, image searching are most prevalent in multimedia databases.

Some of the important applications of multimedia databases are repository applications, power point presentations, collaborative works using multimedia, documents and record management, education and training (EDUSAT, Distance Education), knowledge dissemination, real time control and monitoring.

3.5 MOBILE DATABASES

The mobile phones using 3g and 4g technology, satellite phones, laptops, palm top computers/ tablets along with wireless technologies have opened up new ventures for mobile computing. These devices fitted with latest programs allow the users to access data from remote locations. The SMS/ MMS reference service and internet connectivity on mobile phones, GPRS technology have facilitated the access to any database on this globe. Sybase's SQL Anywhere dominates mobile database market. Other popular mobile databases

are IBM's DB2, Everyplace 7, Microsoft's SQL 2000 Windows CE edition and Oracle 9i Lite.

3.6 SPATIAL AND GEOGRAPHICAL DATABASES

Spatial databases support data based on spatial locations and are useful for efficiently storing indexing and querying data on the basis of spatial locations. These are also helpful in disaster management for pinpointing the exact locations

of disaster. Geographical data such as road maps, land use maps, topographical maps are some of the examples of such databases. IBM DB2 Spatial Extender and Oracle Spatial provide support to spatial and geographical database.

3.7 ACADEMIC DATABASES

Some of the examples of academic databases and different search engines are listed below for better understanding:

NAME	DISCIPLINE	LOCATION
Academic Search	Multidisciplinary	www.ebscohost.com
African journals Online	Multidisciplinary	www.ajol.info
AGRICOLA	Agriculture	www.agrocola.nal.usda.gov
Books In Print	Books Subscription based	www.booksinprint.com
Chemical Abstract Service	Chemistry	www.cas.org
DOAJ	Journals	www.doaj.org
Open J- Gate	Open Access Journals	www.openj-gate.com
MEDLARS	Medicine	www.nlm.nih.gov
Scopus	Multidisciplinary	www.scopus.com

4. CONCLUSION

Databases are real time repositories for long term preservation and quick retrieval of information from any corner of the world at anytime with the support of information and communication technology. The users' behaviour in seeking a particular piece of information provides a platform to develop content specific database. The direct user access to database proves the relevance of five guiding principles even in the era of highly developed information and communication technology that have made possible libraries without walls. The technological advancements are a boon for the library and information centres for efficient and coordinated management of information in today's networked world.

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