CHAPTER-4
DIGITAL LIBRARIES
IN INDIA
Chapter-4
Digital Libraries in India

INTRODUCTION

Librarian and information officer are required to acquire new skills for developing and managing the digital libraries. There are a number of university and Institutes libraries in India, which are in the process of conversion in to digital libraries.

However, Digital libraries can be explained as electronic libraries in which large number of geographically distributed users can access the contents of large and diverse repositories of electronic objects. Digital Library includes networked text, images, amps sounds videos, and scientific, business, government database, hypertext, hypermedia and multimedia objects. Digital Libraries basically store materials in electronic format and manipulate large collections of those materials effectively.

Digital library is a collection of information both digitized and organized and which offers capabilities beyond those of the traditional library. A digital library is a global virtual library- the library of thousands of networked electronic libraries.

(1) Objectives:
(a) It requires technology to link the resources of many libraries.
(b) Universal access to digital libraries and their information services.
(c) Digital library collections extend to digital artifacts that cannot be represented or distributed in printed formats.
(d) The purpose of digitizing a document is to make the document more useful as well as more accessible. It enables user to conduct a full-text search on a document.
(e) A document can be converted into digital format depending upon the objectives of digitization, end user, availability of finances etc. cost saving, preservation, keeping pace with technology, and information sharing. Digital conversion process includes document, data capturing, data processing, storage, indexing and retrieval.

(2) Benefits:

The main benefit of digitization is:
Preserve rare and fragile objects with enhancing their access to multiple numbers of users simultaneously.

The prime reason for the digitization is the need for the user for convenient access to high quality information.

Quality preservation

Multiple referencing

Wide area coverage

Archival storage and

Security measures.

The concept of digital libraries developed in India, began in the mid 1990s with the advent of information technology on a large scale. The advent of the Internet acted as a catalyst for digital library initiatives. The use of Information technology (IT) and information and Communication Technology (ICTs) is concentrated in University and technology libraries. Indian Instituted of Technology (IITs) Indian Institute of management (IIMs) Indian Institute of Science (IISs) and Research and special Libraries. There are some government agencies, as well as institutions, mostly in the public sector are also engaged in digitization of libraries.

(3) **Problems of Digital Libraries in India:**

I. There is a lack of interest on the part of parent institutions and the absence of action plans or priorities are major hindrances. Moreover there is an acute shortage of competent manpower to take up the task of digitizing local content and creating digital information repositories.

II. **There is a and need to retain the existing staff:** Libraries judiciously utilize enhanced information will contribute much to research activities in India by reducing some of the existing barriers to information communication such as time and space.

III. **Digitization is digital divide:** Access to digital libraries is dependent upon hardware and software requirements. Therefore, the people from affluent communities can meet their requirements As a result, information and knowledge sharing are not provided to all the people which have similar qualities of information access.
IV. **Inadequacy of information for rural area:** The digital divide is much more media. The Internet is accessed by 0.37% of users in urban areas.

V. Traditional library service needs to be supplemented by electronic resources making use of information technology, computers and communication.

(4) **Information Infrastructure and Services in Digital Libraries**

Most of the library and information centers of India have started using information communication technologies in organizing their collections, housekeeping operations, processing, retrieval, and dissemination of information to the end users. The automation and networking of many universities, national institutions and other institutions of higher learning has been initiated by the national agencies dealing with information and library networks like NICNET, INFLIBNET, DELNET, CALIBNET, and other metropolitan and city networks which have started developing various bibliographic databases of their holding. NICNET and ERNET have made e-mail/Internet service available to the academic as well as in Government sectors. Some of the metropolitan and city library networks like MALIBNET, CALIBNET, MYLIBNET, PUNNET, BONET etc. have also been initiated and started functioning and providing various online services through these networks.

It needs an adequate information infrastructure required in any university/institutional libraries for sharing of information at regional, national and international or global level. These libraries are equipped with the latest ICT gadgets having fully automated/computerized library housekeeping operations and LIS services for end users; campus wide network, well connected to the Internet either by V-SSAT, lease line, radio frequency or by broadband dial up connection; and also having access to the digital or e-resources like e-journals, on-line databases, CD-ROM databases and online bibliographic services provided by the library and information networks like INFLIBNET, DELNET etc.
3Chapter-4.1

OPTICAL CHARACTER RECOGNITION (OCR)

For image by image main polities, including converting TIFF (text image File format) to web delineable JPEG (Joint photographic experts Group) files and GIF (Graphic Interchange format) files, adobe Photoshop is the more common selection. Electronic text creation primarily involves the digitalization of text and images. Apart fro re-keying, the best method of digitizing text is optical character Recognition (OCR). This process is accomplished through the utilization of scanning hardware in conjunction with text scanning & of tware. OCR takes a scanned image of a page and convert it into text.

This is also good time to examine the physical document and attempt to anticipator problems with the digitalization process. Fragile spins, flaking or foxed paper, badly inked text; all will create difficulties during the scanning process and increase the likelihood of project delays if not anticipated at an early stage. This is another situation that requires examining representative samples of text. This could be that one text was cared for in the emulate conditions of special collections facility while another was stored in a damp corner of a bookshelf. Problem not only arises out of condition of the physical object but also out of such lettings as typography. OCR digitalis tar is heavily reliant upper the quality and type of fonts used in the text.

OCR Software is optimized for laser quality printed text. This means that the older the printed text, the more degradation in the scanning results. This type of problems made about how to deal works them- decagons that become enginificant part of the project methodology.\(^1\)

The final stage of document analyzes is deciding which features of the text to encode. You have the control over how much of the document you want to encode, taking into account how much time and manpower are dedicated to the project. There are three basic categories of level of encoding to couender of what to tag-

(1) **Structure**

These are all assigned tag names:

(i) Chapters
(ii) Sections
(iii) Stanzas
Anything in document can be encoded but it is important to have established what level of markup is necessary.

(2) **Common elements:**

(i) Bold  
(ii) Italic  
(iii) Typeface

(3) **Documents contents. (features)- Textual relationship:**

(i) Themes to be highlighted  
(ii) Ideas to be highlighted

Examples: for anthers biographies.

Encoding of: (i) Authors name  
(ii) Authors Date of birth  
(ii) Written works  
(iv) Spouse etc.

(4) **Decision:**

(i) Textual revisions  
(ii) Deletion  
(iii) Additions

**4.1.1 Digitalization**
Digitalization is a creation of a computerized representative of a printed analog. There are many methods and media (audio, Video) of degitising. As hardware and software develop the quality of digitizing are improving output.

(i) Quality of output
(ii) Price cut in storage costs
(iii) Improvement in archival imaging standards

But the best quality image will result from digitizing the original object.

There is a chain composed of number of intermediates that come between the original object and digital image. More intermediates means more links in the chain. Each link attains a level of importance so that if one piece of the chain were to break the entries project would fail. It all depends on the quality of image being scanned. Scanning may be of-

(a) A copy of a microfilm of an illustration originally found in a journal
(b) Scanning the image straight from the journal

### 4.1.2 Selection of hardware and software

It is careful stage when a hardware and software is selected. Before selecting the hardware and software the following points to be considered:

(a) Whether fragile manuscripts that cannot handle the damages light of a flatbed scanner.
(b) A book whose binding cannot open post a contain degree, to the digital camera.
(c) Fading pages.
(d) Uneven type

To solve this problem best text scanning software should be selected.

To accomplish this best comb rated between hardware and software is need.

### 4.1.3 Methods of image capture
There are few methods of image capture. A scanner can have the following quality equipments of a high – end digital camera-

1. **Camera:**
   
   (i) Flat bed
   (ii) Sheet bed
   (iii) Drum
   (iv) Slide
   (v) Microfilm

2. **Hardware quality and requirements:**
   
   (i) Quality of laves, mirror and other optics.
   (ii) Mechanical stability of the optical system
   (iii) The focal range and stability of the optical system
   (iv) The quality of scanning software of scanning hardware.

3. **Quality of image capture**

   An image capture require an image scanning software to accompany the first decision regarding image capturing is the purpose of the images being cheated. It should be a basher quality of setting of images and the hasher the setting necessary for scanning.²

   (i) 1- Bit black and white
   (ii) 8- bit grayscale
   (iii) 8- bit colour
   (iv) 24 bit colour

   a ‘0’ or a ‘1’ are indication of presentation of a single bit. A ‘o’ is couriered an absence while a ‘1’ is a presence with more computer representation of information being accommodated by multiple and gathered bits.

   1. 1- bit black and white – it can either black or white. It is unsuitable for almost all images.
2. 8-bit grayscale- it is an improvement from 1-bit. They encompass 25 shades of grey it is used for non color images and provide clear image. They are couriered more adequate

3. 24 – Bit color- for archival copies- best choice.

4. 8- Bit color- it is similar to 8- bit grayscale. In this each bit can be one of 256 colors. It dependent on project, type of computer

4.1.4 Text creation

There are quite a few images formats to choose from. There are three types fundamentals of text creation-

1. TIFF (Tagged Image File format) files. This is most widely accepted format for revival image creation and retention as master copy.
   (a) These files can be read by almost all platforms.
   (b) Most digitalization property begin image scanning with TIFF format.
   (c) It gather more information from the original and then save these data.

   This file has disadvantage of size of image. Once the image saved, it cannot be called up at any point and cannot be read by a computer with different hardware and software system.

2. JPEG (Joint Photographic Expert Group) files.

   It is format of web viewing and transfer through systems that have space restricted. These files are popular for – (a) capability and quality.
   (i) Least compression of the file.
   (ii) Image losses information
   (iii) Once the image is saved, the discarded information is lost.

   Disadvantage is that the entire image or any part cannot be enlarged.
   Therefore, it is useful for archiving that method for online reviewing

(3) GIF (Graphic Interchange format) files.

They are older format limited to 256 colors.
(i) Uses lossless comprising format with requiring more space
(ii) They are useful for graphic art and live drawings.
(iii) In this is frequently used in web design but can have a beneficial use in text creation.
(iv) It can be read by web browser

4.1.5 Role of OCR (optical character recognition) technology

The goal of recognition technology is to re-create the text and other elements of the page including tables and layouts. OCR technology examines the patterns of dates and turns them into characters.

**OCR Technologies**

Optical word recognition plus – (POWR++) technology:

(i) It remises 13 languages including brightest and American English.
(ii) It includes full dictionaries of each language OCR technology is optimized for laser printer quality text.
(iii) The condition of the document to be scanned.
(iv) The changes in paper moving from a blacked white to a yellowed, sometimes foxed, background creates anise and the software most sift through.

4.1.6 Optical Character Recognition

There is a plan to create a portal for digital library of India piloted by the officer of the principle scientific Advisor to the government of India, Ministry of communication and Information technology (MCIT) with Indian Institute of science (IISc) and Carnegie Mellon University, USA, as partners for fostering creativity and free across to all human knowledge.

It is proposed to create the Digital Library in India with a free-to-read, available to everyone over the Internet. This portal would provide a gateway to Indian digital libraries and will provides and support for full text indexing and searching based on OCR technologies where available. The availability of online search allows users to locate relevant information quickly and reliably by enhancing student’s research capability.
The scanning centers of Digital Libraries of India show that approx 39478 Million pages have been scanned at various centers in India. It shows that approximately 119810 books have been scanned.

<table>
<thead>
<tr>
<th>Language</th>
<th>No. of Books</th>
<th>No. of Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>77610</td>
<td>20304320</td>
</tr>
<tr>
<td>Telugu</td>
<td>15080</td>
<td>2899760</td>
</tr>
<tr>
<td>Hindi</td>
<td>6890</td>
<td>1707420</td>
</tr>
<tr>
<td>Urdu</td>
<td>3990</td>
<td>719670</td>
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<tr>
<td>Tamil</td>
<td>2682</td>
<td>401630</td>
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<tr>
<td>Sanskrit</td>
<td>2800</td>
<td>748540</td>
</tr>
<tr>
<td>Persian</td>
<td>2100</td>
<td>246900</td>
</tr>
<tr>
<td>Multi</td>
<td>1660</td>
<td>230820</td>
</tr>
<tr>
<td>Others</td>
<td>1890</td>
<td>289850</td>
</tr>
<tr>
<td>Arabic</td>
<td>970</td>
<td>198650</td>
</tr>
<tr>
<td>Kannada</td>
<td>780</td>
<td>153880</td>
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<tr>
<td>Marathi</td>
<td>670</td>
<td>127080</td>
</tr>
<tr>
<td>German</td>
<td>1100</td>
<td>50870</td>
</tr>
<tr>
<td>French</td>
<td>170</td>
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<tr>
<td>Bengali</td>
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<td>3130</td>
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<tr>
<td></td>
<td>119810</td>
<td>39478</td>
</tr>
</tbody>
</table>

This project has been taken in collaboration between National institute of science Communication and Information Resources (NISCAIR), council of Scientific and Industrial Research, Ministry of Science & Technology and Department of AYUSH, ministry of health and family welfare. NISCAIR is the centre of digital process.

4.1.7 Other Projects
Vidyanidhi began as a project in the year 2000 with support from NISSAT, DSIR, Govt. of India. Vidyanidhi is India’s premier digital library of facilitate the creation, archiving and accessing of Ph.D these. It is an information information infrastructure, a digital library, a portal of resources, tools and facilities for doctoral research in India and works national repository and a consortium for e-theses through participation and partnership with universities, and academic institutions.

(a) **Gyandoot**

Gyandoot is a Digital Library in the Dhar district of the state of Madhya commissioned on Jan. 1, 2000. It is connecting rural public cybercafés with a corresponding website is an extension of Gyandoot intranet providing global access via a portal. Gyandoot is a unique form of G2C (Government of Citizen). It is enabling over half a million rural citizen affordable access to various government and market-related needs through state-of-the-art information technology kiosks.

(b) **INDEST**

The Ministry of Human Development (MHRD) has sat-up the Indian National Digital Library in Engineering Sciences and technology (INDEST) consortium it in clouded, 39 institutions including IISc, IITs, NITs, IIMs and a few other centrally-funded Government institutions through the consortium headquarters set-up at the IIT. The Consortium has an active mailing list and a Web site at the IIT Delhi, the INDEST Consortium is the most ambitions initiative taken so far in the country. The benefit of consortia-based subscription to electronic resources has extended to all AICTE-accredited and UGC-affiliated institutions. 250 engineering colleges and institutions have already joined the consortium on their own.

INDEST consortium has presently including ACM Digital Library, ASCE Journals, ASME Journals (AMR), Capitaline, Enormonitor (GMID), IEL Online, Indian standards, Nature, ProQuest science (formerly ASTP), Science Direct, springer’s Link and bibliographic database of Compendia & Inspect and mathSciNet.

(c) **UGC INFONET**
TGC info net have a data centre is being set up. This repository will host e-resources like e-journals, e-books etc for the fair use of Indian academic and research community. Digital content like E-These are well maintained in the server, and maintained by INFLIBNET for the better use. The University Grants Commission (UGC) has started a program to provide electronic access over the Internet to Scholarly Literature in all areas of learning to the university sector in India.

(a) **CSIR Consortium**: NSCAIR is the nodal organization for developing a “Consortium of Consortium for CSIR Laboratories for Accessing e-journals”. The activity shall range from creation to monitoring of the access facility of scientific periodicals published by leading international institutions e-journal publisher and M/s Elsevier Science have an agreement for a period of four years for 1200 journals. CSIR scientists may take have fit of accessing these journals and material of their choice and need.

(b) **The National Library of India**: the national library undertook a pilot project entitled “down Memory Lane” to digitize its rate and brittle books in late 90’s. The English books that were published prior to 1900 and India books published before 1920 were taken into to hand first. A total of 9901 books containing more than 25 million pages were scanned and archived in 548 CE-ROMs (in duplicate) before June 2001. The National Library has in its possession a small holding of manuscripts representing some basic and important branches of knowledge.

(c) **IIT Delhi**: has installed a fiber optics-based campus LAN connected to a 2 Mbps VSNL in 1998 and radio link enabling faster Internet access for its community.

(d) Recently a project proposal has been made by India Institute of science and technology Collaboration. With carriage Mellon University will associate of US side. IIS will be the nodal agency.

For the first time in history, technology seems to favor the possibility of digital preservation of all the significant literary, artistic, and scientific works of mankind, as well as the potential of free access to them from every corner of the world. There were about 12 million unique book and document editions before the year 1900, and about 120 million since the beginning of recorded history. An average-sized book is around 260 pages and would require about 50 MB of disk storage if the book were stored as compressed images. Thus, the total requires 5 peta byte of storage. With the storage capacity of digital disks increasing by a factor
of 1,000 in ten years, it looks technically feasible and financially affordable to store on the computer all forms of knowledge produced.

(d) The Approach

The Indian Institute of Science (IISc), Indian Institute of Technology (IIT), NISCAIR and many other academic, technical and government organizations, totaling about 27 “Content Creation Centre”, have partners in the Digital Library of India (DLI) initiative for the digitization of Library of India heritage present in the form of books, manuscripts, art and music. Each centre brings its own unique collection of literature into the digital library. Many authors have contributing their books to the digital library free of charge. This digital library is also intended to be a test bed for Indian language Research. Digital Libraries in India is intended to be a leading and contributing partner in worldwide efforts toward making knowledge free.

For the digitization of old books, complete process comprised of scanning with planetary scanners, cropping, cleaning up images, and using software for the OCR conversion of English documents, format conversions and search engines have been developed. With available technologies, a 500-page paper book can be digitized and made available on the web in about two hours without having to unbind the book. So far, more than 291,000 books have been scanned, of which nearly 180,000 are in Indian languages. More than 85,000 books (26 million pages) are available on the DLI web site of the Indian Institute of science (http://www.new.dli.ernet.in).

1.1.8 Technological Challenges

There are many parties involved in the process of digitized project. The DLI work is performed by humans and machines. There are occasional errors possible, and which all into categories human errors and machine errors.

Human error arises most often due to miscommunication between project staff or to staff incompetence or non-adherence to process and standards. DLI projects have procured books from sources like libraries and standards. DLI project has procured books from sources like libraries and government archives, and the records for these books contain metadata entered by knowledgeable personnel. Although, in general, the metadata can be relied upon, the quality of that metadata are nevertheless subject to individual biases which are not foolproof. An improper
scanning operation made without following the standards set, may result in a digital collection that is not useful or suitable for an end-user. These problems manifest in various forms like the page of a book slipping while being scanning or an incomplete scan of a page. Manual errors can incur significant costs to the project, as (i) there is no satisfactory way to identify such errors when data is generated on such errors when data is generated on such a massive scale, and (ii) the erroneous data generated will not useful to end – users, thus undermining the purpose of the project.5

Machine errors creep due to the understandable limitations of the software being used or from improper configuration of the machines and software. Data generation, which is done during the scanning, is the key phase of the digitization process while obtaining digital images from the books. Once these images are obtained, the book is sent back to the library from which it came, and hence any problems that the book be re-obtained and re-scanned are costly. Errors due to improper configuration of scanners during the scanning phase are more serious, as the data generated becomes less useful due to its low quality.

Optical Character Recognition (OCR) is the software module that reads in image, understands the textual content in the image and outputs the text. Is the appropriate means for storing data, occupies less storage than images do, is easily editable, and helps in the indexing and searching of the documents. OCR is thus a process of creating the digital library. If the OCR is 99% accurate, it will result in 36 erroneously converted characters per page, and therefore for a book of 500 pages there would be about 12000 errors in the OCR-generated text. Such a situation would be unacceptable to the end-user, although it does not significantly affect the efficiency of indexing and searching.

4.1.9 Data Management and OCR technology

(1) Ease Access: Each scanning centre is responsible for gathering the metadata and the scanned content from the contractors operation at the scanning locations. This data is to be enabled on the web and also preserved for future. Enabling many tera-bytes of data for access to everyone in a highly reliable manner is needed for the success of the efforts put into the digitization process. Also data synchronization and management across centers needs to be bone to reduce duplication and ensure reliable high availability and immediate recovery in the event of storage media failures and server failures.
(2) **Use of everyone:** the data being frequently commuted between the centers needs to be preserved uniquely to ensure easy workflow management. Every book that is scanned and stored is associated with a unique barcode and descriptive metadata for identification, search and retrieval.

(3) **Scanning location:** Because the books to be scanned come from various sources there could be duplicates among scanning locations maintained by a Regional Mega Scanning Centre (RMSC). However, the project cannot afford the extra cost of scanning these duplicate books, processing their images, and performing quality assurance on them. Thus communicating metadata across centers and within scanning locations is important. The duplicate books can be identified only by the metadata is incorrect, missing or incomplete; it makes the duplicate detection all the more difficult.

(4) **Rich Metadata:** the metadata formats that are traditionally used for physical books, though comprehensive, are not sufficient for handing digital objects. There are three subcategories of metadata:

(a) **Regular Metadata:** Regular metadata contains information about the book like title, author, date of publication, publisher, ISBN, keywords, subject, language et. Dublin Core metadata format is widely followed and extended with a few fields like edition information of the book.

(b) **Administrative metadata:** Administrative details of the book, like the location of scanning the original source of the book, etc., may not be of interest to the end-users of the book but are useful to the operational organization. These details can be used to trace the progress of the project, generate reports and identify bottlenecks in the scanning process.

(c) **Structural Metadata:** This metadata contains information pertaining to each page, like the size of each page and whether that page is blank or has an important context attached to it- index, preface, table of contents, etc. such information enables us to improve the navigation of the book for the end-user and also improves search and retrieval systems.

(5) **Replication of Storage:** All the books scanned in the DLI project are replicated and preserved in different locations across the world. We also store the content in two different formats- DVD/CD and hard drives.
4.1.10 Architecture of the ULIB Project

The architecture of the Digital Library Information (DLI) project is motivated factors like scalability, ease of maintenance, dependability and economy. All the tools and technologies used by DLI are open source. Many issues related to interoperability and collaboration arise due to the huge number of books in different languages that are scanned at the various scanning locations, and the differences in the infrastructures used to preserve these digital objects. This can be solved by deploying a distributed, decentralized architecture and by modularizing the tasks, using technologies like XML, databases, web services, etc.

(a) Indian Language Technology Research

The DLI is not simply a static repository of books – it has made possible bringing home the language and information processing technologies for Indian languages. Major impact contributions of the Digital Library of India to the Indian Language information technologies are:

(b) OCR in India Language – Kannada and Telagu

Indian languages have more than 300 characters to distinguish, a task that is an order of magnitude greater than distinguishing 26 characters. It is estimated that at least a ten million-word corpus would be needed in any font to recognize Indian languages with an acceptable level of accuracy. DLI is expected to provide such a phenomenally large amount of data for training and testing of OCRs in Indian languages. Using this extremely large repertoire of data, a Kannada and Telagu OCR has been developed.

(c) Om Transliteration

India is fast becoming a software superpower. While the development of an operating system in a native language is one solution, this solution is likely to be limited to only a few languages. If the Indian language texts were instead available in parsable English-like texts, they would benefit from the advances in the language processing of other international languages.

Thus there is a need for the development of a digital representation that lays a common foundation for all Indian languages. For seamless adaptation of algorithms in language technologies, this representation must also be parsable by universal language processing tools algorithms, such as for machine translation, information retrieval, text summarization and statistical language modeling. First developed a representation scheme for Indian languages,
called OM transliteration, which formed the basis for all other work in Indian language research at DLI.

Om uses the same representation for keyboard input and formation, and digital storage. The OM transliteration developed under DLI is case-independent, and avoids excessive use of non-alphabetic characters; where they are consistent. Furthermore, the English alphabet combinations are designed such that they are easy to remember at the time of input using a standard keyboard, Om’s features enhance usability and readability; it has been designed on the following principles:

(i) Easy readability,

(ii) Case-insensitive mapping (While preserving readability, this feature allows the use of standard natural language processing tools for parsing and information retrieval to be directly applied to the Indian language text), and

(iii) Phonetic mapping, as much as is possible. (This makes it easier of the user to remember the key combinations for different Indian characters).\(^7\)

When a user is not interested in installing language components, or when the user cannot read native language script, the text may be read in the English transliteration itself. Indian people can speak and understand more than one Indian language as well as English. Hence even in the absence of OM to native font converters, people around the globe can type and publish texts in the OM scheme that can be read and understood by many others, even when they cannot read native script. The major contribution of OM is to separate storing and rendering, which makes it language-independent across the Indian languages.

\(d\) **Multilingual Book Reader Interface**

The books of the digital library of India are available to anyone, anytime, anywhere. While OM transliteration helps one to read the text of one language with a script of another, it does not provide any translation. Due to the grammatical and etymological similarity amongst Indian languages, and their phonetic similarity, OM takes things a step beyond mere transliteration. When presented with electronic text in any Indian language, the book-reader allows text to be transliterated into any one of the many Indian languages. This is made possible with the OM transliteration scheme. This allows the user to read, the reader, while especially suited to a multilingual country like India, is also extendable to any other digital library where the resources of translation and other digital library where the resources of translation and
transliteration are available at large. The multilingual book-reader presents novel features that improve the usability and reach of any digital library.

\( e \) \hspace{1cm} \textit{Indian Language Search Engine-Tamil Search Engine (OmSe)}

OmSe search engine has been developed using the off-the-self open source software Greenstone search engine. The use of the OM transliteration scheme makes it possible to store any Indian language information in ASCII and to use any conventional search engine for information search and retrieval.\(^8\) The retrieved text, in addition being made available in readable English transliteration, is also converted to native Tamil script and displayed. Therefore, the Tamil search engine is built over a collection of born-digital newspaper articles, crawled from the web. The interface between the client side and the server side consists of matching the user query with entries in the database and retrieving the matched web pages to the user’s machine.

\( f \) \hspace{1cm} \textit{Machine Translation}

Example Based Machine Translation (EBMT) is basically by analogy. And EBMT system requires a set of sentences in the source language and their corresponding translation in the target language. A bilingual dictionary composing of sentence, phrases, words and phonetic is used for the machine translation system. Instead, we can store the frequently occurring phrases and their translations and use these translations to translate a complex sentence.\(^9\) A sentence can be seen as a combination of phrases Each sentence can be divided into a set of phrases and works.

The current machine translation system supports the following language-pair translations:

1. English to Hindi
2. English to Kannada
3. English to Tamil
4. Kannada to Tamil

User feedback is stored separately and used later, after a verification for correctness, so that the main database, and hence the performance of the machine translation system, is constantly improving. DLI has developed search engines, and clusters for database storage and retrieval. It
has helped in creating a tight bond for those doing research in India within 27 centre, spanning academia, government and religious institutions.

**REFERENCE**

In scholarly communication innovation is forging ahead in a variety of areas now that digitization and the World Wide Web allow informal distribution of information. Discipline based servers dedicated to research fields or specific concepts are becoming essential platforms for scholars. These are sources for preprint and peer-reviewed articles, primary research and an interactive exchange of ideas and even materials.

Certainly the SPARC and JSTOR are examples of cooperation between libraries and publishers to maintain the values of academe in the publishing and distribution of and access to scholarly resources in the view digital landscape. Data collection capabilities from digital collections are far more sophisticated, reliable and precise than from print collections, providing abundant opportunities for research on usage and user behavior.

All the Technical services, functions including e-journals acquisitions, cataloguing and catalogue maintenance all required increased staffing. In addition in staff to click-in, claim and bound printed journals, fever was needed for reshelving and stacks maintenance. Montgomery believes that building and maintaining a digital library collection is far more complex than doing the same for a print collection due to the price and license negotiations that are required.

No doubt, SPARC has demonstrated remarkable impact already with a variety of new publications and outreach programs that have raised understanding of these complex issues across the nation. Further, library demand for scholarly publications creates a unique market environment. In order words, unlike most markets involving differentiated products, it is not
appropriate to model demand as a discrete choice process. Rather, the typical library attempts to
provide access to as many STM journals as possible through a combination of subscriptions and
inter-library exchanges."^1

When commercial publishers analyzed the demand structure of libraries, they came to
understand the profitability of acquiring more titles through mergers. As a few publishers gained
greater market power they were able to increase the price of individual titles within the portfolios
they had to offer. McCabe concludes that these three factors inelasticity of demand, library
acquisition by portfolio within broad subject areas, and publisher mergers all contributed to a
higher rate of journals price inflation over the last several years than can be explained by the
improved quality or increased publishing costs of the journals themselves.

Briefly, users are going to the World Wide Web for their information, in many cases,
 bypassing the library. What does this mean for the role of the library in the future? Traditionally,
libraries have maintained the authoritative record of scholarship and made that record broadly
available. Libraries must communicate the actual costs of digitizing collections to a wider
audience and digitization must be understood not as a cost saver but as a value-added service.

4.2.1. Future of Digital Library Collection

We may define Library is a central cultural institution. The mission of the library is to
collect, preserve and give access to recorded knowledge in all documentary forms, for the benefit
of all engaged in research and learning or with other information needs.

As found in Australia, Wales, the fundamental nature of the Library’s work was
determined by the Royal Charter that established the Library’s existence in 1907. The current
wording of the Charter gives as the Library’s functions: the collection, preservation and
maintenance of manuscripts, printed matter, maps, photographs, visual and audiovisual material
relating to Wales and the Celtic peoples and similar material which further the aims of higher
education and literary and scientific research.

*Library Charger is the basis for several key features of the Library:*

- Its emphasis on material of Welsh (and Celtic) internet.
- Its wider collecting responsibilities (these are based on legal deposit and purchase)
- The fact that collects material in such a wide variety of media.
• Its mission to support researchers and those in higher education.

In 1999 valuable pointers to the future of the library were provided by the many responses to Choosing the future, the first large scale public consultation exercise ever conducted by the Library. Individuals and organizations expressed clearly and at length their strong views on how they think the Library should evolve.

*Among the consistent themes to have emerged from the responses were:*

• Universal support for the established core functions of the Library.
• General support for new developments within these core functions: opening up the library, its buildings and contents to a wider range and a larger number of users developing new services for those in higher (and further) education making the collections and services more relevant to all learners.²

Not only those in universities and colleges the use remote, especially electronic services, and specially digitization, to further these aims building partnerships with other organizations, public and private.

The existence and work of the Library depend on certain principles and values, shared by those who govern it, work in it and use it. They are seen as complimentary to the values and principles of the National Assembly in guiding the Library’s work.

As analyzed this intellectual record is not confined to any particular medium, format, period or language. From its beginning the Library has been more than what is conventionally recognized as a ‘library’, that is a collection of printed works. It stores a wide and still widening range of formats capable of carrying intellectual content. Among these are: books and periodicals, manuscripts and archives, pictures, photographs and maps, sound and moving images and electronic material.

All the record of the ‘matter of Wales’ (and of the other Celtic countries) is, however, part of a wider, indeed world-wide, domain of recorded knowledge, produced in many languages and over many centuries, which the Library attempts to represent in its collections for the benefit of its users.
Wider collection of a Digital library, mainly acquired in print form through legal deposit, are essential to its ability to support study and learning, not only in sciences and technology, but also in a very wide range of other subjects.

These Library’s collections and services exist to meet the needs of all those who can benefit from them. The library is proud of the fact that it is a public library, in the sense that any adult is able that it is a public library, in the sense that any adult is able and welcome to use its collections for reference with little formality and without charge.

At present among the groups that make use of the Library for consultation and reference are academic and personal researchers, students and other learners, business, the media, and visitors from Britain and overseas. This right unrestricted access is part of the democratic rights of citizen in pursuit of information, knowledge and enlightenment and contributes to the promotion of ‘social inclusion’.³

Many more people and a wider range of people will make use of the Library’s services than in the past.

As well as continuing to serve researchers and leaner’s wishing to study the collections, the Library will welcome many more visitors interested in exploring the history and culture of Digital library services through collections.

A range of information service will be developed to satisfy the needs of specific groups of users, including those interested in family and community history.

- The Library’s services to readers and visitors will be backed up by a strong and well-organized series of collection, technical and administrative services.
- The Libraries already well-developed partnerships with other organizations will be further strengthened.

However, the degree to which the Library will be able to realize this vision will depend on a number of factors:

- The availability of sufficient resources to maintain existing functions and fund new developments.
- The speed and ease with which new technical systems and tools can be harnessed to the achievement of our objectives other success with which the Library can nature innovation and adaptive thinking among its own staff.
Fundamental of what the Library does is contained in its five ‘core functions’. These set the minimum boundaries of its policies and practice. Within each case an indication of the chief means by which they are performed.

Collecting of materials by legal deposit, Purchase, donation, bequest, exchange and deposit, in accordance with agreed collection development policies. This function is carried out through:

- Assembling as complete a collection as possible, in all media of published material relating to Wales. Including printed publications and sound and moving image material.
- Maintaining (mainly through legal deposit and purchase) the most comprehensive collection in printed material published in India and or research material from other countries.
- Developing collections of unpublished materials relating to or deriving, including archives and artistic works.
- Accessioning, processing, cataloguing and storing material acquired.

To preserve and conserve materials in the collections. This function is carried out through:

- Ensuring environmental, storage and handling conditions favorable to the continued preservation of materials.
- Intervening to conserve materials and hence arrest deterioration or repair damage.
- Transferring in some cases, information to more suitable preservation formats.

To provide satisfactory access for users of the Library to its building, collection and services and adequate information about them. This function is carried out through:

- Providing access to public spaces, collections and facilities within the Library’s building.
• Providing document delivery, enquiry and information services to those wishing to use the Library in person or remotely.
• Providing easy access to catalogues and lists of the Library’s collections and surrogates of selections from them.

To raise awareness and disseminate knowledge of the Library’s collections. This function is carried out through:

• Leaflets and other publicity material.
• Publishing printed monographs and serials.
• Mounting material on the Library’s website.
• Staging exhibitions derived from the collections.
• Arranging lectures and seminars.

To collaborate with, and where appropriate give leadership to related professional and other bodies in the fields of library and information services, archives museums and galleries. This function is carried out in science and technology libraries in Delhi NCR, I.I.T. in India. Acting as a focal point for library and archive bodies. Working with bodies in Wales, in Britain and beyond to purpose co-operative initiatives and partnerships and advance professional practice.

The library underpins the performance of these five core functions through the following ‘supporting functions’:

• Management and development of its human resources.
• Budgeting, control and accountability of its financial resources and income generation.
• Maintenance and development of the Library’s information and communication technology infrastructure.
• Maintenance and development of the Library’s building and its facilities.
• Continuing investigation, monitoring and analysis of user needs.
Many of the key objectives below belong to the two major development initiatives of the Library: the Digital Library Initiative and the Open Library Initiative. These are priorities for increase funding.

4.2.2 Digital Library Initiative

We see the Digital Library Initiative, began in 2001-02. It seeks to make a substantial contribution to this objective. In particular, it will extend significantly the ability of the Library to cater for teaching and learning in digital libraries.

The interlocking elements of the Digital Library Initiative that require additional funding over the next three years are:

- Collecting and archiving Welsh websites.
- Acquiring a Digital Store and a Content and Digital Asset Management System.
- Improving online access to collections and items within them.
- An accelerated digitization program.

(a) The open Library Initiative

Today, the fundamental challenge facing the development of the Library is to open its collections and services to more people, for a wider range of purposes—in particular to contribute to education and lifelong learning. The elements of the Open Library Initiative that require additional funding over the next three years are:

- Developing services and facilities in the visitor centre, including exhibition and public programs.
- Improving reader facilities and opening hours.
- Establishing services for local authorities.
- Founding a Family and Community History Centre.
- Extending promotion and marketing of the Library.
• Implement improvements to the Library’s goods.
• Improving facilities for disabled users.

The following will be necessary:
• Drastic reductions in collecting and cataloguing of collections.
• Reduction in opening hours, including the closure of the reading rooms for one day a week.
• Fewer online services.
• Cutbacks in preservation activity.
• Fewer exhibitions.
• Reduction in staff training and development.
• Failure to contribute to co-operative initiatives including the Shared.

(b) Searching bibliographic records

The most of the current American Memory collections have a set of item-level bibliographic records which can be searched. The search in use is INQUERY, the text search toolkit from the Center for Intelligent Information Retrieval. A ranked list of “hits” is returned. INQUERY’s flexible query commands have been used to list the hits for queries of two or more terms in four sub lists:

1. Item that contain the entered query as an extract phrase;
2. Items that have all the search words within 20 words of each other;
3. Items containing all the words, but not close to each other;
4. Items with one of the entered words, but not all.

Complete bibliographic record display, which has a link to the item. For images, the link in the bibliographic display is a thumbnail version of the image. Each subject terms displayed in a retrieved bibliographic record is also a link that invokes photographers; and other creators are links to searches for other works by the same person or organization.

A large number of the presentation details, including the division of the hit list into sections, have been modified after user feedback. An informal study in the Prints and Photographs reading room involved ten users performing two pre-selected image retrieval tasks using an earlier version of the American Memory interface.⁵
While the searchers were encouraged to talk is they searched; reference librarians logged their comments and the difficulties they were observed to have. Several users were very concerned when searches returned many results that were not close matches to their query; two explicitly requested that the system indicate if there were no items that matched all the entered terms.

(c) Browsing subject terms

In case of each collection with item-level bibliographic records a brows able alphabetical list of all formal subject heading has been compiled. These subject headings typically include names of people and places, terms describing the genre and format of the original item, and typical descriptors.

(d) Searching full text

In case of text collections, users can search the full text of documents. INQUERY is used for indexing and retrieval and the ranked list of hits is subdivided in the same way as for bibliographic searches. Each title in the result list acts as a link to an HTML presentation of the corresponding document.

However full-text search is the primary access tool for Life Histories gathered during the Federal Writers Project, a project of the works Progress Administration (WPA) in the 1930s. Since there are individual bibliographic records. For text collections with bibliographic records or SGML versions of the documents, there are corresponding links from the HTML version of the full text.

There is challenge of guiding the selection of collections which has at least aspects: determining the characteristics that best describe the distinguish the collection; and finding ways to present those characteristics in a fashion that lets the user select element collections easily.

Though as an alternative or supplements to the traditional text-based searching of catalog records, the User Interface Team plans to explore the use of direct manipulation and rapid feedback during the selection of collections through browsing and filtering operations.
Hence to support these operations in a prototype interface, the team will build an independent set of descriptive (but non-MARC) records for the collections using a format that is easily modified and indexed by INQUERY, but not intended for viewing by users.

After the experimental stage, during which the choice and format of attributes will be refined, the Library expects to integrate the content of these records into any standard architecture for collection-level metadata that emerges through broader digital library efforts. Guiding users to relevant collection is not the only navigational challenge for the user interface.

While most items in the digital archive have individual bibliographic records a search across all items is straightforward. The level of description is roughly comparable and catalogers take considerable efforts to be consistent (although consistency is more common within collections than across different collections).

Computer offers rapid access to an array of resources, but its screen is less convenient than a large table for studying images and than a book for skimming through indexes and pages of text to determine its relevance. The images the library has disseminated to date have been sized for display on today’s computer screens, usually between 500 and 1200 pixels wide.

An increasing volume of primary textual material is although available online, there is no consensus on how best to present long documents in a way that supports convenient use. The challenges is to support rapid navigation without losing the sense of context provided by a physical book. Most of the books, papers and pamphlets in the historical collections have been coded in SGML with embedded links to images of the original pages, illustrations and tables.

Book-length works are somewhat clumsy in their HTML form, but this format does allow any user to download or print in the text of the entire work reasonably conveniently absolutely necessary for use in schools where equipment for access to the Internet is, at best a scarce resource. The problem of networked access to book-length works is not unique in more advanced libraries also like LC.

All compressed files for on-line delivery of images are loaded onto disk drives attached to the WWW servers. The CD-ROMs serve as an archival copy for the uncompressed versions. As the size of the archive grows, these CD-ROMs require formal inventory control.

Continuing usability of the archival files is also important sine the accumulated effort involved in their creation will be valued in millions of dollars. The need to manage vast archives of computer files is not unique to libraries; solutions are appearing from the commercial sector.
In order to address the estimated need for 50 terabytes of managed storage by the year 2000, the Library will be installing a commercial hierarchical storage management system over the coming months. Storage management software will transfer files automatically between high-performance disk and less expensive storage media from which retrieval will take longer.

The location is typically based on time since last access, but more complex rules can be enforced. Since the highest resolution images will be accessed only occasionally, they will usually be resident on the slower medium. The allocation is transparent to applications accessing the files; “stub” files left in that have been relegated to another “layer” of storage. For its magnetic tape cartridges under robotic control.6

More so, hierarchical storage management software will be installed on individual computers over the next few months, in conjunction with system upgrades. Direct access to the archival digital reproductions will also support other functions. Online access to high-resolution images could facilitate digital reproduction as an alternative to the Library’s current service that provides users with photographic copies of graphical materials for a fee.

Providing files will be easier and more reliable with online access than by manual sorting through CD-ROMs and copying large numbers of files. The hierarchical storage management system will address issues related to physical storage of files, but there is also a need for more formal management of the collections and objects themselves than can be provided by the Unix file system.

However, the organizations of collections is currently through the relationship between naming schemes and Unix directories. There is no automatic enforcement of naming conventions. If a digital item has several component files, there is no way to treat that item reliably as a unit. One of the custodial divisions keeps track of directories on charts posted on a office wall.

When the number of collections is small, this approach is feasible, but the library recognizes that it will need enforcement of unique names, more automatic adjustment of all pointers when files are relocated and a structure that recognizes key relationships between items and their component files, and between collections and the items they comprise. Since no adequate system has emerged from the commercial marketplace to support effective access to multimedia resources of this
complexity, the Library has begun work with collaborators to design and build two prototype “repositories” as experiments in this area.

### 4.2.3 Technology and Knowledge Communication

Undoubtedly the new technologies are understood to refer mainly to the computer and related communication equipment and software that enable one computer to communicate with other computers. It has often been suggested that education has up to now been relatively slow in making use of these technologies, despite their ability to facilitate access to knowledge and information.

Through the prospects of such a crisis occurring may seem to be remote, there is little doubt that in helping to reconfigure how learners are beginning to present a very complex set of challenges for the world’s formal education systems. Overshadowing the utilization of the new information and communication technologies in education are worldwide disparities in access to these technologies. Most of the countries lack the basis infrastructure needed for gaining access. All of Africa, for example, has barely more telephones than the city of Tokyo. A majority of the world’s school do not have sufficient electricity.

The dangers of a widening gulf in the world between ‘information rich’ and ‘information poor’ countries have been of particular concern to UNESCO.

Through Skeptics have suggested that is the education sector has been hesitant up to now in making use of the computer and related communication equipment this could be due to the legacy of disappointing experience with older technologies film strips, radio, television-which once were.

### 4.2.4 Internet-Ground work of Digital Library

The Atlantic has used of 1858 was established to carry instantaneous communications across the ocean for the first time. Although the laying of this first cable was seen as a landmark event in society, it was a technical failure. It only remained in service a few days. Subsequent cables laid in 1866 were completely successful and compare to events like the moon landing of a century late…. The cable…… remained the use for almost 100 years.
In 1962, Dr. J.C.R. Licklider was chosen to head ARPA’s research in improving the military’s use of computer technology. Licklider was a visionary who sought to make the government’s use of computers more interactive. To quickly expand technology, Licklider saw the need to move ARPS’s contracts from the private sector to universities and laid the foundations for what would become the ARPANET. The Atlantic cable of 1858 and Sputnik of 1957 were two basic milestones of the Internet prehistory. You might want also to take a look on the *Telecommunication and Computers pre History*.7

### 1. Merging the Networks and Creating the Internet

**TCP/IP**

With so many different network methods, something needed to unify them. Robert E. Kahn of DARPA and ARPANET recruited Vint Cerf of Stanford University to work with him on the problem. By 1973, they had soon worked out a fundamental reformulation, where the differences between network protocols were hidden by using a common internetwork protocol, and instead of the network being responsible for reliability, as in the ARPANET, the hosts became responsible.

With the role of the network reduced to the bare minimum, it became possible to join almost any networks together, no matter problem. DARPA agreed to fund development of prototype software, and after several years of work, the first somewhat crude demonstration of a gateway between the Packet Radio network in the SF Bay area and the ARPANET was conducted. By November 1977 a three network demonstration was conducted including the ARPANET, the Packet Radio Network and the Atlantic Packet Satellite network—all sponsored by DARPA. Stemming from the first specifications to TCP in 1974, TCP in 1974, TCP/IP emerged in mid-late 1978 in nearly final form. By 1981, the associated standards were published as RFCs 791, 792 and 793 and adopted for.

### 2. ARPANET to NSFNet

After the ARPNET had been up and running for several years, ARP looked for another agency to hand off the network to; ARPA’s primary mission was funding cutting-edge research and development, not running a communications utility. Eventually, in July 1975, the network had been turned over to the Defense Communications Agency, also part of the Department of
Defense. In 1983, the U.S. military portion of the ARPANET was broken off as a separate network, the MILNET.

The networks based around the ARPNET were government funded and therefore restricted to noncommercial uses such as research; unrelated commercial use was strictly forbidden. This initially restricted connections to military sites and universities. During the 1980s, the connections expanded to more education institutions, and even to a growing number of companies such as Digital Equipment Corporation and Hewlett-Packard, which were participating in research projects or providing services to those who were.

In October 1962 Licklider was appointed head of the United States Department of Defense’s DARAPA information processing office, and formed group within DARPA to further computer research. As part of the information processing office’s role, three network terminals had been installed: one for System Development Corporation in Santa Monica, one for System Development Corporation in Santa Monica, one for Project Genie at the University of California, Berkeley and one for the Multics project SHOPPING at the Massachusetts Institute of Technology (MIT). Licklider’s need for inter-networking would be made evident by the problems this caused. 8

“For each of these three terminals, I had three different sets of user commands. So if I was talking online with someone at S.D.C. and I wanted to talk to someone I knew at Berkeley or M.I.T about this, I had go get up from the S.D.C. terminal, go over and log into the other terminal and get in touch with them”.

I said, it’s obvious what to do (But I don’t want to do it): if you have these three terminals, three ought to be one terminal that goes anywhere you want to go where interactive computing have.

**ARPANET**

Promoted to the head of the information processing office at ARPA, Robert Taylor intended to realize Licklider’s ideas of an interconnected networking system. Bringing in Larry Roberts from MIT, he initiated a project to build such a network. The first ARPANET link was established between the University of California, Los Angles and the Stanford Research Institute on 29 November 1969. By 5 December 1969, a 4-node network was connected by adding the University of Utah and the University of California, Santa Barbara. Building on ideas developed
in ALOHA.net, the ARPANET started in 1972 was growing rapidly, by 1981 the number of hosts had grown to 213, with a new host being added approximately every twenty days.

4.2.5 Use and Culture

Email and Usenet-The Growth of the Text Forum

E-mail is often called the killer application of the Internet. However, it actually predates the Internet and was a crucial tool in creating it. E-mail started in 1965 as way of multiple users of a time-sharing mainframe computer to communicate. Although the history is unclear, among the first systems to have such a facility were SDC’s Q32 and MIT’s CTSS.

The ARPNET computer network made a large contribution to the evolution of e-mail. There is one report indicating experimental inter-system e-mail transfers on it shortly after ARPNET’s creation. In 1971 Ray Tomlinson created what was to become the standard Internet e-mail address format, using the @sign to separate user names from host names.

A number of protocols were developed to deliver e-mail among groups of time-sharing computers over alternative transmission systems, such as UUCP and IBM’s VNET e-mail system. E-mail could be passed this way between a number of networks, including ARPANET, BITNET and NSFNet, as well as to hosts connected directly to other sites via UUCP.

4.2.5.1 A World Library-From Gopher to the WWW

As the Internet grew through the 1980s and early 1990s, many people realized the increasing need to be able to find and organize files and information. Projects such as Gopher, WAIS, and the FTP Archive list attempted to create ways to organize distribute data. Unfortunately, these projects fell short in being able to grow without bottlenecks.

One of the most promising user interface paradigms during this period was hypertext. The technology had been inspired by Vannervar Bush’s “Memex” and developed through Ted Nelson’s research on Project Xanadu and Douglas Engelbart’s research on NLS. Many small self-contained hypertext systems had been created before, such as Apple Computer’s Hyper Card.

Scholars generally agree, however that the turning point for the World Wide Web began with the introduction of the Mosaic (Web browser) in 1993, a graphical browser developed by a
team at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign came from the High-Performance Computing and Communications Initiative, a funding program initiated by then-Senator Al Gore’s High Performance Computing and Communication Act of 1991 also known as the Gore Bill. Indeed, Mosaic’s graphical interface soon became more popular than Gopher, which at the time was primarily text-based, and the WWW became the preferred interface for accessing the Internet.

4.2.5.2 Search Engine

Even before the World Wide Web, there were search engines that attempted to organize the Internet. The first of these was the Archie search engine from McGill University in 1990, followed in 1991 by WAIS and Gopher. All three of those systems predated the invention of the World Wide Web but all continued to index the Web and the rest of the Internet for several years after the Web appeared. There are still Gopher servers as of 2006, although there are a great many more web servers.

As the Web grew engines and Web directories were created to track pages on the Web and allow people to find things. The first full-text search engine was Web Crawler in 1994. Before Web Crawler, only Web page titles were searched. Another early search engine, Lycos, was created in 1993 as a university project, and was the first to achieve commercial success. During the late 1990s, both web directories and Web search engines were popular—Yahoo! (founded 1995) and Altavista (founded 1995) were the respective industry leaders.

4.2.5.3 Intellectual property results

1. Introduction

Knowledge is the awareness and understanding of facts. Truths or information gained in the form of experience or learning. Knowledge is an appreciation of the possession of interconnected details which, in isolation, are of lesser value.

There are three types of repositories of knowledge. They are structured repositories are databases, expert systems and the like. They are characterized by their case of search ability because they have search aids like indexes.
2. In most organizations these include project reports, sales-call notes and other sources. These are searchable by free text means. The two repositories mentioned above are for explicit knowledge the knowledge that is out there for all to find, see and use.

3. Tacit knowledge resides in the heads of people. The tools to get to this knowledge are phone directories. Annotated company directories, company knowledge yellow pages and other people listings.

4. Management refers to strategies and structures for maximizing the return on intellectual and information resources. Because intellectual capital resides both in Tacit form (human educator:, experience and explicit form (documents AV, electronic formats, websites and data etc.), KM depends on both cultural and technological processes of creation, collection, sharing, recombination and reuse. The goal is to create new value by improving the efficiency and effectiveness of individual and collaborative knowledge work while increasing innovation and sharpening decision-making.

5. **Four steps in getting started in knowledge management are described by Boynton**
   - Making knowledge visible.
   - Building knowledge intensity
   - Developing a knowledge culture
   - Building knowledge infrastructure

1. **KM strategies**
   - Transfer of information and best practices via IT systems:
   - Capture data about customers. Invest in IT system for capturing customer data.
   - Leverage R & D into several applications;
   - Create more value from existing intellectual assets:
   - Create strategy focused on individual’s innovation and knowledge creation. Many professional services firms adopt a strategy that focused on an individual’s innovation and knowledge creation. This is probably why, for historic reasons, they are partnerships;
   - Commit to a ‘knowledge focused strategy’. Very rarely do we find companies who adopt a ‘knowledge focused’ strategy, which allows them to leverage all assets.

2. **Kn in Libraries**
• Future Libraries are the perfect environment for new media applications. Libraries are undergoing tremendous change due to impact of globalization, economic competition and revolution of ICT. ICT tools and Techniques, KM systems, Internet, web resources, digital libraries etc. have made a significant change in the existing library system services. It is a major challenge before the librarians to cope with the new technological & digital challenges.

4.2.5.4 The Role of Librarians in KM

Libraries represent a major storehouse of human knowledge. Librarian acts as the knowledge manager who disseminates information and knowledge in optimum quality and quantities to any information seeking community.

(1) Challenges of knowledge Management

• **Intellectual Capital:** Managing of tacit knowledge is not easy. Because, difficult to share their knowledge. And they are away from knowledge sharing.

• **Obsolescence:** There are types of information which gets obsolete as soon as it is generated eg. Stock market information.

• **Overloading:** Knowledge gets accumulated, if obsolete information is not removed it leads and difficult to identify the required information.

• **Technology:** Due to rapid changes in technology it is difficult to communicate the knowledge to the user because technology helps knowledge management to a large extent.

• **Structure:** Structure of KM should show overall economy. Whether to follow centralized or decentralized system.

(2) Barriers to implement proper KM system

• Ignorance: Not knowing who has the right information required for the job.

• Lack of time to find out and absorb the best practices recommended.

• Lack of relationship between the source and recipient of knowledge.

• Time lag taken to implement best practices recommended across departments.

• Inadequate budgets and staffing;
• Arbitrary cuts in budgets and staffing;
• Low esteem given to information work in general;
• The lack of an appreciation of the value of library and information services in contributing to organization goals.

We are living in the information Age. Where information is a vital resource. There are various means through which a person can gain information. One of the best sources of information is a book. Books are the unparalleled instruments for setting down man’s wisdom and knowledge. According to Fasanya, books are a key to a vast array of educational as well as recreational experience, for broadening inter-cultural understanding, for the extension and dissemination of ideas and most important for giving man the insight to understand himself and his relationship to family, group and the world.

4.2.5.5 Intellectual Property Rights

Today books and other information resources are available in prints as well as non-print form. As more and more information resources are being made available in non-print form, the concept of intellectual property, rights and thereby, copyrights is gaining importance. Twenty-five years ago, perhaps even 15 years ago, intellectual property law in general and copyright law in particular were of importance to information professionals but were relatively static from legal and policy perspectives. But more recently, our information age and information economy have propelled this subject to extreme importance and exponential change-in large part because technology has vastly altered the medium of intellectual property. The result has been efforts by millions to gain access to intellectual property on their terms—such as unauthorized electronic sharing of copyrighted music—and, in response, by business to protect their content by increasingly aggressive tactics.

1. Copyright Law

Copyright laws have been developed to protect the authors and publishers rights. A copy of the threat posed by trade in copyrighted books evolved as a response. The author and the nature of human creativity nation was founded on. Time, and a global industry-wide growth in the publishing enterprise expansion and cultural industries in the world, the ‘ownership’ of the locus to the right of the individual to move from the
corporate right. Berne Convention on copyright (1971) of their employers across the
contract that gives the right of the individual authors. However, a consistent data
structure for corporate owners unconditional 'copy right' bestows a favor that is being
dispaced. Effective 1st January 1995, the Agreement on Trade Related Intellectual
Property Rights (Trips) section, with the exception of the Paris and Berne Conventions,
such as the author's economic rights Independently previous standard recognizes that
"recognizes that the Berne Convention, 6 bits, also said that the rights transfer Then, to
claim authorship of the work and shall be questioned, this would be prejudicial to his
honor or reputation, the work said."9

The copyright for the environment and all of our digitized for digital products is
being extended. A digitized environment posed by the industry was forced to respond to
the challenge of data.

In a library, information resources are used by a large number of users. The
copyright law is considered. "Fair Use" as some make copies for educational purposes, is
a copy of the document depends on the percentage.

2. Copyright Law of India

The copyright Law of India moral rights to the authors of an original literacy work. Moral
rights under the Indian law have been conferred upon the authors of an marginal work. And
include the combination of three rights. Viz. droid de divulgation might of publication): droid a
la paternity (right of paternity): and au respect de simmers (the right of integrity). It is pertinent
to note that moral rights stand independent either economic rights flowing through authorial
creations. And vests with the author conenafyer the transfer of his copyright. The aspect of moral
rights in India has been upheld as author specific right bestowed upon him rights to prevent
mutilation of work in any form.10

The Indian copyright Act had evolved over many years to reach its present form. A
copyright Act was passed for the first time in India in 1914. the copyright Act 1957 adopted
several principles of the British copyright Act 1956 to cope with the emerging problems created
by technological advances in communication. Broadcasting. Microfilming. Movies. Etc. the
copyright Act 1957 was amended in 1983, 1984, 1992, 1994 to keep it in tune with the changing
needs and technological progress. Including the challenges posed by the rapid growth of information technology.

The copyright Act was further amended in 1999 to incorporate features making neighboring rights including performer’s rights and protection of rights of broaching organizations.

The digital form of a document makes it very easy to copy it any number of times and being transferred over the Internet. The ability to distribute copyrighted works in digital form through high capacity pre recorded disks (CD ROMs, DVDs etc.) and Internet–enabled transmissions have brought new challenges to the protections of such content from unauthorized copying and use. Technological advancements in this regard are reviewed. Despite the ease with which digital content owners can now transfer data, Images, Music video and multimedia documents across the Internet. Current technology does not let them protect their to the works which has resulted into widespread music and video piracy in fact. Although the internet permits widespread dissemination of digital content. The easy-to-cop nature of digital data limits content owners’ willingness to distribute their documents electronically. Digital Rights Management (DRM) technology is a key enabler or the distribution of digital content. DRM refers to protecting copyright of electronic content by restricting the extent of usage an authorized recipient is allowed in regard to that content. DRM technology has historically been viewed as the methodology for the protection of digital media copyrights.

Digital media has set distinct characteristics that make it easily replicable the characteristics that influence digital media replication include: ease of replication. Ease of transmission compactness. Multiple and fixation of digital and multimedia works.

Owing to their unique, Digital documents need a different set of laws to protect these form copyright infringement. The bundle of rights. Which copyright professes to be, has a profound impact in the determination of authorship. With the theory of indivisibility of copyrights redundancy. Coupled with the increase in electronic publishing. Complex issues arise as regards authorship of a copyrightable work.

(3) Copyright infringement

Copyright infringement occurs under different situations that are clearly mentioned in copyright law and is a legal offence. A copyright in work is considered to be infringed:
• When any person without a license granted by the owner of the copyright or the Registrar of Copyrights or in contravention of conditions of a license so granted. Or of any conditions imposed by a competent authority under the copyright act does anything. The exclusive right to which is conferred by the copyright act upon the owner of the copyright. Or permits for property any place to be uses for communication of work to the public where such communication constitutes an infringement of the copyright in the work.

• When any person makes for sale or hire or sells or lets or hire. Or by way of trade displays or offers for sale or hire or distributes either for the purpose of trade or to such anextent as to affect prejudicially the owner of the copyright. Or by way of trade exhibits in public, any infringing copies of the work.

The Copyright laws need to be rewritten to include digital documents, copyright is not absolute. There are a number of limiting principles and exceptions to the rights. Those principles and exceptions to the rights. Those principles that are relevant for libraries in the digital age are listed below:

(1.) **Archiving and copying:** Libraries and archives are permitted to make up to three copies of unpublished copyrighted works for the purpose of preservation. Security or for deposit for research use in another library or archive. Libraries can also make up to three copies of a published work to replace a work in their collection if it is damaged. Deteriorated or lost. Or the format of which has become obsolete.

(2.) **Fair use.** What constitutes fair use is debatable. However there are certain factors that govern fair use:

- Purpose and character of use. i.e. is it for commercial use or for non-profit educational purposes?
- Mature of the copyrighted work. The fair use principle is generally more lenient for fact-based works then it is for –fanciful works. And also is broader for published works than it is for unpublished works.
- Amount or proportion of the whole that is to be copied.
- Effect that the use has on market potential or the value of the copyrighted work.
In the context of modern society. Information is an increasingly important resource. There is recognition that information is now a hugely tradable commodity and new markets for information are opening up. Information, if managed correctly. Could be used to stimulate innovation, raise levels of productivity. Boost the level of competitiveness and ultimately promote the overall success of an economy it thus appears that information is growing in value and economic importance.

In Indian context. Copyright infringement is seen mainly due to two reasons. Book piracy in India. Primarily depends on two factors. Namely the price of the book and its popularity. These two factors positively contribute to piracy. Piracy is generally confined to foreign and good indigenous books. Because these books are demanded in large quantities and are also priced high the types of books pirated mostly are medical. Engineering and other professional books, encyclopedia and popular fictions. The piracy is also widespread with respect to books published by National Council of Educational Research & Training (NCERT). National Open School and Board(s) of Secondary Education. These books even if priced low are having large demand.

Piracy of literacy works leads to loss of revenue to publishers (in terms of less sales), authors (non-payment of royalty) and the national exchequer (non-payment of income tax and other levies payable by publishers/authors). While it is believed that book piracy is high in India. It is very difficult to arrive at an estimate.

Not only the end users, the right holders and the dealers/distributors are also to be educated on the Indian copyright laws. Many right holders, through were aware of copyright, are not fully acquainted with the various provisions of the Indian Copyright Act. The right holders in many cases are reluctant to do anything even if they come to know about the violation of their works. This is more so in the case of cinematographic works, and music and to some extent book publishing.

Copyright has been a debatable topic for the authors, publishers and the end users since the days of print documents. This debate has continued in the digital era also. India needs to develop a concrete legal policy to protect digital information from being unfairly copied.

The National knowledge commission (NKC) has been set up mainly advise this country's highest authority on matters relating to knowledge creation. Knowledge dissemination and knowledge application to bring about changes within the diverse sectors of development. To
fulfill this difficult mandate. One major area which needs immediate attention and sustained effort is the Library and Information Services (LIS) sector. This is primarily because all the focus areas of development will need organized, systematic and relevant LIS support for all activities.

The library and information sector is committed to support the creation of knowledge society by providing equitable, high quality, cost effective access to information and knowledge resources and services to meet the informational, educational, recreational and cultural needs of the community through a range of national, institutional and public libraries.

Therefore, libraries of the future may undertake the following:

- Disseminate knowledge as widely as possible:
- Serve as a major vehicle to facilities creation of new knowledge:
- Facilitate optimal use of knowledge by all sectors, such as government, industry, rural sector and civil society; and
- Ensure that people from all sectors and all parts of the country have easy access to knowledge relevant to their needs, in their own language.

### 4.2.6 Working Group On Libraries

Libraries Working Group's recommendations on the future role changes and expected to accomplish the desired augmentation Lisa field facility was derived. NKC recommendations submitted by the Prime Minister are as follows:

1. **Commission on Libraries Set**

   On libraries, permanent independent and autonomous financial information and education to all citizens of India National Commission ultimately to meet the requirements set by the central government as a statutory body should be. Mission Mode To start the process, the National Mission on Libraries should be set up immediately for a period of three years. The mission will then be converted to a permanent commission. Libraries on the proposed National Mission / Commission more details about the role of the alliance.

2. **All librarie prepare a national census**

   All Libraries National Census, conducted a nation-wide survey to be prepared. Libraries on the Census data collection plan will provide the baseline data. For this purpose, has been set up by the Department of Culture of the Task Force should be given to the financial and
administrative support for the implementation of this activity and a priority basis (within one year) to complete the survey. User needs and reading habits as part of a nationwide survey of the National Sample Survey should be periodic.

3. Lisa education, training and research facilities to improve

Libraries on the proposed Mission / commission Lisa management of the country's manpower needs assessment as soon as possible, and Lisa through education and training to meet the country's needs must take the necessary measures. Lisa field to keep abreast of recent developments. To promote research in this area should be given to the evaluation of the research. Library and information science and services for advanced training and research organization established a well-equipped for this task will be provided the necessary impetus.

4. Libraries re-assess their

The changed context, the libraries and library and information science departments for the manpower requirements of different kinds are needed to evaluate. Keeping in mind the qualifications descriptions. Designation pay scale. Terms of Service career advancement, etc.

5. Central Library Set

Central and state education budget a certain percentage of the libraries should be marked for the car. In addition, a central library FIR Converter 3-5 years, the government was initially Rs funds may be established to improve the existing libraries. Corporate philanthropy can be matched by the private sector 1,000 crore. The fund libraries at the National Mission / Commission should be guided by.

6. Modern library system

Libraries and tools to optimize the planning and staff so that they respect each user communities (including special teams) should be related to the training. An outline of a model for the modernization effort of the library, including the charter, which is proposed by the new collaboration will be synergize the power of different types of libraries. By libraries to services, and a library bibliographic records for the network and a list of proposals for a national repository.

7. Encourage greater community participation in library management

The libraries of different stakeholders and user groups should be included in the administrative decision-making process is essential. Committees representing public libraries by library users must be run by local self-government. The committee should ensure the
involvement of local communities and cultural and education to conduct community-based programs should be independent enough to take independent decisions. Libraries local area to develop community-based information system should be integrated with other knowledge-based activities.

8. All libraries in the Information Communication Technology (ICT) programs promoted Libraries catalog with all the necessary connections to local, state and national should be put on the website. The different types of libraries and bibliographic records of active networking and collaborative virtual interactive control system focused on using the latest ICT will establish national repository. Equitable and universal access to knowledge resources enable libraries can share the various languages at all levels, by digitizing relevant reading materials should be encouraged to make more digital resources. Publicly funded research in the peer research paper on the subject of copyright rules, open channels, should be available. Open it up to the standards and free and open source software that is recommended to be used.

9. Ease of maintenance grants and private collections

Need to be recognized in the many rich private and personal collections. Documented and preserved for posterity. To create a decentralized model to identify individual storage needs. It also receives donations from organizations and individual storage through a simple process to preserve sensitivity is required to produce. National Mission / Commission under an eminent scholar Chairpersonship private and personal collections committee may be set up.

10. Lisa encourages the development of public private partnerships

Philanthropic institutions, industrial houses and other private agencies to support existing libraries or to set up new libraries should be encouraged by financial incentives. Also, the civil society sector ingenuity that Lisa needed to meet the requirements of ICT can be used to set up.

4.2.7  Digitalizing library material

Digitization has become a crucial issue in the development of digital libraries. With more and more libraries digitizing their collections, policy concerns and technology problems are issues for digitization today.

4.2.7.1  What standards or guidelines are used?
Standards and guidelines associated with library digitization practices vary from projects. Some have been around for some time while others just come into being recently, are widely accepted and practiced in the digitizing efforts of many libraries. Metadata standards and image quality standards and guidelines are commonly sought when discussing digitization projects. Many of these are noted on the Digital Library federation’s website are also prominent standards being used.

REFERENCES

Chapter-4.3

INDIAN LIBRARY NETWORK

The digital revolution has altered our walks of life and libraries are not exception to this. The last five decades have witnessed tremendous advances in information technology and its application. The latest technologies offer cheap computer processing power, cheap mass storage, inexpensive access to high speed networks and retrieval devices which give us the ability to create, manipulate, store and transfer large quantities of information in digital form at low costs. Electronic publishing and resource sharing activities have become very and convenient today. These changes have resulted in the evolution of libraries into digital libraries.
Digitization refers to the process of translating a piece of intimation such as a book. Sound recording. Picture or video into bits. Bits are the fundamental unit & information in computer systems. Turning information into this binary digit is called digitization. This digitization process can be carried through a rarity it exciting technology.

The current age (the 21st century) is a development summit in the history of libraries and publishing. First became possible to build a wide range of services where the storage collections of digital formats and information retrieval via computer networks possible. Articles of sources of information stored in computers. And networks working on connecting computers to personal computers to the offices of the beneficiaries. Thus formed digital library in full. And we no longer need the paper. We have more numerous digital libraries that have been built using the various information and communication technologies, and the belief of those working on this transformation it is the information revolution on the their importance amalgamated technique is long-distance communications. With the technical library and information. Which appealed to by many in the early twentieth century, and absolutely softened Vainer Bush in his famous essay under the title “As We May Think” in (1945), noting the language of writer a proficient exponent of tools, and the mentality of informational progress what can be done his appearances under the what is known in “Library Without Walls”, and library of the future (Library of future), the belief and visionary to the future, because of its dualities multi-may change the form of our issues old traditional. Which is truly an libraries which can access to it through communication networks far-reaching and which advantage of the holdings and services without having to abide well in specific or a particular location.

(1) Content’s Know you

Know your content for the beneficiary’s contents to be the most important and valuable what differentiates the Digital Library that the creator’s digital libraries need of the management and decision-making regarding the shall be selected topics and the elements that will become digital and also the selection of elements that are used languages: standard generalized markup language (SGML). The creator has to assess the long term value of information.

Involve the right people that the ideal scenario is unilateral multiple backgrounds and supply expertise to contribute to building a digital library. The practice may not be the case, but even if we all know must be building any system needs to be considered after the realization of a number of areas to get the best digital library, and the more applications are specifically
computer science and library sciences. Computer scientists. We find that in addition to improving the possibilities and the limits of technology in general are building the system. The library specialists understand add catalogs and girl scouts and archives in addition to compiling scientific article, they do not understand the needs of the information and applicants, but that it expands to provide materials to ensure continued access and use the research and development of the Digital Library mean that every group that understands and knows that correct dimensions to the other groups

Mechanism has been computer scientists may take a logical assumptions and criteria descriptors data for the web (Metadata) for the digital library in the space provided information broad Internet a lot. Specialist’s libraries and extensive prior experience in indexing retrieval. In addition to the fact that many of the valuable information found in many systems descriptors data for the web (Metadata) including standards (MARC21). Curricula and methods to map the data between the systems used across these corridors crossing developed.

(2) Design usable system

Design Usable system Most digital libraries available on the internet through technology networks we find that more web sites successful those designed as a preparation agents, including the differences technical computers and browsers that include speed of access and the differences between the beneficiaries included on the search engines of choice across the network. Browsers vary in their presentation of information but using the same basic communications protocols such as:

- Hyper Text transfer Protocol (HTTP)
- File Transfer Protocol(FTP)
- Standard Language such as Language (HTM)

To provide multiple points available do not make the digital Library enjoyable, but also recognizes the differences within user’s effort, the availability of the users of the rate of physical disability must be taken into account when developing the front to the Digital library. This includes access to all users contents and documents plain and simple, the ability of the list of
contents and information guidelines. Search engines, including the composition of clear standards benchmarks.

(3) **Open Access Ensure**

Open Access Ensure that the emphasis on open access to use considerations includes access to information in the digital library. In other works, the digital library itself.

N knew (Cherstin Brueggemann) access to the information that “connectivity and the availability of computer technology used contents, such as, where the beneficiary has the requisite knowledge and skills as the contents themselves are a useful and viable use.

There is one way to confirm open access to the contents of the programs and avoid complex or special devices whenever possible. While it may be responsible for the establishment of the contents of the use of economic instruments and systems available. While avoiding the use of programs and special devices to access these contents.

Whenever the program easy loading and whenever developers realized Digital library any choice programs to display images and fantasies (Images) clearly whenever Contents become more available as long as the façade (Interfaces) available. In any case for continued access, user and open the complex systems – or private is always preferable

(4) **Automate possibilities**

Digital library building requires major efforts, especially the mentality of the designers. We find that more automation means (Automated) is that can be built and better use but will be in the use of human sources. This means it needs to be easy to use addition to the appropriate time. Including the date of deposit. Lists and some other means of keeping time. It allows the contents of the expert used descriptors data on the internet.

To add descriptors data on the internet to the main database and the introduction of information only once subsequently been consolidating and summarizing the information as required by the core database to the latest pages (HTML). Flashlights and research reports. The data entry for one time only provides the time and effort of people and soon will be updated facades network databases, and will allow the renewal whenever important.

(5) **Standards**
Adopt and adhere to standards that the use of standards in building the system has many benefits. As the presentations (Applications) more carry, transport and circular All these characteristics and features are very important for the design. Processing and maintenance of digital libraries.

The benefits of the use of standards must be clear to any developers. The delivery of the contents of the digital library in the network using the standards. Laws and legislation. In addition to the current HTML descriptors data for the Web (Metadata) and other Web technology standards doubled the chances ability Web search engines to find the libraries and in particular specific components and technology because this change very quickly.

(6)  **Ensure the quality**

Quality Ensure that kind things can be traced back to all operations and imports falling in the establishment of the digital library. It is an occasion to choices and descriptors input data for the web (Metadata), all uses of the system, that the completion of the correction Descriptors data for the web, where many benefits that the descriptor incomplete impact on the type of complete digital library. Some species of control can automatic and others requires human review extremely accurate.

The digital library projects must know is interested in the curriculum and methods of control in its natural with the accession to the curricula and methods to ensure that the appreciation of the type now an integral part of the building and management of the digital library.¹

4.3.1 **Network**

The Networked of digital library aims to ensure that all future researchers and scholars have understanding and skills in electronic publishing and have used and submitted a work of their own to a digital library.

For digital library network infrastructure the followings:

1. High and server with good configuration and client computers (web server for housing library resources)
2. Router and Gateway
3. CD-Net server for accessing related databases
4. Leased Line connection from internet service provider
5. Proxy for local area network connection
6. Firewall for secure access
7. Library automation package
8. Scanner for scanning images and putting it into the internet

A digital library is entities that stores information such as full text, images and multimedia in a digitized formal and has methods it access retrieve the same. It consisted of infrastructure such as software, hardware and internet facilities to provide users with easier. Faster and comprehensive access to information. Digital library help students by providing them with a rage of reference they are aimed at encouraging better use of information resources.

4.3.2 Information sharing

A fundamental step towards information sharing in digital library is to understand a basic resource that a library has to share materials. But before considering what can be shared it may be instructive to consider what cannot be shared:

A book owned by a library that is needed frequently by users of that library is not fair game of sharing since it will not be available locally when it is needed it is only those materials that are not needed frequently that can be considered for sharing.

The effectiveness of information sharing depends on the availability of an infrastructure including appropriate communications, technology, and delivery systems. The computer has been an extremely effective device for processing and locating materials quickly and conveniently regardless of distance, but again an adequate infrastructure must be assured consistent reliable electric power, and appropriately trained personal.

Access to digital libraries and their collections is dependent upon a stable information technology infrastructure (power, computers, communications links etc.). Hence, Despite the egalitarian potential of the digital library. Many of those who could most benefit from its global reach.²

The digital library network within the user’s community saves a lot of access time and energy of both the users and the library or information personal. To connect to the regional, national or global databases connectivity to these systems is essential through telephonic or
satellite or both connections as the case may be. A complete plan of necessary hardware, software and connectivity may be drawn with the help of experts from computer and networked fields.

(1) **NICNET**

Due to the further improvement of communication technology, we can inter connect computers using satellite lines and called this network as satellite Based Data Network (SBDN). This is used for international and inter-continent data exchanges. In India NICNET, is oriented so that the integration of computer and communication and as well as globalization of a network, is progressively implemented using the low cost technologies available in the international market. This network is planned during the Eighth Plan for various central and state government departments. Its main objectives are to promote collection, storage, analysis, transmission and exchange of data at districts, state head quarters and central government departments, ministries in the country, for the use of planning management and monitoring projects and government sponsored programmers.

(2) **INDONET**

The CMC Ltd., a public sector undertaking has developed an integrated software package called MAITRAYEE suitable for a library network. This package can be used in a network of libraries in Calcutta i.e. CALIBNET. INDONET is a commercial distributed computer network, to provide access to the considerable computing and software resources of CMC Ltd. The objective is to provide computing power and software to users who cannot afford or fully justify investment in dedicated hardware and expensive, specialized business and investment in dedicated hardware and expensive, specialized business and scientifical software. It has three IBM mainframes at Calcutta, Bombay, Madras and smaller computer at Delhi and Hyderabad. It plans to mount public databases, on one or more of its computers.

(3) **INFLIBNET**

The University Grants Commission (UGC) of India commissioned a broad based Interagency Working Group, to prepare a report for a project INFLIBNET. This network links libraries in universities and colleges in the country, and libraries in institutions affiliated to the CSIR, ICMR, ICAR, DRDO and other government departments. This will cover 184 universities
and 23 institutions deemed to be universities, 6,100 colleges and over 200, libraries affiliated to other organizations. It will function with a national centre for managing, over-seeing and coordinating the networks, of holdings of libraries and databases of projects, institutions and specialists.

Will be a multiple function/service network, providing the following services:

(a) Catalogue based services,
(b) Database services,
(c) Document supply service (fax/Non-Fax),
(d) Collection development, and
(e) Communication based services viz, referral, E-mail, bulletin board, audio/video/computer conferencing etc.³

The aim is to pool, share and optimize resources, facilities and services of libraries and information centers in university systems and R&D centers.

(4) **CALIBNET**

Calcutta Library Network is the first library network conceived in India in 1986. NISSAT provided the finance. There are 38 science and technology libraries in this network. Each library is expected to automate its library operations by using MAITRAYEE software. The network centre will provide on-line access to the network’s union catalogues and CAS & SDI.

(5) **DELNET**

Developing Library Network covers 35 libraries in Delhi. All participating libraries are using CDS/ISIS for creation of their database with CCF. All databases are created co-operatively. They will be available on a central computer system and dial up access will be provided to all participatory libraries. DELNET E-mail has launched in march 1991, to promote library mainly inter library requests, distribution of questionnaires, activisation of professional contacts, and also allow the access to national and international on-line services.

(6) **BONET**
Bombay Library Network is aimed at promoting cooperation between libraries in Bombay. Bonet will offer training related to library computerization and networking. Participating libraries continue to make bonet funding self-sufficient. It provides access to centralized catalogues and E-mail for its members. It offers the following services:

(a) Consultation on standards,
(b) Staff training to member libraries,
(c) On-line catalogue of journals, books etc.
(d) Inter-library loan for books and periodicals,
(e) Information retrieval services,
(f) Computer network support for book ordering,
(g) On-line access to international databases,
(h) SDI services,
(i) Courier service for inter library loan, and
(j) E-mail

(7) **HYLIBNET**

Twin cities of Hyderabad and Secunderabad have more than 100 libraries. These libraries cover a wide range of subjects in agriculture, engineering and technology, life sciences, languages, humanities and social sciences and management sciences. Potentiality of organized resource sharing among the libraries in twin cities has not been explored systematically. Initial studies show a greater scope for resource sharing in the twin cities. The core working group of HYLIBNET hopes that this network supports access to catalogues of not only HYLIBNET but also other networks like CALIBNET, DELNET, MALIBNET, BONET etc.

(8) **HYLIBNET**

Twin cities of Hyderabad and Secunderabad have more than 100 libraries. These libraries cover a wide range of subjects in agriculture, engineering and technology, like sciences, languages, humanities and social sciences professional contacts, and also allow the access to national and international on-line services.

(9) **MALIBNET**
Madras Library Network was registered as a society in Madras on February, 1993 which is going to network more than 50 important libraries in Madras. It will offer the following service:

(a) Serials acquired in 25 libraries,
(b) Full journal holdings of about 50 libraries
(c) Contents of about 1500 important journals,
(d) Specialized databases of abstracts of articles,
(e) E-mail with global connections, and
(f) Door delivery of documents on inter-library loan.

India’s first data communications and computer network (INDONET) was commissioned in 1986 by CMC Ltd. In the first phase, mainly they have networked Bombay, Calcutta and Madras; after some time New Delhi and Hyderabad was also linked as additional stations. INDONET is presently having an International Gateway which is providing access to worldwide packet switched networks like USA’s Global Network Systems (GNS), TELNET and INTERNET Singapore’s TELEPAC and Germany’s DATEX-P (ROY, A. 1989). With the present network one can access the information from the world major databases such as NTIS, INSPEC, ERIC, CMPENDEX, MEDLINE AND CLAMS. It is costly affair. CD-ROM Lan system has solved this problem. Once the system is installed and connected to a network, such a INDONET or ERNET, any user of this network will access the information easily and saves lot of their budget. Several organizations have joined networks such as BTISNET, CALIBNET, SIRNET, DESINET, ERNET, INFLIBNET, VIDYANET, etc., it is better to develop the CD-ROM collections in their own fields first, afterwards install a CD-ROM LAN system, so that all the users of these networks will access other’s database. This encourages sharing others resources, and saves lot of budget of many participating libraries. Perhaps this is the right time for INDIA to think seriously about this problem and go foreword to choose the appropriate and latest technology, which suits its requirements, CD-ROM networks not only save money, but also have influence on education, research and industrial output which is required in India right now.

With globalization of education and competitive research, demand for journals has increased over the years. Due to insufficient funds, libraries have been forced to cut subscriptions of journals. UGC has turned towards the Internet to cover the gap between demands and supply
by wary of e-journals that can be subscribed online. Most of the journals are available in electronic form. UGC has entered into alliances with publishers for adapting a consortia-based approach for subscription of journals. These journals are available over UGC-INFONET to all the universities, thereby, making quality information accessible to a wider academic scholar base spread across the country at an affordable price.\(^5\)

Implementation and operation of UGC-INFONET will be coordinated by INFLIBNET, an autonomous inter-University Center of the University Grants Commission of India. INFLIBNET is providing a variety of services to the academic community of the country and is helping libraries in their automation efforts. About 142 University libraries are on the way to computerization.

ERNET India, scientific society under the Ministry of communications and Information Technology, in partnership with the University Grants Commission has setup infrastructure for UGC-INFONET. Under this programme it is proposed to use Information and communication technology (ICT) and Internet to transform learning environment form a one-dimensional one to a multidimensional one.

### 4.3.3 Other Electronic Resources

*Insight*

The J-Gate is an Internet gateway and portal set up nearly two-years ago by Informatics (India) Ltd. It offers affordable access to global electronic journal literature.\(^6\) It provides seamless access to journal articles through database interface of 10,00+ e-journals. Currently J-Gate offers the following types of products/services:

1. “Directory of e-Journals” that includes more than 10,000 journals listed with link to journal/publishers site.
2. Table of Contents (TOC) for an equal member of journals.
3. A comprehensive searchable database consisting of more than 10 Lakhs + articles added every year across all disciplines.
4. More than 10,000 journals including 1200+free journals and 22 Lakh articles across all subjects areas.
5. Send e-mail to authors requesting reprints of articles for journals not subscribed by your library.
6. Locate a local library that has the journal
7. Search Database – By Author, Title Abstract, keywords, Author Address, Broad Subject Categories.

4.3.4 Bibliographic Databases

(1) Compendex

The Compendex is the most comprehensive bibliographic database of engineering research available today, containing almost seven million references and abstracts taken from over 5,000 engineering journals, conferences and technical reports. The broad subject areas of engineering and applied science are comprehensively represented. Coverage includes unclear technology, bioengineering, transportation, chemical and process engineering, light and optical technology, agricultural engineering and food technology, computers and data processing, applied physics, electronics and communications, control, civil, mechanical, materials, petroleum, aerospace and automotive engineering as well as narrower subtopics within all these and other major engineering fields.

Approximately 250,000 new records are added to the database annually from over 175 disciplines and major specialists within engineering. Compendex is updated weekly to ensure access to critical developments in your field.

(2) INSPEC

The INSPEC, from the Institute of Electrical Engineers (IEE), is the world’s leading database in the fields of physics, electronics and electrical engineering, computers and control, and information technology. It contains citations with abstracts of the worldwide literature in physics, electronics and electrical engineering, and computer fields. Primary coverage is of journal articles and papers presented at conferences, although significant books, technical reports, and dissertations are also included in the database’s 7.3 million records.

Sources include more than 4,200 journals and more than 2,000 conference proceedings, books, and reports corresponding to the following publications: Physics Abstracts, Electrical and Electronics Abstracts, and Computer and Control Abstracts, as well as to the online INSPEC database. The INSPEC would be accessible from the EI Village. The EI Village, besides
providing access to Compendex Plus and INSPEC, also provides access to US patents, abstracts and links to Web sites, online reference services, standards, etc.

4.3.5 Library Consortia in India: Networking planning

Due to a financial crunch and the rising costs of journals, many Indian university and colleges cannot subscribe to all the required journals and databases. To overcome this problem, libraries are forming consortia. Some special libraries and organizations like the India Institute of Astrophysics (IIA) Library, Inter-university Centre for Astronomy and Astrophysics (IUCAA) Library, National Centre for Radio Astrophysics (NCRA) Library, Physical Research Laboratory (PRL) library, Tata Institute of Fundamental Research (TIFR) Library, Council of Scientific and Industrial research, Department of Atomic Energy, etc, have established consortia to share electronic access to journal literature. NISCAIR (formed by the merger of INSDOC and NISCOM) is developed a consortium for CSIR labs for accessing e-journals.

Consortia in sciences and technology libraries of NCR Delhi though have a adopted consortia but still needs proper guidelines and methodologies. In a survey by UGC in 2001, it was noted that although all important libraries of NCR and university libraries have Internet facilities and interlinked to INFLIBNET, and other networks at national and international level. UGC launched a major initiative called UGC-INFONET that provides high speed Internet connections so as to have electronic access to professional literature including research journals, abstracts, review publications, and databases from all areas in science and technology, as well as in social sciences and humanities.

Today, a number of professional journals are available over UGC-INFONET to all universities. The e-subscription initiative under UGC-Infonet is an important portent portal for sharing print as well as electronic resources amongst university libraries. INFLIBNET functions as a resource center with an aim to cater to the needs of its members for resources not accessible to them in electronic media or are available in print media.

4.3.6 INDEST Consortium

The Ministry of Human Resource development (MHRD) has set up the “Indian National Digital Library in Science and Technology (INDEST) Consortium”. The ministry provides funds required for the subscription to electronic resources for 72 academic institutions, including the Indian Institute of Sciences, Indian Institute of Technology, Regional Engineering Colleges,
Indian Institute of Managements, and about 60 centrally-funded/aided government institutions through the consortium. The INDEST consortium is the most ambitious initiative so far in the area of engineering and technology disciplines. The primary objective of libraries is to organize and provide access to information, and it remains the same although the format and methods have changed drastically. Under the present scenario of declining budgets and higher subscription costs of journals in India, it is becoming very difficult to meet the demands of library/information users.

4.3.7 UGC-INFONET

This is an initiative of University Grants Commission and INFLIBNET, Ahmedabad for providing e-resources to Government aided member universities. Now its facilities are also being extended to colleges and private universities.

Thus the information technology progress is so penetrating and pervasive that it is now possible to obtain basic information on any topic by accessing databases across the world within reasonable time and cost. The not so distant future homes of tomorrow would have a minimum of a 100 computers embedded in all kinds of appliances and amenities. In such a highly computer mediated society, the routine work of libraries and librarians would be taken over by computer programs. Such programs will find information no matter where it is stored and will match it to the needs of the user, and further correlate it with other information to make new and useful synthesis.

The form an quantum of information that can be shared anywhere on the globe has naturally raised the issue traditionally perceived in the form of brick and mortar structure. Libraries have no doubt made use of the advances in information technology right from a standalone computer system to computer networking to the web and Internet and also modified the services accordingly. It is clear that libraries will have to remain relevant by meeting the demands of patrons in the forthcoming information plenty era.

Library and information services have always been seen as part of a wider provision of research and learning support. In the last decade or so, infrastructure development to create system-wide efficiencies included creation of systems that brought together services and data holdings from different libraries. Focus was on integrated library systems, more openly available abstraction and indexing services and electronic journals. In the web environment, the common
pattern of provision became multiple websites, each with a standalone interface, and databases that were hidden behind these interfaces.

These efforts had always been on enhancing the effectiveness of technologies in libraries; however, the long-term issue is how technology will influence the wary library users behave and what they expect. This follows from the fact that more applications are now web based, which allows a free flow of data from users, by users, to users. Organizations are using a central web-based application to create workflows that pivot around the web. People and organizations are sharing components, problems and work. Social networking through blogs, wikis, and IM (instant messaging) is increasing.

Libraries traditionally have provided themselves at nurturing relationships through registering the borrowing habits of users on the one hand and selective dissemination of information services and current awareness services for them, on the other. To this extent, libraries have been successful in establishing a symbiotic relationship. In contrast to the prevailing seamless information environment, library resources even to this day contrary to the above web experience of a user, the links in discovery-locate-request-deliver of a library resource are still not clear, making it impossible to track the status of an item easily. Library services and resources have failed to bring library content in workflows and on web (as RSS for example), making them inaccessible or un-discoverable.

Libraries, therefore, need to build on services that save time, and are built around user workflow. The library requires playing a more active role in user environment for example, in ways that supports their learning and/or research objectives. A lot of information services are being bundled, remixed and pushed on networks. Libraries need to investigate and implement new technologies that may enhance the library system’s practices is something that libraries need to understand and evolve practices around. Once synchronous with distance learning, it primarily includes not only courses that are online and taught over a distance but those traditional classroom activities with electronic elements.

REFERENCES
Chapter-4.4

DIGITAL LIBRARY PROBLEMS

4.4.1  INTRODUCTION

(1)  Electronic Librarian

Today’s Electronic librarians are spread throughout the library organization. This small study set out to determine whether these positions reflected major organizational redesign or were incorporated into a traditional library structure. They are analyzed for four factors: title, reporting lines, functional components.

a. Traditional Duties:- The job descriptions were analyzed for specific references to services such as reference desk rotation, generation or subject bibliographic instruction, subject
bibliography and faculty liaison duties. It was found that all but five of the job advertisements had some component of traditional services not directly related to electronic resources.

b. *Electronic versus Traditional Duties:* Results show that the majority of library jobs are still solidly centered on traditional duties such as reference, collection development, acquisitions, and cataloging. A cursory look at the job requirement section of the advertisements reveals, however, that all librarians are expected to have expertise in computer-based library tools, as well as database and Web searching skills.

(2) *Cost*

The promised budgetary saving associated with technology have not materialized. Libraries have been forced to make electronic resources access decisions that involve considerable shifting of funds away from one format to the other or from one resource to the other. On the publishing front, the cost of conversion has proved a handicap to wholesale retrospective digitization. This means that for the foreseeable future academic libraries will still need to maintain print collections in order to meet the needs of researchers and students.

(3) *Copyright*

Publishers and librarians have not been able to come to an agreement as to what represents fair use in the electronic environment. Libraries currently subsidize electronic access through purchase of full-text database and one-time payment for reprints. As long as this conflict is not resolved, however, unlimited online access to scholarly remains out of reach.

Academic libraries are in a transitional period. Although the advocates of the digital library have proven a bit too optimistic, it is true that technology has dramatically transformed basic definitions such as “collection” and “access”. Most have embarked on some kind of restructuring, whether at the position, departmental, or institutional level. Nevertheless, there is still a need for traditional functional services such as acquisitions, cataloging, reference and circulation, and these duties are not likely to vanish in the foreseeable future.

“With duties ranging from selecting and licensing electronic databases to answering questions at the reference desk, these librarians must be proficient at multitasking in several environments. They must be technologically expert and knowledgeable about one or more
academic disciplines. They must manage departments, administer budget, teach undergraduates, and negotiate with vendors.”

(4) The Society

The digital librarian is a automated agent that combines functionality for information elicitation, planning data mining and coordination of search, retrieval, and content summarization. There are multiple communities interested in digital libraries. The computer science view of a library as an organized digitized collection leads to an emphasis on technological solutions. Digital libraries are constructed, collected and organized by (and for) a community of users and their functional capabilities supports the information needs and users of that community. Many libraries are now digital publishers, many have some in house digitized collections and a significant part of the collection of academic and large public libraries in now digital. A hybrid library is which involves new electronic information resources and traditional hardcopy resources an integrated information service, accessed via electronic gateways available both onsite, and remotely via Internet or local computer networks. At the same time, libraries face competitions from Web sites and services such as Amazon, Google and eBay. User’s perspectives on search and availability of materials have been dramatically altered by these services. The continuing proliferation of formats, tools, services and technologies has upended how we arrange, retrieve and present out holdings.

These users are self-sufficient they are satisfied with what they are finding and they value and expect seamlessness…. From query to full text or image or video, they want it all interlinked and immediate. The digital library is a blend of old and new, bringing new formats, technologies and techniques to the global dissemination of information, while based on the theories and practices of organization of information and service to users which are grounded in library and information studies.

Digital librarian having highest ranked choices in the technology area were digital library architecture and software, technical and quality standards, Web markup languages, database skills, and Web design skills. Among library related skills, they identified the ability to understand user needs, knowledge of digital archiving and preservation, cataloguing and metadata, indexing, and collection development as most important. And for other needed skills, they emphasized communication and interpersonal skill, project management and leadership
skills, knowledge of legal issues, the ability to write proposals and teaching and group presentation skills.

Courses in LIS programs tended to offer a balance of theory and technology while those in Computer science emphasized metadata, and information retrieval. Courses on digital reference, web design and publishing, digital documents and XML, creating digital, project management, and digital asset management and others like them, have been added in the last 5 to 10 years. Some schools promote courses like these to students as a means to offer intensive specializations in digital librarianship. The University of Delhi, IGNOU, and Nagpur University offers a specialization in Digital Libraries Information Management within the MLIS Course.

Competencies such as project management, communication skills, and the ability to adapt to change, including technological change, will continue to be important. Their roles as organizers, content and services providers, designers and managers, ethicists, and experts on licensing and preservation are now established. The challenge for LIS educators in to provide the specialized skills needed by digital librarians within the LIS educational framework. The challenge for digital librarians is to continue to develop as information professionals in order to remain relevant in the changing information landscape in which they work.

(5) Selection of materials

A document to be digitized and made available to the uses will be open for use and comment by any scholar, professional and the general public. The document should be a unique publication and it carries with all the characteristics of a published document. The publishing body digitizing the document should be allowed for copying, further publication, increased access etc.

(a) The publisher should have license to digitize the document or owns copyright the document. For non-copyrighted materials it would be better to see whether has not been digitized before by any other Agency.

(b) Digital databases need to be accommodated in new formats and hardware using compatible software from time to time. The project should have the means of revenue generation or the facility of getting a regular fiancé for maintaining the digital data.
(c) Scanning Cost couple with quality control checks, preparation of indexes, catalogues and metadata should be in reach. Therefore select the best documents at the initial stage.

(d) The document of sensitive nature for a group, society or country should not be digitized unless a information is part of the objectives of the project.

4.4.2 Digital Library system

There are systems that might be considered digital libraries that harvest or focus on remote web-based resources.

The systems selected here share the requirement that they support local collections and content. There are three areas:

1. General open source database system may often have a larger community of users and offer more assurance than software that is maintained and developed for a narrower purpose.
2. Missing features that has already been tailored to a specific purpose may not be as easy as implementing one made available with the expectation that it will be customized.
3. Many digital library systems are geared toward self-contained content; the content that is ready for dissemination at the time of entry.

1) DLbox (Digital Library-in-a-box)

It is a project distributed by the Digital Library Research Laboratory at Virginia Technology. It utilizes extensions to the OAI Protocol for Metadata Harvesting (XOAI-PMH) to support component-to-component integration. DLbox allows tremendous flexibility in designing a digital library. Following are the important components are listed:

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<tr>
<th>Component</th>
<th>Description</th>
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The Components of a DLbox
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
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<tbody>
<tr>
<td>IRBD Search Engine</td>
<td>A search engine based on an OAI accessible data archive, capable of submitting queries and retrieving results.</td>
</tr>
<tr>
<td>DB Browse Engine</td>
<td>A browsing system based on the use of categories in the metadata.</td>
</tr>
<tr>
<td>OAIB</td>
<td>The heart of DLbox, this is server and requires an SQL-capable server such as MySQL and a servlet container, such as Tomcat.</td>
</tr>
<tr>
<td>DB Union Archive merger Component</td>
<td>Mergers OAI and XOAI-PMH archives together for local storage and processing.</td>
</tr>
<tr>
<td>XML File:</td>
<td>This adds OAI supports to a set of XML files.</td>
</tr>
<tr>
<td>Submit Archive Component</td>
<td>XOAI-PHM requires the ability to “put” a record in an archive, something that is not supported in the current OAI protocol. This component supplies this functionally.</td>
</tr>
<tr>
<td>Threaded Annotation</td>
<td>A custom engine, this allows external annotation to be applied to any resource.</td>
</tr>
<tr>
<td>What’s New Engine</td>
<td>Supports a listing of a new random ser of records through OAI.</td>
</tr>
<tr>
<td>MD Edit XML Schema-based Metadata Editor</td>
<td>Web-form based metadata editor.</td>
</tr>
<tr>
<td>Grunk</td>
<td>The Grammar Understanding Kernel is an application from NCSA to extract metadata from text file documents without existing metadata.</td>
</tr>
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</table>

The components can be downloaded individually and largely are built with Perl and Java tools. If you have already built a structure for a digital collection in a relational database, these components can be used to apply additional functionally to your existing setup.

(2) **Stages**
(1) **Server Stage**

This category encompasses threats such as physical damages to server machines, operating system attack via network, penetration to the file system and Trojans. It is not difficult to maintain server security due to the physical available of software and hardware components. There are numerous techniques and many hardware-software tools for providing an acceptable level of security.²

(2) **Network Stage**

Some well known threats in this area are packet sniffing, spoofing, session hijacking, denial of service etc. It is usually very difficult to make sure that the access link in well protected and the communication packets are not received by other on the network. The cryptography a useful solution. Data encryption tools in the network, such as SSL servers are among existing solution solutions for this problem. VLAN connection is also a good method for attaining a relatively secured network; whenever possible.

(3) **Client Stage**

Hacking client side application, changing client side standards but Spy-wares, Trojans, etc. are common threats which can be found in client machines. Skilled hackers can unlock almost any constraint. Web browsers usually work based on standard HTTP protocol making them very vulnerable and hackers can get through almost any constraints applied to the client side.

(3) **Content Delivery**

Content delivery systems are of varieties. The current system is designed to the used in public Digital Libraries and universities so the military considerations and special purpose contents are not concerned. In order to keep up with the security not affecting speed, ease of use and integrity of the system. There are various factors to maintain those parameters in developing digital libraries of universities solutions may be:

a. The quality of delivered contents designed in order to provide enough satisfaction to individual access.

b. Digital content delivery system based on web application architecture.

c. The delivery content in the solid form i.e. image based contents.
d. The requested part of data has to be extracted from the server and sent to the client.

e. For format interchangeable the system can intervene in cases of generating solid form. A stereotype is XML. The negative side of this method is the relatively large volume of transferred data which necessary is in solid form.

f. The activities which deal with the data structure have to be performed on the server side.

g. Images be patented through digital signatures to prevent misusage.

h. There should be ways to prevent client side of misuse and copying without permission of contents. Some of security controls in the client side includes disabling the right click, preventing the cache of the delivered content, preventing the copying of images and viewing the HTML source.\(^4\)

i. The compression technique is also a very effective parameter in gaining user satisfaction. The quality of digital page and the size of transferred documents depend heavily on the compression method.

j. Display frames should be limited in sizes in order to enforce scrolling screen. This will prevent the assembling of scrolled image captured by print-screen utility.

(4) **Digital library Intellectual**

Digital libraries refer to information resource banks with substantive and well-organized information that can efficiently serve large amount of people in different geographical location via advanced technologies. Its information resources consist of two categories.

i. Actual collections of information resources owned by the library, such as electronic books, journals and databases which developed by the library or saved in the library computer system. The library has rights to update, amend, use and dominate the actual collection.

ii. Virtual collections refer to the summation of various information resources outside the library but can be stably used by the library via Internet.

Library can embrace peer-to-peer technologies into their own services. And possible develop new service models, or improve existing ones.
Under the circumstance of modern information technologies and network environment, both purpose and method of intellectual property evaluation and the intellectual property contents of resources.

Library electronic collections are evaluated on the basis of copy number, the number of years set for use, quantity of information, copyright of and the contract with authors. There are still evaluations of DL technologies, such as the novelty, usefulness, creativeness and access mode. Specifically evaluation is also made of quantity and category of the remote database, the technological innovation based on network resources, network communication problem shooting, and bandwidth and velocity of information transmission. It is to do the qualitative and quantitative evaluation, the intellectual property value of digital library should reflect as the future advantages gained by the owner.

(1). Market method determines the assessment value by comparing other comparative exchange value in present market, which requires sufficient reference market. Market method is seldom applied to copyright evaluation.

(2). Cost method evaluated by assuming total expenses and consumptions of recreating the property. Intellectual labor domains a great part of the necessary labor time of our social. There isn’t complete one to one corresponding relationship between copyright cost and value.

(3). Profit method is deciding the property value according the future profits gained by the property user. As for a technological property, more profit to the enterprise implemented the technology means higher value of the patient; therefore calculating profit becomes one of the methods to evaluate copyright. Profit method discounts the future profit of property to present value, through which to evaluate the property. Since copyright and trade marker cab bring profits to owners.

4.4.3 Economics factors

The cost effects to the evaluation of intellectual property in Digital Library include development cost conversion cost, and permit cost etc. development cost refers to the total investment Value of the needed human resource, material resource, and investment capitals etc, in the development process. Research and development cost dominates the total cost of
information commodities. There is cost for gaining the permit of the owner of copyright it is a little part of the total value; the dominant part include the expected profit and others. The exchange of commodities should be done in the market. As a special kind of commodity, intellectual property in Digital Libraries is also limited and affected by market mechanism and the regulation of value.

The bearer of risks in the investment category is mainly the owner of the intellectual property the bearer of risks in the profit category is the transferee of the intellectual property. Between the two kinds of risks, risks in the profit category have greater influence to the evaluation of intellectual property in digital library.4

(1) Evaluative Levels

(a) User-centered levels

i. Social level which analyses the needs, demands, roles, and practices of a society. Or community. This level is difficult evaluate due to the diverse objectives of the society or community.

ii. Institutional levels which analysis institutional or organizational objectives. It finds out how well institutional resources are integrated. It is also difficult to evaluate.

iii. Individual level which analysis information needs, tasks, activities of people as individual users. It is most direct and easiest to evaluate, but difficult to generalize to a larger population.

(b) Interface level

Interface it analysis the access, searching, navigation, browsing, a and interaction with a digital library.

(c) System-centered level

i. Engineering level which analysis the hardware, network, and related configuration performance.

ii. Processing level which analysis the procedures, techniques, algorithms, operations, performance. These are very systematic.
iii. Content level which analysis how well is the collection or information resources, selected, represented, organized and structured. It is also systematic.

(2) Evaluation approaches

Digital libraries are complex social institutional and technical systems. There are three aspects required for evaluation.

i. **Systems approach** it involves study of some aspect of performance it includes assessing effectiveness and efficiency specific and technological component.

ii. **Human approach** It involves study of behavior in respect to given information needs, such as information seeking, browsing, searching or performance.

iii. **Usability approach** It involves assessment of different features, particularly in respect to portals, by users.

iv. **Ethnographic approach** It involves study of life ways, culture and customs and study of impact environment.

v. **Anthropological approach** It

vi. Involves study of different stakeholders or communities and their cultures in relation to a given digital library.

vii. **Sociological approach** It involves assessment of situated action or user communities in social setting of a digital library.

viii. **Economic approach** It involves study of costs, cost benefits economic values and impacts.

Globalization is used in a variety of ways. Google represents the apotheosis of digital information and that the remaining problems in this domain have either been solved or will be solved by Google (or perhaps by Yahoo!, MSN, etc.) Globalization has infected funding agencies, both public and private. While the absence of a well –funded digital library research program within the National Science Foundation can be attributed to a number of causes, the notion that “Google has solved the problem” is contributory.

4.4.4 Digital Library Architecture
In general, the large-scale use of Dublin Core and OAI-PMH has proven their utility for providing basic digital library services, but has also revealed a number of implementation problems. The most outstanding of these relate to metadata quality and OAI-PMH validity, especially XML-schema compliance. As a result the administrative costs of maintaining the MR have been unexpectedly high.

Digital libraries are valuable for education because they offer access to and opportunities for use of online primary resources. But, also effective as educational tools, they need to do more than provide access to quality resources. Reeves wrote “the real power of media and technology to improve education only be realized when students actively use them as cognitive tools rather than simply perceive and interact with them as tutors or repositories of information”. Marshall also noted that digital libraries need to be more than repositories and must support the full life cycle of data. Information and knowledge.

- Digital library than a collection of simple web pages or static documents.
- Use the notion of learning objects to indicate a collection of information, which includes not only one or more primary resources, but also the dynamic educational context for the information. Context includes social and cultural information; patterns of use; pedagogical goals, the nature of learner’s educational systems; and the learner’s abilities, preferences and prior knowledge. Information context can be quite complex, reflecting the breadth of audiences served by a digital library and the differences in how audiences use and manipulate information.
- Capturing opinions, comments, and reviews about library resources and their history of use.
- Describing the community of users involved in the creation of a learning object.
- Capturing learner interactions and connecting their profiles to learning objects.
- Associating teacher recommendations and correlations to state education standards.
- Tracking and storing the search keywords that led to eventual use of the resource.

Problems and Issues

A digital is a collection of information sources in a place (if not a physical place, then at least a logical one). A digital library of the future in which software agents use principles of artificial intelligence (AI) to perform “monitoring, management and allocation of services”. A
digital library is a “community of information agents” that would retain most of the properties of the traditional library, but would perform them using intelligent software rather than human beings.

No doubt that metaphor of the traditional library is powerful, useful, and compelling. Further, there are good reasons for the properties of the traditional library. Science, scholarship, learning and teaching could not have evolved as we know them without the existence of the great and small “traditional” libraries of the world.

(1) Information Resource (IRs) in the Digital Library: Problems

- The establishment and control the currency, accuracy, and integrity of information sources (quality problem)
- Maintains the data and intellectual integrity of IRs? (authority control problem)
- Provides intellectual access to IRs (organizational problem)
- Recognition different version of the same IR? (fluidity problem)
- Addressing the issue of transient IRs (preservation problem)
- Preserving the concept of authorship (conceptual problem)
- Observing the Copyright laws for IRs? (legal problem)
- Limiting to some classes of users accessing to some IRs? (political problem)
- Offering the services, if any by the Digital Library.
- Integration of digital libraries into traditional libraries and its accomplishment.
- A digital library may have librarians and their role.
- Digital library having well-defined classes of users?

There is a need to frame a search on a Internet search engine such as Met Crawler or Alta Vista and within a few seconds, retrieve the object of the search. Internet is a powerful tool.

However, the digital library has implications for the kinds of information (and other) resources to place in it. If a digital library is conceived in terms of a traditional library, certain resources are implied; if one has a broader view, other kinds of resources would be appropriate. Thus one puts into a digital library whatever one wishes to put into it, so long as they can be digitized. Theoretically, the possibilities are almost unlimited. The information resources to be found in a digital library will depend on the library's collection development policy, on what the
users of the library want to be included, as well as on what is technically and economically feasible.

There are various types of resources:

1. kinds of metadata that libraries have been producing for centuries: indexes, catalogs, and the like.
2. More and more full texts are available in digital form
3. Multimedia collections of all kinds
4. various sets of numerical data.

(2) **Digital Library: Collection Development**

In the early stages of the Digital Library, collection development is not a big issue because the focus is on establishing a collaborative framework for library operation, involving all project partners. Furthermore, there was little point worrying about collection development policy when there is no funding to carry out digitization anyway. It is necessary to deal with a preliminary issue of library purpose and philosophy before taking a coherent view of collection development.

Once the realities of what was feasible with available funding became clear, collection development could be addressed. Initially there were three main priorities:

- To make use of physical collections held by project partners, for both political and practical purposes.
- To establish collections that illustrated the benefits of a collaborative project by pooling resources that might otherwise result in duplication of effort.
- To create content.

(3) **Development Methodology and Design Issues**

Organizations and management of diverse collections of digital objects has been a big issue for big libraries, but at a simpler level ‘a number of servers, spread over the Internet, that interact with each other to meet user requests’. The library establishes service meeting these criteria (CAIRNS) but this regarded as a distributed library catalogue rather than a digital library. The Digital Library is not initially concerned with interactions between distributed servers, but it did need a system for managing its content. This is less simple than it sounds, with multiple
contributors, collections, file formats and access methods involved. Information is held and maintained in several different forms:

a. Access databases containing titles and descriptions of digital objects.
b. CDs containing folders of hundreds of images.
c. Web pages offering prototype public access to image and documents.
d. A library catalogue system holding MARC records of object metadata.

As Access database is required as a condition of funding for collections, Access is chosen as the initial content and metadata repository. Library content and metadata is then generated from Access in different purpose, this is a modular, flexible, low-cost content management system using common desktop software.

(4) User Interfaces

There were five main requirements for the digital library: (i) web interface: (ii) consistency, flexibility (iii) scalability (iv) accessibility and feasibility. **Consistency** meant devising a design template that could provide visual coherence across all collections without imposing blanket uniformity. **Flexibility** meant enabling users to access library content in different ways (across as well as within collections). **Scalability** meant creating an interface that would look acceptable with only three or four collections yet be able to cope with dozens or hundreds. **Accessibility** meant meeting requirements of funding bodies and standard web accessibility guidelines. **Feasibility** meant creating something quickly and inexpensively.

(5) Information Retrieval

Priority should be given in creating a flexible browse able interface to illustrate existing collections, as user need an overview of the content in order to carry out useful searches. Once this was in place, options were added one collection at time, using different solutions for different collations. This is not ideal from a user service perspective, as there is an inherent (through minor) inconsistency between searches options in different areas of the library. However, from a research perspective it is useful to investigate and understand different search solutions. In the longer term, the aim is to use intelligent scripting to provide cascading search facilities.
There are almost endless possibilities in providing complex search facilities for a digital library. Such as:

a. Indexing
b. Relevance ranking
c. Case sensitivity
d. Phrase searching
e. Stemming
f. Pattern matching,
g. Boolean searching and
h. Results paging.

(6) Search

There is a huge difference between providing access to discrete sets of digital collections and providing digital library services. Information providers have designed enhanced getaway and navigation services on the interface side and also introduced federation mechanism to assist user’s through the distributed, heterogeneous environment.

Computer and networking technology has changed dramatically over the last 10 years and now where is this more evident than in the rapidly world of digital library implementation and practice.

(7) Hardware-PC or UNIX

Another important issue to be assessed before site development begins is the storage location of the digital library. The two server must have access to the Internet, ample hard drive space, and the ability to handle the expected access load. Preferably, the computer will have a better connection to the Internet. This will also faster access for users. If a PC is used, it should be at least a 100 MHz Pentium. Similar speeds are recommended for UNIX machines. Ample disk drive space for library materials is also preferred.

It is common for users who have opted to use a PC to be running Windows Networking Technology (NT). Two of the most popular web servers for this operating system are Microsoft’s Internet Information Server and Netscape’s Enterprise Server. If a UNIX machine was chosen,
one of the numerous free web servers that can be downloaded from the web, such as NCSAHTTPd web server can be used.

Many people consider UNIX machines to be more reliable than PCs. Also, the software is relatively view. We chose to use a UNIX machine attaché to a TI line because of the reliability and speed of this arrangement.

(8) **Storage-Database or File Structure**

Storage of the files will comprise the digital library. There are a number of options available. Two possible methods are using a database and creating a special directory and file structure which includes Oracle, MS SQL and Microsoft Access. If you use a PC, Access would probably be the database of choice, as it would be the most compatible with NT. Oracle is a good choice for a database on a UNIX machine. It is very reliable and fairly flexible. The creating database, if a new field need to be added a new database need to be created. On a number of systems, the transfer of data from the old database to the new one can be difficult and time consuming.

(9) **CGI Scripts**

A CGI (Common Gateway Interface) Script is used to take information from the web, manipulate it, and return a result. These scripts can be written in a number of languages. The two most popular languages for CGI scripts are C and PERL. We chose to very similar to C and has a number of string manipulation functions which are very convenient. In addition, it does not require compilation (since it is interpreted) and it is a “pure” scripting language. There are free available to handle a lot of the overhead of passing data into the script from a web browser.

The web server has to know that the script is a CGI script. This can be done in two ways.

(1) All files ending with a particular extension are CGI scripts have to end with the “CGI” extension. When server tries to load a file with that extension, it will think the file is a script, and will therefore try to execute it. If a script was saved with any other extension, the web server would just return the contents of the script as plain text and would not execute the script. The advantage of using this method is that scripts can be saved in any location.
(2) With this method the web servers tries to access any file within that directory, it knows that the file is a CGI scripts, so it tries to excuse it. Any script not saved in this directory will be processed as a plain text file. The typical name given to these CGI directories is “CGI-bin”.

REFERENCE