

Digitization of Indigenous Materials: Problems and Solutions in the Context of Kerala University

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Relevant Content

The problem of our Information Infrastructures is lack of information in the system. Information relevant to us, valuable to us, generated by us. Take the example of the Information Systems existing in any educational or other institution or department of the State. Networks will be there. Sophisticated computers and high tech professionals will be there. Facility to access information from world wide sources will be there, and some times every system in the institution will have connection to Internet. But none of these systems or the connectivity is going to provide you very valuable information generated by that institution, or the information available only at that institution which is sought not only from inside the organization but from all over the world. The systems may provide you access to any document in Library of Congress or a village library in U.K. But not any document from your organization or State. Take for example our Latest edition of Gazetteer of Kerala. Can you get it from Internet or any campus networks in Kerala? No. But if you want to refer a similar publication on any region of U.K. go to the Internet terminal in your organization or to any Internet cafe in your Panchayat. Within seconds the book will open in the terminal in front of you. This is the problem addressed by this paper.

ICT Environment of Kerala University

This study is prepared based on the situation existing in the Libraries and Information Systems of Kerala University (KU) and a few institutions around it. The KU Central Library, the Campus Central Library at Karyavattom, the departmental libraries, the Oriental Research Institute and Manuscript Library, the KU Publications Division and various other collections under the university as well as institutions and departments associating with it possess many rare and important documents. But none of them are available through Internet or even in the university's campus network

The present library facilities in higher education and specialized institutions are automated systems and digital libraries, which form the heart of the campus wide networks and information systems of such institutions. The main tool of Information access by scientist, teaches and students is computer terminals providing access to campus wide information systems and networks as well as Internet. The KU also has Information Systems and Networks, which includes Library LAN, Campus LAN etc, and the university provides Internet facility in most of its libraries. The students and teachers have access to Internet through their home computers as well as Internet cafes available near their residence.

"Information in itself has no inherent value. It only has a value when it becomes accessible". The valuable information contained in the ancient manuscripts and records preserved in Oriental Manuscript Library, Kerala Collection of KU Library, the PhD theses Collection of the university etc are remaining under utilized due to their in accessibility caused by fear of destruction, undue importance to preservation of the physical form of the material, bureaucratic hindrances and lack of awareness about their existence; as well as misconceptions about Networks and campus wide information systems development.

The study is done with the belief that application of Digital Library Technology can improve the situation. It can provide a cost effective solution to conservation of indigenous documents and knowledge. It can make them accessible to teachers, students and researchers inside and outside the

university, make them useful to the society and contribute for creation of new knowledge. More than that digitization of our documents and establishing a digital library as the central hub of university's network and information system can give meaning to the Information Infrastructure that KU has developed and is further developing; by bringing our own information into it.

Indigenous Content of KU

A digital archive can be established under KU with huge digital storage capacity and network connectivity's that can enable its accessibility throughout the campus as well as from the residence of teachers and students. KU possesses very valuable content that is record of Knowledge generated inside the university during more than a century as well as records of knowledge that originated in the region through many centuries. They are at present held in traditional media like palm leaf, paper, etc as well as microfilm, computer hard disk, etc at various institutions and they form part of existing library collections. From this; the content of importance and relevance that requires digitisation is to be identified and selected according to their value and priority. The portions of the collections that are to be digitised and which should form the content of the Information System and network of KU are identified by this study as follows.

Holdings of Indigenous Materials: There are many institutions under KU, affiliated to it as well as in the geographical regions covered by it holding very valuable records of knowledge that originated in the region. KU can take the initiative for establishing a digital library of their holdings. The following are the institutions that have been considered for this short study.

Oriental Research Institute and Manuscript Library: The Collection contains about 60 000 manuscripts, which includes palm leaf manuscripts, paper manuscripts and other records. It is a very valuable collection on ancient science and technology in Kerala, and covers subjects like Ayurveda, Siddha, architecture, astronomy, tantra, astrology, Vedanta, Mimamsa, and Nyaya etc. Ninety percent of the documents in the collection are never published and of these most of them have no duplicate copies anywhere.

Kerala Collection of KU Central Library: The Kerala Collection contains books on various aspects of the Region. There are many old and rare books and out of print books on various aspects related to Kerala. The collection comes to about 75000 books. Of these approximately 15 thousand books requires digitisation when their conservation, reference value, demand relevance etc are considered.

PhD Theses Collections: The Theses collection at the KU comes to about 400 dissertations approved by the university for awarding Doctoral Degree. Presently the complete collection is not available at a single place. The use of some titles is difficult due to their age. As KU should possess at least one copy of the Theses accepted for reference, ensuring the safety of old theses has become very important which causes restrictions on their use.

Rare Items in other Institutions: Some of the institutions affiliated to KU also possess rare and valuable records in their collections the digitisation of which can enable the university to possess copies of such records and make them accessible in their information system

Affiliated Institutions: There are many colleges and other institutions affiliated to KU, which have very valuable, rare and ancient collections related to Kerala. Examples are Centre for Development Studies, University College, and Government Women's College etc.

Private Collections Around: There are many private collections in the geographical region covered by KU like church libraries, temple libraries, publisher's collections, Collections in various families etc. The owners of these collections will also permit the university to digitise their collections on terms and conditions agreeable to them, which may enable them to conserve their records as well as enable the university to possess copies of such records and make them accessible in their information system.

Museums, Archives, Archaeology: State Archives, Sree Chitra Art Gallery, Museums and many other institutions possesses many valuable ancient documents, which are highly relevant of research on Kerala. KU can join them in some digital library development project, which will enable all these

institutions to conserve their records and make them accessible to the public through a common digital library project.

Records Digitization

The documents contained in the collections of KU and affiliated institutions mentioned above are of high relevance not only to the research conducted in the university but also all over India. But these are not accessible to the extent to which even manual systems make it possible to extend their use. But now ICT offers unlimited possibilities for increasing their utility to society.

The main purpose of this study is to focus attention on this aspect as well as to ensure conservation of these valuable records and maximizing their utilization by applying digital technology by establishing necessary infrastructures for digitizing and networking of records and other materials held in the collections mentioned above under the KU and other institutions.

Digital Technology: Digital Library Technology can ensure the accessibility as well as conservation of recorded knowledge for a future generation. For developing digital information systems we have to bring together traditional scholars, language specialists, archivists, scientists, artists, etc on the one hand, and information systems people on the other.

There is a need for urgent utilization of high technology including information technology and computer communication networks for conservation of our ancient records, art and cultural heritage. In much the same way as there is a movement for saving the endangered species of flora and fauna, so also there is a felt need for saving the endangered species of manuscripts, ancient books, art and culture. In the text sub-domain, a number of our books, manuscripts and other records stand the risk of environmental onslaught every day. Several thousands of these manuscripts become unusable or vanish without any trace. For very similar reasons, old paintings and sculptures are getting degraded and even lost. In the dynamic visual heritage sub-category, traditional folklore dances are vanishing every year through loss of continuity of new generation of artists. A very good example is Teyyam. Music is also meeting a similar fate. Even ancient systems of life

styles are getting wiped out through imperatives of modernization. We also need to use digital library technology to maximize the utility of results of current research in Science and Technology by organization and dissemination of the records reporting research and development through our information systems.

Forms of Records/Information to be Digitized: Knowledge existing in KU as well as the institutions and society, served by it and the expression of cultural and scientific heritage in general, looking from the informatics angle naturally falls into Texts, Images and Sound categories. In KU Collections as well as in institutions connected to it, recorded information of all these categories exist.

The text information may be palm leaf manuscripts, texts inscribed in carved stone tablets, handwritten paper manuscripts, old printed records and books or many others. Hundreds of thousands of such manuscripts exist in South India.

Image sub-domain may be paintings as 2-dimensional example, and sculptures/temples as 3-dimensional examples. It may also be dynamic like the various forms of dances like, Kathakali, Teyyam etc. The sound sub-domain encompasses vocal and instrumental music, historical speeches, to mention a few.

In the setting up of such a digital archives and information system, a standardized inventory across all the recorded information resources under KU, which has, numerous correlation, is most essential. Starting of a planned digital archiving programme is essential if any information system and network built up by the university is to become meaningful.

There are inherent correlations among the three major sub-domains- Texts, Images and Sound. There are situations where, the historical study would require all the three to be simultaneously presented, simultaneously analyzed and correlated. This can be made possible through the technology of multimedia systems.

Digital Technology can combine graphics, animation, speech synthesis and video with multimedia technology, which can support the archiving, and interchange of texts, images and sound based information, mainly heritage information.

Digitization Efforts Worldwide

There are many examples of digital library development projects, which we should know about before starting such a programmes or selecting a solution for developing digital library.

International Organizations

UNESCO Memory of the World Programme: (<http://www.unesco.Org/webworld/mdm/index>). This project seeks to safeguard documentary heritage of the world. Naturally, it reflects the diversity of languages, peoples and cultures. The archive to be developed is expected to be ' the mirror of the world and its memory'

American Memory: (<http://www.loc.gov/>) American history in words, sounds and pictures and extensive online exhibitions of historic photographs and documents. The project initiated by United States library of congress is already available in the web.

Digital Libraries Initiative (DLI): The National Science Foundation, Department of Defense Advanced Projects Agency and the National Aeronautics and Space Administration, USA funded six research projects in 1994 aiming at developing new techniques for creating digital libraries.

Ankorvat Heritage Conservation Project: It is part of World Heritage Inventory and Management project. It is meant for ancient site of Angkor, Kampuchea and specifically related to conservation of Preah Khan, a twelfth century temple complex in the ancient city of Angkor, Kampuchea.

National Efforts

In India, several institutions and national level organizations have taken steps to develop digital libraries. Projects aimed at digitizing rare and out of print publications and manuscripts have been taken up in institutions like Indira Gandhi National Centre for Arts, Indian Institute of Science, National Library, Kerala Agricultural University, Centre for Informatics Research and Development, Centre for South Indian Studies etc.

Ragamela: It is a multimedia archiving project initiated with support from UNESCO. Indira Gandhi Centre for Arts (IGNCA) has developed a programme for archiving cultural and historical environment for enabling the future to experience the past using virtual technology. A digital archive on Indian culture has already been developed at IGNCA.

National Library: National Library at Calcutta has initiated programmes to digitize its rare collections. A number of utilities have been developed there to facilitate creation of digital libraries using solutions offered by various groups.

Regional Level Digitization Efforts

KAULIS: Kerala Agricultural University has developed a digital library. In it, the digitized collection of PhD theses accepted by the University forms the indigenous content. KAULIS also has digitized content on Agricultural Research conducted in India from 1971 to present and course materials meant for various specialized Information Technology programmes offered under it.

Kerala History DL: (<http://www.cirdindia.org/>). It is a project to develop a digital library of reference materials on Kerala History. It is a joint venture of Centre for South Indian Studies and CIRD. This library was first demonstrated during the South Indian History Congress held at Trivandrum in December 2001.

Kerala Forestry Documents: a prototype of archives of working plans existing in Kerala Forest Department has been developed using Nitya Archives in 2002.

Mathrubhoomi Weekly: A digital library of Mathrubhoomi weekly for a few years has been developed using the technology provided by Centre for Informatics Research and Development. This is a fine example of application of language technology for local scripts. This digital library has a search mechanism for original Malayalam scripts.

Biodiversity of Kerala- Flora Herbarium: It is a prototype of digital library of Flora of Kerala. It has been developed under a joint programme of Forestry College, Thrissur and Centre for Agricultural Informatics.

KSDP Archives: A Digital Archives of the Minutes of the Board Meetings, Kerala State Drugs and Pharmaceuticals (KSDP), Alappuzha has been developed using Nitya Archives.

KINFRA Archives: Minutes of Board Meetings of KINFRA, Trivandrum, India has been digitally archived using Nitya Archives.

Brennen College DL: Brennen College has prepared in 2004 a complete database of its Malayalam books in a Malayalam Script based DBMS named M/ISIS. It has been released as an electronic publication and is available to other institutions on exchange basis. The college has also developed a prototype of digital library of Malayalam books available in the college and this full text is linked to the bibliographical database using Nitya Archive.

Kerala Sahithya Akademi DL: Kerala Sahithya Akademi has started in 2004 a digital library project, which will include old and rare Malayalam and English books available at the Akademi Central Library and Appan Tampuran Smarakam. The work has been allotted to CDit a Government of Kerala undertaking specializing in ICT. The solutions are under development.

TPL Digital Library: The digital library of old Malayalam and English documents available in Trivandrum Public Library has been developed using Nitya Archives. The project was started in 2004. By now approximately 2000

Malayalam and English books have been incorporated in the digital library. It has the facility to search in Malayalam and English script. The library is functional now and is the first such multilingual digitization project in India dealing with local scripts.

Solutions for Records Digitization

There are many computer programs and solutions from national and international level organizations for developing digital libraries, archiving of museums, monuments, text, and multimedia. The concept of library has gone far beyond digitization of text or library materials to incorporate other institutions and environment to the library like, art galleries, museums, and even cultural environments or incidents. Digital technology enables the conservation of heritage by creating and preserving heritage items by copying the environment for preservation using virtual technology. Cultural heritage information management has become more sophisticated and efficient.

World Heritage Inventory Management Program: One important system is World Heritage Inventory and Management Program. The programme successfully tested at the ancient site of Angkor, Kampuchea.

The conservation of built heritage requires the identification of items and the subsequent recording as an organized management tool for the care and conservation of items. The heritage records are precise and reliable dossier of graphic and written documentation of an historic resource. This basic information should be used to guide conservation analysis, design and maintenance activities. The use of a computerized database is integral to the quantitative management of resources, and to the basic requirement of centralizing the wealth of information that the system is designed to accommodate.

The prime objective of the programme was to function as a central inventory of buildings, relics and moveable objects and could be used as the basis for an accessible register and management tool for the conservation of the Monuments.

The main components of the World Heritage Inventory And Management Program are as follows:

The linking of the graphics files to the databases is facilitated. The program is primarily designed for tangible arte facts and buildings. Hence the programme is capable to retrieve a plan or a photograph easily, and from wherever one may be in the program. Establishing a consistent method of recording is a fundamental starting point of any computer system. Using this database, information is can be organized into an appropriate hierarchy. The selected options become more sophisticated as site knowledge increases. With single keystrokes, words, paragraphs or graphics can be introduced or retrieved. The system is designed to be applicable to a variety of cultural heritage items or artifacts and to provide project management in addition to the inventory program. Archival documentation can be scanned into the system, there is a library of slides, drawings and photographs and these resources are linked to the inventory and can be found using keywords. They are planning to make this system accessible by network. Such a system can be used to conserve the records and knowledge on Padmanabha Swamy Temple, Suchindram Temple, Padmanabhapuram Palace, and the heritage buildings inside East Fort etc.

Basis Plus Package: One of the powerful packages available in India and used worldwide is Basis Plus. It can be used for creating and maintaining digital libraries. Basis Plus is a Relational Database management System (RDBMS) that combines many features normally not available together in any other similar packages. It combines the three key technologies; full text retrieval, relational database management system, object management in a single platform. The Information Dimensions who has produced the package has also developed Basis Web server that can be overlaid in Basis Plus. Basis Plus' sophisticated search mechanism enable the retrieval of information we seek instantly, rather than being at the mercy of a haphazard hyperlink path. Its navigation features can enable us to move through a display or from document to document with a dexterity not found in most other Web server packages.

The Digital Library Toolkit: The Digital Library Toolkit developed by Sun Micro Systems are used in some digital Library projects. The systems and software are dependent on solutions offered by Sun Micro systems. In India University of Hyderabad had used this Tool kit.

Greenstone Digital Library software: Green stone is a suit of software, which has the ability to build digital library collections. It provides a new way of organizing information and publishing it on the Web. The New Zealand Digital Library Project at the University of Waikato produces greenstone. It is open source software available free of cost from UNESCO.

University of Michigan Digital Library Extension Service (DLXS): University of Michigan Digital Library extension Service provides foundation and the framework to develop digital library collections. It is an impressive and comprehensive suit of tools including a search engine and an array of middle ware some of which are free and some of which are priced.

Nitya Archive: For Text and Images: Nitya Archives is a digital library package developed by Centre for Informatics Research and Development (CIRD). It can digitally record millions of records, books, different types of manuscripts like palm leaf, tablets, typescripts, metal or stone inscriptions, etc.; and manage them in an efficient way that enables full text retrieval within in seconds. Nitya has various programmes meant for text, manuscript, images, heritage items etc.

DSpace: It is a digital repository system that captures, stores, indexes, preserves, and redistributes an organization's research data. Jointly developed by MIT Libraries and Hewlett-Packard Labs, the DSpace software platform serves a numerous digital archiving needs. Research institutions worldwide use DSpace to meet a variety of digital archiving needs like building up Institutional Repositories, Learning Object Repositories (LORs), eTheses and for Electronic Records Management, Digital Preservation, Publishing etc. DSpace is freely available as open source software. DSpace accepts all forms of digital materials including text, images, video, and audio files. Possible content includes articles and preprints, technical reports, working papers, conference papers, e-theses, datasets: statistical,

geospatial, matlab, etc., images: visual, scientific, etc., audio files, video files, learning objects and reformatted digital library collections

Selection of DL Solutions

The digitization of information is an efficient, effective and accessible means by which information can be compiled in a readily accessible manner. The information can be made available to maximum number of users at any time and at minimal cost.

Evaluating Digital Archiving Systems: A Package selected for developing digital library in an organization should fulfill some basic functions. The requirements are that the solution must be:

- Adaptable: In scope and application
- Easy to use: In data input and retrieval
- Current: Using the best system available and standardizing input methods
- Low Cost: Affordable to more people and therefore widely accessible
- Expandable: With options for enhancements and up gradation
- Compatible: With other programs enabling data transfer and networking
- Multi-media: Ability to store text and graphics in one relational system
- Managerial: With capabilities to track time, budget and tasks
- Filing System: Ability to maintain, modify, update and protect data
- Support: Opportunity to obtain help or training
- Networking: Communicate with others regardless of geographic limitation
- Interdisciplinary: Applicable to the various disciplines with minimum customization requirements.

We use the above criteria for the selection of an appropriate system for the digitization of almost any record of any media or for digital library or museum projects.

The Problem with General Solutions: Although, several packages are in vogue for materializing digital archives, they lack efficient search mechanism. Devoid of an efficient search mechanism, digitally stored information in hard disks and compact discs will remain as dump places of information, just the same way as documents converted into microform. The full potential of digital archiving can be exploited only if selective access to content is made possible. Then only it can perform the traditional functions of a library.

Depending upon commercial agencies always for the creation of digital libraries is neither practicable nor cost effective. Therefore, it is necessary to make professional approaches towards the development of appropriate utilities and to train a new generation of library professionals to create and maintain digital archives.

Advantages of Nitya: When compared with the possibilities offered by the available packages for digital library development and electronic publishing Nitya fulfils most of the requirements mentioned above. In digitization projects of Kerala the local language and scripts are very important. Ninety percent of the manuscripts and records up to 1950, which any digital library project of Kerala has to deal with, are in original Malayalam Script. The only solution available for computerization of original Malayalam Script till now is Rachana technology. Nitya can incorporate this power and hence it makes Nitya a unique solution for digital library projects in Kerala. As CIRD, which has produced Nitya, is capable to develop for computers other ancient scripts of India in other languages also Nitya can be used for digitizing documents in other Indian languages also. So Nitya can succeed in achieving the goals of digital library package that KU requires.

Nitya for Digitization in KU: CIRD has developed the NITYA the package meant for digital archiving of materials in English and local languages of Kerala. CIRD is a Research and Development organization functioning under

the Act XXI of 1860 of Government of India. It consists of a group of professional librarians, linguists, historians and ICT experts.

Nitya is the result of research by Sri. K H Hussain, an information scientist from India who is also the Founder President of CIRD. He has structured more than 15 databases; majority of them Bibliographic, since 1985 and is an expert in CDS\ISIS; the UNESCO package for documentation and information system development. He has developed interface between Ventura and CDS\ISIS. He is also involved in developing Rachana software, which recreated the original / full character set of Malayalam language in word processing and typesetting. He has also developed a DBMS in Malayalam; interfacing CDS/ISIS and Rachana, which will be instrumental in future bibliographic control of documents in Malayalam and other information systems for folklore, traditional medicine, agricultural systems, etc which have to deal with local languages and scripts.

Nitya is programmed in Delphi as an interface between CDS/ISIS and Adobe Acrobat. Nitya combines high-level text compaction techniques and sophisticated free text search and retrieval procedure. The most outstanding aspect of Nitya is that any piece of information graphics, sound or video, contained in any page of the millions of documents stored in this archival system can be searched and retrieved within seconds.

Aptness of Nitya Archive for KU

Main features of Nitya are its capability for fast search and retrieval of documents from digital libraries, its aptness for stand alone Digital Archives and its facilities for publishing digital collections in CDROM. It elevates the status of CDS/ISIS by making it a powerful tool for digital libraries.

Physical Infrastructures and Front End: KU should develop in the university Library minimum infrastructures required for developing and organizing digital content. Physical System of the digital library should have capacity to digitize, organize and manage content or information resources available at various centers of the university well as permit access to it from through Intranet and also from anywhere through Internet.

The infrastructure may consist of the Digital Library, connected to Building LAN of the university Library that will be linked to main campus network and through WAN to the automated libraries in distant campuses of the university connected to concerned campus networks. The project should also consist of a leased line or V-sat connectivity to the LAN consisting of the digital library. This will give to the campus networks strong communication capabilities to access information from their own Digital Library and also from various outside sources.

Storage of Digitized Collections: The digital library storage systems that can manage storage in a cost effective way and disseminate information efficiently consist of three types of hard wares; meant for highly used information, middle level usage information and less or rarely used information. One model KU can adopt is the system developed by Kerala Agricultural University (KAU). In KAU Electronic Library the storage systems with Alpha Server 1000A; under high security stores very costly specialized software and databases and agricultural research information received and downloaded under various MOUs and licenses. The PhD dissertations of KAU are available in this electronic library. The Electronic Library has a storage capacity of approximately 6.5 crore printed pages and it already has in its storage systems content copied under various MOUs and books and other documents acquired in electronic medium consisting of approximately 5.5 crore pages and about hundred and twenty hours video/ audio files. Course materials are also stored in the digital library, which was used for conducting about 12 specialized courses on different aspects of IT.

User Interface in Digital Library: Paradigm used to develop a DL package should be adapted from the user approach to books in traditional libraries. When a user enters a library, he goes to the catalogue first and searches under appropriate access points such as author, title, subject, etc. This enables the user to get the documents he wants. He locates relevant chapters/pages of the book with the help of table of contents and index. In the same way, when one opens DL, a dictionary of keywords similar to traditional catalogue should appear. Terms in the dictionary are to be used to form queries. Search should yield hits of relevant documents with

bibliographic details. From them required full text is to identified, selected and opened. Nitya has this functionality. Any digital library solution used should have a similar functionality.

Organization of Digitized Records for Use: DL package should enable digitizing, storing and managing unlimited number of documents. Older books, manuscripts in palm leaves, research reports, conference proceedings, parliament/legislative proceedings, theses/ dissertations, journals, newspaper clippings, etc needs to be made in to digital archives and stored either in hard disks or in compact discs. Retrieval of a document or a page in DL is to be accomplished in seconds.

Information Retrieval from Digital Library: Nitya has the above functionalities. Nitya is so versatile that both Reference Retrieval System and Document Retrieval System are achieved in one step. As software tool that achieves these two high ends, Nitya but represents half the picture. Other half is application of documentation principles in archiving. Different kinds of materials demand different methods of indexing in order to achieve maximum benefits out of archiving. For example, documentation methods applied to archive and retrieve Old printed books, PhD theses, technical reports etc should be different from that of archiving palm leaves of the Oriental Manuscript Library. Digitising the exhibits in the Sree Chitra Art Gallery, or the exhibits in the Archaeological Museum requires different solutions. For bringing out the KU Publications in CDROM another solution is required. So the package used by the KU should have modules for all these, should be viable for customisation of similar different requirements that may come up in the system, should be viable to the local scripts used by the manuscripts and books, and should enable pooling of all the digitised resources for use.

Unless proper documentation methods are applied, any archival system would be ineffective in retrieving relevant information. Here proven practices of traditional librarianship in organizing Universe of Knowledge come in help for designing Nitya. Since Nitya uses CDS/ISIS, defining databases and applying indexing methods are naturally adhered to cataloguing and documentation principles.

Incorporation of Traditional Library Practices: A DL package used should translate age-old practices of traditional libraries archives and museums to modern ICT practices in organizing knowledge. The solution provider should also offer professional consultancies to librarians and archivists who will be building up digital libraries. The package should also be a flexible archival system. It should be able to change documentation methods, dictionary building and query methods depending upon the nature of materials and collection. As the archival and retrieval of Theses, Conference proceeding, Manuscripts in palm leaves, etc. are different from each other, the package should offer different versions or modules according to the need and vision of participating museums, libraries and archives. As document of many local scripts may required to be processed by a digital library in any region of India the application of the package will need to be extended to all Indian languages. Already techniques have been developed by CIRD to search in Malayalam - the regional language of Kerala especially in its original scripts in which most of the State's ancient documents and publications that arose before 1950 are available.

Digitization of Internally Generated Records

KU has Websites and Intranets. Ninety percent of the people from all over the world that access KU web site check for university publications, its library and digitised content of knowledge generated by its academicians and researchers available in the web sites. But nothing of that sort is available in the site. Nothing of that sort is available in its Intranets. None of its own resources are available even in its Library LANs. This will be a disgrace to KU in this age of Cyberspace. The networks and automated information systems end as mere systems, cables and connectivity, which may enable access only to information other institutions, may permit us to access.

Hence in developing Information Infrastructures of the university, which includes, Campus Wide Information Systems, Building LANS, Campus Networks, Automated Libraries etc KU should take development of a Digital Library of its own content as a priority item.

Digitisation Projects at KU: KU should undertake a digitisation project of indigenous content with specified time frame. In the first phase to be completed in three years KU should digitise complete PhD dissertations accepted by the university and full text of selected rare manuscripts and books originated up to 1925 available in all collection. Of this priority is to be given to PhD Dissertations of the university. The author has attempted a digitisation of PhD thesis of Kerala Agricultural University (KAU) in 1998 when digital library packages were rare and Nitya was only in its development stage. A simple programme has been developed using MS Access at front end and approximately fifty dissertations have been digitised in four months. Later Nitya became available and the data has been transferred to Nitya with more facilities. By authors experience and by the trend in current technology it is calculated that if well planned KU can digitise all its PhD dissertations in one year. That means in one year any PhD dissertation accepted by the university will be available online for the academic community.

They should be organised in speedily retrievable formats using Nitya. Then the digitisation of remaining documents should be under taken and completed in a reasonable period say another five years so that everything becomes accessible from anywhere at any time.

Nitya Packages for DL at KU

For digitization after a discussion on available packages and their use this study recommends Nitya solutions. Presently there is no solution that has been tested and proved to successfully deal with English and Malayalam documents together. Also Nitya represents a new generation of CDS\ISIS application. It not only exploits the power of search and retrieval of CDS\ISIS, but also explores its potentialities in developing digital libraries. It simplifies the looks and functionalities of CDS/ISIS, there by making it user-friendly and more acceptable outside the realm of library professionals.

For different types of materials, concerned prototypes of 'Nitya Archives' like those for Heritage Information Systems, Theses, Research Reports, Technical Reports, Conference Proceedings, Historical Documents, and Manuscripts in

Palm Leaves, Journal Articles, Paper Clippings and Internet Downloads etc which already been developed by CIRD can be used.

Use of Nitya for digitization in KU can check the accumulation there like in some other universities, which have recently undertaken such projects, the development of non-documented digital collections that only 'dumps' thousands of scanned pages in CD or hard disks without proper retrieval mechanisms.

For producing e-versions of KU Publications also Nitya can be considered. When the e-publication produced by KU existing at present and publications released in Nitya are considered the Nitya versions of publications are far more user friendly and perfect. Digital collections developed using Nitya can be distributed to any number of users along with Electronic Document Reader. This will facilitate effectively organized electronic publishing of KU publications with information retrieval mechanism attached to each.

No existing digital Library solution has the power to deal with Malayalam manuscripts and other publications especially those with scripts used prior to 1950. Nitya's customization for original Malayalam script and other Indian languages will be a milestone in the history digital library movement and CDS\ISIS applications in India. As most of the research and development on Nitya occurred in Kerala, KU should make use of the technology and further develop it.

Standards and Support

Following of International standards as well as locally available support are two important aspects for selecting a digitization solution. Nitya has consultancy and training by CIRD available in Kerala. CIRD transfers technology to professional librarians and archivists. The five types of institutions in need of digital archive creation identified by CIRD are the following.

- Archives and libraries which plan to develop digital collections but not want to set up digitization unit.

- Institutions particularly larger ones which will outsource the work now but have the potential to develop its own infrastructure later.
- Institutions having all the necessary equipment, software etc. but do not have the digital archiving know how.
- Institutions that have already started digitizing records using other packages, but decided to change to Nitya after assessing its capability
- Institutions who want to publish ancient manuscripts, books etc in CD using Nitya software

KU can select one of the options from those given above that will be convenient to it. CIRD has also various schemes to support all types of institutional requirements.

CIRD Consultancy for Nitya includes; designing an customizing Nitya to meet special needs of the collection, users and the librarians, general training in CDS/ISIS and Nitya and specific training in digitization, adding document to the archive, publishing in CD etc. These above schemes will be of high relevance to KU and can be availed for its digitization programme.

Need for Absorbing New Technologies

Archives, libraries and museums as they exist now in KU and other research institutions limit mainly to collection, preservation and services using original exhibits, printed documents, manuscripts and non-print materials like microforms. Services through these mediums are losing their relevance and cost effectiveness. What we actually require is collection, preservation, organization and dissemination of the thought content of these records or a facility for viewing the exhibits online. Now electronic mediums are in a better position to fulfil all these functions. Any archive or museum or library providing support for research also should transform it by accepting new technology and should form the heart of any information system or network the organization develops. Availability of locally developed solutions using programmes like CDS/ISIS supported by UNESCO and of International standard can give to KU and other institutions the power to enter the Information Superhighway in a deserving way. Skill, imagination, motivation,

sincere effort and devotion of a large number of people will be necessary to achieve this goal.

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