20. Application of Recent Advanced Technology in Sardar Vallabhbhai National Institute of Technology (SVNIT), Surat

T. B. Ghosh

Abstract

The modern age of information explosion poses stiff challenges in providing right information to right user in right time. In such a situation Information Technology (IT) comes to rescue of libraries and information centers. Today's changing scenario in publishing and IT fields has forced the library and information professionals to accept the changing demands placed on the profession today. In view of this changing scenario an attempt is made by Sardar Vallabhbhai National Institute of Technology (SVNIT) Library, Surat to introduce the application of recent advanced technology in their library. The computerization of SVNIT library including all modules i.e acquisition, cataloguing, serial control, circulation and OPAC was introduced in 1998 using LIBSYS Software and the software is upgraded from time to time depending on the situation. An attempt was made to create digital library by digitized question papers and other reports, procuring CD-ROM databases along with e-resources subscribed under INDEST. In addition to INDEST e-resources the library is also subscribing other e-resources like Taylor & Francis Journals online, ASTM Standards, ESDU. The library has also procured 6,034 e-books, 174 volumes of e-handbooks, 230 volumes of e-encyclopedia and 407 e-reference books with perpetual access against onetime payment. The library has introduced online video library by converting videocassettes in to CD and keeping the same in Mirror server, which is accessible from any system in the campus. E-prints server is established recently. In addition to the digital library a Virtual Library is created at URL *http://www.geocities.com/ghosh_svrec* for the benefit of the students and faculties. Most recently RFID (Radio Frequency Identification) technology is introduced with Library Security gate (2 EAS pedestal), self-checkout and check in facility to save the time of transaction and to minimize the manpower in the circulation counter.

1. Introduction

The library is the heart and main information resource center of any institution. It is the part and parcel of education and teaching system. The modern age of information explosion poses stiff challenges in providing right information to right user in right time. In such a situation Information Technology (IT) comes to rescue of libraries and information centers. Today's changing scenario in publishing and IT fields has forced the library and information professionals to accept the changing demands placed on the profession today. The constant changing in the technology have direct impact on the functioning of library and information services. The information service has crossed national boundaries and with the rapid progress in information technology and web technology the demand for information and its methods of supply have undergone a sea change with advent of e-books and e-resources.

2. Definition

Information technology is a generic term used for all activities connected with computer based processing, storage and transfer of information. It involves computers, electronic media, satellite, telecommunication

T. B. Ghosh, Librarian, SVNIT, Surat

and mass storage devices.

Information technology, as defined by the Information Technology Association of America (ITAA), is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." Encompassing the computer and information systems industries, information technology is the capability to electronically input, process, store, output, transmit, and receive data and information, including text, graphics, sound, and video, as well as the ability to control machines of all kinds electronically.

Information technology is comprised of computers, networks, satellite communications, robotics, videotext, cable television, electronic mail ("e-mail"), electronic games, and automated office equipment.

Information technology does not confine only to hardware and software but it also covers the techniques and methods used for collection, storage, processing and dissemination of information.

The information technology can be grouped in to the following areas:
1. Computer technology
2. Communication technology
3. Reprographic technology
4. Storage
5. Databases
6. Information systems
7. Expert systems
8. Videotext and teletext

3. Need for information technology

The new technology has made a deep impact on the libraries. Nowadays the emphasis in libraries is shifting from collection to access. Providing speedy and accurate access to information is the pivotal point of activity. To cope up with the time electronic resources are beneficial because the information changes every minute. Due to jet speed of information emergence, manual scanning of books and feeding the information is neither practical nor possible. In addition to this, electronic information resources are growing enormously, access to which is not possible without application of Information Technology (IT). The access to electronic information resources and resource sharing with near about 140 countries of the world has been rendering easy with the application of new technology. The IT is also growing and getting advanced day by day. The library and the librarian should run at par with the advancement of technology.

4. Application of Advanced Information Technology in SVNIT Library

Sardar Vallabhbhai Regional College of Engineering and Technology, Surat was established in 1961 with 3 branches of engineering i.e. Civil, Mechanical and Electrical. In 2004 it is converted to National Institute of Technology. It consists of 7 Undergraduate 18 Postgraduate branches. All major branches are conducting Ph.D. Studies. The SVNIT library is providing services to its 2500 students including PG and Ph.D., 300 faculties and supporting staff.

In addition to teaching the institute has been providing consultancy services and undertaking research projects from time to time. The central Library of SVNIT, Surat is trying to satisfy the needs of its users with 92526 number of collection including back volumes, standards, technical reports and 180 current journals. In this era of information explosion it is not possible to satisfy the specific needs of user and to disseminate the right information to user in right time with the traditional library system and the application of Information Technology(IT) is felt necessary.

The application of IT has been introduced in SVNIT Library in the following major areas:
· Library Automation
· CD-ROM/VCD
· Digital Library
· Virtual Library
· Application of RFID (Radio Frequency Identification)

4.1 Library Automation

The first attempt to computerize the library was made in 1995-96 with modest set of machines including

two personal computers one dot-matrix printer and CDS/ISIS software. Initially 3000 entries were made in CDS/ISIS. In 1997 LIBSYS Software was installed and the library has started the automated circulation system from the date of installation of LIBSYS software without engaging any manpower following three steps stated below.

4.1.1 Step 1: Entry of frequently used books

Initially books were issued by entering author, tile, call number and accession number. After getting back the books from the user, the entry of the rest of the data elements is done and the books were sent to the stack putting "ENTRY COMPLETED" stamp on the date slip. After running this method for two semesters (i.e. one year) it was found that all the frequently used books have been entered in the database.

4.1.2 Step 2: Entry of often used and rarely used books

After running above mentioned system for two semesters one of the staff members who was responsible for manual cataloguing work was engaged to check the stack physically and pick up remaining books for data entry. Most of the data entry work was completed in December 1999.

4.1.3 Step 3: Entry of back volumes

As the back volumes are bulky and heavy it was not possible to bring those volumes to the computer terminal. In January 2000 two staff members were engaged, one for preparing worksheet and one for data entry. The entry of 6,627 back volumes of journals was completed in June 2000 and full-fledged automated library system was introduced forthwith. The LIBSYS software is updated from time to time and presently Internet embedded version of LIBSYS is used.

4.2 Digital Library

In addition to computerization of library function i.e. OPAC (Online Public Access Catalogue) acquisition, cataloguing, circulation and serial control etc. a Digital Library is also established. The Digital Library of SVNIT is consists of the following.

1. CD-ROM Databases
2. Online Video Library
3. Online E-journals subscribed by INDEST Consortium
4. Online E-journals subscribed by the Institute
5. Archive of document collected from source
6. Online E-books
7. E-prints

4.2.1 CD-ROM Databases

The SVNIT Library has introduced CD-ROM collection since 1998 and at present 15 CD-ROM Databases and 2 Books on CD-ROM are available in the library. User can search the databases and get print out against a nominal charge. Some of the databases are also available online in the campus only.

List of CD-ROM Databases available in SVNIT, Surat.

Sr.No.	Title	Type	Coverage
1.	Ei Compendex (CD Version of Engineering Index)	Abstract	1995 to 2005
2.	Chemical Engineering & Biotechnology Abstracts	Abstract	1997 to 2005
3.	Environmental Chemistry, Health & Safety	Abstracts	1980 to 2005
4.	Ei Chem Disc	Abstracts	1988 to 1999
5.	Petroleum Abstracts	Abstracts	1988 April to 1998 December

6.	International Mechanical Abstracts	Abstracts	1973 to 1999, June
7.	INSPEC	Abstracts	2000 to 2005 Feb
8.	ICONDA (International Construction Databases)	Abstracts	1976 to 2004 March.
9.	SAE Technical Papers	Full Text	1996 &2004-2005
10.	SAE Emission Technology Collection	Full Text	2004
11.	SAE Diesel Engines Technology Collection	Full Text	2004
12.	SAE Spark –Ignition Engines Technology Collection	Full Text	2004
13.	SAE Vehicle Dynamics Technology Collection	Full Text	2004
14.	ASTM Standards	Full Text	Starting to 2005 (now online)
15.	Indian Standards	Full Text	Starting to 2005 (now online)

Books on CD ROM

1.	ASM Hand book (20 Volumes)	Full Text	
2.	Polymer Encyclopedia	Full Text	Now online

4.2.2 Online Video Library using Mirror Server

The library is having 1042 Videocassettes purchased from different sources like IIT, Delhi, IIT Madras and other organizations. Since last six months a project is undertaken by the librarian to convert the Videocassettes in to VCD with permission of the concerned publisher/creator. Following steps are used to create Online VCD Library.

- Step 1: Conversion of the cassettes
- Step: 2: Mirroring the VCD in to Mirror Server
- Step 3: Run the VCD in the PC from the Mirror Server
- Find out the URL (location/path) of the VCD in the Server
- Create manual index of the same in front page or HTML and link the VCD

Presently near about 600 cassettes are converted in to VCD and mirrored in the server. The mirror server is linked in the Institute's Library website which enable the students and faculties to watch the VCD in their PC.

4.2.3 Online E-journals subscribed by the INDEST Consortium

The SVNIT Library is also a member of INDEST Consortium and the getting access of following e-resources like other NITs

Full Text Resources

- IEEE Online - IEEE Journals
- Springer Verlag's: Link - Engg. and general resources
- Proquest Science - Formerly Applied Science and Technology Plus
- Science Direct - Engineering
- ACM Digital Library - Mathematics and Comp. Algorithms
- ASCE Journals - Civil Engg. and Applied Mechanics
- Nature
- ASME Journals - Mechanical Engg.

Bibliographic Resources

- JCCC - J-Gate Custom Content for Consortia

The link of INDEST E-resources is created in the Institute's web page for easy access of the faculties and students.

4.2.4 Online E-resources subscribed by the Institute

INDEST Consortium was established in 2004 and gradually the trends of use of Internet and e-resources have been increasing continuously. The Institute has introduced 18 Post Graduate Courses and different Ph.D. Programmes. As a result necessity of more e-resources is felt and the Institute has subscribed following e-resources , in addition to the e-resources subscribed through INDEST Consortium.

- Science Direct: Back files of Engineering and Chemical subject bundles from issue 1 to 1994
- ASTM Journals
- ASTM Standards
- Taylor & Francis online Journals (4 subjects 130 Journals)
- ESDU - Engineering Science Data Unit
- LNCS - Lecture Notes in Computer Science

4.2.5 Archive of documents collected from other online sources

The institute library has been maintaining an archive of documents collected from other freely available online resources. The librarian used to collect information from the concerned heads of the department, In-charge of different Post Graduate sections and Ph.D. guides about the topic of potential research and downloading the research papers, Ph.D. thesis from sources and archiving the same in mirror server for accessing in networking environment. At present contents of 10 years question papers, 70 Ph.D. thesis 500 research papers and 150 e-books including audio books from different sources by harvesting the several e-print servers all over the world are archived in the mirror server. These contents are linked in the library web page under the heading "Other Resources Created by the Library

4.2.6 Online E-books

E-book is one of the most important resources of the library. During the severe flood in Surat in the month of August, 2006 near about 20,000 books were washed away. Considering the worst situation, the collection of e-books is felt necessary and the library has procured 7,150 numbers of books including handbooks, encyclopedia and referex engineering collections as stated below.

Sl.	Particulars	Titles Qty	Volumes Qty
	(A) Handbook, Encyclopedia & Refrex Engineering Collections		
01	Handbooks (Elsevier Science & Wiley Inter science)	30	174
02	Encyclopedia (Elsevier Science & Wiley Inter science & UNESCO)	30	460
03	Engineering Village Refrex Engineering Collection	407	407
Total	Handbooks, Encyclopedia & Refrex collection	467	1,071
	(B) E-books published by Springer & Wiley Interscience		
04	Springer E-books published in 2005 to 2007 on Computer Science, Engineering, Earth & Environmental Science, Chemistry & Material Science, Mathematics & Statistics, Physics & Astronomy.	5,767	5,767
05	Wiley Interscience Publications	267	267
	Total	6034	6034
	Total E Books A + B	7150	7150

4.2.7 E-prints

Recently e-print institutional repository is introduced at http://eprints.svnit.ac.in ePrints@SVNIT repository collects, preserves and disseminates in digital format of the research output created by the SVNIT community. It enables the Institute community to deposit their preprints, post prints and other scholarly publications using a web interface, and organizes these publications for easy retrieval. ePrints@SVNIT can be accessed by anybody, submission of documents to this repository is limited to the SVNIT community. ePrints@SVNIT repository is running on E-Prints open archive software, a freely distributable archive system available from eprints.org. ePrints@SVNIT complies with the Open Archives Initiative (OAI) framework allowing publications to be easily indexed by web search engines and other indexing services.

Initially a few papers are uploaded and a lot of research papers are under uploading process.

4.5 Virtual Library

The virtual library is outcome of the World Wide Web (WWW). Virtual library is a library that does not exist. It is used to denote a library with distributed collections or services that act as one. It is website with pointers and links to other sites. Virtual Library site provides access to a large number of library resources like indexes, journals, and reference materials, and online reference service.

The librarian has tried to create link of such resources at URL *http://www.geocities.com/ghosh_svrec* in different sections like e-books, e-journals e-databases, e-prints information, E-learning, etc. The main and important links are described. A snap sort of the index page is shown below
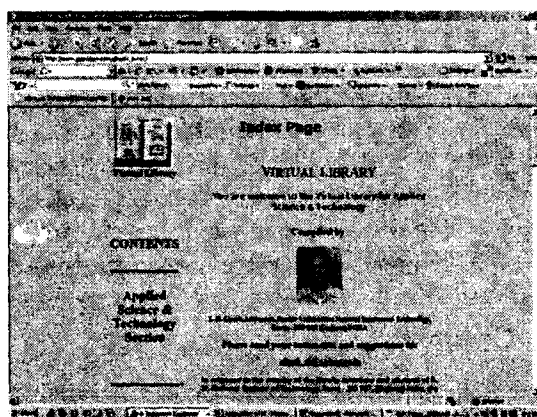
4.5.1 Online Free E-books http://www.geocities.com/ghosh_svrec/ebook.html

Due to advancement of web technology different organizations and institutions like Virginia University, Pennsylvania University and other organizations have taken up digital library and E-book projects. As a result different E-books are freely available online. Freely available online electronic books on Applied Science and Technology and other interdisciplinary subjects are identified and linked in this section. Some reference books dictionaries and encyclopedias are also linked in this site.

A section is created under the heading Children 's Digital Library which includes children's story books, text books and MP3 audio books.

4.5.2 Online Free E-Journals: http://www.geocities.com/ghosh_svrec/ejnl.html

Journals on Applied Science and Technology including Information Technology and Internet those are freely accessible are identified and linked with the above-mentioned URL.The number of journals is not exhaustive as the work is going on and it is a continuous process.

In addition to Applied Science and Technology, Journals of the following areas those are freely accessible are also linked.

· Library and Information Science
· Intellectual Property Rights
· Collection of Journals of MOA (Making of America). It includes back files of 23 Journals of old period ranging from 1843 to 1900.
· Ornithological Journals. It consists of the back files of 7 Ornithological Journals of old period ranging from 1884 to 2000.

4.5.3 Online Free Databases: http://www.geocities.com/ghosh_svrec/dbase.html

Different databases on Applied Science and Technology like Compendex, INSPEC, ASTP etc are available on CDROM as well as online, but it is not possible to subscribe the same for small and medium sized libraries and self financed Engineering colleges due to high rate of subscription. The author has made an attempt to identify the Online Databases, which are freely accessible through Internet and linked at URL *http://www.geocities.com/ghosh_svrec/dbase.html* Outline of the online databases linked in this URL as stated below:

- **Thesis & Dissertations**. It contains thesis database of different prominent universities and organizations
- **Engineering Databases**
- **Patent Databases** (U.S. Patent Data base, Free Patent online etc)
- **Environment database**
- **Biotechnology Information Directory**

4.5.4 E-print Sources: (http://www.geocities.com/ghosh_svrec/eprint.html)

E--prints and Open Access Archives are closely related. The Open Access Archives (OAA) is where authors of published research papers and papers intended for peer-reviewed publications could self archive the full text of their work for all to refer. Researchers who self-archive, want to improve access to papers while presenting the recognized quality control established by journals.

Now a days the Internet and its usefulness creation of vast qualities of digital contents have accelerated the pace of changes in our libraries and the library services. Electronic libraries, Digital libraries, Electronic journals, electronic books, online databases are introduced. Subscription of E-journals are introduced by INDEST consortium and UGC Infonet, but the subscription of all these resources involves a large amount of financial burden, which is not possible to bear for individual researcher, small and medium sized voluntary organizations and self financed institutions. Looking in to the needs of researchers and academicians of different discipline the author has tried to compile the link of E-print, preprint sources at the URL *http://www.geocities.com/ghosh_svrec/eprint.html*. Followings E-print resources are the most important.

- CiteSeer or Research Index
- OAIster
- BASE (Bielefeld Academic Search Engine)
- ARC (A Cross Archive Search Service)
- OpenDOAR (Open Directory of Open Access Repositories)
- SHERPA (Securing Hybrid Environment for Research Preservation and Access)
- OpenSearch
- Find Articles
- Article Directory

In addition to the above links, subject wise (i.e. mathematics, Computer Science, Environmental Engineering etc.) links are also provided for the benefit of the researchers.

4.5.5 E-Learning Resources

Recently the author is trying to add one more section i.e. E-Learning resources in to this Virtual Library at http://www.geocities.com/ghosh_svrec/elearning_engtech.html It includes the video links with the different institutions and organizations like M.I.T., U.S. department of energy and other video links to watch the video on the desktop of the user. This site is still under construction.

4.5.6 Links of other resource

In addition to above mentioned sources many more links are created for the benefit of the users so as to enable them to access their required information by a single click

- Prominent libraries and digital libraries all over the world
- Indian College and Universities
- Earthquake Information Centre
- Educator's Reference Desk
- CLIR (Council of Library & Information Source Report)

Separate similar virtual library is also created for General subject, Medicine and Management.

4.6 Application of RFID the most recent advanced technology

The RFID (Radio Frequency Identification) is the most recent advanced technology in the Library and Information center. RFID is a technology that is sparking interest in the library community because of its applications that promise to increase efficiency, productivity and enhance user satisfaction. Current library management systems use barcode technology and security strips. Using barcodes, a library management system can keep records of lending, borrowing and shelving status of items such as books, audio or video tapes, CDs, DVDs, etc. security strips on library items tag their movements. But it is not possible to operate automated self check-in and checkout in barcode technology

Barcodes and security strips (electronic article surveillance or EAS) have their limitations. They are slow to read and are prone to sabotaging by thieves. All these lead to irreparable loss to a library and its valuable inventory stock. This is where RFID technology can come to the aid of library managers and users.

In addition to security of materials the RFID technology can reduce the manpower in the library due to its automated self check-in and checkout facility, just like an ATM machine in the bank. Considering this aspect SVNIT library has opted RFID technology.

Tagging work of 50,000 books was started in the month of October, 2006 and completed at the end of December 2006
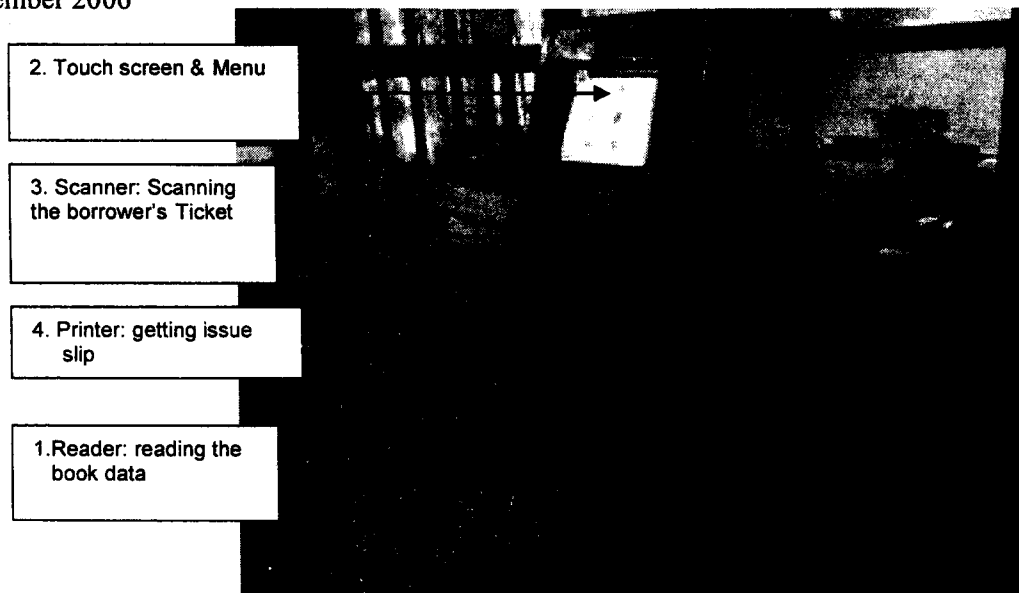
All the components of RFID technology were installed in January 2007. From January 2007 to March 2007 it was operated in trial basis and faced some problem like collection of fine from the Kiosk, issue of reference book from the kiosk, printing problems etc.

The system is under full-fledged operation from the beginning of current semester i.e. from August 2007 with automated self check-in and checkout facility. It is observed that the system initially has reduced

two library Counter staff. An overview of self check-in and checkout kiosk and the RFID gate are shown in the following figure.

Users are performing the functions step by step as mentioned above. Keeping the books on the reader, selecting menu by touching the touch screen, scanning their ID Cards and getting print out of issued books. It works just like an ATM machine in bank. After getting issued the books in the system the users are coming out of the library crossing the RFID security gate as stated below. The photographs shown are as it is in our library.

Red light & Alarm
If the borrowers don't checkout the books in the kiosk the red signal will be flashed with a sever alarm sound

Exit Sensor
It reads the frequency of the tag inserted in the book and catches if the tag is not deactivated in the kiosk

5. Conclusion

Information Technology is a wonderful gift provided by the present day technological advancements and innovations.

In order to meet the growing needs of information we must make use of the best possible services in our profession which can benefit a lot of its users. Information technology provides the advantage of benefiting academicians, ordinary information seekers or miscellaneous groups by making the right information available at the right time. IT changed the total information scenario and it has become the need of the day and demands its worldwide acceptance for meeting the enormous growing information needs. This changes is never ending and we should implement it in our work to our possible extent.

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