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MODERN & SMART LIBRARY IN THE INFORMATION AGE

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Abstract :

Due to information explosion, the knowledge can be available without boundaries and with the help of new technologies, the library services are developing day-by-day. With smart Technology, the modern library can fulfill the demand of users.

Introduction:

Enhancing knowledge by collecting and understanding useful information is the main objective of education. The three major sources of information in systematic education system are **teacher, books, and libraries**. In classical education system, learning centres like schools, colleges and universities have teachers for teaching new concepts, specified books based on curriculum for studies, and libraries for additional reference. The library is considered as place of accumulated information for the students in any area of interest. After invention of internet as a product of Information Communication Technology (ICT) became a boon for improvement in conventional education system and is now emerged as online global education system. In this changing scenario of education system, the concept of classical information resources like teachers, books, and even libraries are also changing. **Teachers are renamed as Learning Enabler, Books are changing the format as audio/video e-books, and the libraries are changing as Learning Resource Centres.**

Now a days, a library can be established without walls, without boundaries and its users can access the library collections from anywhere at any time without any limitation. To fulfill the user's need in modern age, it is very essential to establish a modern library. The daily life of a man becomes easy due to innovation of new technologies and development of new software. As the change in the information environment caused by the advancement of ICT has occasioned the need for new changes in the contents, systems and services of libraries and information centers. The information system in the Web 2.0 environment emphasizes the participation, sharing and collaboration of users through Social Network Services such as Facebook, Twitter,

Flicker and blogs. Furthermore, the convenient mobility of information services using smart phones and tablet PCs is creating a ubiquitous environment in which information can be utilized anywhere and anytime as per the requirement of the users. Technology converts our hard work into smart work and our daily life becomes smarter. Today almost all people have been using smart phone, smart cards, smart technology – then why we do not need a smart library!!! Smart technologies should be used in a modern library system, thus we will be able to provide smart services to our users and this library will be known as a smart library.

The development of mobile information services using portable devices such as smart phones and tablet PCs etc., an effective and information system which incorporate the concepts of cloud computing, mobile-apps, annotation and Library 2.0, is required. Furthermore, the collection of data produced by the relevant agencies and digitalization of the collected data are needed to develop the contents services to cope with the changing information environment. The coming days will continue to challenge the librarians to envision their own modern library, and design for themselves a plan of execution to make that vision a reality. The Library and Information Science professionals should represent the next generation of librarianship as they are passionate, knowledgeable and poised to re-define librarianship

Basic Concepts of a Modern Library:

Digital information storage technology and information communication technology together can revolutionize the concept of library system and can transform it into a modern library system, which can be called a digital library, e-library and smart library. In a modern library,

the entire library functions are automated and a central library will digitize all the information and provide such services to all institutional libraries in electronic formats. These local libraries should have electronic systems to retrieve any information based on search facility to the readers. Such local client libraries will become a paperless systems. Now local libraries are being transformed into E-resource centres. A user can get access to any information through e-books, e-newspapers, e-magazines, e-journals and their back volumes through search facility. Such modern libraries have advantages in terms of reduced cost to maintain resourceful libraries without any physical copy of the resources.

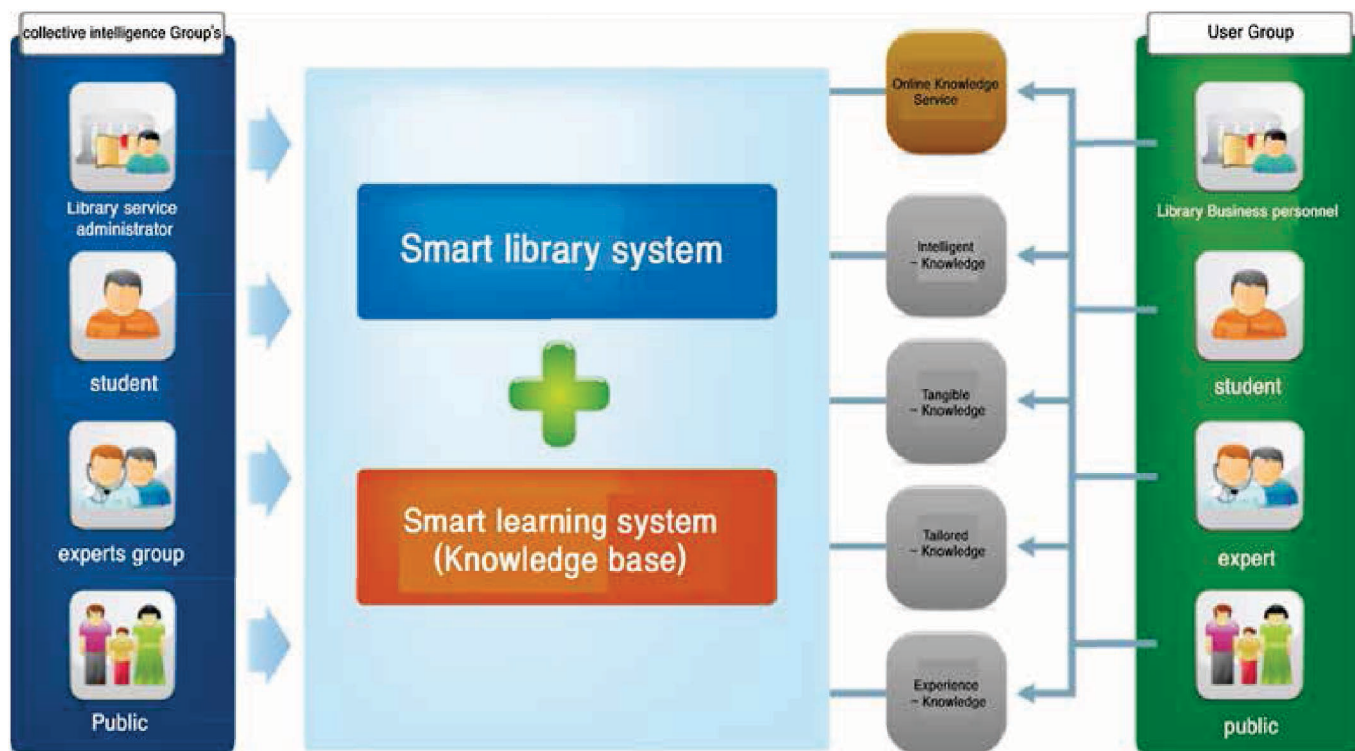
Conceptual principles of planning a modern library:

Traditional libraries don't meet the changing needs on information provision of today's information society. Library buildings, which are planned on old norms and standards, do not satisfy today's situation. There are four basic concepts to planning a modern Library as mentioned in Figure-1 Summarizing all the above, some principles of modern library's activity and its architectural solutions can be formulated, which are as follows :



(Figure-1: Basic concepts to planning a modern Library)

- The library must be a comfortable zone.
- A modern library have to initiative an open data repository
- The building of a modern library should be a technological playground
- A modern library has to exist in harmony with its natural and urban environment.
- Modern library as an open, democratic and intellectual communication institution.



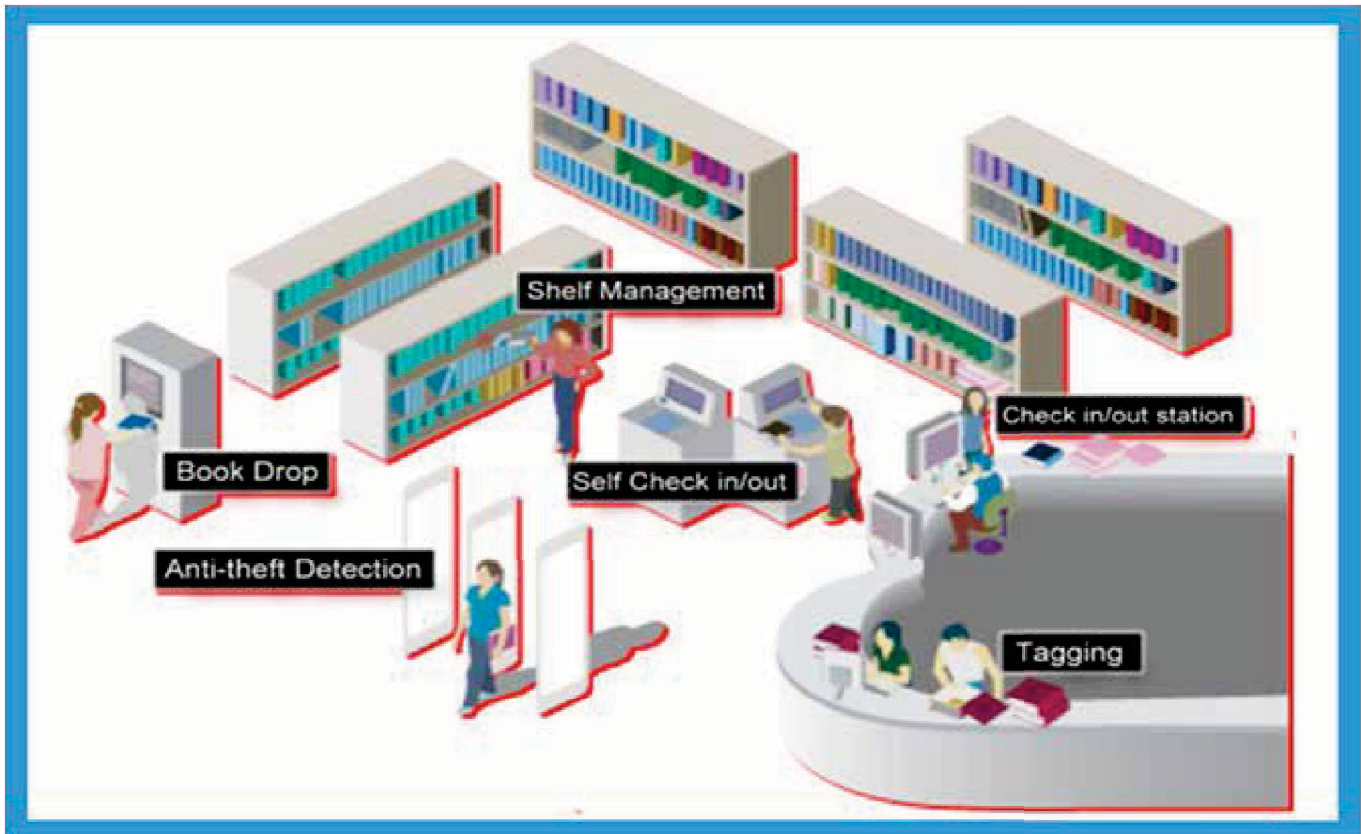
(Figure-2: An Overview of a Smart Library)

- Planning of the building has to be flexible and simple.
- Design of an internal garden in the middle of a building.
- Locate the storages on the underground floors.
- Services should promote knowledge creation rather than knowledge consumption.
- Modern library is works as community centers, bringing the community together.
- It has to be a multifunctional Centre including cultural and social services.
- A modern Library always focuses on impact rather than outcomes.
- Its impactful changes on philosophical than technical.

Basic Concepts of a Smart Library:

The library information service of the future must go beyond just providing passive and simple knowledge accumulation and become a smart library that facilitates active knowledge creation and provides services through collective intelligence. Figure-2 shows the basic concept of a smart library. Now days, most libraries create a wide range of

information and provide it to users in addition to managing the information. Although libraries provide user training, announcements, etc. through their homepages, the information is often not delivered to users. However, some libraries recently adopted Web 2.0 to provide information, and that helped to properly deliver information to users. If libraries only continue providing information on new arrivals, announcements and databases, they may not gain the attention of users. Therefore, the library and information service must be like a smart library which combines the existing library system functions with the knowledge-based e-learning system to develop creative human resources. It must be a system that enables the participants to develop their collective intelligence-based learning knowledge base using a collaborative and interactive interface, and which promotes self-managed learning to improve the creativity and logical thinking of the student. While the existing library information service emphasizes the online knowledge service provided by library personnel, the smart library system can create, validate and categorize knowledge using collective intelligence group and provide intelligent knowledge, realistic knowledge, customized knowledge, and hands-on knowledge. Improving the national knowledge



(Figure-03: A model of modern Smart Library System)

resource competitiveness and smart tutoring and can help to achieve the national policy goals of developing, creative human resources, improving public education, reducing private educational expenses, achieving a more balanced distribution of learning opportunities, and overcoming the gap between regions and social classes. The smart library can play a central role in improving the country's position as a knowledge powerhouse in the modern era of the knowledge-based society. The application of global technology will enable the building of student-centered learning spaces and the restructuring of classrooms, and promote collaboration and cooperation between government agencies on the construction of a global-based lifelong learning system.

Recent technologies for initiatives for Modern and Smart Library:

The library space will be an indoor learning environment, where students, faculty, researchers and entrepreneurs can develop, test and demonstrate smart technologies, analyze the collected data and conduct research and student projects, while optimizing the indoor climate, lighting and acoustics and therefore boosting the chances of learning.

The recent technologies, which have been used for a modern and smart library system, are as followings:

- **Sensors:**

A Smart Library will utilize the sensors to evaluate the movements like infrared, Wi-Fi, Bluetooth, Acoustics, microphones, speakers., Light measurements, brightness and color, Climate, temperature, humidity, particles, anemometer (air-speed), VOC (smell), Bluetooth, Li-Fi, camera. Modern smart library should be using fully smart technologies to serve its users and all the activities of the library should be in smart way.

- **Integrated Library Automation Software -**

All the works and services will be automated by using library automation software. All most libraries have been automated in the present time, but a few of them are fully automated for the daily routine works and services of the library. Others are partially automated only for a limited services i.e. circulation, acquisition, cataloguing, membership, reports, budget etc.; Integrated Library Automation Software facilitate smart features i.e. email/message alerts and notifications to the users, Web-OPAC, user login to check library status etc.

- **RFID Security and Transaction-**

Radio-frequency Identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to library materials i.e. Books, Journals, CD/ DVDs etc., the tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio wave. Using of the RFID technology, circulation transactions (issue/return) will be simplified, automated and even without help of a library staff. Searching of library materials will be easy and time saving. All the library materials will be safe from stolen.

- **Finger Print Identification and Security-**

Many time users are forgetting their library membership/Identity cards. Sometimes a few users have been misused some others membership card to borrow a library document and use the library services without a membership. To solve the above problems, finger print is the latest technology to recognize the right user/member to use and access the library collection.

- **Artificial intelligence with voice recognition**

The utilization of artificial intelligence system in library will provide more smatter services. Intelligence systems like identify duplicity, text reader, voice recognition, automatic manage of temperature, lights etc.; the modern smart library will be voice recognized to fulfill the quarries of the users i.e. search a document, check availability of a material etc.

- **Content Management System**

Sometimes users are facing problems to search their needful things among the huge collections of documents. They usually refers a lots of similarity documents to filtering their useful materials. Basically the users go through the titles, authors, publishers etc. of the document, they can't find out the contents of the documents. To overcome this problem, libraries needs to utilize contain management system to maintained the content of the library collections. Some popular content management software like Drupal, Joomla, Wordpress etc. manage the contents of both print and digital library resources.

- **Electronic & Optical Storage Technologies-**

The advents in information communication technology, internet, and digitization of books, periodicals, newspapers, magazines, journals, video lectures, and most of the reference books, changed the concept of conventional libraries, and provided new model of library called Resource centres. These digital resources can be stored in the library using electronic and optical storage technology or subscribed online from such service providers to reduce and avoid storage of paper based books, journals and periodicals as old volumes. By introducing digital library concept, modern libraries will reduce book storage space, and decreases the cost of maintenance of libraries in education institutions.

- **Cloud Storage and Service-**

The cloud technology is a type of on-demand IT service in which users can receive IT resources over the Internet anywhere and anytime. Based on virtualization and distributed processing technology, it provides software, platform, infrastructure and other IT services to users by integrating various resources. The cloud service has emerged as the answer to the demand for expansion of the IT service environment with the rapid spread of the Internet and the development of new Web services such as Web 2.0.

- **Web 2.0 Based Library -**

Information search on a library homepage tends to be less effective than on other sites. To overcome this problem, libraries renewed their homepages, basing them on Web 2.0. As a result, library homepages became more user-centered thanks to the application of such technologies as AJAX, RSS, Open API, Mash-Up, Wiki, and blogs. RSS and blogs are the leading Web 2.0 technologies, which can be used to improve library systems and services. The introduction of RSS in particular helped to make library contents available outside and hence accessible from anywhere and users can reduce the time spent searching for the library homepage. A blog can improve communication between librarians and users to solve such problems of the users. Libraries are providing digital reference services such as real-time chatting and e-mail services.

- **Digital Repository and online services**

A digital repository is a mechanism for managing and storing digital content. Putting content into an institutional repository enables institutions to manage and preserve it, and therefore derive maximum value from it. A modern mart library must have an digital repository with providing online services to its users. Therefore, users can access e-resources the institutional repository at anytime and anywhere. Some popular digital repository software are available free and license under open-sources software like DSpsce, DuraSpace, Greenstone, EPrint, IRPlus etc.

- **Library Networks & E-Resource Consortia**

The library users will benefited to access much more e-resources from outside there library through the Library Networks and E-resource Consortia. The libraries are connected with many library networks like DELNET, ERNET, NICNET etc., and share their resources like e-books, e-journals, online database, e-thesis etc. among the membership libraries. A library consortium is a group of libraries who partner to coordinate activities, share resources and combine expertise.

- **Mobile Applications for Library**

The present age is full on using Mobile-Apps; everywhere we are using the mob-apps TVshows, social networks, e-business, e-wallet, I-Banking etc. The main benefits of using apps is that the user can get access to his needs easily with utilizing a lower speed of internet connection, saved his recent data and immediately get notifications. After development of applications for library, it provides its users smart services to access from their mobile, tablet, PCs. It helps to deliver e-resources and get up-to-date notifications about the recent-additions, library availability and suggest library resources etc. Users can check their circulation status, check availability of a library document, catalog searches and mobile access to library services. Boopsie is world leader in mobile apps for libraries and enables librarians to remind their users and community that their library is just one click away.

Strategic potential for a Smart Library:

As a new model of modern library, smart library takes representative of new idea and practice during

innovation, change, and persistence time. Basically there are three main features of a smart library:

1. Interconnection, including comprehensive perception, three-dimensional connection and cooperation;
2. Efficiency, including energy-saving and low-carbon, sensitiveness and integration
3. Convenience, including full of wireless network, easy to reach and personalization.

Here are some essential strategic which are possible for a smart modern library to serve its users a satisfactory service and increasing the interest of the users to use the library regularly.

- Library impact, grades, retention
- Service assessment
- Data-science-employees, analytics, data management
- Closer collaboration with researchers
- Contributing to research and student-assignments
- Standard for excellent learning environment
- Network with industry and entrepreneurs
- Collaboration with other organisational units
- Innovation
- Inspiration

Conclusion:

A modern library and a smart library should be able to provide information services and fulfill its function as a knowledge centered capable of responding to various information demands. The development of next-generation information systems based on the latest information and communication technology and it needed to development of mobile information services

using portable devices such smart phones and tablet PCs and information systems which incorporate the concepts of cloud computing, mobile apps, annotation and Library2.0 is also required. The information system of a library should utilize collective intelligence and cloud computing. A smart library should have use smart technologies to save the time and fulfill the needs of the user. Overall, a modern library and a smart library both are synonymous terms; the services must be user satisfactory, user friendly and automatically. A smart library must follow the five law of Library science to overcome the challenges of the technological era of the modern age and next-generation.

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