

Application of Information Communication Technology for Smart Library

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Abstract

ICT is one of the greatest blessings of modern science and technology that has significantly altered the field of library and information science. It has opened a new chapter in library communication and made it easier for people all over the world to access information regardless of where they are in the world. ICT has a significant impact on the advancement and growth of human civilization. Computer programmes, databases, communication networks, analysis and design techniques, programming languages, artificial intelligence, knowledge bases, etc. are some of the technologies utilized in ICT. ICT has a lengthy history of influencing nearly every aspect of human activity. The ICT goods are useful for electronically storing, retrieving, manipulating, and transmitting information. The idea of libraries has undergone a transformation because to information and communication technologies. ICT makes the smart library for its various application and fulfil the need of patrons.

Keywords: - Information Communication technology, Smart Library, Artificial Intelligence.

Introduction: -

Libraries have been the cornerstone of human knowledge since the dawn of civilization. From the clay tablets of Mesopotamia, which recorded trade transactions and religious texts, to the papyrus scrolls of ancient Egypt, libraries have historically served as repositories of knowledge and culture. The Library of Alexandria, one of the most famous ancient libraries, exemplifies the vision of universal knowledge preservation, where scholars could access texts from diverse cultures and languages. In India, Nalanda and Takashila ancient universities maintained extensive collections of manuscripts, attracting students from across Asia, highlighting the early integration of libraries with education and research.

With the advent of the 21st century, libraries have undergone a profound transformation due to the rise of **smart technologies**. Today's libraries are no longer static repositories; they have become dynamic **knowledge ecosystems** that actively support learning, research, and community engagement. Smart libraries leverage emerging technologies such as Artificial Intelligence (AI), Internet of Things (IoT), Blockchain, Radio Frequency Identification (RFID), Augmented Reality (AR), and Green Library practices to improve efficiency, accessibility, and user experience.

ICT is defined as:

According to the Encyclopaedia of Computer Science: "Information Communication Technology (ICT) is an imprecise term frequently fundamental to broad areas of technologies and associated with the use of computers and communications".

Carter (1987), "The system & devices used for receiving, storing, analysing & communication Information in all forms and their application to all aspects of our lives including in office, home, factory."

According to UNESCO: "ICT is a scientific, technological and engineering discipline and management techniques used in handling information and application and social, economic and cultural matters". "ICT is Combination of informatics technology with other related technologies to process of communicates information. ICT uses newest technologies to process and communication information. It deals with computer and computer software for store protects process and transmits / retrieves information."

Recent Technologies Used for smart Library

The recent technologies, which have been used for a smart library, are as followings

1) **Sensors:** Smart Library utilizes 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. Smart library uses fully smart technologies to serve its users and all the activities of the library in smart way.

2) **RFID Security and Transaction:** Radio-frequency Identification (RFID) use of 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. 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 (Avvai, 2017).

3) **Finger Print Identification and Security:** Many time users are forgetting their library membership/Identify cards. Sometimes a few users misuse some others membership card to borrow a library document and use the library services without 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:** The utilization of Artificial intelligence in library provides more smarter services. Intelligence system like identify duplicity, text reader, voice recognition, automatic manage of reader, voice recognition, automatic manage of temperature, lights, etc. smart library users i.e. search document, check availability of a material etc. (Das, 2017)

- **Electronic and Optical Storage:** The advents in information communication technology, internet and digitization of books, periodicals, newspapers, magazines, journals, video lectures, and most of the reference books, has changed the concept of conventional libraries, and has provided new model of library called Resource centers. These digital resources can be stored or subscribed online from such service providers to reduce and avoid storage of paper-based books, journals and periodicals as old volumes.

- **The cloud technology:** 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 IT services to users by integrating various resources. (Mohapatra, 2017).

- **Augmented Reality:** Augmented reality (AR) is a technology that enhances the real world by overlaying digital information, such as images, sounds, or other sensory input, onto a user's perception of their physical environment. Unlike virtual reality, which creates a completely simulated environment, AR integrates digital elements with the real world, allowing users to interact with both simultaneously. This can be achieved through various devices, including smartphones, tablets, and AR glasses.

- **Block Chain Technology:** Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain. The four main types of blockchain networks are public blockchains, private blockchains, hybrid blockchains and consortium blockchains. A blockchain is a type of distributed ledger technology (DLT) that securely records and verifies every transaction across multiple connected computers, or nodes, all at once (Baryshev, and Babina, 2016).

The Application of ICT in Libraries for Smart Library

ICT represents an important part of libraries nowadays. ICT has a tremendous impact on academic libraries through application. ICT is necessary for many housekeeping tasks, library management and administration, the use of various electronic and digital media and computer-aided electronic equipment, and the retrieval and dissemination of information through an internet connection and network. ICT plays an important role in the modernizing of libraries.

1. **Library Automation:** Library Automation is a key component in modern libraries that seeks to reduce human involvement so that a user may readily access information while spending considerably less money. The main benefit of library automation is the increase in

productivity.

1. **Library Network:** By using library networking, an institution or group of institutions can save a significant amount of money, allowing them to advance and make a significant contribution to the field of library science as well as the development of human resources worldwide. Library networking is the interconnection of libraries and information centers for the purpose of information exchange and communication. Consider the Library Consortium.

1. **Library management:** Library management consists of different kinds of duties, including stock verification, circulation, acquisition, classification, cataloguing, serial control, indexing, and database processing. We can simply carry out the aforementioned operations thanks to the use of ICT. The growth of ICT has a significant influence on the general collection development and services, which must be done carefully in order to conveniently meet the valuable demands of users. We utilize soul and other software for library purposes, such as electronic books, electronic journals, electronic databases, electronic newspapers, audio-visual materials, graphics, and other library items obtained online.

1. **Technical communication:** Technical writing, editing, publishing, and DTP systems are all parts of technical communication.

1. **Digital Library:** This relates to the combination of digital computing, retrieval, and communication tools as well as the provision of the data and software required duplicating the resources provided by conventional libraries using paper and other material methods of record collection, cataloguing, location, and dissemination. The main facilities of traditional libraries should be completed with a full-fledge digital library and the well-known benefit of digital access, search and connectivity should also be included. But to sum up the area mentioned above, we hereby posit the following as the area of ICT application in library operations:

Reader Service Division (RSD): Technologies like computers, scanners, printers, photocopying machine, RFID, barcode scanner etc. can be applied in this section to ease the reading process of both the library staff and the user.

Technical Service Division (TSD): This section includes cataloguing and classification sections and other technical activities of the library. Library Management Software like SOUL, Koha, Virtua etc. can be used to ease the cataloguing and classification process.

Collection Development Division (CDD): In this section, computers, internet connection, library consortia, library management software etc. are the matter of requirement that can be applied for collection development.

Conclusion

Thus, information and communication technology provides the opportunities for quick access to information and improves the effectiveness of the library system. Libraries may now provide users with digital resources and services that are simple to access from anywhere at any time due to the integration of ICT in libraries. Greater information access, better educational opportunities, and improved service delivery are all benefits of ICT in libraries. However, smart libraries face several challenges and maintaining ICT enabled services, including Information Access limited funding, lack of technical expertise, and infrastructure limitations. Despite these challenges, libraries must continue to invest in ICT to cater to the evolving demands of their users and stay relevant in the digital era. Smart Libraries can effectively utilize ICT to improve their services and achieve their mission of providing access to information and knowledge for everyone by employing appropriate planning and implementation strategies.

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