Smartlib using RFID and Android

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Abstract: **A library is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. It provides physical or digital access to material may be a physical building or room, or a virtual space, or both. A library's collection can include books, periodicals, newspapers, manuscripts, maps, prints, documents, microform, CDs, cassettes, videotapes, DVDs, Discs, e-books, audio books, databases, and other formats. This paper mainly includes the description and evolution of library system and their disadvantages over centuries in different parts of the world. The source of knowledge in an Institution is Library. Here, librarian plays a crucial role in managing the library functions such as adding new student, book data, date of issuing books, entering details of all relevant information about books, etc. For this the student has to wait for his/her turn as Librarian enters data student by student. It is very time consuming process and costly because of high manpower requirement. This paper titled- SMARTLIB USING RFID AND ANDRIOD, deals with management software, for monitoring and controlling the transactions in a library. This paper mainly focuses on the basic operations in a Library like view total books, view available books, updating information, searching books and a facility to request and return books. The System is an Android Application written for smart phones, designed to help users to maintain and organize Library Management System.**

I. INTRODUCTION

The generation of library system can be classified as:- First generation systems (1960s to 1970s), Pre-Internet generation (1970sto 1990s)**,** Internet generation (Web 1.0) (1990s to2000)**,** Post 2000 – the Web 2.0 Era**,** 2010 onwards: Library services platforms: Integration of Systems.

During the First generation systems i.e., early modern period, there was no universal method to arrange books, so some books were organized by language or book material for example, most scholarly libraries had recognizable categories like philosophy, saints, mathematics. The first library to list titles alphabetically under each subject was the Sorbonne library in Paris. Kimber, (1968) in his document entitled "An Introduction to Computer based Library Systems", provides the understanding of what automated systems can do in libraries and has highlighted library housekeeping operations for automation and how librarians can develop their own automated systems in their own libraries. Singh, (1975) in

"Automation in Libraries" explains concepts use and impact of automation on libraries including data processing equipment. It also describes the state of automation in number of libraries and information centers in several countries and serves as an introduction to subject of automation and application as viewed from working of modern library.

In 1979-1990 Networking and New Technologies like Micros, Optical Discs, and CDROMs, became a focus in the early 1980s as many countries had developed or were developing national networks by that time.

In Pre-Internet generation (1970s –up to 1990s), a library catalog or library catalogue were introduced. It is a register of all bibliographic items found in a library. Key features include: The catalog module provides an easy way to create and edit library catalog, familiar keystrokes such as "copy," "cut" and "paste" for editing data fields within and between records, records may be saved as templates for subsequent use, link multimedia and web addresses to catalog records, immediate and dynamic status control of items. The card catalog was a familiar sight to library users for generations, but it has been effectively replaced by the online public access catalog (OPAC).In 1990-2006 Networks, Protocols, Electronic Document Delivery, and OPACS became a broader sense of interest. The public catalog also continued to be a concern. With the development and rapid proliferation of microcomputer terminals, the Online Public Access Catalog (OPAC) became the goal for many libraries.

Web OPAC is designed to operate on all available browser platforms and complies with disability access standards. The segmented browser enables easy viewing of popular collections such as videos and CDs. Key features include:- Integrated OPAC and web browser access, works with e-discovery platforms, ability to design your own OPAC and web pages, Google-like searching with word auto-complete function, Enables patrons to search the catalogue, place reservations, renew items and view their loan histories using the Intranet or Internet. Images can be attached to items to enable viewing over the Internet, link images, sound files and/or video clips to records, inquiry management allows patrons to communicate with the librarians and vice-versa and Easy access to hyperlinked information. Then RFID

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technology was introduced. RFID is a technology which is known as electronic tag (E-Tag) technology is a non-contact automatic identification technology in the library. RFID ideally suits to the needs of library applications, such as to keep track of thousands of individual items and involving millions of transactions at the most efficient and possible manner.

II. LITERATURE SURVEY

Ashutosh Tripathi & Ashish Srivastava [1] proposed "Online Library Management System" in Feb2012.Thepaper for Online Library Management System is developed in java which mainly focuses on basic operations in library. This proposed system provides facilities to the student to search required books and this allows the Librarian to issue and return books to student. The proposed system is a windows application written for 32-bit windows operating systems, designed to help users maintain and organize library.
Advantages: It provide user friendly interface for both beginners and advanced user, so easy and fast access to use for beginners and advanced users.
Disadvantage: Managing the library by manually at librarian side.

C. Srujana, B. Rama Murthy, K. Tanveer Alam, U.Sunitha, Mahammad D.V, P. Thimmaiah [2] proposed "Development of RFID Based Library Management System" inJune2013. RFID is a Radio Frequency Identification, it is an automated identification technique used for the fast transactions of books and journals. This system is based on the high frequency DLP RFID1 Read/Write having the frequency range is up to 13.5Hz. The database for this system is maintained with MySQL using MATLAB, which is which stores detailed information about the books.

Advantage: It provides intelligent and effective services to both librarian and student such as remainders for due dates which allows users to submit, the borrowed books and other materials in time. This RFID technology also provides users will spend less time waiting in checking out lines by using Self Check in Check out systems.

Disadvantage: High initialization Cost and difficult to handle and operate.

Shane Curran [3] proposed "Libramatics" onJuly2012. Libramatics is basically a Cloud-based library management service provider based in Dublin, Ireland. Libramatics retrieves books information such as its cover arts, title, author, publisher and an even abstract automatically based on its ISBN codes. Libramatic turns a Smartphone's camera or by using USB barcode scanner, allowing librarian to loan books, pull up author information, and locate specific titles on their shelves without having to squint or type in any numbers by hand.
Advantage: The use of online library management system has increased drastically since the rise of the "Cloud" technology and also it allowing librarians to circulate books based on an ISBN.

Disadvantage is to import their student lists, libraries need to email Libramatic file with the name of their students, which some libraries may not feel comfortable doing for privacy reasons.
CERN Document Server Software Consortium [4] proposed "Invenio" in November 2012. Invenio is an open source free software package suite enabling and providing the tools for management of own digital library on the web. A Digital Library is a special library can vary immensely in size and scope, and focused on the collection of digital objects. The Digital Objects include visual material, electronic media formats and this electronic content may be stored locally, or accessed remotely via computer networks, it is a type of information retrieval system.

Advantage: It is a web based and written in Python programming language.

Disadvantage: Lack of Security and finding a particular book consumes lots of time.

Verus Solution [5] implemented "NewGenLib" inMarch2005. NewGenLib, stands for New Generation Library is an integrated library automation system. NewGenLib was declared Open Source Software under GNUGPL License by Verus Solutions. The functional modules are completely web based and Uses Java Web Start Technology. Every user's Smartphone becomes his/her own circulation desk. Users can Check-out and Check-in their books using their Smartphone.
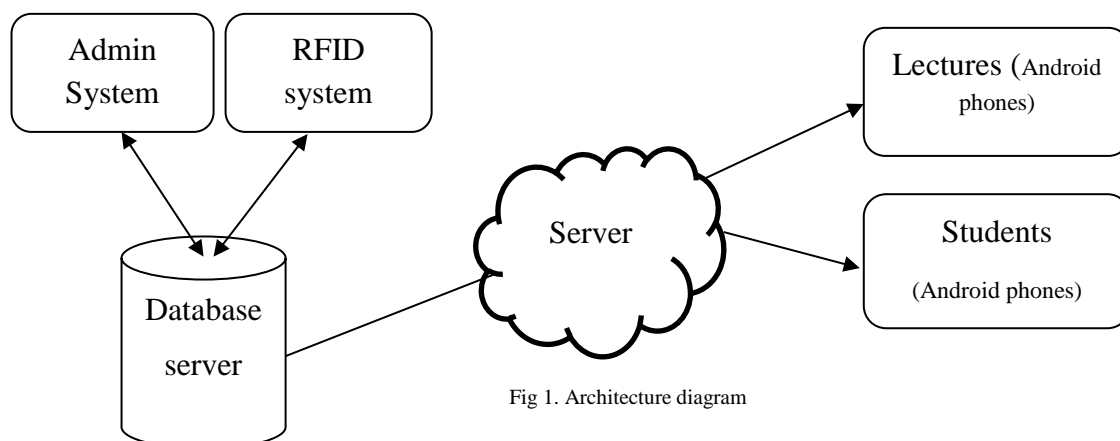

Fig 1. Architecture diagram

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Advantages: The NewGenLib is platform independent and can be installed on Linux and Windows operating systems. Also provides No Restriction on use and Low Cost.

Disadvantage: It is too time consuming and no more than one user can access the information at same time.

III. PROPOSED SYSTEM

Smartlib using RFID and Andriod, we are creating a Virtual Private Network (VPN) for Library that will exist only between College Library and the Students studying in the same College. Here in this network the Server will be the PC in the Library i.e. Admin PC and Client will be the Students who will be interacting with the Server through their Mobile Phones. The software on the Server Side will be scripted in PHP and Student's Side will be an Android Application.

Basic structure consists of librarian and student/lecturers where librarian is directly connected to database server. Students have their android phone on which library management application is installed through which they interact with book database without going to library.

RFID (Radio Frequency Identification) invented in 1969, it is the latest addition of technology to be used in the libraries for a combination of automation and security activities in the maintenance of documents inside the library which prevents form theft and miss placing of books. RFID system carries data in suitable transponders, generally known as tags, and retrieve data by machine-readable means, at a suitable time and place to satisfy particular application needs. RFID is a combination of radio-frequency and microchip.RFI chips are smaller and smarter to the point where they can be added every kind of document and can be read and updated from a distance. The data capacities of a transponder normally range from a few bytes to several kilobytes. The power supply to the transponder is drawn either from the field of reader (passive tag) or from the battery incorporated in the tag (Active/Semi-active tag).

The concept of RFID simplified the use of an electronic barcode and can be used to identify, track, sort or detect library books. This system consist of smart RFID labels, hardware and software, provides libraries with more effective way to manage the collections while providing greater customer service to their users. The information contained in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment and the information is matched to the information stored in sever for efficient document tracking purpose that combines easier and faster charging and discharging of documents, security of materials, inventorying, stock verification and self-handling. In order to save the time of the users, by coming to the libraries in search of books which is not available, we have made use of the Android phones which contains all the information about the books on the PC of Admin. This will be helpful

for the users to search the details of the book in the library. The server will be the PC in the library i.e. the Admin PC and the clients will be that college students and staffs who will be interacting with the server through their mobile phones. This Android Application for Library Automation mainly focuses on the basic operations in a library like view total books, view availability of books, updating information, searching of books and a facility to request and return of books. System software is easy to use for beginners and advanced users. It allows fast transaction flow and will make easy to handle issue and return of books from library without much intervention of manual book handling which benefits by adding security.

IV. CONCLUSION

This paper has traced the history and evolution of library system through its fundamental steps, driven by how digital libraries could newly be conceived in connection with the availability of new technologies and the changing needs of the community of library users. Digital libraries are undergoing a continuously evolution process, influencing all sectors where knowledge has to be created, sorted, transmitted and used.

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