Library Automation Using Android

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Abstract – The previous experiences in library, the issuer issue a book and goes to the librarian. The librarian enters the issuer's & book's details into the database and issues the book. While the librarian is diligent with this work then issuer have to wait for issuing the book. The goal of this project, library automation is to automatically issue books and to come back it. In simple words Library Automation can be defined as the utilization of astute phone to perform fundamental jobs of library like issue of books, ingression of issuers & books details into the library database. Here we have opted to utilize NDEF for communication, In future NFC tags and NFC enabled astute phone. With implementation of such a latest technology, an organization will not only be utilizing the library efficiently but will withal be efficacious in time.

Index Terms – Smart Phone, NFC, SQLite, Cloud.

1. INTRODUCTION

A Library is an institution of erudition acquisition and learning; it provides invaluable accommodation to its members, to a wider local community. The main objective of our project is fixate on an implementation of NFC predicated system in library. It will provide a comprehensive route for enhancing all library accommodations and upgrade operations for everyone concerned with the library. The NFC technology is product for performing transaction expeditiously, facilely and without manual error. With NFC applications in libraries, all the library assets, namely books, journals, CDS, DVDs, videos, audio cassettes, etc. have to be embedded with NFC tags and they are scanned by utilizing NFC enabled astute phone. The library activities which we mainly focusing in our project are check in and checkout process which are consequential jobs in library.

Problem Definition: The quandary revolves around automation of library utilizing NFC technology through utilization of keenly intellective phone. Fundamental task of library such as check-out is performed through astute phone and check in process is performed through keenly intellective phone or NFC reader to facilitate smooth, efficacious and time preserving library process.

Near Field Communication (NFC) is wireless technology which operates on 13.56 MHz frequency at less than about 4 cm. It is predicated on the Radio Frequency Identification (RFID) technology. NFC link between tag and NFC reader is established by just a tapping once or bringing NFC reader in close proximity less than four cm which makes it convenient for utilizer. It transmits the data with transfer rate up to 424 kilobytes per second. The functionality of NFC is predicated on three modes as designated by NFC forum.

Reader/Inditer mode enables contrivance to read or indite data on NFC tag. Peer to Peer (P2P) mode sanctions two contrivances to exchange data in between them and Card Emulation mode enables contrivance to act as an astute card.

NFC tags are integrated circuits storing data that can be read by utilizing any NFC enabled contrivance. For maintaining operability of NFC contrivance and tags, the NFC Forum has designated the four types of tags (Type 1/2/3/4) which differs from each other in storage capacity and their utilizations.[1][2]

2. RELATED WORK

Near Field Communication (NFC) is wireless technology which operates on 13.56 MHz frequency at less than about 4 cm. It is predicated on the Radio Frequency Identification (RFID) technology. NFC

Our main objective is to perform sundry operations of library utilizing astute phone with less intervention of librarian and with minimum duration invested by utilizer. The

Consequential requisites for project are as follows,

1 NFC enabled astute phone
2 NFC tags

NFC enabled perspicacious phone is utilized for reading NFC tags. Perspicacious phone must have internet connection for performing library operations. NFC tags, type 1 or type 2 read only tags with unique tag id is affixed to every book for apperceiving the unique book. This unique id is read by the keenly intellective phone and processes further to perform check in or checkout process.

1 Message Begin (MB): shows first record of message.
2 Message End (ME): shows last record of message.
3 Chunk Flag (CF): shows payload of record is continued in next record.
4 Shortest Record (SR): defines size of payload field.
5 ID Length Present (IL): shows presence of optional id field.
6 Type Name Format (TNF): determines type information format.
7 Type and ID field is optional. [2][3]

3. PORPOSED MODELLING

A. Checkout

In conventional library system, checkout process is done manually. User selects the book and submits it to the librarian

for issuing purpose. Librarian checks all the minimum required constraints for issuing the book. If he finds everything ok then issues the book by entering record in database manually.

In our automated system, the checkout process will be carried out with the help of the NFC enabled smart phone. User login the system using unique id and password assigned by the library. For this, user must be registered with the library. Book NFC with enabled DataNFC ^{tag} Scan tag phone smart constraints Check base .The figure shows checkout process, in which NFC enabled smart phone is used for reading unique tag id stored in NFC tag which is attached to the book. Before issuing book system will check two types of constraints as follows,

1. If user has four books already issued on his name then system will not permit user to issue new book.

2. If user has already issued copy of the same book then system will not allow user to issue book.

If both of these constraints are satisfied then system updates library database. Once the checkout process is completed system gives acknowledgement message as well as returning date of the book.

B. Check in

Check in process is related with the returning of the book. In conventional library, check in process is also done manually. In proposed automated system, check in process is divided into two parts- book return before due date and book return after due date.

In case of book returning before due date, user will scan NFC tag using smart phone. Book's unique id is fetched by the smart phone. System will check if returning date of book is not passed then it will update library database and acknowledge user. For book security or for checking whether book is submitted in library one return bit is maintained which turns on after completion of check in process.

In case of book returning after due date, if system finds that returning date of book is passed then it will calculate fine. Fine is calculated for each day after returning date. It will show the fine to user with proper message for returning the book to librarian.

C. Search book

Search book is the process which is utilized for finding whether required book is available in library or not. In this process utilizer can probe book by utilizing the book name or by utilizing an author's designation. After entering the book name or author name system will particularize about book as well as status of book whether the book is available or not in library. In case, if all facsimiles of respective book is issued by the different users then system will apprise utilizer.

D. Notifications

Notifications is the process in which we provide periodic alerts for the return books, fines, etc.

4. FUNCTIONING OF THE SYSTEM

The block diagram for the whole automated library system is shown in Fig.4. The NFC predicated library automation system is developed for the android hence it requires NFC enabled keenly intellective phone having android. As it is authentic time system internet connection is required for the keenly intellective phone. Mifare type 1 and type 2 read only tags are utilized in proposed system. NFC tags contains unique tag id and book name stored in it. Unique tag id is utilized as a unique book id for the system. Single tag is annexed to each book in the library. Afore utilizing application on keenly intellective phone every book available in library and every utilizer utilizing library must be registered with the system. Each time incipient utilizer or book arrives librarian registers it with system. At the time of registration, utilizer is assigned with the unique username and passwordwhich will be utilized by him aeonianly for utilizing system. Book names and their tag id are registered by the librarian for ease in operations. Book database is additionally utilized for inventory management and inventory check purport.

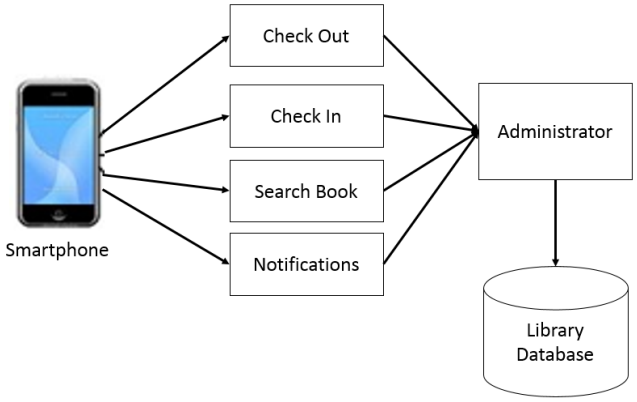

Fig.1. System Block Diagram

Above figure shows the functionality of system. Library application is installed on the perspicacious phone. Utilizer must authenticate utilizing username and password assigned to him at registration for utilizing an application. After prosperous authenticate, menu comes to screen which shows three operation- checkout, check in and search book. If utilizer culls one of the option from checkout or check in then utilizing astute phone NFC tag is read and further processing is done of respective job as mentioned earlier in paper. If utilizer culls search book operation then NFC tag reading is not required. In each case library database is updated and user's account is maintained as well as shown to utilizer after completion of

single operation. Once the all processes are done utilizer must logout from the system.

A.Algorithm:

Step 1: Start.

Step 2: Login the system using username and password which is already registered with the system.

Step 3: Select choice from menu.

(a). Checkout
(b). Check in
(c). Search

Step 4: If checkout then,

(a). Read NFC tag using smart phone.
(b). If user has already issued 4 books then system will not issue the book else issue book.
(c). Give acknowledgement message.

Step 5: If check in then,

(a). Read NFC tag using smart phone.
(b). If return date is passed then calculate fine and give message to user.
(c). Else return book successfully and give acknowledgement message.

Step 6: If search then enter book name, system will give message whether book is available or not in library.

Step 7: Logout.

Step 8: Stop. [9]

5. CONCLUSION

In this paper, automated library system is presented which uses NFC enabled smart phone automating and performing various jobs of library. The presented system reduces manual errors in library processes as well as it helps to schedule the routine of library staff as so much time is saved by using this system. System uses smart phone and NFC technology which are very reliable.

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