# Smart Stock Verification System Using Android Application

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## Abstract

**In recent years, the Android platform has gained popularity for its usability, availability, and low-cost handsets. Mobile technology is used to solve various problems in different fields. On an average any library of an institution will have at least a few thousand books. The books need to be brought to a scanner for verification which requires a lot of technical assistance. Stock verification is one such problem in a library. This process is tedious, time consuming and requires lot of manpower. There is hardly any problem in carrying a few books to the scanner, but this process becomes more difficult when a few thousand books need to be verified. Stock verification of books is a regular activity, which needs to be done every year. It is both cumbersome and error prone. Therefore, we propose an Android application. Barcodes can be scanned using the application and the corresponding status like available, mismatched, and traced will be tagged against the scanned book. This system will make the process of stock verification handy, unambiguous, and smooth.**

***Keywords :*** **Android application, library, stock verification.**

## I. INTRODUCTION

### *A. Stock Verification*

Stock verification in a library is a very important function that involves checking books that are in stock. Stock verification is an annual process of checking what is there in stock in relation to what there was in stock. It is performed to count the number of missing books and the books that are in circulation along with those on library shelves. The emphasis is being put more on finding which items are missing than on how much is the loss calculated in rupees. In the context of a library, it is the periodic verification of books and other reading material. There are two types of stock verification:

**(1)** ***Continuous Verification :*** In this system, stock verification continues all year round according to plan. Different store items are verified twice, thrice or even more in a year, depending on their nature, importance, and issue fend etc. Therefore, a perpetual inventory

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displaying all transactions is retained so that reconciliation can be made**.**

**(2)** ***Periodic Verification :*** This verification scheme is usually performed once a year, i.e. at the end of a year. The duration generally includes the academic year. Since it involves the entire audit job, it requires a few days of a week to finish the verification. No transactions take place during the audit period and therefore, issues may arise. It is a matter of cautious planning to take physical stock. There are several steps involved. A detailed programme has to be prepared giving a complete breakdown of the process store wise. In a periodical stock verification system, the audit staff are instructed to complete the work as expeditiously as possible since the usual store transactions remain suspended during the audit period. Verification cards and check sheets must be prepared according to requirements. Separate provisions are made for damaged or deteriorated items. Each member of the verification staff should have selected areas for verification to ensure orderly compilation of the job without duplication or omission.

## II. LITERATURE REVIEW

Several papers and applications on stock verification have been studied as a reference for this project. The details that have been inferred from those applications and papers are discussed next.

### *A. Automated Library Stock Verification with Barcode and LibSys*

The automated stock verification procedure [1] adopted at Raja Ramanna Centre for Advanced Technology (RRCAT) library employs barcode and LibSys facilities. Library stock verification can be performed easily with less manpower; one person scans the barcode label (accession number) of documents and another marks the documents by putting month and year stamps at the inside back cover to ensure that the document is physically verified. Besides, identification of damaged and wornout documents for repair, binding of obsolete volumes, and rearrangement and cleaning can also be done simultaneously. During the stock verification period, the returned (check-in) documents are also verified before shelving. Once the data capture is over, the verification and generation of report with LibSys can be done in a short period of time.

### *B. Artificial Neural Networks*

Joshi, Karia, Patel, and Desai [2] proposed a technique wherein the accession number of every book is detected by an Android app that is then verified by the college's library server. The app clicks an image of the accession number and converts it into a base64 string which is then pushed using POST request to 'Heroku', a cloud platform where application for all image processing is built and used as SaaS (Software as a Service). This application decodes the received base64 string into an image, does pre-processing, and finds contours to locate sub-images, each containing a single digit. The sub-images are then fed into a model for prediction; the model is the output of a neural network that has been trained to identify digits either in printed format or are handwritten. After detecting all digits of the accession number/unique code, the application sends a JSON response containing digits along with each detected digits position in the image, status of response etc. The Android app then sends this detected accession number/unique code to the library server in order to verify a particular book or periodical. The only disadvantage is that it can detect only handwritten dataset.

### *C. Using RFID Technology Tools*

RFID is a combination of radio frequency-based technology and microchip technology. The information contained in microchips in the tags affixed to books are read with radio frequency technology. Rao, Potdar, Joshi, Das, and Vora [3] stated that RFID is the latest and a fast-growing technology used in library theft detection systems and as a tracking system or access control system. RFID can track, manage, and secure library resources. It is not just to tag books, but it provides a comprehensive route to enhance all library services. As the accession number of a book is unique, it was chosen to identify the RFID tags of books. RFID tags contain a memory chip and RF antenna that sends and receives several bits of data. Such RFID tags are known as smart labels or digital identification tags. The RFID tags are placed in books and generally covered with a property sticker. Antennas of different sizes based on application are used to read the tags and manage various library functions. The data is captured very quickly and accurately from RFID tagged books. While scanning the tag affixed in books and documents in client software

installed in Tablet PC, the data is received as per the order of scanning, but this is a costly technology and another problem readers have is reading a lot of chips in the same field. Tag clash occurs when more than one chip reflects back a signal at the same time confusing the reader. The scanner may not read properly the RFID tagged books kept near metal bookends.

### *D. KOHA LMS*

Earlier, manual stock taking was done in which details of each and every book had to be manually entered into accession registers. Now with the introduction of barcode technology, it is very easy for the library staff to just place a scanner on the barcode, which denotes accession number of the concerned item. The scanner automatically passes the scanned information to the library database.

Koha's Inventory Tool can be used in any one of the following two methods:

**(1)** By printing out a shelf list or accession register sorted as per the call number in which verification team members can mark.

**(2)** By uploading the list of barcoded accession numbers of the scanned items. Notepad file is used for taking barcoded accession numbers gathered by the scanner. Simply check the box next to the CSV file. Choose the text file and the date you want to mark all items as seen and then click 'submit' (Fig. 1). However, the verifier has to carry the books from the shelves for scanning the barcodes as the scanner and computer have a wired connection. It leads to a lot of technical issues.

## III. PROPOSED SYSTEM

Stock verification is a very tedious and time-consuming process. The existing system needs ample amounts of technical assistance and manpower. Hence, to make the process easier and time efficient, we have proposed a solution in the means of an Android application. With Android application, verifiers don't have to remove all the books from the shelves for verification. Since the application uses the phone camera to scan the barcode, barcode scanners are not required. The need for the usage of computers is also avoided. This system requires a


**Fig. 1. Inventory of KOHA LMS**

minimal amount of technical assistance. The verifier will be able to scan the barcode on the books using their phone camera and fetch data from the backend. We have implemented the project in two modules, staff module, and admin module.

### *A. Software Used*

Flutter was used for the front-end which is Google's UI toolkit designed for building beautiful, natively compiled applications, and cloud-based free storage of MongoDB was used as a storage service. Since libraries have lakhs of books, a huge amount of storage is required which can be purchased. Express JS was used as interface development for connecting the respective frontend and backend.

### *B. Staff Module*

In the staff module, the faculty will be assigned a user ID and password. Faculty have the privilege to scan the barcode on the book. Data about the book like accession number, title of the book, ISBN of the book, author of the book, material status of the book etc. will be fetched from the database and Mongo DB specifically. Faculty would verify the data fetched with the hardcopy of the book.

If there are some changes, the corresponding fields would be tagged, and stored in a new database. The number of books to be scanned will be mentioned as a target and the number of books scanned will also be mentioned as the number of scans. After the complete process, a report will be generated which includes staff details and book details.

### *C. Admin Module*

In the admin module, admin has the privileges to add a new faculty by providing their name, department, staff ID, and password. Admin can delete the faculty if required.

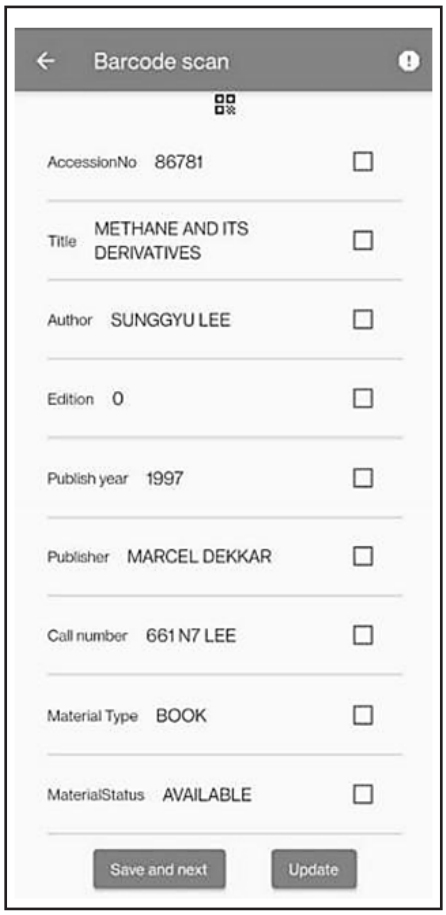


**Fig. 2. Scanner Module**

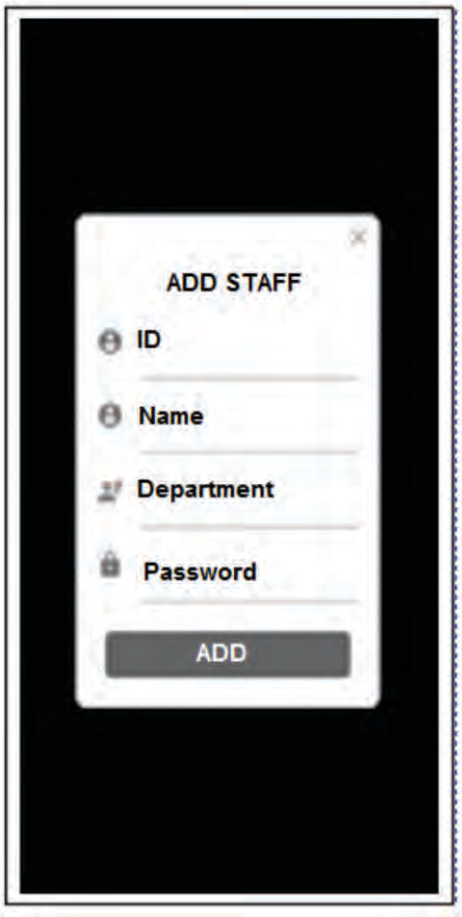


**Fig. 3. Add faculty**

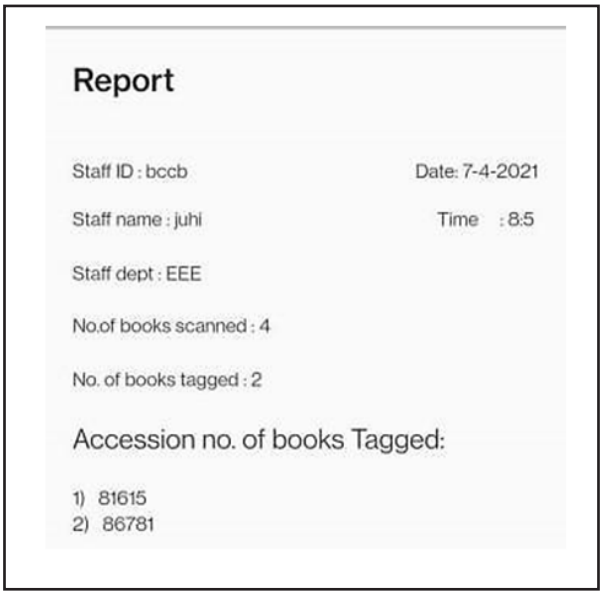


**Fig. 4. Report**

Admin can view all the reports generated by all the faculties.

## IV. CONCLUSION

The system we developed is more customized and specifically designed according to the requirements of the library. Manual stock verification is a tedious job. Our application makes the work simple and efficient. We are able to scan the barcodes and fetch data from the database. Mismatched data are tagged and stored in a new database. At the end of the process, a report is generated. With the help of enhanced programming platforms, the making of this application had been made simpler.

Further enhancements that can be incorporated are adding graphical visualizations in the admin module using data analytics to give privileges to download the report as pdf and print the report from mobile phone, to add an option to change the password and enhance the user interface.

## AUTHORS' CONTRIBUTION

Hari Prasanth S. and Hari Krithik B. studied various technologies used for stock verification and the gaps were identified. Prathikksha S. M. and Juhishree V. developed a methodology to make the process of stock verification easier. Prathikksha S. M. and Juhishree V. along with the help of fellow mates developed an Android application for stock verification in library.

## CONFLICT OF INTEREST

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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## REFERENCES

[1] P. Rajendiran and I. Bhushan, "Automated library stock verification with barcode and LibSys," *DESIDOC J. Library & Inform. Technol.,* vol. 26, no. 5, pp. 17–21, 2006, doi: 10.14429/djlit.26.5.3692

[2] K. Joshi, K. Karia, J. Patel, and S. Desai, "Library stock verification system using Artificial Neural Networks," in 2018 *Int. Conf. Smart City and Emerging Technol.,*Mumbai, India, Jan. 5, 2018, pp. 1–6, doi: 10.1109/ICSCET.2018.8537289

[3] A. M. Rao, S. M. Potdar, S. S. Joshi, S. S. Das, and K. C. Vora, "Library stock verification using RFID technology tools." *Knowledge Centre,* Automotive Res. Association of India, Pune. [Online]. Available: https://www.researchgate.net/publication/295908685_Library_Stock_Verification_using_RFID_Technology_Tools

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