# Library Analytic Management System using Android Development

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**Abstract**
*Library Analytic Management System is an Android App that desires to provide a technique to govern a Book Library. Designed for every Users/Students and Library Admins, various operations including adding/removing/updating books, searching books, issuing/re-issuing/returning books, seeing issued books with due dates, amassing fines, etc. can be performed. The App uses Cloud Firestore due to the fact the returned-prevent database for storing records of the Books and Users. Firebase Cloud Messaging is used to deliver real-time notifications to Users if a pass returned deadline is approaching, his/her first-class is increased, or at the same time as a state-of-the-art e-ebook is added to the Library. Cloud Functions are used to display the database to update fines and purpose notifications. The App has a user-first-class and interactive interface. Overall this venture of ours is being superior to help the students further to frame of employees of the library to maintain the library with within the quality way possible and moreover reduce the efforts.*
***Keywords:*** *Library Management System, Cloud Firestore, Firebase Cloud Messaging.*

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## I. INTRODUCTION

The library control gadget is all approximately organizing, dealing with the library, and library-orientated tasks. It additionally includes retaining the database of getting into new books and the file of books which have been retrieved or issued, with their respective dates. The major goal of this challenge is to offer an clean to deal with and automatic library control gadget. This challenge additionally offers capabilities and an interface for retaining librarians' records, students' records of issues, and fines. The proprietor can without problems update, delete and insert records with inside the database with this challenge.

**The following are some of the features provided by this project:**
➢ The trouble of books with the aid of using on-line mode.Columns supplied to go looking books on-line.
➢ Requests to the librarian may be despatched to offer new books withinside the column. Login portal for a scholar for safety functions of the library. Homepage for the scholar which has extraordinary buttons to navigate to pages containing the date of trouble, date of return, nice charges, etc. Columns for instructors to get the e-e book issued if desired.

A library is an area in which a massive series of books and sources are to be had which may be available with the aid of using the users. It acts as a mind for the institutions. It complements the dissemination of expertise and non secular civilization a number of the students. The lots of books and studies works are charming the scholars to improvise their expertise from all perspectives. It courses the scholars to sell their perspectives differently. This expertise optimizes the scholar to reap a higher bring about educational in addition to private ability development. Improvisation in era reasons the call for for growing a manner to decorate the conventional library installation to a virtual one. Numerous tedious strategies lessen the performance of the library. For example, it constantly wishes guide aid to do any sports withinside the conventional library. The matter and information of books are scribbled at the paper for reference. Each information is fetched withinside the pocket book for destiny citations. To study any information then they should discuss with the notebooks. At the identical time at the same time as dispensing the books to the scholars they should input into the pocket book in which they want to symbolize the ee-e book identityentification, distribution and renewal date, and scholar identityentification. The librarians/team of workers should assign a tag for every ee-e book and offer an identityentification for it. They should align and set up the books at the cabinets and marked them. Missing or robbery the ee-e book builds a severe trouble and confusion for the librarians. While gathering the ee-e book from the scholars they should confirm the consequences of the books. Therefore it reasons an uneventful a number of the team of workers. Consequently, it builds an dull a number of the scholar because of the sluggish development of the team of workers. To evoke the library into the technological era, we supplied a gadget

known as the Library Management gadget (LMS). It is an automated gadget that reduces the paintings burden of the team of workers/librarians with a unmarried click. It will manage, organize, and orient the library task. The LMS helps the librarian to feature/view/delete/replace information from the library stock. Here we combine all of the library information into the SQL server. Preliminarily the librarian has to feature scholar and ee-e book information into the database. After that he/she will view/delete/replace the ones information via the Library Management gadget. On account of this, the person can get admission to the library at any time. The librarians can help with the information with none confusion. Each information are retrieved from the database. if he/she accesses any person information then it suggests username, identityentification, ee-e book information, and penalty information. They no want to jot down it on paper for any references. By enhancing the information they could alternate the parameter in it. Despite running at the guide, the librarian can experience smooth to deal with the automated gadget.

Shasha et al[1], researched the library management system to upgrade the management to meet the need of the students demand. Honghai et al[2], proposed a paper where he represents the wasting of investment in CD which is attached along with the books. To save the cost of the library, he suggested cloud computing for data transfer. Bao et al [3] presented a paper on constructing the prediction model for the library. He introduced two models for predicting the process such as the co-efficient of simple determination and t-test. This analysis explains the strong relationship between lending and the number of readers. They mainly concentrate on library lending for designing the construction of the model library. Eraxiang et al [4], launched a paper where he highlighted the disadvantage of the traditional library management systems. He provided a solution for the disadvantage by utilizing struts and hibernate frameworks in MVC architecture. The MVC architecture is also called a multilayer tier where presentation, business, data persistence, and database layer are available. These extra features improve the maintainability and reuse of the system. Zheng et al [5], introduced a paper based on UML for the Library Management system. Due to the good application prospect of UML, the LMS is designed and modeled based on this concept. The case diagram and analysis diagram are drawn after the analysis of simple LMS. Hitchens et al [6], proposed a paper on flexible usage of classes. He suggested the reuse of classes for some similar conditions. Yang et al [7], explained the tedious work of the manual process of the librarians. So he introduced an LMS through VB. Bretthauer et al [8] exposed information about the open-source software for libraries. He also explained the drawback of software. Brave et al [9], presented various open-source software such as LMS, digital library software content, citation, and knowledge, journal management software, etc. Albee et al [10], examined the staff satisfaction and attitude towards the open-source library. Singh et al [11], proposed a paper where a comparison takes place between expectations and experience of the open-source library. Huang et al [12] proposed a paper for learning the SQL database. It will provide students to test whether the SQL statement is working or not. To improvise the design and progress of the library management system, we represented an LMS in Cloud Firestore technology which can easily access by the librarians. It overcomes the drawbacks of the existing methods. The system is highly secure and provides an effective result to the users.

## II. LITERATURE SURVEY

As the financial boom will increase the human beings are caused a better aspiration to excel in schooling and paintings thru higher get right of entry to to statistics and knowledge. Technologies for constructing person-targeted virtual library environments and making computer-person interactions greater wise need to be explored [1]. Earnshaw mentioned in his article approximately the vintage libraries and their drawbacks to preserving records. A ee-e book furnished an irreducible deposit of statistics that would be read, reviewed, and criticized, in addition to offering the premise for the improvement of its thoughts into in addition volumes [2]. Information is not completely library-centric however is likewise network-centric. The middle of gravity has moved from statistics provision to statistics get right of entry to. Online search (thru engines inclusive of Google) is changing bodily search. Combining the first-rate of each worlds i.e. the conventional library and the net search – to fulfill the growing necessities of customers is a key task for the destiny [2]. In this text, the writer mentioned the virtual media attention, the preliminary improvement of virtual libraries, and the long-time period protection of virtual data. As noted in this text virtual library is a repository in which a substantial share of content material is withinside the virtual form. Which may be listed and searchable thru digital method that's a bonus over paper-primarily based totally statistics [3]. The issue and cost of maintaining virtual statistics is a capacity obstacle to virtual library improvement. Preservation of conventional substances have become greater a hit and systematic after libraries and files incorporated protection into the general making plans and useful resource allocation. Digital protection is basically experimental and replete with the dangers related to untested methods. Digital protection techniques are formed through the wishes and constraints of repositories with little attention for the necessities of contemporary and destiny customers of virtual scholarly resources. This article discusses the existing country of virtual protection, articulates the necessities of each customers and custodians, and shows studies wishes in garage media, migration, conversion, and standard control techniques. Additional studies in those regions might assist builders of virtual libraries and different

establishments with protection duties to combine long-time period protection into application making plans, administration, gadget architectures, and useful resource allocation.

## III.    EXISTING SYSTEM

In the to be had Online Library Management System, librarian keeps the info of every ee-e book at the registers so that you can discover the range of books to be had withinside the library they want to head to test the whole access which makes the manner slow. While they want to spend an additional hour to preserve the statistics of books. A scholar who desires to understand approximately a ee-e book withinside the library wishes to look the whole ee-e book section. The scholar wishes to test the fame of the ee-e book which means the final date of the ee-e book, and what number of books had been issued.

## IV.    PROPOSED SYSTEM

Library Management System ambitions at growing a totally practical automatic gadget to preserve all of the every day hobby of a library This undertaking has many functions along with the ability of consumer login and teacher's login. Also, on pinnacle of all this, there's an admin who could be dealing with the whole application's authorization and authentication, now no longer no intruder can log in and adjust the data, as a login for admin is likewise available.

**4.1 BLOCK DIAGRAM**
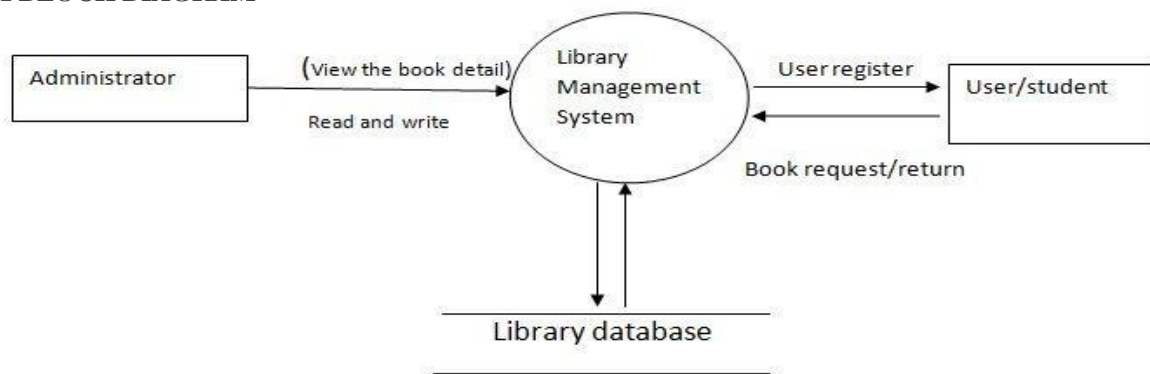


**4.1.1 BLOCK DIAGRAM DISCRIPTION**
**REGISTRATION of BOTH USER AND ADMIN**
After coming into the house web page of the website, a librarian can select the ADMIN/USER LOGIN alternative in which they may be requested to go into a username and password, and if he/she is a legitimate consumer then a login web page might be displayed.

**SEARCH BOOKS**
The seek feature need to permit college students to visit the library segment at the faculty or university internet site and without difficulty look for their topic. The librarian and college students need to be capable of seek through names of authors, subjects, or maybe publishers or can outline the hunt subject with seek filters primarily based totally on need. The seek end result will tell the person whether or not the aid is to be had and wherein to discover it. In case the ee-e book is checked out, it may additionally ship notifications while a specific ee-e book is to be had.

**ADD BOOKS**
Here, only the admin have the authorized access to add a particular book to the library shelf. The user hasno access to this. The library admin more like the librarian can add new books to the library as much as possible for the user to borrow and use.

**REMOVE BOOKS**
Open the Books app.
Tap Library, then find the item that you want to delete. If the item is part of a series, first open the series.
Tap Edit in the upper-right corner.
Tap the item, then tap the Trash icon.
To remove the item from your device, choose Remove Download.

**UPDATE**

The system reports the performance of the library automatically. Charts and graphs are provided for review and tracking of the library functions. This aids in making changes and improvements to the library.

**ISSUE BOOK TO USER**

Issuer The person who issues the book is like the librarian. Date of issuing: It is the date that will be recorded on which the book will be issued. Date of return: It is the date on which the particular book will be returned.

**RETURN BOOK FROM USER**

When a user returns a borrowed book to the library, the entry for his borrowing action must be updated with the data returned. Also for book entry, the number of available copies of the book must be incremented.

**COLLECT FINE**

It automates and organized the library operations and also helps in maintaining the book details present in the library. With the library management system, the staff can track the books' status, collect the fines, and generate insightful reports to identify gaps and future needs. This electronic module improves the structure of the library and enhances the efficiency of the librarian.

**SEE MY BOOKS**

Stock checking and verification of books in the library can be done within a few hours. The automated system saves a considerable amount of time as opposed to the manual system.

**NOTIFICATION**

Issue date of books and penalty amount to be paid. Through SMS users can send a text message to a dedicated number and he/she can get information about books, penalties, due date, issue date, etc. alert via SMS.

## V.    KEY RESULTS

**5.1 LOG IN PAGE**
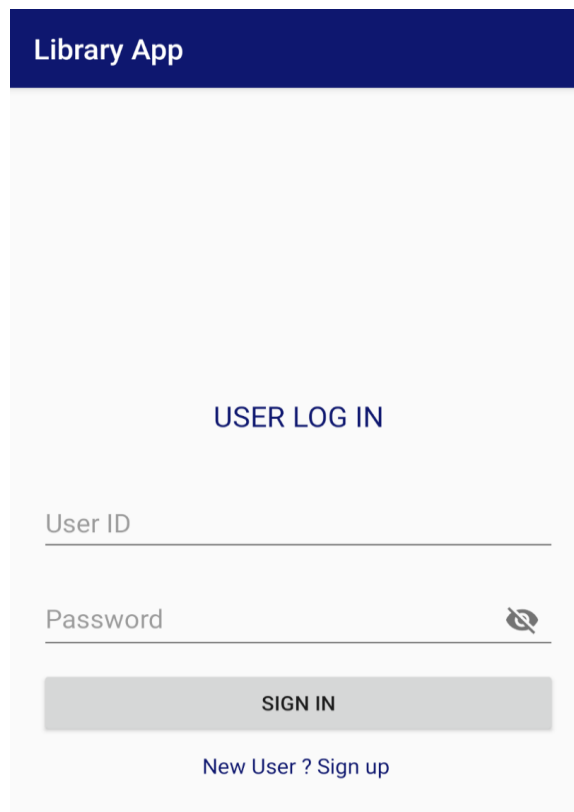


**FIG 5.1 LOG IN PAGE**

**5.2 USER REGISTRATION PAGE**



**FIG 5.2 USER REGISTRATION PAGE**

**5.3 ADMIN REGISTRATION PAGE**



**FIG 5.3 ADMIN REGISTRATION PAGE**

**5.4  USER HOME PAGE**
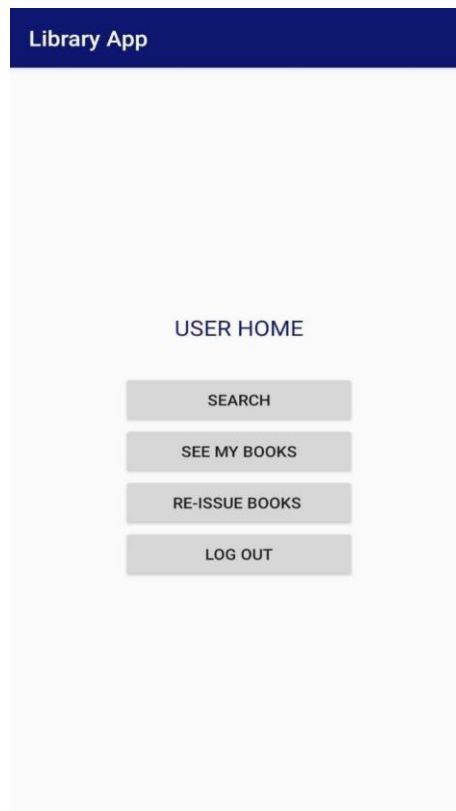


**FIG 5.4 USER HOME PAGE**

**5.5 ADMIN HOME PAGE**
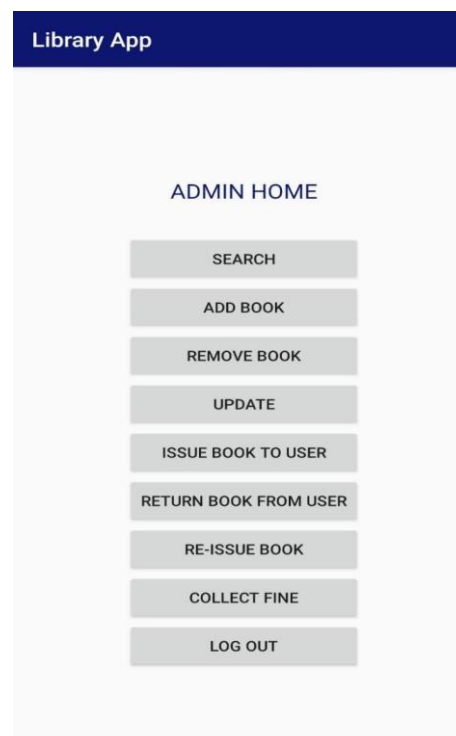


**FIG 5.5 ADMIN HOME PAGE**

**5.6 ADD BOOK PAGE**



**FIG 5.6 ADD BOOKS PAGE**

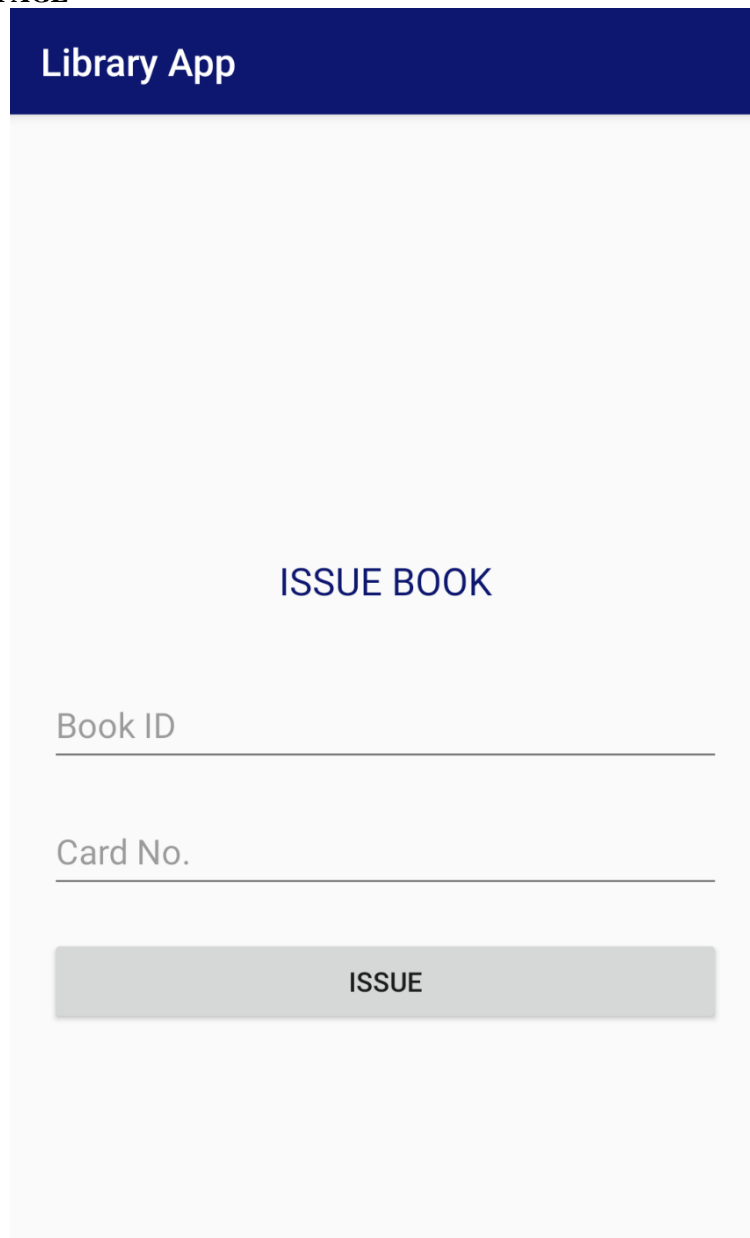**5.7 REMOVE BOOK PAGE**



**FIG 5.7 REMOVE BOOK PAGE**

**5.8 ISSUE BOOK PAGE**



**FIG 5.8 ISSUE BOOK PAGE**
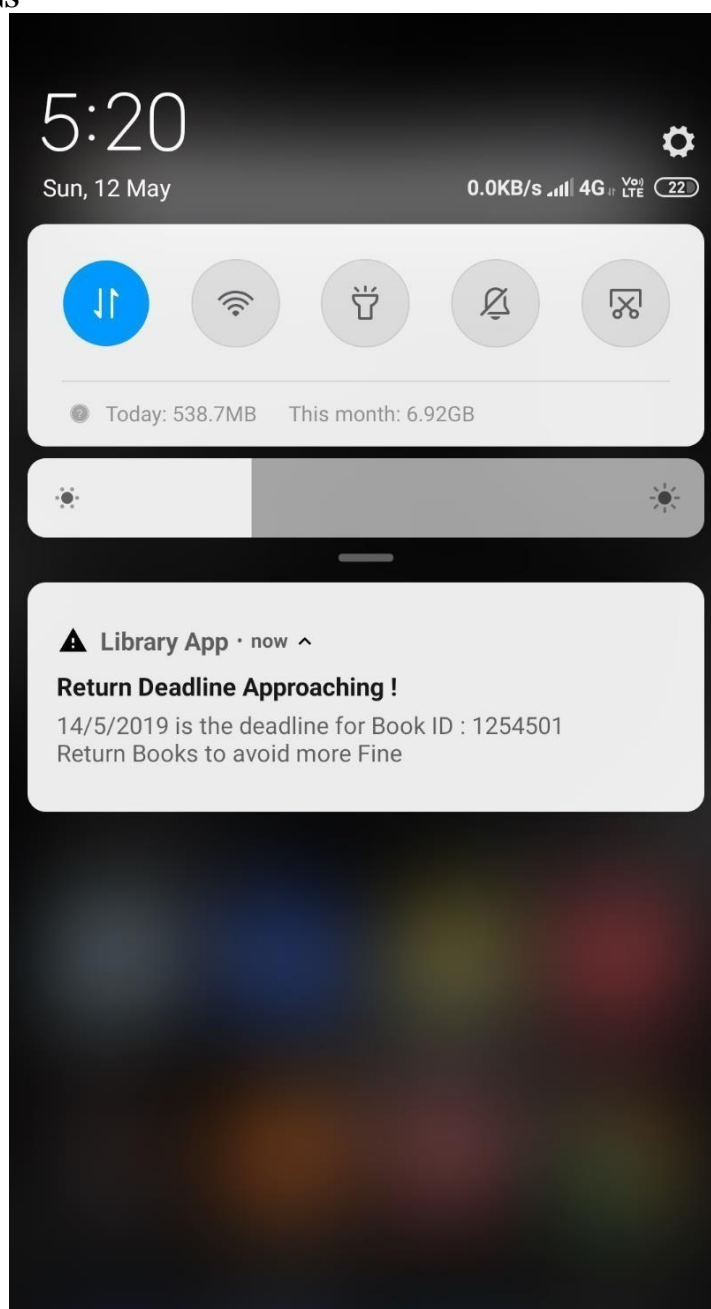
**5.9 NOTIFICATIONS**



**FIG 5.9 NOTIFICATION PAGE**

## VI. FUTURE ENHANCEMENT

This software can be easily implemented in various situations. We can add new features as and whenwe require them. Reusability is possible as and when required in this application. All the modules are flexible.

## VII. CONCLUSION

In conclusion, from proper analysis and assessment of the designed system, it can be safely concluded that the system is an efficient, usable, and reliable Library Management System. It is working properly and adequately meets the minimum expectations that were for it initially. The new system is expected to give benefits to the users and staff in terms of efficiency in the usage of a library system.

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