

Book Barter: Online Book Lending and Borrowing System

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Abstract - Books are considered to be a person's most loyal friend. They impart knowledge and wisdom and are an integral part of learning. However, not everyone has the financial means or the luxury of splurging money on buying new books or purchasing a library subscription. This paper presents the development of an Android Application "Book Barter" that aims to tackle this problem by providing a platform for users to borrow and lend books. It allows users to keep a record of all books in their personal collection which is stored in the database. When a user wishes to read a book that they do not own, they may simply search for it and will be presented with users around them who own the same book which is stored in the Firebase Backend and can then proceed to request to borrow that particular book. This application has been developed in Android Studio and is easy and straightforward to use. Thus, "Book Barter" acts as an affordable solution for readers to both borrow books as well as lend books to other users. This app targets students as well as avid readers of all ages, especially those who are from economically weak backgrounds and may not have the means to purchase brand new textbooks for school every year.

reliability (using well-maintained database and stable individual components), availability (by making the application available from anywhere at any time through an android device with a proper internet connection) and maintainability (through the use of modular programming).

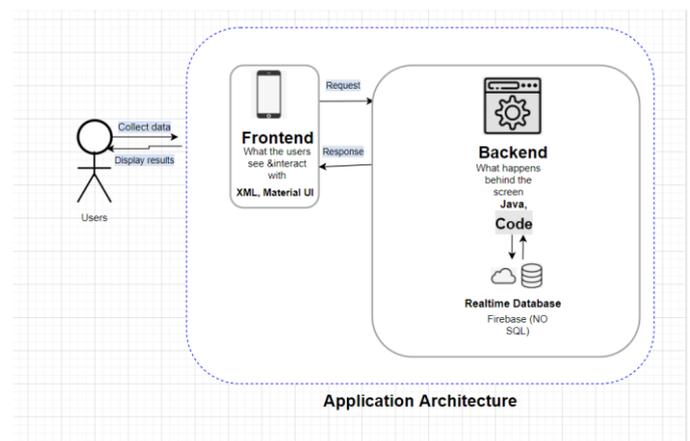


Fig -1: Architecture Diagram

Thus, the proposed application, "Book Barter", provides a platform to connect book readers.

Key Words: Android Application, Android Studio, Real time Database, Firebase, Authentication, Books, Barter, Lend and Borrow

1.INTRODUCTION

Books are integral for growth and development. However, students and avid book readers usually find the materialistic cost of books burning a hole in their pockets. In addition to that, the paper industry is the fourth largest consumer of global energy. Book Barter, by helping users to borrow or lend books, allows users to share and exchange them instead of having them stacked up in racks. It also helps conserve energy through the reuse of such precious items. It provides an affordable solution to people who may not have the luxury to splurge money on buying new books or purchasing a library subscription. The purpose of this application is to solve the mentioned problems while providing the user a convenient user experience through a well-designed user interface and features such as security (using real-time authentication),

1.1 FRONT END

On opening the application, the user is presented with a splash screen that displays the 'Book Barter' logo. The next activity is the Login page where users are prompted to login with their registered email id and password. Functionality to reset the password in case a user has forgotten his/her password is also provided. New users are directed to the Sign Up activity where they can create an account.

Once a user is logged in, they are presented with the dashboard which contains a list of books displayed along with the author name, genre and location of the user who owns the book. The dashboard includes a search bar where a user can search for whichever book they desire to find. It also includes a button to 'Send borrow Request' to the owner of the book.

Clicking this button opens up a new activity where the user may select a time frame for which they want to borrow the book. They may then request to borrow the book - this opens up in the inbuilt email application on the user's device with a pre-written mail containing all the

required details that the user simply has to confirm to send. After sending the request, the user can click the button 'Set reminder to return book', which automatically sets a reminder for the user to return the book after the requested time frame. The requests sent by the user are systematically stored in our database as well.

The user can access the various activities via the Navigation bar on the top left corner, that is, the 'Dashboard', 'Personal Library' and 'My Account'. The navigation bar also includes a logout button.

'Personal Library' is the activity where users are presented with the books that they own and have uploaded to the app. Users may also add new books, update the details of existing books and delete added books that they own here, the records of which are stored in our database.

'My Account' displays the user profile. The user can edit their personal details here.

runs on 99.5% of the present (February 2022) android devices. The backend of Book Barter is coded in Java programming language. The application opens with a splash screen which is displayed until the program and data are loaded. Following that, the user is directed to the Login/Sign-up page where Authentication takes place. All users are authenticated using their email addresses and passwords that are stored in Firebase Authentication. On signing up, the personal data of the user, such as their name, phone number, email address, pin code, and a unique user ID is stored in the Firebase Realtime Database. The unique user ID helps identify and keep track of various user activities such as owning a book, borrowing, lending, and more in the app. Post authentication, users are directed to the Dashboard where they can find location-based recommendations. Authenticated users can send a borrow request for the book of their choice and search for the book they wish to read in the search bar. Depending on what is entered in the search bar, a query is run. This query finds the matching substring inside the documents of the Books collection in the Firebase Realtime Database. Users can add, update or delete books in their personal libraries. These books are suggested to nearby users while ensuring that no details except the name and email id of the book owner are available to other users on the application, hence providing users with privacy and security.

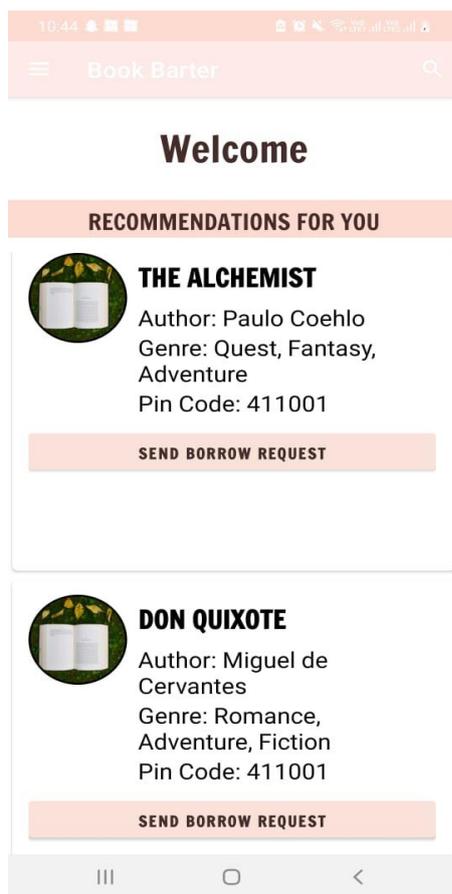


Fig -2: Dashboard Screen

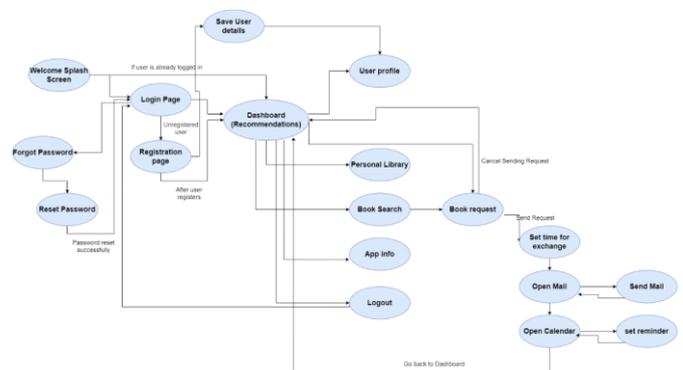


Fig -3: Level 1 Data Flow Diagram

1.2 BACK END

Book Barter works on Android Apps with the minimum API level as API 18: Android 4.3 (Jelly Bean). This version

2. PLATFORM / TECHNOLOGY

Listed below are the various technologies and platforms that we used to develop our app, making it user-friendly, systematic and organized.

Table -1: Platforms:

Sr.No	Technology Used	Description
1	Android Studio	Used to Develop the Application

2	GitHub	Used for Version Control and to make the code Open Source
3	Firebase	Used as the Backend to store data
4	Canva	Graphic design tool

2. 1 ANDROID STUDIO

Android Studio is the official integrated development environment (IDE) for the Android Operating System. It is easy to use and provides various tools and functionalities for app development. It provides several features such as:

- 1) Visual Layout Editor
- 2) APK Analyzer
- 3) Fast, feature rich emulator
- 4) Intelligent Code Editor
- 5) Flexible Gradle-based Build system
- 6) Realtime profilers

Android Studio was used for the development of Book Barter.

2. 2 GITHUB

GitHub is a hosted version of Git and globally the most popular code repository for sharing open-source code. It provides developers with version control i.e. ability to keep track of and manage changes made to the source code of a software. It provides developers with services for coordinating and collaborating in coding, reporting and discussing issues, and more.

2. 3 FIREBASE

Firebase is a platform, developed by Google, that provides a cross-platform SDK for developers to build and ship apps securely and fast. It provides a Realtime Database, File storage, Authentication, hosting and several other features.

Book Barter uses Firebase Realtime Database, a No-SQL Database that stores documents in a JSON like form within collections. Our app also makes use of Firebase Authentication using a password to authenticate users securely.

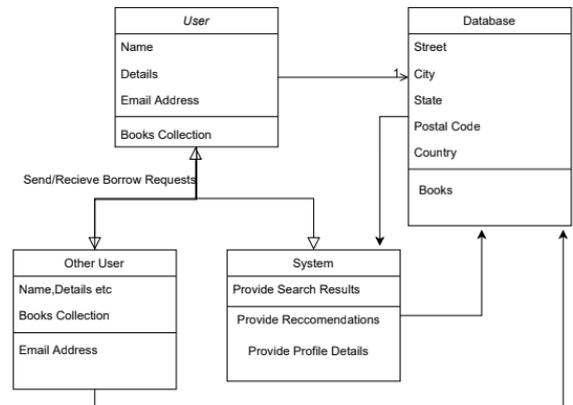


Fig -4: Class Diagram depicting interaction with database

2. 4 CANVA

Canva is an online graphic design tool that uses a drag and drop format and makes it easy for non-designers to create designs and graphics. It provides users access to over a million images, icons, elements, and fonts. It makes creating custom graphics easily manageable through its user-friendly website that can be accessed through a web browser using any device like laptop, iPhone, iPad, and Android phone or tablet.



Fig -5: Logo of the application

3. CONCLUSIONS

The purpose of this research paper is to make a difference by providing insights and an effective solution to the real world problem faced by millions of students across the globe through the android application, Book Barter. The application provides a practical and budget friendly solution for students and readers to read and gain knowledge from books without having to make costly purchases. It also promotes and encourages borrowing of books instead of purchasing brand new books which can relieve the impact that the paper industry has on the environment. The future scope of the application involves addition of an inbuilt chatting feature for the users to communicate with each other directly through the

application. Other prospects include functionality to scan the ISBN number to add the book to the personal library and addition of a recommendation system built using Machine Learning that recommends books based on both reader's interests and proximity to the book owner. Book Barter, with its simple and user-friendly interface, proposes a simple solution to the problem by providing aid to several students by making books more accessible to them irrespective of their economic background.



"A motivated and driven undergraduate student who is passionate about Deep Learning, Application and Web Development and is constantly looking for new opportunities to learn."



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ACKNOWLEDGEMENT

We would like to express our heartfelt gratitude to our guide and mentor, Professor Jyoti Gavhane, for her guidance and support in the fruition of this project. We would also like to extend our gratitude to the Principle of MIT School of Engineering, Dr. Kishore Ravande and our Dean and Computer Science Department Head, Prof Dr. Rajneeshkaur Sachdeo for providing us with all the facilities that were required.

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BIOGRAPHIES



"An enthusiastic undergraduate student who is passionate about technology and loves to learn and implement knowledge to help build things that matter and mean to the people."