

SMART LIBRARY MANAGEMENT SYSTEM USING QR CODE

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Introduction

- The importance of this project is in the development of library technologies. Even with digital information, libraries remain to be the primary source of information for thousands of people.
- The aim of the project is to create a smart and simple solution for managing libraries through a QR code system.
- Through the QR code function, the users can use the application as a digital library with minimal to no employee assistance.
- This system simplifies library processes by keeping track of all records and making the library more directly accessible to its users.
- RFID and IoT are used in library systems but are not as feasible for small scale libraries because of being highly expensive.
- This application provides an end to end solution for easy library book management, i.e. issue and return books, exploring books, and maintaining book records.

Technology

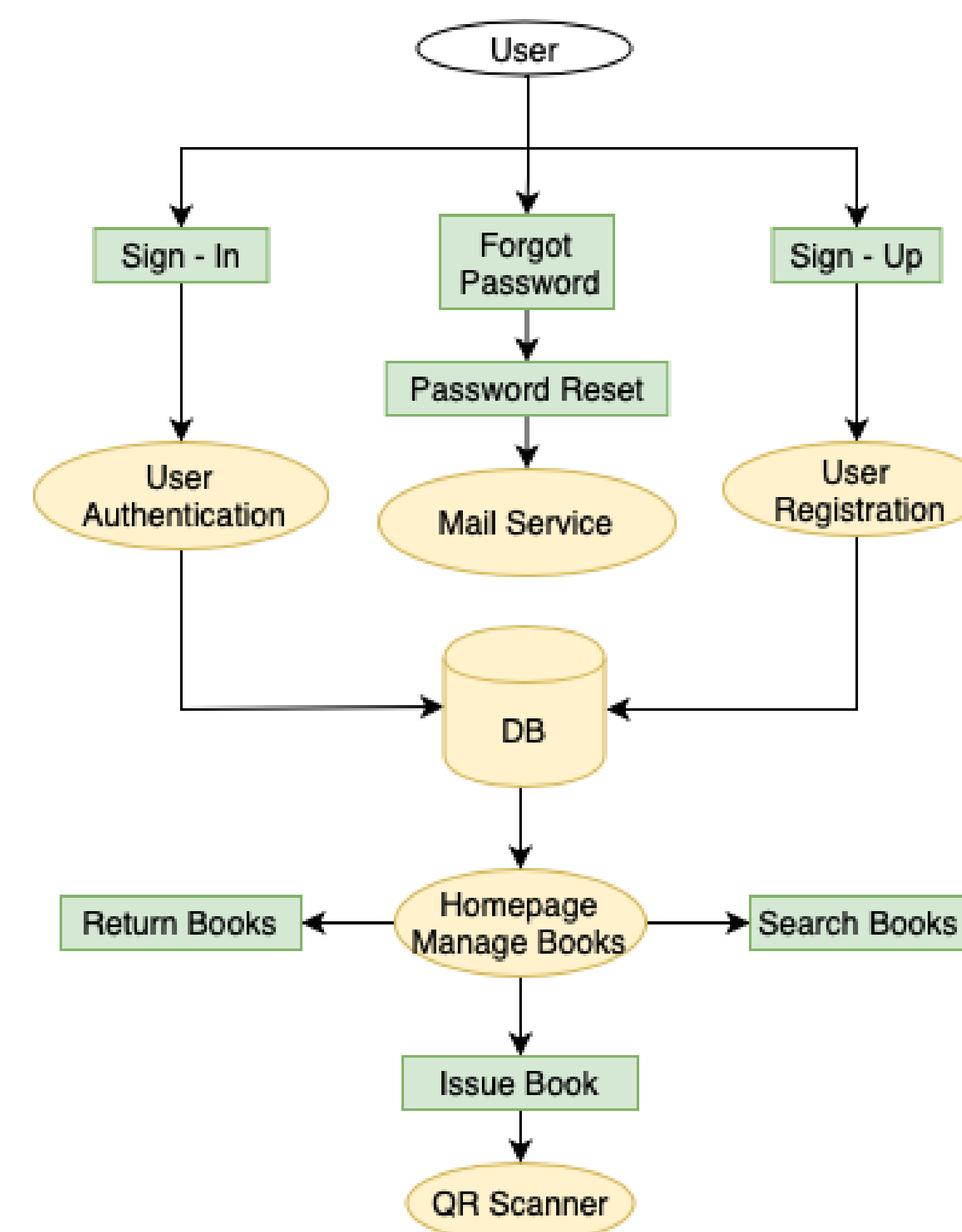
- QR code is a matrix barcode readable by smartphones and mobile phones with cameras, developed in 1994 by Denso-Wave, a Toyota subsidiary.



- On most phones purchased in the United States, a free application is accessible to process QR codes.
- The QR code usually appears as a small white square with black geometric shapes, although some colored and even branded QR codes are now being used as well.
- The information encoded in a QR code can be a URL, a phone number, a SMS message, a V-card, or any text. They are referred to as QR because they allow the content to be decoded at high speed.
- Both the applications are developed using Android Studio which is the integrated development requirement for Google's android operating system. The development language is Java.
- The application uses the google firebase database to register users, store books, authenticate users and manage all the in going and outgoing books.

Design

- The student interface of the application gives the options to: 1) issue books, 2) return books, 3) search books. The figure shown is the structure of the student application.
- The application gives the user access to the student page if they log in with a student ID.
- The library staff has a different application and they log in with their staff user ID which gives them access to extra features.
- The librarian interface includes additional features, such as a "Manage Books" option which allows them to add or remove a new book from the database. The library staff are also able to regulate the incoming/outgoing of books, contact students, and run interference as necessary.



- As the application is launched, the user is directed to the welcome page where they can login, sign up, or choose to reset the password of their application.
- New users can choose to sign up by providing information such as name, student ID and cell number. On successful registration, the user is redirected to the homepage.
- The homepage is the main page of the application where the user has access to all the primary features of the application such as issuing a book, searching a book, finding the issuance status of a book, extending the lending time, and returning a book.

Comparison

- The books are stored in the database and can be searched by titleid, ISBN, author and name of the book as shown in the figure.
- Each student user has a personal page which contains their information and the history of books issued with the library. This allows the user to choose between past interests and track movement of the books.
- Each staff user gets access to the list of books in and out of the library, when a book is issued out of the library, it is added to the list of "books away."

	TitleID	ISBN	Author	BookTitle
1	898823	4515283136792	John Doe	Lorem Ipsum
2	283908	8139585904671	Jane Doe	Lorem Ipsum
3	463447	5525868552474	John Doe	Lorem Ipsum
4	296781	4290215104189	Jane Doe	Lorem Ipsum
5	152110	267522790609	John Doe	Lorem Ipsum

Future Work

- Using machine learning, makes the "search book" feature user friendly. On the basis of the search history, users are recommended the books pertaining to their interest.
- A web interface of the application that is in sync with the mobile application. With some extra features, the library can be accessed completely digitally.
- The book issue period is calculated on the basis of the popularity of the book which is determined by the number of people who requested to issue the book.

References

- "This poster is based on work described in "Smart Library Management System", Adarsh Singh, available at <https://portfolios.cs.earlham.edu/index.php/author/asingh16/>

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