

JUET ROLLCALL

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Submitted in partial fulfilment of the degree

of

**BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING
at**



**JAYPEE UNIVERSITY OF ENGINEERING & TECHNOLOGY,
GUNA, MADHYA PRADESH (INDIA) - 473226**

Jan 2023- May 2023

Jan 2023- May 2023

DECLARATION

We hereby declare that the work reported in 6th semester Minor project entitled “JUET ROLLCALL,” in partial fulfilment for the award of the degree of B. Tech (CSE) submitted at Jaypee University of Engineering and Technology, Guna, as per the best of our knowledge and belief there is no infringement of intellectual property rights and copyright. In case of any violation, we will solely be responsible.

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CERTIFICATE

This is to certify that the project titled “**JUET ROLLCALL**” is the bona fide work carried out by **Ashutosh Srivastava, Pakhi Vashishth** and **Pampa Ghosh**, students of B Tech (CSE) of Jaypee University of Engineering and Technology, Guna (M.P) during the academic year 2022-2023, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology (Computer Science and Engineering) and that the project has not formed the basis for the award previously of any other degree, diploma, fellowship or any other similar title.

Signature of the Guide

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Date:

ABSTRACT

The student attendance system using QR scan is an innovative solution that utilizes QR codes to track student attendance in educational institutions. The system is designed to simplify the process of taking attendance and reduce the time and effort required by educators. The system generates a unique QR code for each student, which they scan upon entering the classroom. The scanned data is then recorded and stored in a database, which can be accessed by authorized personnel. The system is efficient, secure, and user-friendly, making it an ideal solution for educational institutions seeking to streamline their attendance tracking processes.

Acknowledgement

We would like to express our gratitude and appreciation to all those who gave us the opportunity to complete this project. Special thanks is due to our supervisor **Dr. Nileshkumar R. Patel** whose help, stimulating suggestions and encouragement helped us in all the time of development process and in writing this report. We also sincerely thanks for the time spent proofreading and correcting my many mistakes. We would also like to thank our parents and friends who helped us a lot in finalizing this project within the limited period. Last but not the least I am grateful to all the team members of the '**JUET ROLLCALL**' project.

Thanking you

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CHAPTER-1

INTRODUCTION

1.1 Problem Definition

When classes are large, taking attendance of students is a time-consuming task for university instructors. This task must be completed by the instructor during each lecture, according to some faculty policies. In other words, it is possible that time spent doing this process, which typically takes 10 minutes per lecture, will be taken away from the overall hours allotted to a particular course. The Paper and Pen method to take attendance is slow and the paper system needed a data entering phase to produce reports, which also had comparable issues.

The average age of smartphone users, according to statistics, is 26 years old. Hence, this project addresses the issue of such a waste of lecture time and proposes a method that offers to reduce it by approximately 90% in view of the widespread use of smartphones among university students. The suggested solution provides a QR code that students can scan using a specific smartphone app. The application will be able to verify the student's attendance using the code and the student identity it has collected.

In this manner, this method will not only save the time but also the effort that lecturers were expected to put in during each lesson. It will expedite the taking of attendance and offer plenty of time for the lecture to be delivered appropriately.

1.2 Project Overview

The project “JUET Rollicall” mainly focuses on –

- 1) Saving time wastage during conventional class attendance.
- 2) Implementing a workable solution for the class attendance system by utilizing current development trends.
- 3) Creating a digital environment by automating the entire process.

4) It prevents fake roll calls as one to one attendance marking is possible only.

5) Promoting the everyday application of technology.

As per suggested approach, teachers can use QR codes to take student attendance instead of taking attendance on a piece of paper. Teacher portal and student portal are the two sections that make up the system. where the student portal is an Android application and the teacher portal is a web application.

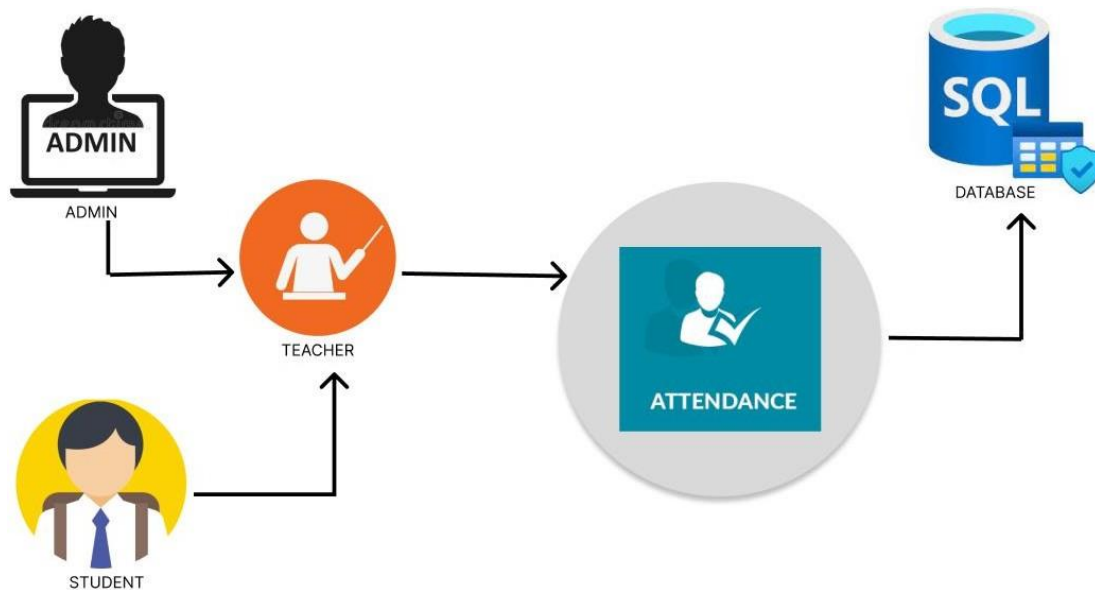


Figure 1. Block diagram for General Framework

1.3 Hardware Specification

The hardware specification for this project is finalized in such a way that it works well for everyone. It doesn't require that much powerful configuration to run the web app or the mobile app. The idea behind this is to make the project more successful by optimizing it to run on the most used systems by the students.

For the Web app, the hardware specification is:

- CPU (3.0 GHz or faster) or faster 64-bit Dual Core processor like Intel core-2 duo.
- 4GB DDR2/3/4 RAM

For the Mobile app, the hardware specification is:

- CPU (1.5 GHz or faster)
- 2GB DDR4 RAM

1.4 Software Specification

The software specification for this project is finalized in such a way that it works well for everyone. It doesn't require that much latest operating system to run the web app or the mobile app. The idea behind this is to make the project more successful by optimizing it to run on the most used systems by the students.

For the Web app, the software specification is:

- Windows 7 or above
- macOS High Sierra 10.13 or later

For the Mobile app, the software specification is:

- Android 6.0 or above
- iOS 10 or above

CHAPTER 2

LITERATURE SURVEY

2.1 Existing System

There are many proposals for Automatic Attendance Systems in the literature and in the market. The majority of them do concentrate on installing software on the lecturer's device, whether it be a laptop or a smartphone. We will mention a few of these proposals in the section. The reference [1] suggests installing software on the instructor's mobile phone. By using a Bluetooth connection, it makes it possible to communicate with student's mobile phones and confirm their presence by sending their Media Access Control (MAC) addresses to the instructor's mobile phone. On the other hand, the suggestion in [3] makes use of a fingerprint verification method. They suggest a system that automates the entire attendance-taking procedure and performs fingerprint verification using the extraction of minutiae technique. Since biometrics is focused with measuring particular physiological or behavioural traits that are specific to humans, the technology has been used to confirm user identity.

Monitoring the existence of the authenticated user throughout a session is becoming increasingly important. As a result, another proposal [2] presents a working prototype of a system that uses facial recognition technology to keep an eye on students or authenticated users. Face detection was carried out using a neural network-based approach, and facial identification was done using the eigenface technique. The experimental findings show that continuous user verification in close to real-time is feasible for high-level security information systems.

We noticed that in these most of proposals instructor is involved in much applications (work during taking attendance) which could not solve the problem. However, our idea does not demand anything extra of the instructor beyond what is required.

2.2 Proposed System

The system balances the boundary between traditional learning and online learning as a facilitation for the attendance record-keeping process, in a way that enhances the lecture time so that it can be better employed in presenting important contents rather than spending the time collecting attendance. To generate an encrypted QR code with precise information, the system requires a quick login by the class instructor using its Server Module. Any time before the class is appropriate for doing this. The instructor shows the pupils an encrypted QR code either in the middle of the lesson or at the start. The system Mobile Module, which is accessible to the students via their smartphones, can then be used to scan the presented QR code. To verify attendance, the Mobile Module will then transmit the data it has gathered to the Server Module. The whole process should take less than a minute for any student as well as for the whole class to complete their attendance confirmation. Smartphones can connect to the server using the institution's provided local Wi-Fi network or the internet.

The system is made up of two components, the Server Module, and the Mobile Module, as was previously indicated. Depending on the developer's preference, the server module may be a distinct programme or linked with the institution's eLearning platform.

Let us look at the following sub-sections which describes the role of Server Module and Mobile Module.

A. Server Module

The system balances the boundary between traditional learning and online learning as a facilitation for the attendance record-keeping process, in a way that enhances the lecture time so that it can be better employed in presenting important contents rather than spending the time collecting attendance.

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- The system Mobile Module, which is accessible to the students via their smartphones, can then be used to scan the presented QR code.
- To verify attendance, the Mobile Module will then transmit the data it has gathered to the Server Module.
- The whole process should take less than a minute for any student as well as for the whole class to complete their attendance confirmation.

Smartphones can connect to the server using the institution's provided local Wi-Fi network or the internet. The system is made up of two components, the Server Module, and the Mobile Module, as was previously indicated. Depending on the developer's preference, the server module maybe a distinct programme or linked with the institution's eLearning platform. Let's look at the following sub-sections which describes the role of Server Module and Mobile Module.

B. Mobile Module

Once the QR image has been created, students can use their smartphones and the system's Mobile Module to scan the QR code to verify their attendance by sending the information they have collected to the Server Module. This Mobile Module is part of Student's application on their Mobile Phone. If it is the first time for the student to login into the application, the system requests the student to enter a username and password. Once logged in, student cannot logout and use that account on multiple devices. The data of app need to be clear(cache) in order to login again into the system. The system gives the user a very brief window of opportunity to scan a QR code.

After scanning the code, the system sends the data to the server and continues operating in the background. The procedure is now regarded as finished. The server will then acknowledge that the process is finished in return. The instructor may check the student proxy prevention by running location check (which is to be discussed later). This whole process which comprises of student and classes confirmation process should not take more than minute. The students can connect their smartphones over local Wi-Fi network or the internet.

2.3 FEASIBILITY STUDY

- **Economic feasibility:** The developed system is time effective because the attendance is marked automatically. It is also cost effective as it does not require any use of paperwork.
- **Technical feasibility:** The system is economic and it does not require any other additional Hardware and software. Each of the software used here is freely available in the market and the technologies used are open source which means anyone can contribute in these technologies. The data collected from user will be stored in user local system which will be used to improve the accuracy and functioning of the application.
- **Operational feasibility:** It is the measure of how well a proposed system solves the problems with the users. Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented. The project made is operationally feasible for the users as nowadays almost everyone is familiar with the use of technology.
- **Behavioral feasibility:** The applications are user friendly. It is a one spot for attendance. The overall UI in both, the web app and the mobile app is developed in such a way that anyone can easily navigate. With proper instructions in the app and a minimal UI, the problem faced by users using them will be almost negligible.

CHAPTER – 3

SYSTEM ANALYSIS & DESIGN

3.1 Requirement Specification

3.1.1 VISUAL STUDIO

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft with the Electron Framework, for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Visual Studio Code also ships with IntelliSense for JavaScript, TypeScript, JSON, CSS, and HTML, as well as debugging support for Node.js. Support for additional languages can be provided by freely available extensions on the VS Code Marketplace. Instead of a project system, it allows users to open one or more directories, which can then be saved in workspaces for future reuse. It supports many programming languages and a set of features that differs per language. Unwanted files and folders can be excluded from the project tree via the settings. Many Visual Studio Code features are not exposed through menus or the user interface but can be accessed via the command palette. Visual Studio Code includes multiple extensions for FTP, allowing the software to be used as a free alternative for web development. Code can be synced between the editor and the server, without downloading any extra software. Visual Studio Code allows users to set the code page in which the active document is saved, the newline character, and the programming language of the active document. This allows it to be used on any platform, in any locale, and for any given programming language.

3.1.2 FLUTTER

Flutter is an open-source UI software development kit created by Google. It is used to develop cross-platform applications for Android, iOS, Linux, macOS, Windows, Google Fuchsia, and the web from a single codebase. Flutter works with any development tool (or none at all), and also includes editor plug-ins for both Visual Studio Code and IntelliJ / Android Studio. Flutter provides tens of thousands of packages to speed your development, regardless of your target

platform. And accessing other native code is easy, with support for both FFI (on Android, on iOS, on macOS, and on Windows) as well as platform-specific APIs.

Flutter is a fully open-source project, and we welcome contributions. Information on how to get started can be found in our contributor guide. Flutter offers stateful hot reload, allowing you to make changes to your code and see the results instantly without restarting your app or losing its state.

3.1.3 DART

Flutter apps are written in the Dart language and make use of many of the language's more advanced features. While writing and debugging an application, Flutter runs in the Dart virtual machine, which features a just-in-time execution engine. This allows for fast compilation times as well as "hot reload", with which modifications to source files can be injected into a running application. Flutter extends this further with support for stateful hot reload, where in most cases changes to source code are reflected immediately in the running app without requiring a restart or any loss of state.

Dart offers sound null safety, meaning that values can't be null unless you say they can be. With sound null safety, Dart can protect you from null exceptions at runtime through static code analysis. Unlike many other null-safe languages, when Dart determines that a variable is non-nullable, that variable is always non-nullable. If you inspect your running code in the debugger, you'll see that non-nullability is retained at runtime (hence sound null safety).

3.1.4 NODE JS

Node.js is an open-source server environment. Node.js is cross-platform and runs on Windows, Linux, Unix, and macOS. Node.js is a back-end JavaScript runtime environment. Node.js runs on the V8 JavaScript Engine and executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting. The functionality of running scripts server-side produces dynamic web page content before the page is sent to the user's web browser. Consequently, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languages for server-side and client-side scripts.

Node.js has an event-driven architecture capable of asynchronous I/O. These design choices aim to optimize throughput and scalability in web applications with many input/output operations, as well as for real-time Web applications.

3.1.5 EXPRESS

Express.js, or simply Express, is a back-end web application framework for building RESTful APIs with Node.js, released as free and open-source software under the MIT License. It is designed for building web applications and APIs. It has been called the de facto standard server framework for Node.js. Express was created to make APIs and web applications with ease. It saves a lot of coding time almost by half and still makes web and mobile applications are efficient. Another reason for using express is that it is written in JavaScript as JavaScript is an easy language even if you don't have a previous knowledge of any language. Express lets so many new developers enter the field of web development.

3.1.6 MYSQL

MySQL is an open-source relational database management system (RDBMS). A relational database organizes data into one or more data tables in which data may be related to each other; these relations help structure the data. SQL is a language programmers use to create, modify, and extract data from the relational database, as well as control user access to the database. In addition to relational databases and SQL, an RDBMS like MySQL works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access, and facilitates testing database integrity and creation of backups. MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL has stand-alone clients that allow users to interact directly with a MySQL database using SQL, but more often, MySQL is used with other programs to implement applications that need relational database capability. MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress.

3.1.7 HTML, CSS & JAVASCRIPT

There are three main components when it comes to front-end development: HTML, CSS, and JavaScript. Each are critical for making a webpage what it is. HTML is the structure and content of the site, CSS (Cascading Style Sheets) makes it look pretty, and, lastly, JavaScript is what powers its interactivity. JavaScript is a scripting language that's inserted directly in the HTML code to be interpreted by the browser. It means that a browser can read JavaScript, interpret it and then run the program, creating powerful client-side experiences.

3.2 FLOWCHARTS / DFDs / ERDs

3.2.1 FLOWCHART

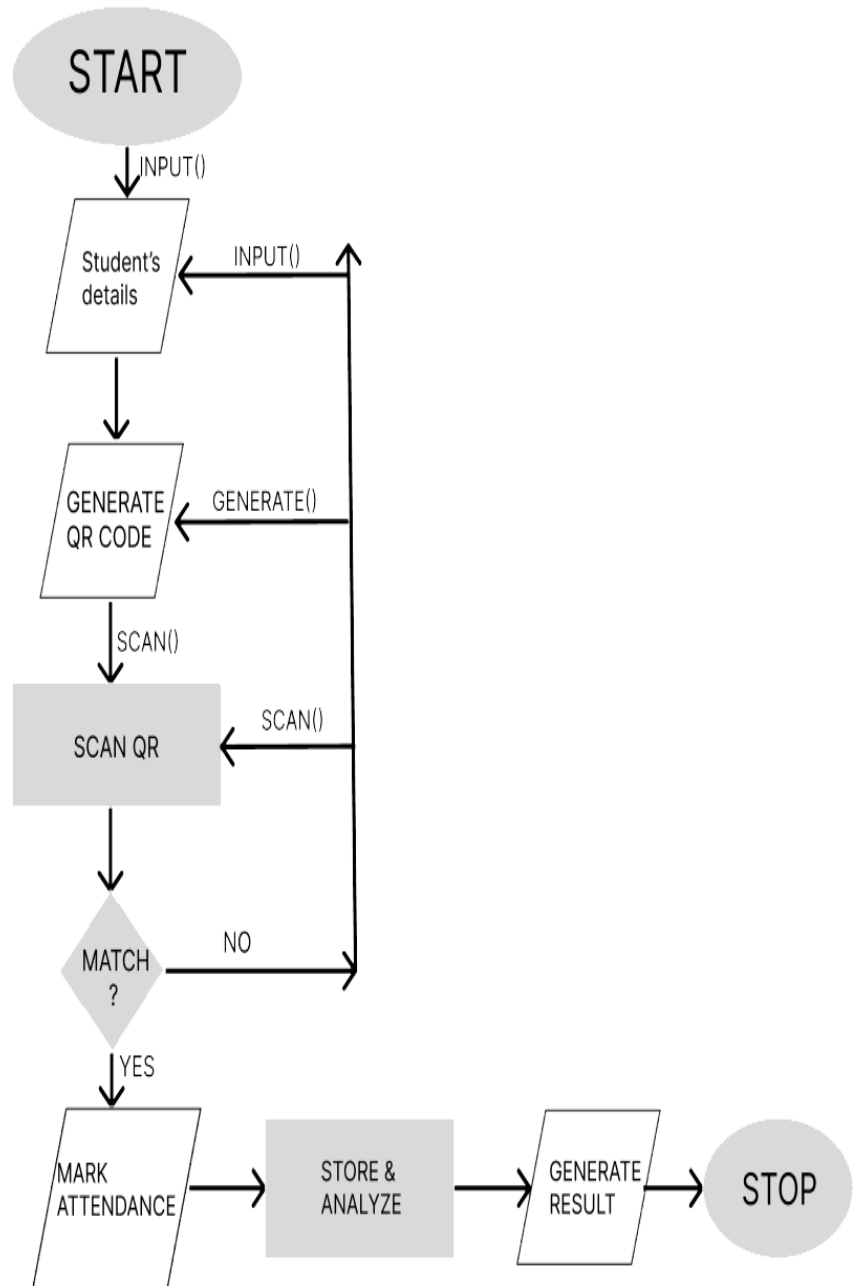


Figure 2. Flowchart of QR Attendance Model

EXPLANATION:

Student Attendance System using QR Scan has a pretty straightforward workflow. According to the Flowchart, you can see that the process starts with taking input from the user. Taking input is done on the mobile app, and once it has all the data, a unique QR Code is generated in the web app with which the data is sent to the web app. The data is only sent if all the given conditions are verified, and if not, the process is restarted. Once the website has the data, then the attendance is marked, and data is stored and analyzed. In analysis, it checks if the user is within the given radius, and once this check is done, the instructor gets the attendance data.

3.2.2 SEQUENCE DIAGRAM

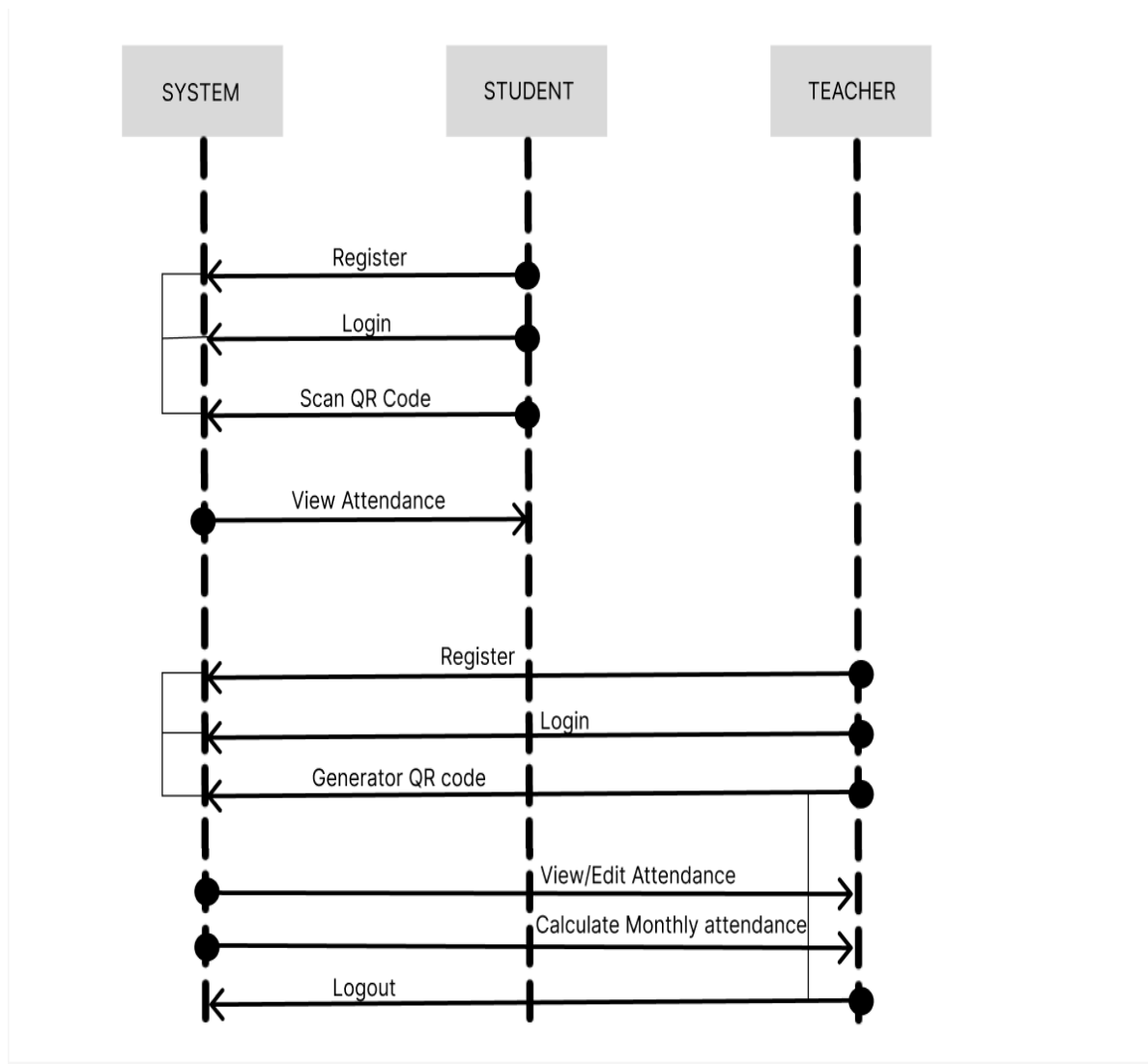


Figure 3. Sequence diagram for QR Attendance Model

EXPLANATION:

The sequence diagram can be explained as follow:

It starts with the student registering his details in the mobile app or, we can say our system. Once the student is registered, his details will be saved in the mobile app. Students can also check their data by tapping on a menu icon located in the top right of the app. Once data is stored, or we can say the login process is completed, there isn't any option in the app to log out, this is for proxies' prevention. After this, all the student needs to do is tap on the scan QR button and then scan the QR code for marking attendance.

The registration process is the same for the teachers, they will fill in their details, and then the details will be stored on the website. After completing the registration, then the teacher will get access to generating the QR code.

After the QR code is scanned by the student, the teacher will be able to view/edit the attendance, calculate the monthly attendance and even log out of the website. Log out option is exclusive to teachers.

3.2.3 Use Case Diagram

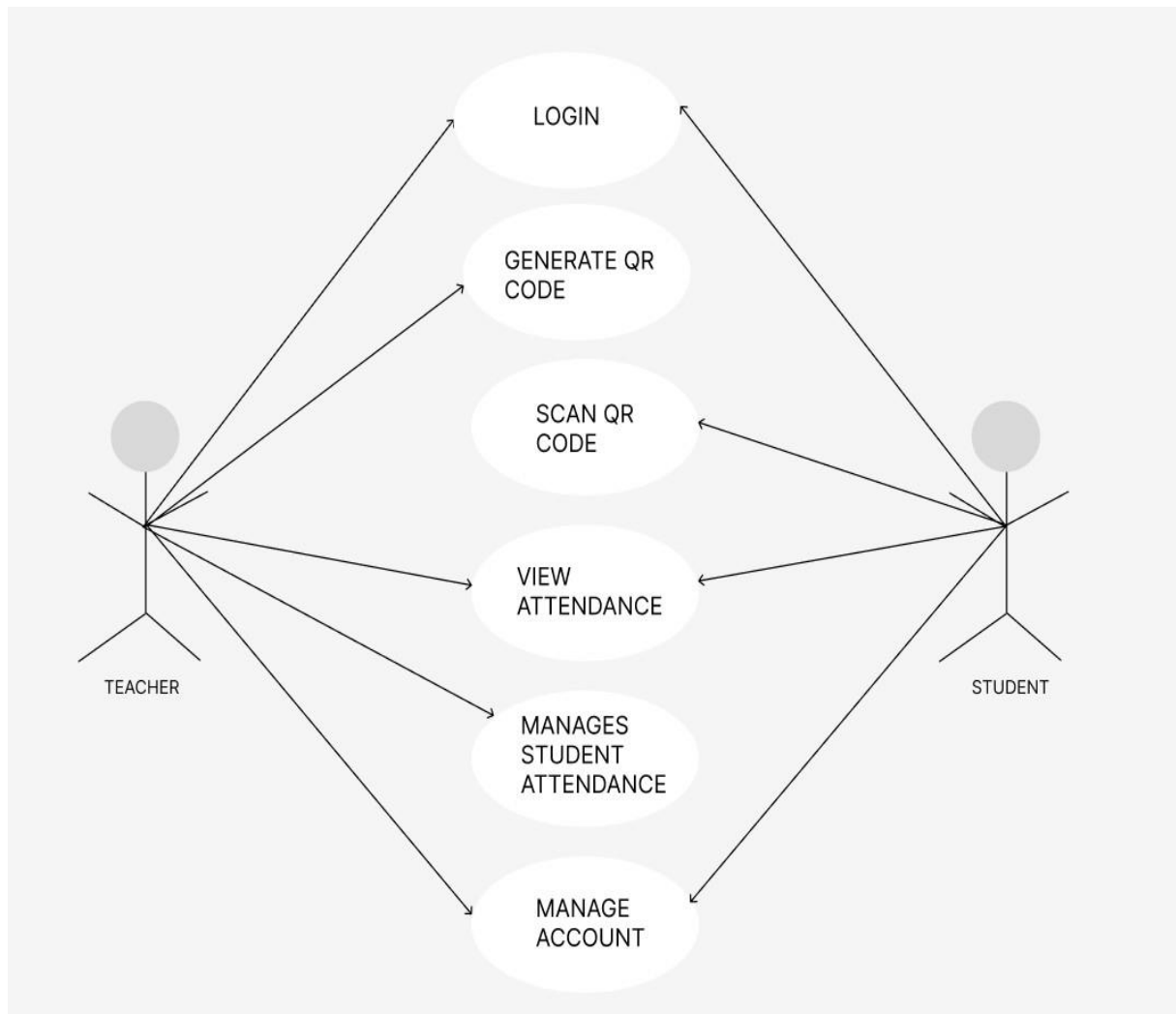


Figure 4. Use Case diagram for QR Attendance Model

EXPLANATION:

The user starts the system by giving their details to the app. Once the student has logged in the app, then he can start scanning the QR code by tapping on scan QR code button in the homepage of the app. The QR code will be generated by the teacher after logging in to the website. The QR code will be displayed for only 60 seconds, and in that time, the student need to scan it, and after scanning, the student's data will be sent to the website from where the teacher can access it. The teacher has the authority to manage the student's attendance, and log out of the website.

CHAPTER-4

RESULTS/OUTPUTS

With the help of this project, professors and students will save a lot of time during lectures. It will allow them to be more productive and share more information in class. Both the mobile app and the web app are made in such a way that anyone can use them without having any issues. The UI is simple and easy to navigate, and the hardware, as well as software compatibility, is very high.

As of now, the frontend of both the app and the website is ready. The website can generate QR Codes, and the mobile app has a QR Scanner to scan the code. We're thinking to proceed with the same project next semester. The plan for the 6th semester includes adding data collecting API to have the student's data from the app, Google Map's API for using geofencing that will also help us to prevent proxies, and cloud deployment of the website.

SCREENSHOTS

WEB PORTAL :-



Welcome to JUET Attendance
Management System

College Management Site that provides complete functionality to
manage Attendance Management System.

Enter



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Figure 5. Main Page

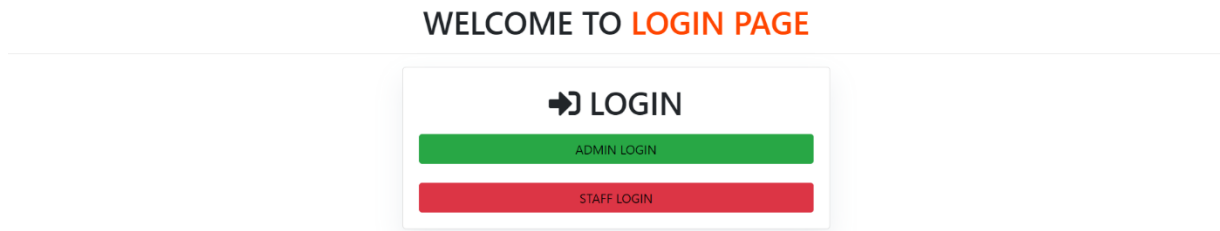


Figure 6. Login Page

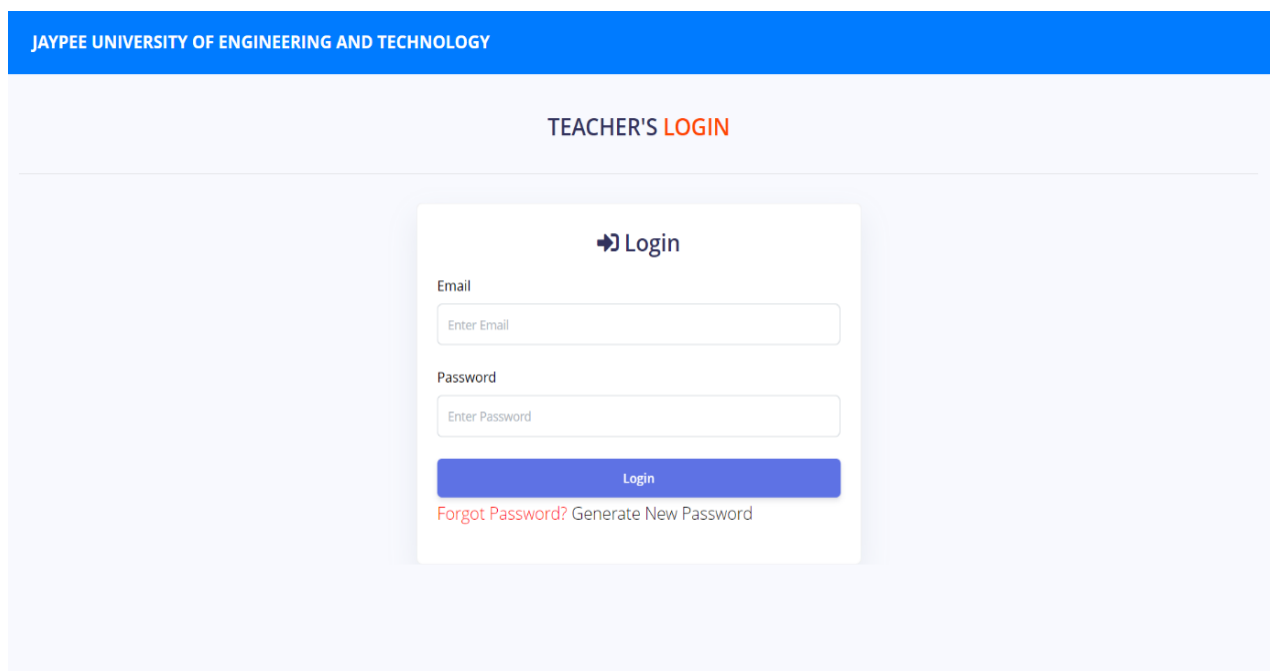


Figure 7. Teacher's Login Page

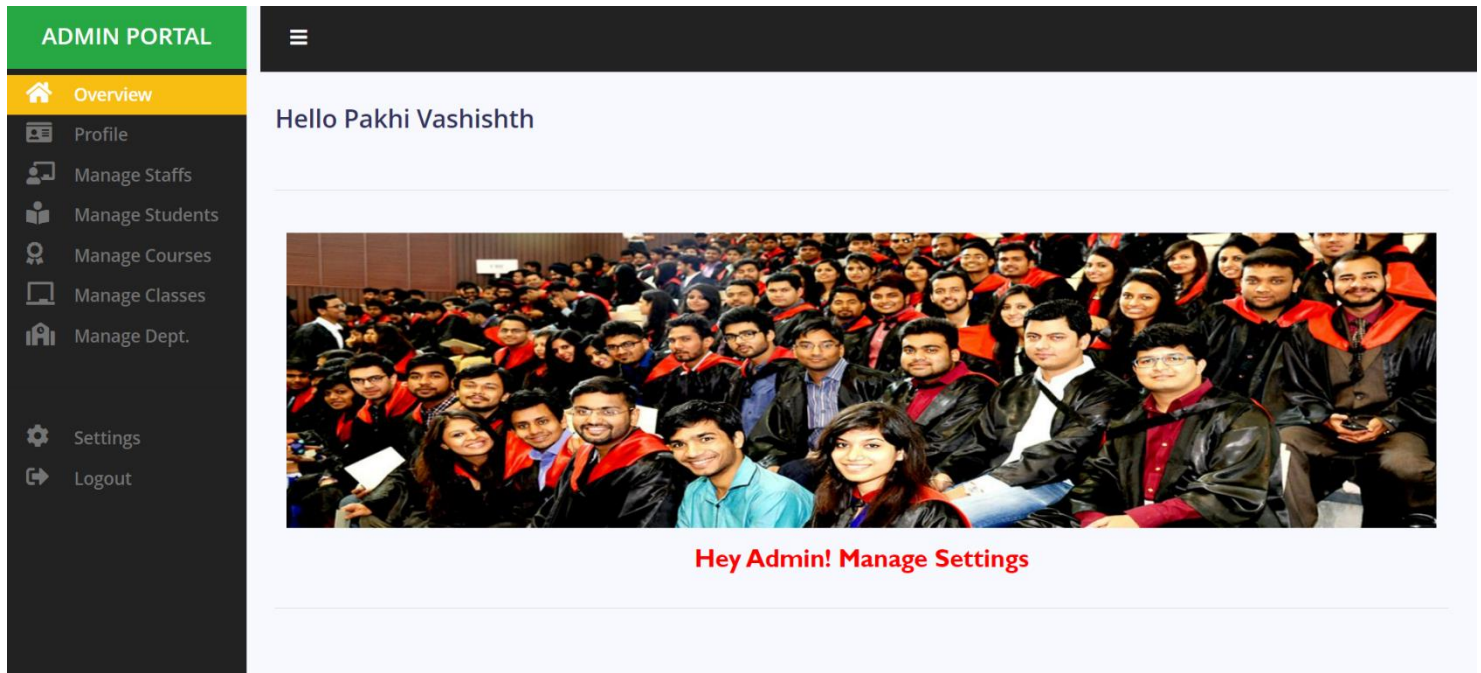


Figure 8. Admin Dashboard

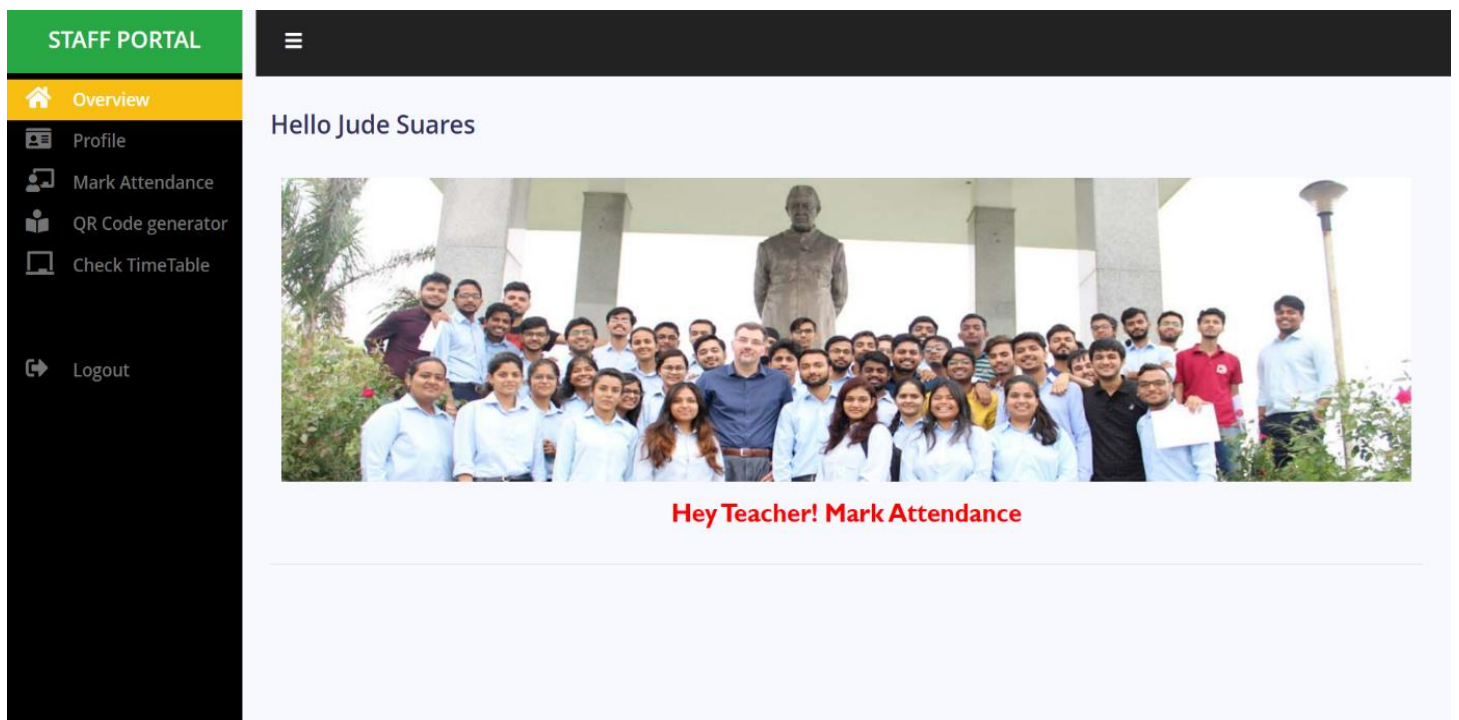


Figure 9. Staff Dashboard

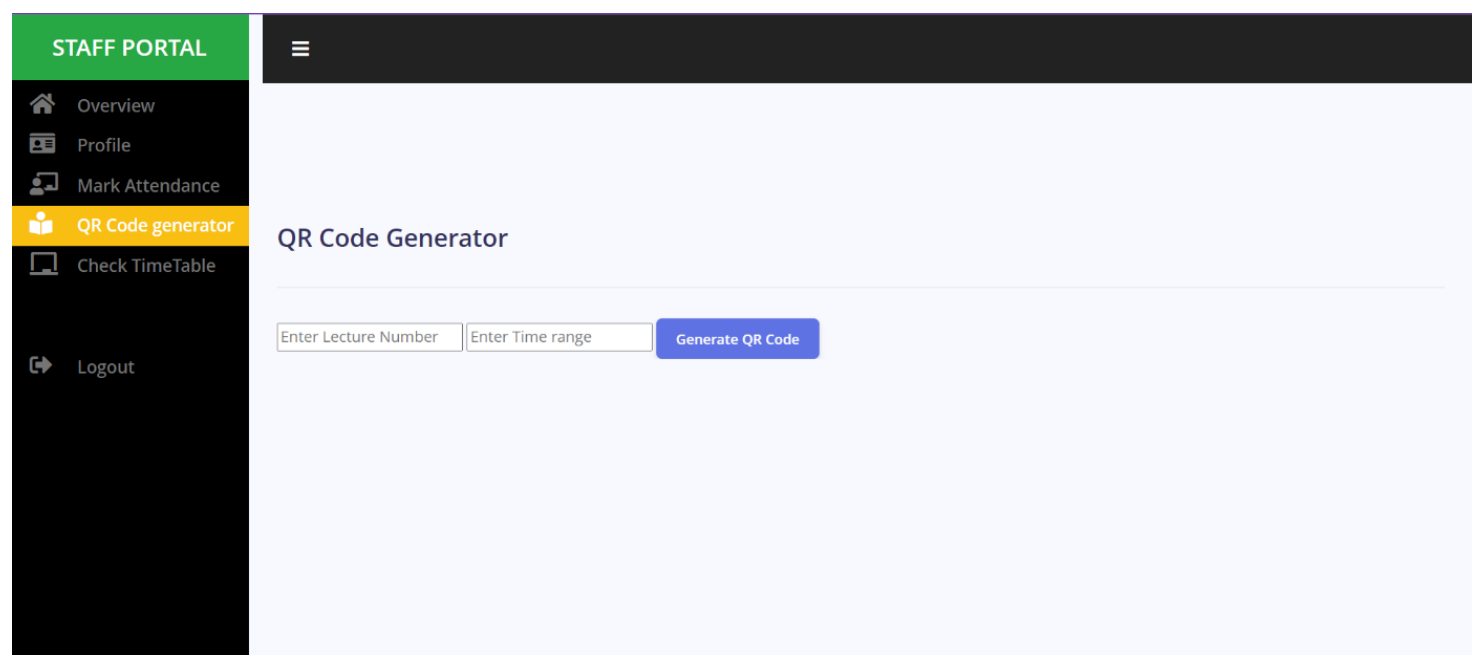


Figure 10. QR Generator Page

STUDENT PORTAL :-

2:06 AM SSG 2.5KB/s 4G

My Attendance

ATTENDANCE

Name

Enrollment Number

G-Suite Email Address

Sign In

2:06 AM SSG 0.0KB/s 4G

My Attendance

Name
Ashutosh Srivastava

Enrollment Number
201B072

G-Suite Email Address
201b072@jeutguna.in

Sign In

< GIF G+ Settings ... Microphone

1 2 3 4 5 6 7 8 9 0

q w e r t y u i o p

a s d f g h j k l

↑ z x c v b n m ↵

?123 , . English ✓

Figure 11. App's Login Page

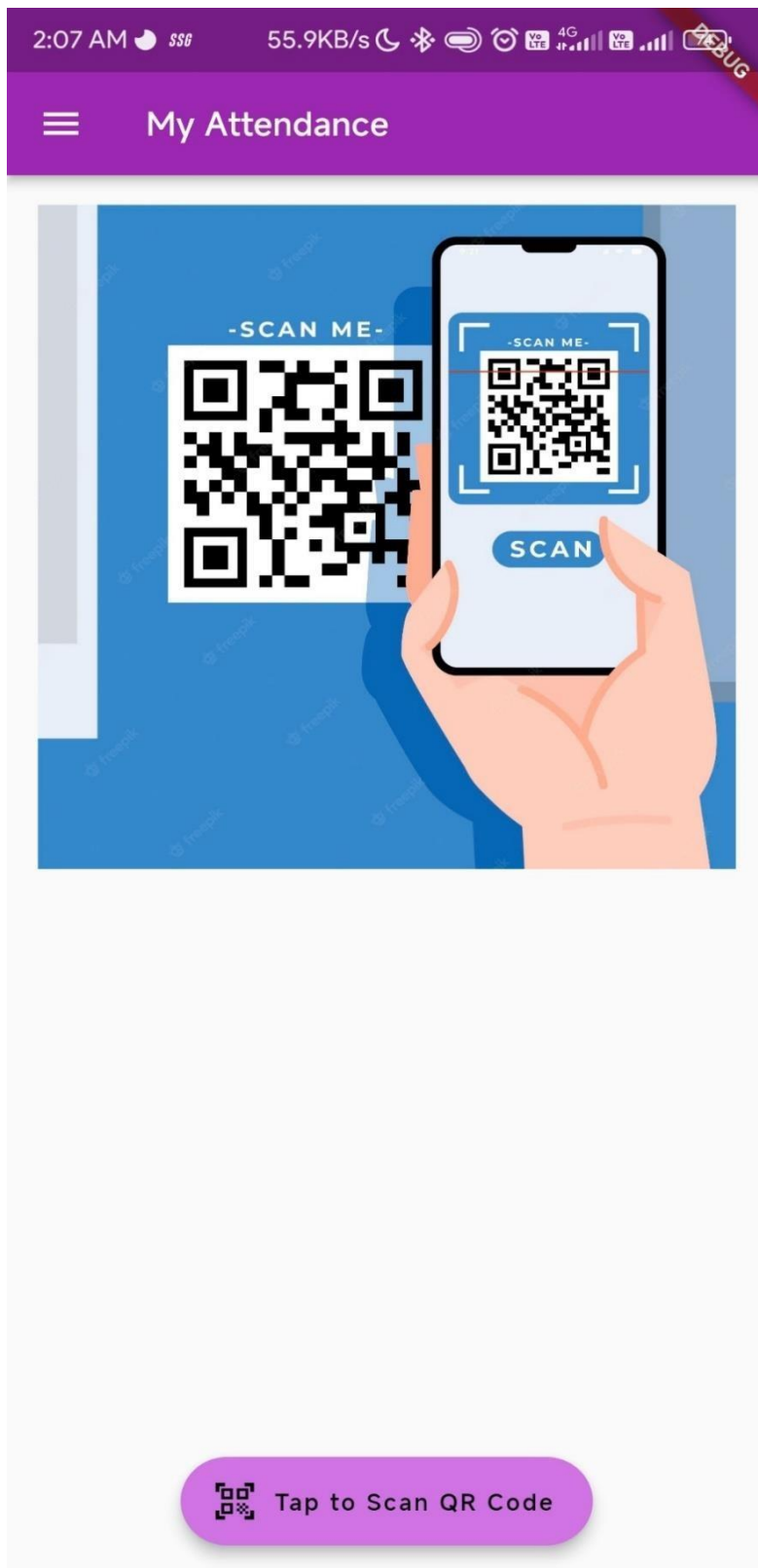


Figure 12. Home Page of App

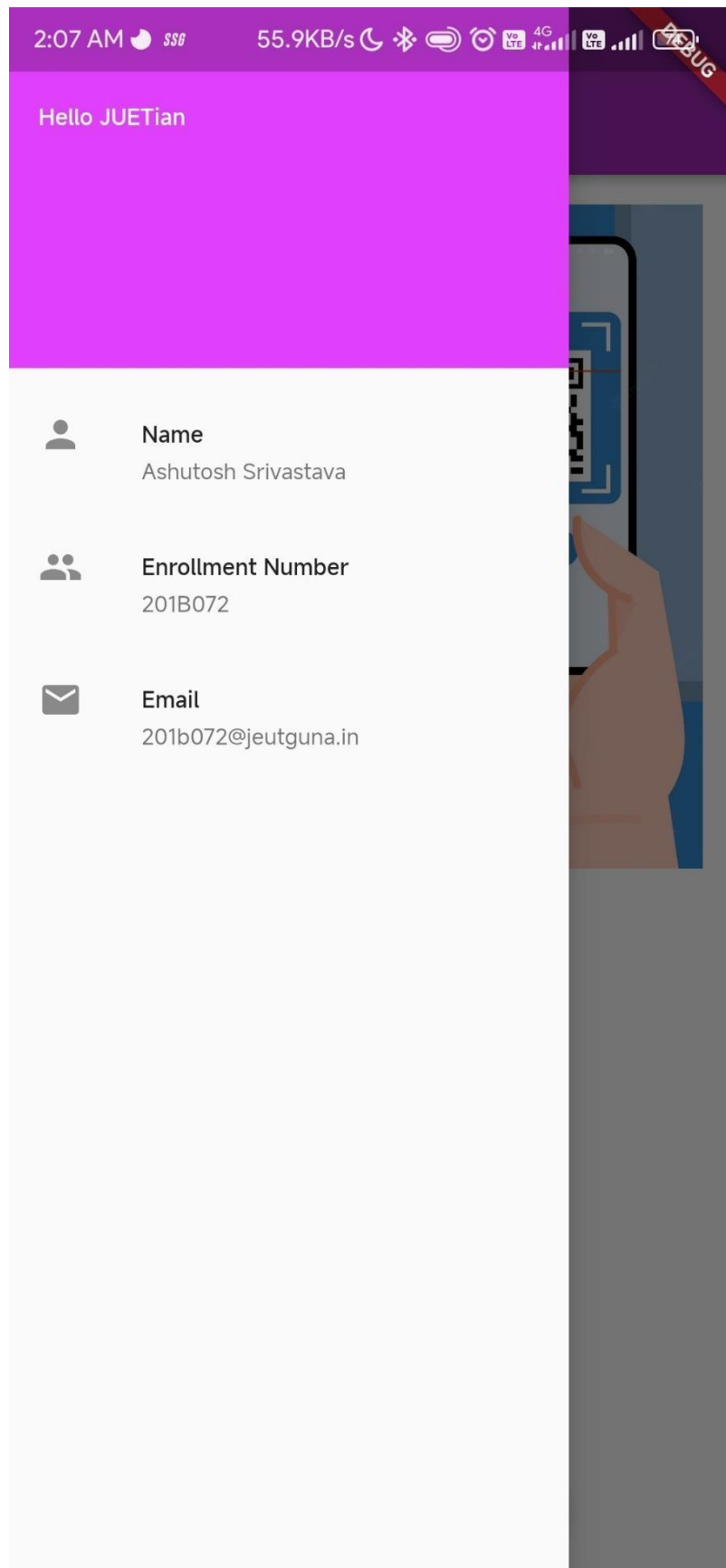


Figure 13. Side bar of Home Page

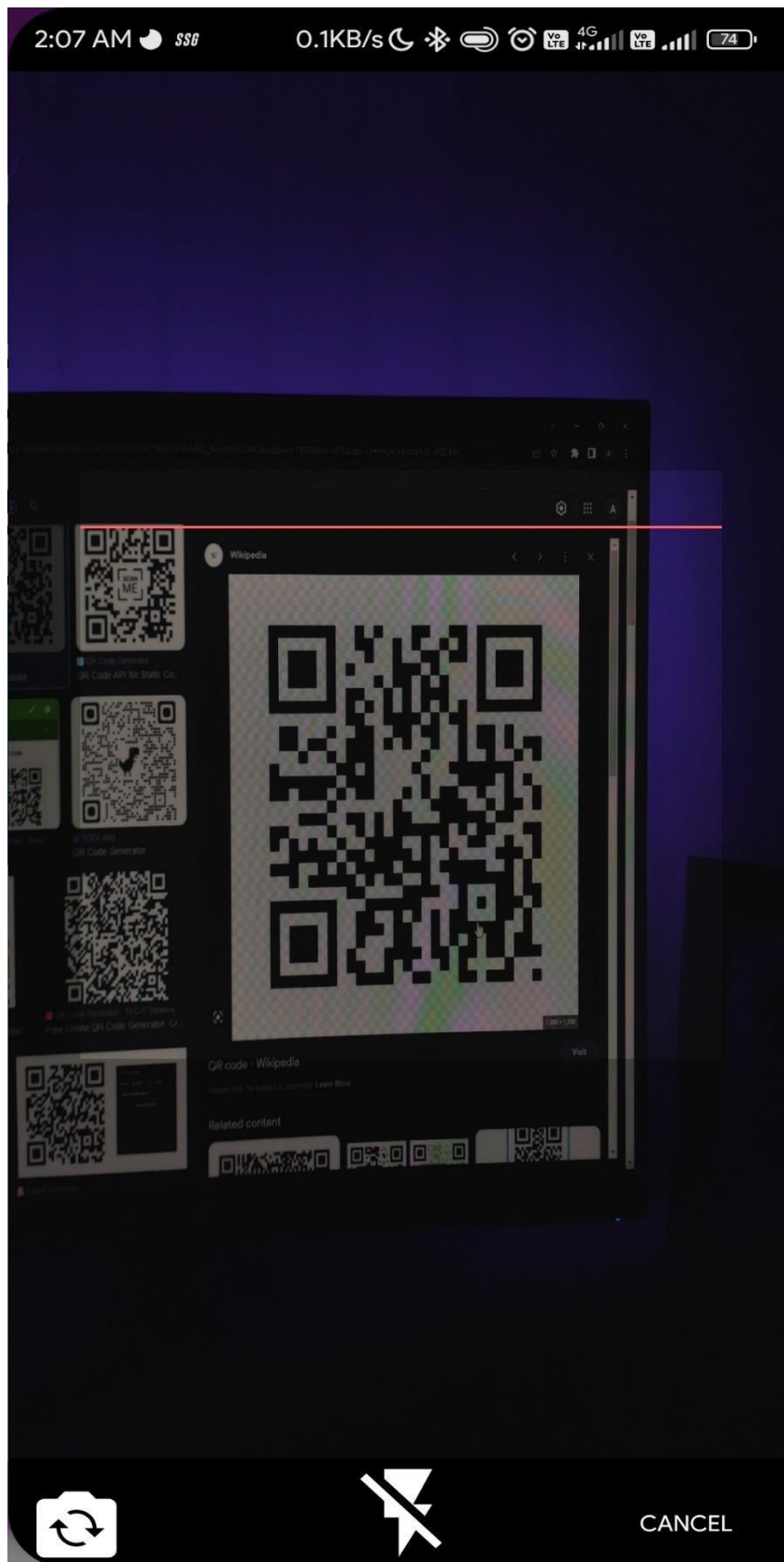


Figure 14. Scanning operation in App

CHAPTER – 5

CONCLUSIONS/RECOMMENDATIONS

- “Attendance using QR SCAN” system provides convenience in different fields like institutions, hospitals, and business.
- At the end of this project, we expect that our application is capable of giving desired output to the users and is able to help them.
- The main goal of the project is to help the student, teachers, and make the lectures more productive by reducing time.
- At the end of this project, we expect students can share their data to the teacher by scanning a QR Code so that teacher can mark them present in the lecture.

The system can be made more flexible and scalable using these recommendations.

Please note that the system implemented here is just a prototype of idea presented via this project. The recommendations are as follows:

- The system can be extended to a greater number of students with freedom to change list of students according to class changes.
- The system can be made more secure by also using the student's location in marking attendance.
- The system can also be extended to allow direct sync of data with Web-kiosk so that the attendance gets updated immediately and teacher doesn't have to give any extra time to mark attendance in the Web-kiosk.

CHAPTER-6

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