



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

APPLICATION BASED QR CODE SCAN FOR STUDENTS' ATTENDANCE SYSTEM USING IMAGE PROCESSING

Preeti K. Bhandi

Student

Department of Computer
Science and Engineering,

D. A. Kulkarni

Faculty

Department of Computer
Science and Engineering,

KLS Gogte Institute of Technology, Belagavi, India.

Abstract: In all the fields we use smartphones and nowadays it has become part and parcel of our life. We use many updated technologies and materials for studying higher education like applications, online classes, tablets digital learning, etc. All age groups of this generation are more familiar with smartphones. We thought to increase lecture time in classes and universities by this automated android application which uses QR code scans for putting the students' attendance. The QR code is displayed by the lecturer and it is scanned by the students for putting their attendance. This helps to maintain the system of registering students digitally and saves time, it verifies student mobile numbers and it cannot be personified. By this, we can have a systematic way and digital data is maintained and can be viewed anytime.

Keywords: Android application, QR code scan, attendance, universities, smartphones, digital data.

I. INTRODUCTION

Today, it's imperative to complete tasks swiftly, pick up new skills quickly, and work on your presentation as soon as you can. Every field, but especially the commercial world and the educational system, needs executive frameworks to allow for adequate management and coordination of the development of learning or work. After considering these many benefits, we came to the conclusion that the advanced degree process, in particular, needs an internet-based framework for monitoring understudy participation.

One of the most important and fundamental requirements in the educational system is regular attendance. The student may not be allowed to take the exam if the attendance criterion is not met. If students incur more absences than allowed, they risk losing the ability to take their final exams. This makes the manual method currently in use more susceptible to calculation errors.

We employ image processing because we scan QR codes since they may be used to get information. The information included in QR codes is normalised using image processing techniques, which makes it easier to record attendance.

We proposed and produced a superior Android application system to assist with these issues. On tablets and smartphones, it is fully responsive. The suggested method ensures data safety, enables quick and simple access to attendance information for the class session or an individual student, and creates reports for the lecturer automatically. The purpose of the internet-based attendance monitoring is to computerise the traditional method of attendance management and to provide a simpler and more sophisticated approach to record institutions' attendance today. Each professor and student will use a unique code known as a QR code. Users (faculty members and students) are expected to use QR scanning devices within in the classrooms at the beginning of each course to scan their unique QR code supplied about them during or at the beginning of each lecture in order to validate their attendance. In light of this, the lecture overall student attendance data as well as other important information will be recorded.

The approach will save a good chunk of time while greatly enhancing student attendance in specific courses they must attend.

II. LITERATURE SURVEY

[1] In this study, they develop an application or software that may be used on tablets, PCs, cell phones, and other devices, and they offer a quick response framework for monitoring educators' and students' engagement. In order to keep up with fresh advancements in innovation, particularly in the circle of education, the foundations have been looking for approaches to further enhance the instructional cycle including the most recent developments. Given the trend toward digitization, we accept that this framework is fundamentally fundamental for the University. This paper makes use of the QR code innovation.

[2] The concept of a GPS-based understudy participation framework on a QR-code has been tested in this work. The QR Response (QR) Code Registration Process with SMS Search And find that the analysts introduced can be used to track a student's participation and provide information about their appearance and flight times at school. The main goals of the review are to develop a QR code participation structure and provide a GPS that can track student whereabouts to replace the documentation participation framework. The experts adopted a methodical strategy to manage the examination. It is a technique where the task is organised, carried out, and reviewed incrementally until it is finished. The plan project was tested and evaluated by 50 users and 10 specialists. A series of tests have shown that the framework can provide a more straightforward and practical way to track and verify participation using a QR Code, as well as the ability to send information about ability to participate through instant messages and reveal location on demand using an Android application.

[3] While self-identification technology like Bluetooth, fingerprint or Radio Frequency Identification (RFID) can speed up the process of documenting each student's attendance status, it still takes about the same amount of time overall. As a result, to address these issues, this research suggests a way for creating a class attendance system using QR codes, known as QR-Class. Concurrent student self-service reduces the amount of time needed and boosts the efficacy of the outcomes.

[4] Since technology and broadcast communication are developing quickly, it is possible to employ a tool to make it easier for students to attend speeches. They use a web application or an Android app that scans QR codes in this page. Additionally, information on student engagement is saved via QR Code technology. You can quickly store data and receive responses using a QR code without actually typing anything. The data encoded in a QR Code can be a URL, phone number, SMS message, V-Card, or another type of message. By looking at the QR Code, which is simple to perform, the information may be easily identified.

[5] The review provided a framework to address the issue of participation monitoring. The suggested method is divided of three sections: one to create the QR Code using the captions of the understudy, one to measure participation using a future application, and one to create the participation using a CSV or XLS plan. The instructor should look at the student's unique QR code to confirm participation. To record each student's participation, the teacher will send their QR code.

[6] According to the proposed approach, teachers can take student attendance using QR codes rather than a piece of paper to record attendance. The teacher module and the student module are the two sections of the system. where the student module is an Android application and the teacher module is a web application. A teacher's module allows them to create QR codes, view and amend student-by-student attendance, compute monthly attendance, and send notifications to individual students. A student's ability to mark attendance for a particular lecture by scanning a QR code. Additionally, a student has access to view notifications sent by the teacher and his or her attendance.

III. RESEARCH GAP

The literature review articles for this project were studied, and it was discovered that many of them even used hardware, such as RFID technology, sensors, and barcode readers. Few have also deployed application- and web-based systems. MySQL and phpmyadmin databases.

For this, we utilised the same application that is simple to maintain for the staff and student panels, and for the database, we used Google Firebase, which is also simple to construct and alter.

In this project, we've done everything we can to prevent impersonation by incorporating authentication, OTP, and dynamic QR codes that change at particular times.

IV. MOTIVATION

We are all aware of how difficult it is these days to manage a student attendance system using pen and paper. Now that the educational system has made such strides, why shouldn't it be digitalized as well? As a result, we may advance in technology as more students use PCs and mobile devices at educational institutions to enhance their education and create smarter systems. Here, we may make use of the QR-Code system for tracking student attendance, which aids in maintaining attendance records and allows for proper and organised tracking.

Nowadays, being current with technology is essential, especially in the realm of education. The latest technologies are being used by educational institutions to improve the educational process. In light of the current scenario, we have considered deploying mobile technology to effectively utilise the full allotted time for a presentation. When classes are large, the time that lecturers spend taking attendance may occasionally be seen as a waste of the lecture time. To address this, we have suggested a method of automating this procedure that uses student devices rather than the instructors. To put it another way, the instructor only needs to present the students with the relevant PowerPoint slides during class.

V. OBJECTIVES

The goals of our project, which is a QR-Code attendance management system, are:

- By iterating the student information and assisting in the maintenance of a single database, it reduces administrative effort.

- As the work is digital, manual work for information retrieval on attendance decreases.
 - Students have easy access since they may check their attendance and make up any missed classes as needed.
 - Because there is less manual labour, time is also saved.
 - The likelihood of error is decreased.
 - It eliminates the need for double data entry when recording attendance and time.
 - Automatic creation of various student attendance system reports.
- The staff can see a student's location on their staff panel even if they scan the QR-Code in a remote area.
 - The attendance system and the system for assigning grades to students can both be maintained.

VI. PROBLEM STATEMENT

With the help of smartphones and a computerised, automated system, this method is designed to provide pupils with QR code scan (Quick Response) Attendance.

- 1) It is an Android app.
- 2) It has an authentication system that allows users to log in to the programme using a pattern, thumb ID, pin, or OTP verification.
- 3) Maintains a student attendance database.

VII. SYSTEM ARCHITECTURE

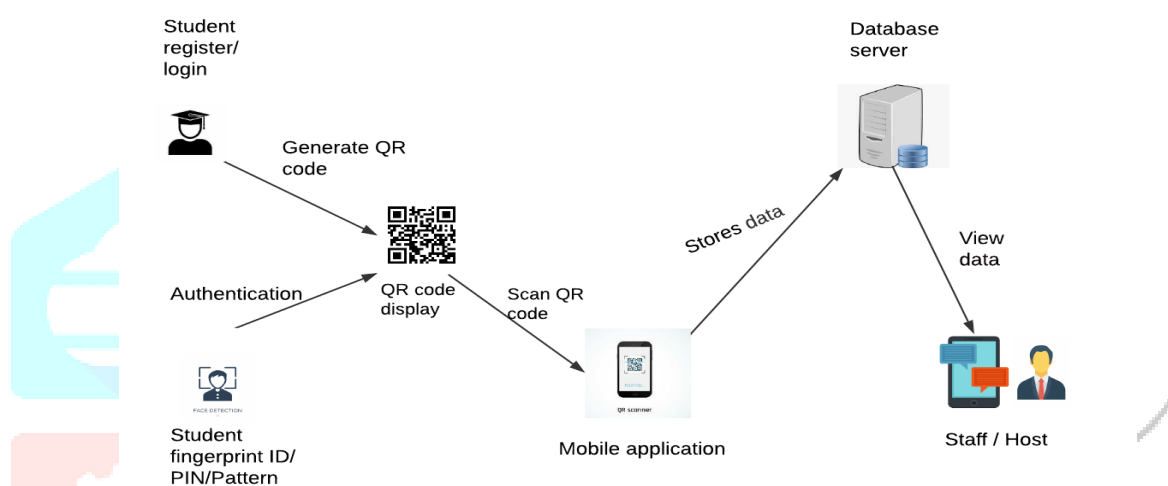


Figure: QR Code attendance system architecture

This figure provides an explanation of the system's design and operation and serves as a representation of the entire system. Students register here by scanning a QR code, which is then shown in a mobile application and saved in the database. The host or staff member can examine it, and they can print or download the material.

VIII. SYSTEM DESIGN

1. DATAFLOW DIAGRAM OF HOST/STAFF PANEL

A data flow graph illustrates how data moves through a process or cycle. It includes the numerous information subcomponents, information sources, information results, and information repositories. In the graphic below, the management of information and all host authorizations are shown.

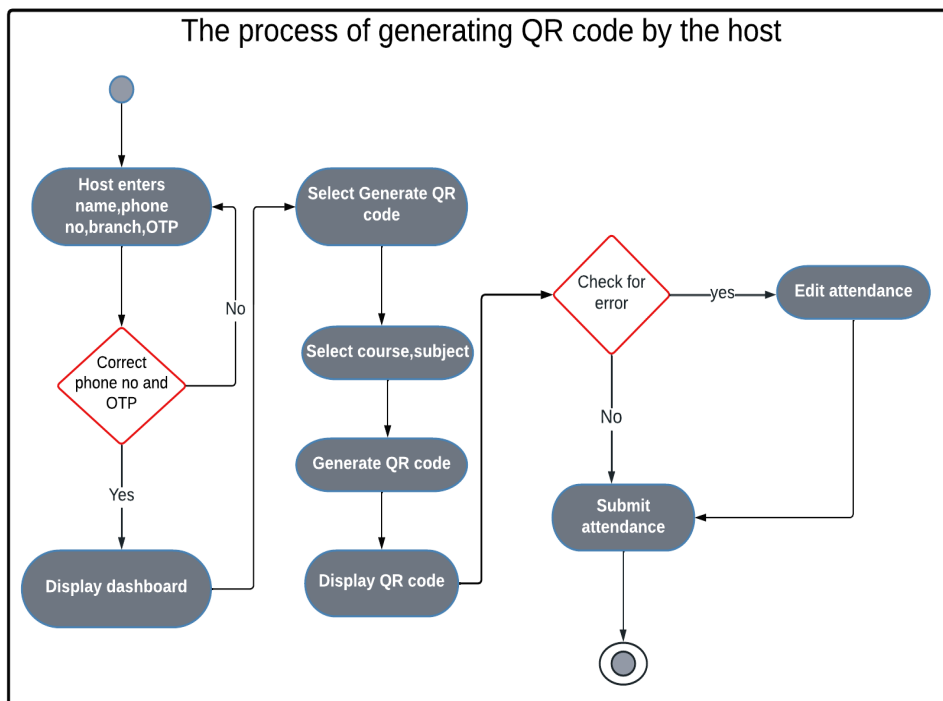


Figure: Data flow diagram of Host/ Staff and generating QR code.

2. DATAFLOW DIAGRAM FOR STUDENT PANEL

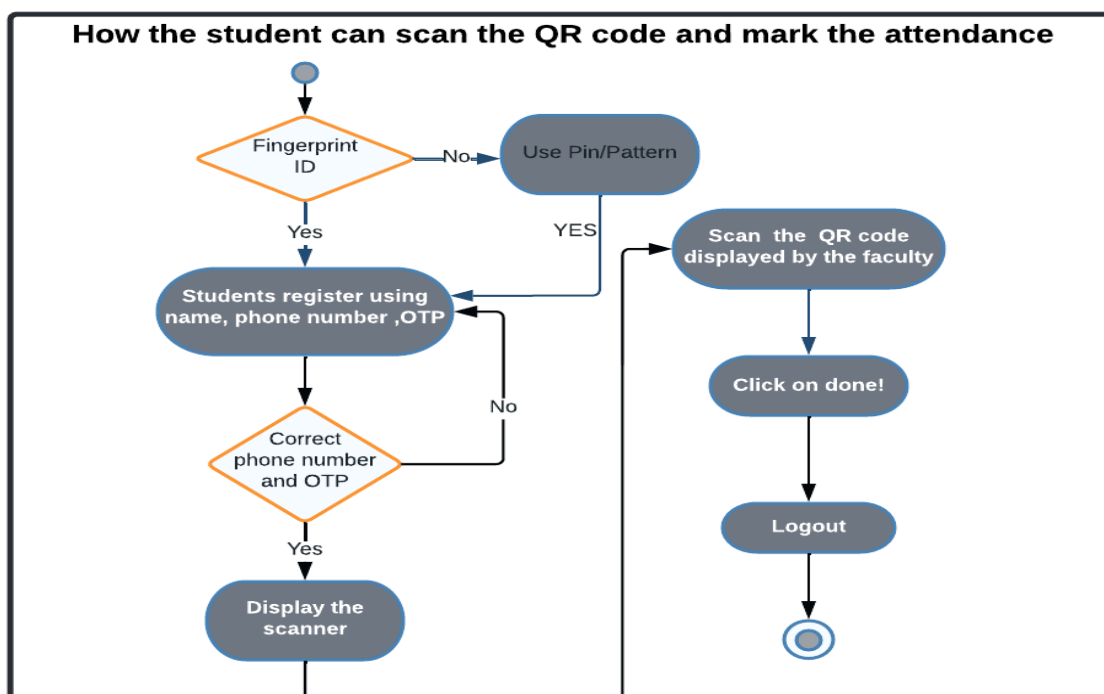


Figure: Data flow diagram of the student how the QR code is scanned and its process steps.

First the users will give their fingerprint Id or pin/pattern and the application opens for registration. By providing their phone numbers, students sign up for the application, and their OTPs are then verified. They then arrive to the QR code scanning page. They scan, and the database will store their attendance. They can select "done" to log out of the programme. As a result, it is depicted diagrammatically in the image above.

IX.TOOLS AND TECHNOLOGIES

1.ANDROID APPLICATION:

Android is a mobile operating system that runs on Linux and is available as an application for smartphones and tablet computers. The Open Handset Alliance, headed by Google, and other businesses created Android.

Android provides a standardised approach to mobile application development, so developers simply need to create for Android and their applications should be able to run on various Android-powered devices.

We use these tools for our project building,
Flutter SDK 1.22.6;
Android Studio 4.1.1;
Firebase 20.2.2; Tool.

2.FEATURES OF FLUTTER:

- Usability: The Flutter code is straightforward. Both iOS and Android have the same code base. The user interface and business logic are identical across all platforms (E.g., Web, Mobile)
- Dart as a Programming Language: Dart is an object-oriented programming language that Flutter utilises to build apps. A large standard library, garbage collection, robust typing, generics, and async-awaits are some of Dart's standout characteristics. Similar to Java, Dart makes extensive use of other languages' popular features. Because to its reactive programming approach, developers may easily fulfil their routine jobs.
- Open-source: Both Dart and Flutter are open-source and free to use. They both offer thorough documentation and community assistance to assist with any problems you might run into.
- Tech Community: There is a sizable group of programmers who are always working to improve Flutter. They facilitate entry and framework learning for newcomers. The software toolbox includes more than 50 movies that might aid in construction. Anyone can easily begin creating an app with the team's assistance.

3.FIREBASE:

Using the Google-supported Firebase application development platform, designers may create iOS, Android, and Web applications. Firebase offers tools for tracking research, announcing and fixing application issues, as well as creating marketing and product trials.

The following are some of the administrations provided by Firebase:

- Analysis: Google Analytics for Firebase offers unlimited, free writing about up to 500 distinct events. Examination provides iOS and Android applications with information about client behaviour, enabling improved execution and application marketing decisions.
- Confirmation - Firebase Authentication creates client sign-in and onboarding while also working to expand secure verification frameworks for engineers. This component includes support for email and secret key records, telephone authentication, Google, Facebook, GitHub, and Twitter login, just to name a few it gives comprehensive identity solution.
- Cloud communication - Firebase Cloud Messaging (FCM) is a free, cross-platform communication tool that enables businesses to send and receive messages on iOS, Android, and the web with unwavering quality.
- Realtime data set - The Firebase Realtime Database is a cloud-based NoSQL data set that enables constant information synchronisation and archiving between clients. Since the data is regularly updated across all clients, it is still open when an application is offline.

Execution - The Firebase Performance Monitoring tool gives developers insight into the iOS and Android applications' presentation characteristics, enabling them to choose the ideal settings to enhance those applications' exhibition.

X. METHODLOGY AND SNAPSHOTS

The attendance system is made easier with the help of this Android app. It makes use of the most recent Quick Response code technology, which is incredibly cost-effective and helps instructors save time. It contributes to lengthening the lecture.

There are two components in this Android app: a student module and a staff module. To begin the application, both must provide a fingerprint Id, pattern, and pin. After authentication, users must submit their phone number and receive an OTP to complete the registration process. Students must then complete the form by entering their first and last names as well as their university identification number. Employees must identify their department and the name of the dealt issue. The appropriate QR code will be generated for the subject, and if the lecturer displays it, the students can scan it to record their attendance for that particular class. Because QR codes are dynamic, they change for each time stamp set by the programme administrator. The list of students who attended the class is available for employees to view on a daily, weekly, and monthly basis.

As a result, the application offers a contactless attendance system and is a more practical and effective way to keep track of students' enrolment.

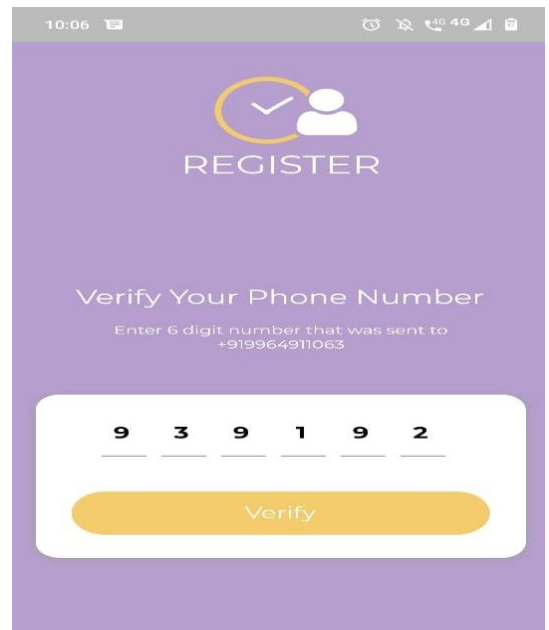
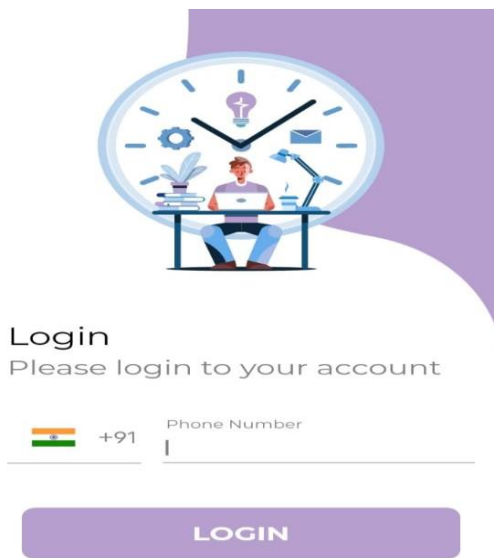


Figure: Above images depict the application's login page and OTP authentication.

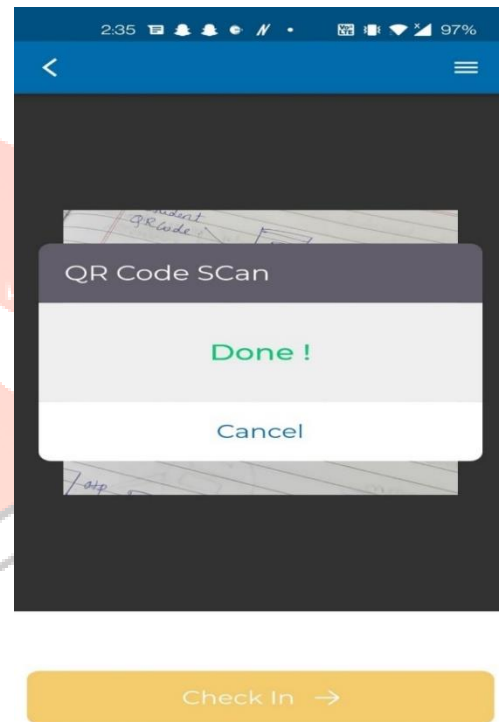
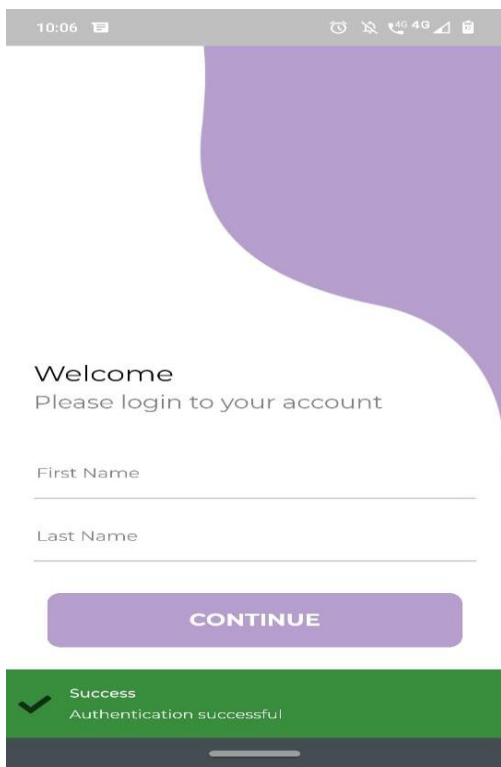


Figure: The top two images display student registration information and, when clicked, transport the user to a screen with a QR code scanner.

< Your Profile
Update your profile details

Your Name *
Ramba

Host Name *
preeti

Tagline *
machine learning

Branch *
cse

Submit

< Your Profile
Update your profile details

Your Name *
Ramba

Host Name *
preeti

Search Organization

Create Branch +

E n C

cse

Figure: These two pictures show branch and organisation details as well as staff details.

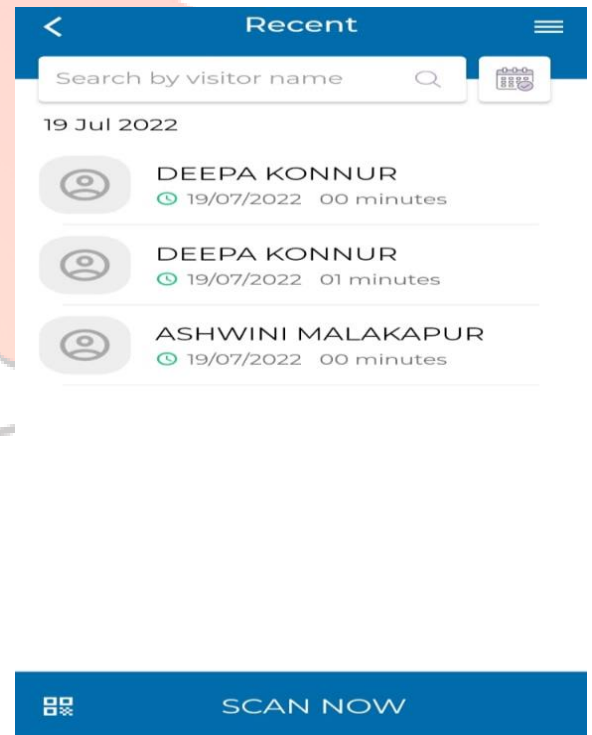
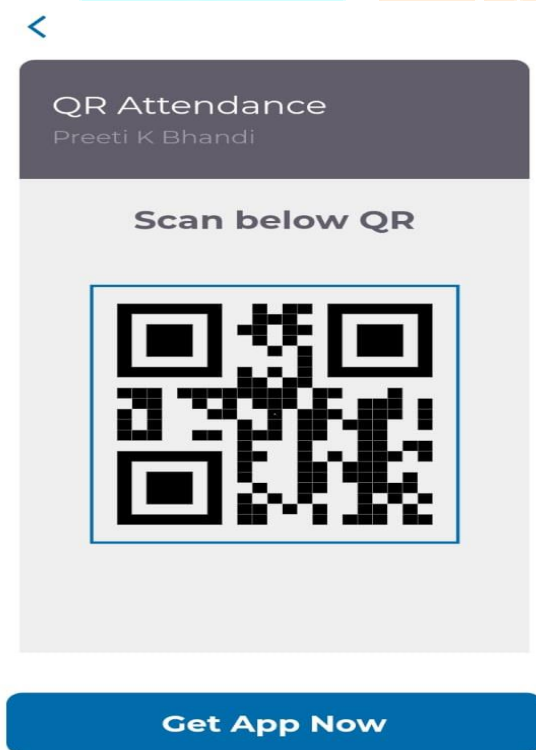


Figure: The above pictures show the QR code created by staff for the subject; upon scanning, student attendance will be clearly recorded in the database.

XI. CONCLUSION

In conclusion, of all the solutions, taking attendance using a QR code is the most affordable and flexible. It can be modified without changing the infrastructure. With the prevalence of smartphones and easy access to the internet, institutions can use it extensively. The automatically refreshing QR code makes it more challenging to falsify attendance. Additionally, it saves lecturers a lot of time and effort by regulating the attendance of their students. The project's goals were fulfilled.

XII. FUTURE SCOPE

This QR code register system can be used in a variety of settings, including employee attendance, factory and hotel staff, as well as faculty and staff at schools and institutions. It facilitates the upkeep of a methodical approach to attendance and makes administrative work simpler, quicker, more inexpensive, and more adaptable.

REFERENCES

- [1] A. Nuhi, A. Memeti, F. Imeri and B. Cico, "Smart Attendance System using QR Code," 2020 9th Mediterranean Conference on Embedded Computing (MECO), 2020, pp. 1-4, doi: 10.1109/MECO49872.2020.9134225.
- [2] Casunuran, J.J.S., Quiambao, C.R.C., Fordan, M.E., Soriano, A.J., Beaño, M.G.P., Mandayo, E.A. and Domingo, B.B., 2020, November. Quick Response Code Attendance System with SMS Location Tracker. In *2020 IEEE REGION 10 CONFERENCE (TENCON)* (pp. 373-378). IEEE.
- [3] S. Nalintipwong, T. Tasarika, C. Ruksomya, S. Vittayakorn and T. Numnonda, "Concurrent Self-Identification Applying QR Code to Record Class Attendance (QRClass)," 2019 IEEE 9th International Conference on Electronics Information and Emergency Communication (ICEIEC), 2019, pp. 1-5, doi: 10.1109/ICEIEC.2019.8784518.
- [4] Hermanto, N. and Baihaqi, W.M., 2018, November. Implementation of QR Code and Imei on Android and Web-Based Student Presence Systems. In *2018 3rd International Conference on Information Technology, Information System and Electrical Engineering (ICITISEE)* (pp. 276-280). IEEE.
- [5] S. Mishra, C. Kumar, A. Ali and J. Bala, "Online Attendance Monitoring System Using QR Code (OAMS)," 2021 2nd International Conference on Intelligent Engineering and Management (ICIEM), 2021, pp. 379-384, doi: 10.1109/ICIEM51511.2021.9445304.
- [6] Patel, Arpankumar, Joseph, Ansel, Survase, Shubham, Nair, Rohini, "Smart Student Attendance System Using QR Code" 2nd International Conference on Advances in Science & Technology (ICAST-2019) K. J. Somaiya Institute of Engineering & Information Technology, University of Mumbai, Maharashtra, India.

