

Smart Attendance System Using QR Code

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ABSTRACT

The student attendance system using a QR code is a digital technology that aims to improve the process of monitoring and recording attendance in educational institutions. This system uses QR codes, which are two-dimensional barcodes, as a means of identification for students. This paper proposes a system that is based on a QR code, which is displayed for students during the lecture. The students will need to scan the code to confirm their attendance. This system offers several advantages over traditional attendance systems. Firstly, it eliminates the need for manual recording of attendance, which can be time-consuming and prone to errors. Secondly, it provides real-time updates on attendance, allowing teachers to take necessary actions in case of any irregularities. The student attendance system using a QR code is an innovative solution to the challenges faced by traditional attendance systems. By using digital technology and automation, this system streamlines the attendance process, making it more efficient and effective.

Keywords : QR code technology, Education technology Teacher workload reduction, Teacher generated QR code, Student QR code scanner

I. INTRODUCTION

A student attendance system using a QR code is a technology-based approach to tracking the attendance of students in classrooms or other educational settings. The system uses QR codes, which are square-shaped two dimensional barcodes that can store information. The system works by generating a unique QR code for each class session. The teacher displays the QR code on the board or a projector screen, and students scan the code using their smart phones.

Traditional methods of taking attendance in classrooms are time-consuming, inefficient, and prone to errors. Manual paper-based systems and sign-in sheets are often used, but they can be easily manipulated or lost. These methods also require teachers to spend valuable instructional time taking attendance, which can disrupt the learning process. Therefore, there is a need for a more efficient and accurate way of taking attendance in classrooms. The proposed student attendance system using a QR code offers several advantages over traditional

methods of taking attendance. One of its main benefits is its flexibility. The system can be used in a variety of educational settings, including classrooms, lecture halls, and laboratories. It can also be customized to meet the specific needs of different educational institutions. It can also be integrated with existing school management systems to enable automatic data synchronization. The system allows for real-time monitoring of attendance data, which can be accessed by teachers and school administrators. This data can be used to identify patterns of attendance, track student performance, and make informed decisions about student support and intervention.

A QR code (Quick Response code) is a two-dimensional barcode that can be scanned by a smart phone or QR code reader to quickly and easily access information or content. QR codes were first developed by a Japanese company called Denso Wave in 1994 for use in the automotive industry, but have since become popular in many other industries.



Fig 1 : QR code

QR codes store more information and scan faster than the barcodes used in the product inventory. It became a hit in the market due to its advanced features. A QR code consists of black and white squares arranged on a grid, with a smaller square in the bottom left corner that helps the scanner determine the orientation of the code. The code can store various types of data, such as website URLs, contact information, product information, and more.

To scan a QR code, a user simply needs to point their smartphone camera at the code and scan it using a QR code scanner app. The app then interprets the code and provides the user with the relevant information. QR codes are often used in marketing, advertising, and other applications where it is important to quickly and easily convey information to a user.

Overall, a student attendance system using a QR code is a promising approach to improve attendance tracking in educational settings. Its efficiency, accuracy, and real-time monitoring capabilities make it a valuable tool for teachers and school administrators.

II. RELATED WORK

In recent years, the use of QR code technology has become increasingly popular in various fields, including education. One such application is a student attendance system that utilizes QR codes. The paper, will review the related works and propose an approach for developing a student attendance system using QR code technology.

Since biometrics are concerned with the measurements of unique human physiological or behavioral characteristics, the technology has been used to verify the identity of users. It is becoming critical to be able to monitor the presence of the authenticated user throughout a session. Thus, another proposal discusses a prototype system that uses facial recognition technology to monitor authenticated users or students.[1]

The proposed software is to be installed on the instructor's mobile telephone. It enables it to query students' mobile telephones via Bluetooth connection and, through a transfer of students' mobile telephones' Media Access Control (MAC) addresses to the instructor's mobile telephone; the presence of the student can be confirmed.[2]

This research paper discusses the implementation of a student attendance system using QR codes in a mobile application. The system was tested on a group of students, and the results showed that the system was efficient and effective.[3]

The technologies like mobile computing, Information, and Communication Technology and advances in behavioral science studies enhance and enrich the current educational system scenario since the educational technology in India has been getting modernized in recent past years due to the development and penetration of Information and Technology. The methodology of this work is to develop an android-based mobile application attendance management system where attendance can be recorded via mobile devices using "PHP" and "MySQL" servers. The final result of this project is very useful for educational organizations to keep, track and maintain the database of students.[4]

The paper proposes a system that is based on a QR code, which is displayed for students during or at the beginning of each lecture. The students will need to scan the code to confirm their attendance. The paper explains the high-level implementation details of the proposed system. It also discusses how the system verifies student identity to eliminate false registrations.[5]

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.[6]

QR Code has a wide range of applications in this evolving technology world. QR code is used to store massive information in a smaller space. By using a QR code in the system and proposed a smart attendance system using a QR code. Secure authentication is achieved using data-hiding algorithms with the embedded QR Code.

In the system by using smart phones student scan a QR code which will be displayed by the teacher. When a student scans this QR code, automatically attendance will be marked according to the user id. It also discusses how the system verifies student identity to eliminate false registrations.[7]

It aims to propose a student attendance system using a QR code based on the mobile application. To ensure the student attends in the classroom, the QR code containing the time information was generated and displayed at the lecturer's presentation. The student only needed to scan the displayed QR code using his/her android or IOS smart phone.[8]

Quick Response (QR) Code Attendance System with SMS Location Tracker that can provide information about the student's arrival and departure time in school. Study to design a QR Code Attendance System to improve manual/traditional attendance and to provide a Global Positioning System (GPS) that can track the location of the students. It is a method in which the product is incrementally designed, implemented, and evaluated until the product is complete. it is also capable of providing information about attendance by sending a text message and can provide location by requesting on the Android Application.[9]

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.[10]

III. PROPOSED SYSTEM

Student attendance is an essential aspect of education that impacts academic outcomes and student engagement. However, traditional attendance-taking methods such as manual roll-calling or sign-in sheets can be time-consuming, error-prone, and do not provide real-time monitoring. Technological advancements have enabled the development of attendance systems that use QR codes. The student attendance system uses a QR code that can improve attendance tracking, streamline administrative tasks, and enhance student engagement.

The system consists of a QR code generator that creates a unique QR code for students, a scanner that reads the QR code, and a database that stores attendance data

and generates reports. The proposed attendance system using a QR code consists of three main components: the QR code generator, the scanner, and the database. A student attendance system using a QR code can be an efficient and accurate way to track attendance in a classroom. Here is a proposed system for such a setup:

Teacher registration:

- The teacher visits the student attendance system Application.
- The teacher needs to click on the registration button and fill in their details, such as First name, Last name, email, College name, and password.
- The system verifies the email and password and creates a new account for the teacher. Teacher Dashboard :
- The teacher visits the student attendance system application.
- The teacher applicant enters their email and password and clicks on the login button.
- The system verifies the credentials and logs in the teacher to their dashboard.
- Faculty will create a subject using the subject name and its description. Along with the subject, it automatically generates a unique subject ID for students to enroll in that particular subject.
- The teacher then starts the timer on their device to begin the class session.
- When the class is over, the teacher stops the timer on their device, and the system records the attendance.

QR code Generation:

- The unique pin is generated whenever the faculty starts the timer.
- The teacher would enter that unique pin on the website.
- The website would generate a QR code based on the pin for that session.
- □ The teacher would display the QR code on a projector screen, whiteboard, or printed paper for the students to see.

Student Registration:

- The students visit the student attendance system application.
- The students need to click on the registration button and fill in their details, such as First name, Last name, email, password, course name, and roll no.
- The system verifies the email and password and creates a new account for the student.

Student Dashboard:

- The student visits the student attendance system application.
- Students need to enter their email and password and click on the login button.
- The system verifies the credentials and logs in the student into their dashboard.
- Students have to enroll in a particular subject using the unique subject ID provided by the faculty.
- Hence, the scanner is ready to scan the QR which is displayed on the screen. Scanning the QR code:
- The teacher displays the QR code on the screen or prints it out and displays it in the classroom.
- The students use their smartphones to scan the QR code.
- The system verifies the student id and marks the student as present in the attendance system.
- Hence, the teacher can view the attendance report for the class in real time.

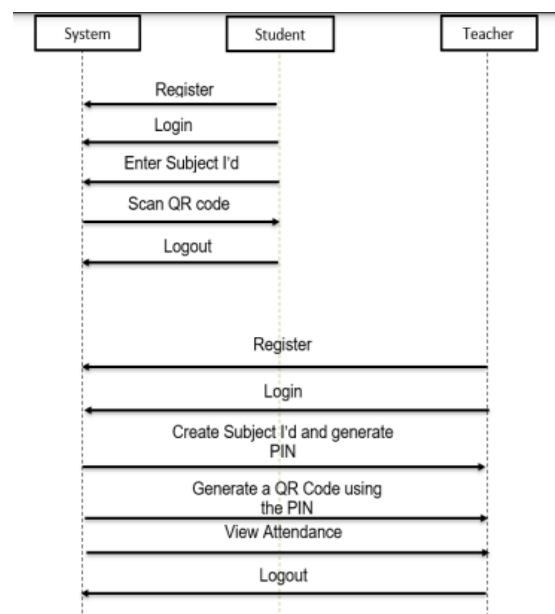


Fig 2 : The system architecture

IV. RESULTS AND DISCUSSION

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 program 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.

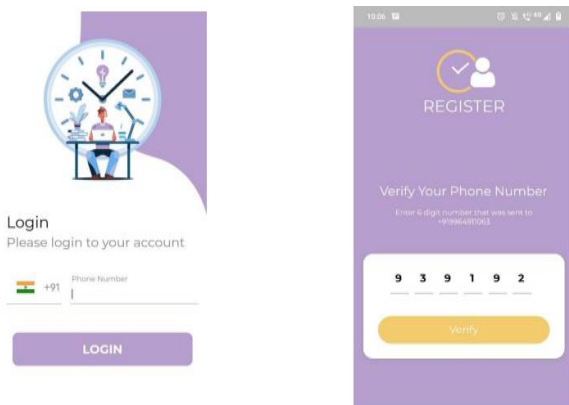


Fig:3 Above images depict the application's login page and OTP authentication

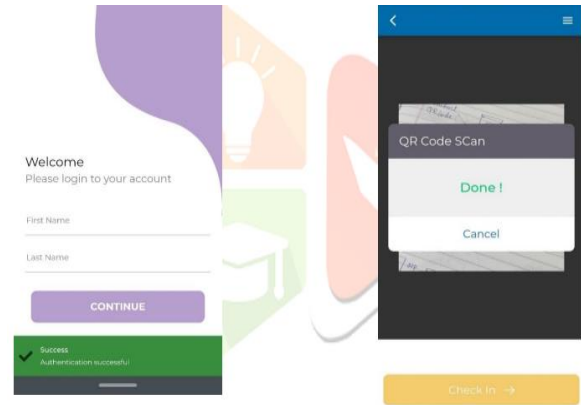


Fig:4 The top two images display student registration information and, when clicked, transport the user to a screen with a QR code scanner.

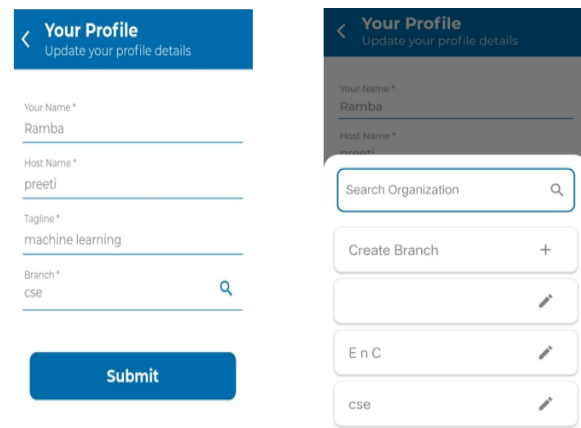


Fig:5 These two pictures show branch and organization details as well as staff details.

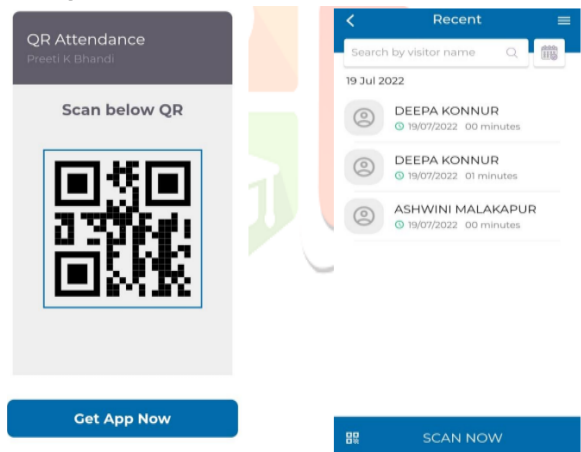


Fig:6 The above pictures show the QR code created by staff for the subject; upon scanning, student attendance will be clearly recorded in the database.

V. CONCLUSION AND FUTURE SCOPE

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 smart phones 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.

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.

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