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Attendance Management System Using QR-Code Verification

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Abstract: *Student attendance has become one of the concerns at colleges in recent years. Teachers marking the attendance of students manually has become a tedious job and time consuming.[1] The other way is by introducing recourses such as semi-conductor chips in the student's identity card which are not cost-effective as semi-conductor chips put in extra cost. Along with that there has been a shortage of semi-conductor chips in recent years and post pandemic the technology has evolved a lot due to online classes and many more.[2] To overcome, we need a cost-effective and an automated attendance management system is required. Attendance Management System Using QR-Code Verification Technique is one such online application developed for the ease of marking the attendance of the students. The proposed system is one of the effective, time saving and cost-effective software developed. The software uses Quick Responsive codes (QR codes) to mark the attendance of students by reducing the manual work. The problems of a student creating clone version of app or creating parallel space to log in to other student's account to mark proxy can arise. Another problem that might arise in the existing systems are that the QR codes can be shared among the students due to which the students can mark their attendance from anywhere even though they are not attending the classes. The proposed application comes with advanced features where all these problems are resolved, assuring the application to be dynamic and safe. The students can even view and maintain their attendance from this application by attending classes. This makes the system efficient in speeding up the process. The lecturer can even track the student attendance easily with the application round the clock. This application has been made completely smooth and responsive to the user making it feasible from the beginning.*

Keywords: QR Codes, Automation, Semi-Conductor chips, Responsive, Python, MySQL

I. INTRODUCTION

The proposed system is an application that has been developed for marking and maintaining the student attendance simplifying the manual work by automating the process of marking the attendance. The existing systems consist of manually calling out of names which would be consuming more time which could lead to marking of proxy attendance in a huge crowd. The other systems which would use biometrics or semi-conductor chips to mark attendance are expensive since the shortage of the semi-conductor chips in recent years. This could be overcome by automating the system with only software technologies that could be utilized by everyone. Hence, this application is more efficient, user- friendly for marking and managing the attendance by saving time.

II. GOALS AND OBJECTIVE

The goal of the project is to design an application that can automate the process of marking the attendance of the students using the devices that could be accessible by everyone which would be cost-effective for the institutions. The proposed system shall provide an efficient and user-friendly platform for teachers as well as students. Hence, this system minimizes the limitation of the existing system saving time and displaying accurate attendance details to the students and teachers.

III. EXISTING AND PROPOSED SYSTEM

- **Existing System:** In the existing system the problem is the manual documentation of attendance. It is difficult to mark attendance of students manually by calling out their name. The manual documentation could also lead

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to proxy of attendance. The other system such as biometrics where semi-conductor chips are used have become expensive and due to shortage of the semi-conductor chips throughout the world. The other QR-code based attendance systems use other approaches by combining the QR-codes with Global Positioning System (GPS)[3] or Facial recognition which would again be expensive for the software since storing them and fetching accurate results would lead to have high end servers which would be expensive.

- **Proposed system:** The proposed system is aimed to automate the whole process by marking the attendance of the students. The system is efficient enough to mark the attendance of the students to the respective subjects that are handled by the respective teachers only. To avoid the proxy of the attendance by students the proposed system uses Media Access Control (MAC) address to avoid the problem helping the software to be efficient. The students can easily manage the attendance by viewing the details through the application. The teachers can also view the attendance details of the students for the respective subject they take. The system has been developed to be user-friendly, smooth and feasible for the users from the beginning.

IV. MODULES

This project keeps track of modules such as: Admin module, student module, teacher module and classroom module.

- **Admin Module:** This module enables the administrator to have complete access to the database where they can add a student or teacher, edit their details or make necessary changes in the information of the students or teachers as per requirements.
- **Classroom Module:** This module generates a QR-code which can be scanned by students and teachers to mark their attendance.
- **Student Module:** In this module, students have to scan the QR-codes displayed on the classroom entrance in order to mark their attendance. They can even view their attendance details in this module.
- **Teacher Module:** In this module, teachers can mark the attendance of the students and can view the student attendance of their respective subject

V. DATA FLOW DIAGRAM

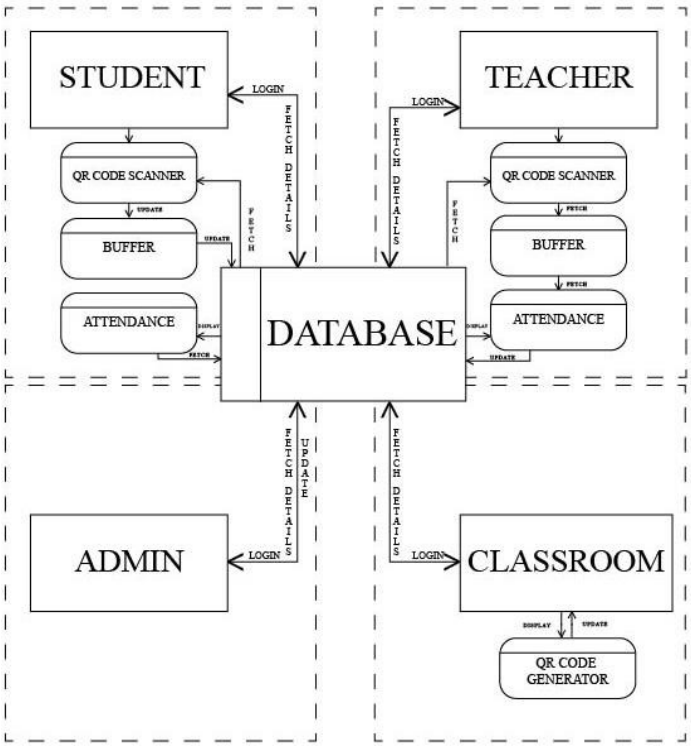

Figure 5.1: Data Flow Diagram of the Complete System

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VI. QUICK RESPONSIVE CODES

They are machine readable matrix barcodes containing data for a tracker or identifier or for a locator with a greater storage capacity of data when compared to standard barcodes. The data present can also be encoded with the help of QR- codes.[3][4]

Figure 6.1: QR Code

There are different variants of QR codes like Micro QR code, IQR code and SQR code.

Micro QR Code: It is the smaller version of standard QR code where the symbol size would be limited with 11X11 modules. The largest can hold maximum of 35 numeric characters.

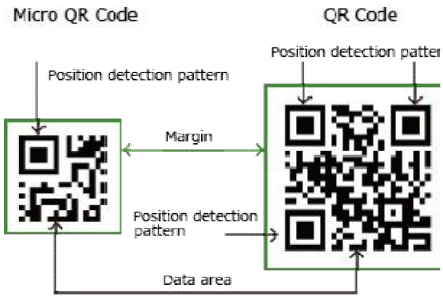

Figure.6.2: Micro QR Code

IQR Code: They are alternate to existing QR codes which can store the same amount of data in 30% less space compared to that of a standard QR code. The minimum size of a IQR code is 9X9.

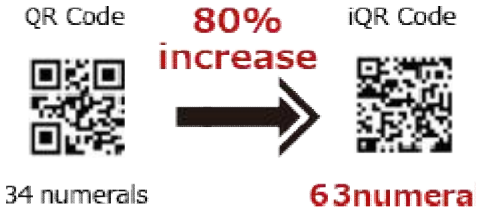

Figure 6.3: IQR Code

SQR Code: It means Secure Quick Responsive Code which contains private data segment which is deciphered with encryption key. The scanned QR code must be appended with a SHA-2 cryptographic hash.

VII. FUTURE ENHANCEMENTS

The proposed system can be enhanced in further by updating the application to use facial recognition along with scanning of the QR-Codes to improve the security of proxy marking of attendance. The system can also be made available with features to track complete academic details of the students

VIII. CONCLUSION

ATTENDANCE MANAGEMENT SYSTEM USING QR CODE VERIFICATION TECHNIQUE has been developed to overcome the faults present in the existing systems. Through this system the manual work of marking attendance or marking attendance with the devices that comprises of semi-conductor chips have been reduced making the system to be cost-effective, efficient, responsive and feasible from the beginning to the users reducing the risk of proxy marking of attendance.

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