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Automating Employee Attendance and Monitoring by Admin Using QR Codes

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Abstract:
Companies usually monitor the participation of employees using old-fashioned methods such as manual registers, login sheets or biometric systems. These methods can take a long time, be susceptible to errors and be difficult to keep up with. These traditional methods not only make things more difficult but also make it difficult for administrators to monitor things accurately, openly and in real time. To bypass these problems, we need a technological solution that automatically monitors attendance and does not require much manual work. This study suggests an automated solution for monitoring and recording employees' attendance using unique QR codes that can be scanned by mobile phones or webcams. The administrator pays attention to the data collected and is assured that it is safely stored, easy to access and can be monitored in real time. This technology reduces errors, increases productivity and makes employees more reliable by getting rid of manual tasks. This method also promotes openness between employees and managers and shows how QR code technology can be used in the daily operations of the company.

Keywords — **QR code, Attendance, Webcam, Smartphone, Accuracy.**

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I. INTRODUCTION
Automated technology-based methods take over the role of manual attendance systems in today's rapidly developing workplaces. Automating employee attendance and monitoring by admin using QR codes is a new way to monitor by admins using QR codes is a new way to monitor and manage participation using "Quick-Response (QR)". This technique works well for both employees and administrators because it uses the fact that smartphones are widely available and QR scanning is easy to use. It can be used in factories, corporate offices and other jobs where the accuracy, efficiency and real-time monitoring are important.

The system makes it easier to combine the central database, QR code, mobile or online applications and scanning devices. Each employee gets a unique QR code that is connected to their profile. When they scan it, their participation is immediately recorded. The system does more than just watching things. This also causes safer operations, can grow with trade, monitors personal data protection laws and gives management useful statistics.

II.LITERATURE SURVEY
Attendance monitoring systems play a crucial role in various domains, including educational institutions, corporate organizations, and government agencies. Over the years, several innovative approaches have been proposed to streamline the process of attendance tracking, aiming to enhance efficiency, accuracy and convenience. In this literature survey, we review and analyse a selection of research articles focusing on different methodologies and technologies employed in attendance monitoring systems.

The centralized attendance monitoring system proposed by Deva Prakash et al. [11] presents a comprehensive framework for automating the attendance tracking process. By leveraging centralized database management, this system offers a unified platform for monitoring attendance across multiple locations or departments. The use of QR codes in attendance management, as discussed in our introductory statement, aligns with the objective of eliminating manual processes and reducing errors. The study emphasizes the importance of centralized data management in ensuring consistency and reliability of attendance records.

Another noteworthy contribution in the field of attendance management is the Attendance Management System (AMS) with Fast Track Analysis proposed by Amir Abas et al. [12]. This system introduces advanced analytics capabilities, enabling real-time monitoring and analysis of attendance data. By incorporating fast track analysis techniques, the AMS enhances decision-making processes by providing timely insights into attendance patterns and trends. The integration of analytics into attendance management systems reflects a growing trend towards data-driven approaches in optimizing organizational processes.

Student data management systems also pay a crucial role in educational institutions, facilitating the efficient handling of student information, including attendance records. The study by Ozwin Dominic Dsouza et al. [13] provides a comprehensive review of student data management systems, highlighting their significance in ensuring data integrity and accessibility. While not solely focused on attendance tracking, this research underscores the broader context in which attendance monitoring systems operate, emphasizing the interconnectedness of various administrative process in educational settings.

In addition to QR code technology, other innovative solutions have been proposed for attendance monitoring, such as RFID (Radio Frequency Identification) and IoT (Internet of Things) integration. Tarun Sharma et al. [14] proposed an automatic attendance monitoring system that combines RFID technology with IoT connectivity, enabling seamless data capture and transmission. By leveraging cloud infrastructure, this system offers scalability and flexibility, making it suitable for diverse applications and environments.

Facial recognition technology has emerged as another promising approach to attendance monitoring, particularly in classroom settings. The Smart Attendance Monitoring System (SAMS) developed by Shubhobrata Bhattacharya et al. [15] utilizes facial recognition algorithms to accurately identify and record students' attendance. By employing biometric authentication, the SAMS offers a secure and reliable alternative to traditional attendance tracking methods. The study highlights the potential of facial recognition technology in addressing challenges related to impersonation and fraudulent attendance practices.

Overall, the literature survey highlights the diversity of approaches and technologies employed in attendance monitoring systems. From centralize database management to advanced analytics and biometric authentication, researchers continue to explore innovative solutions to enhance the efficiency and effectiveness of attendance tracking processes. While each approach has its unique strengths and limitations, the overarching goal remains the same: to streamline administrative tasks, improve data accuracy, and ultimately, support better decision-making in various domains.

III. METHODOLOTY

i) Proposed Work:

The proposed approach to Automating employee attendance and monitoring by admin using QR codes is a fast, cheap and flexible way to handle employees' participation. Employees have their own QR codes that can be made and read using smartphones and other mobile devices. When scanning, your participation is immediately recorded in a secure central database. The system has a report function that allows authorized users to search for data on individuals or department, look at trends in attendance and find workers who might need help with their performance or be on time. Login authentication will be implemented to verify admin access and prevent unauthorized use of the system. Built-in data analysis tools will also provide you with useful information, including finding who is often missing, monitoring employees' involvement

and predicting, how many workers you will need in the future.

ii) System Architecture:

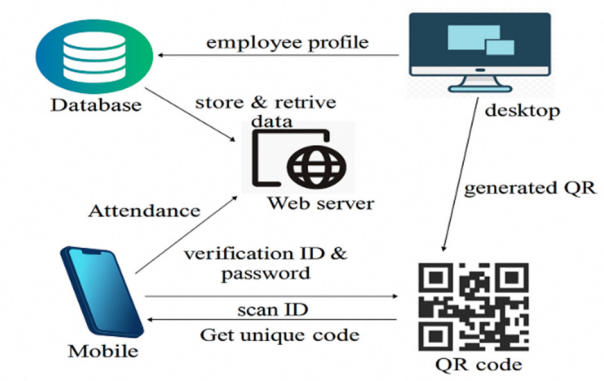


Fig 1 Proposed Architecture

iii) Modules:

To implement this project, we have designed the following modules: they are admin, user and QR code webcam scanner.

a) Admin:

Admin Login: The admin login module enables access to the application's administrative functions by validating admin credentials, including username and password. Admin users authenticate themselves through this module, providing secure access to administrative features and privileged operations within the application. By requiring authentication, the module ensures that only authorized personnel can perform administrative tasks, maintaining data integrity and system security. This module serves as the gateway for administrators to manage system settings, user accounts and other administrative functionalities, enhancing overall control and oversight of the application's operations.

Add new employee details: The "Add New Employee Details" module empowers administrators to input and store comprehensive information about new employees within the system. Admins utilize this module to include vital details such as personal information, contact details, job roles and other pertinent data related to newly onboarded staff. By leveraging this module, administrators streamline the process of integrating new employees into the organization's database, ensuring accurate and up-to-date records. This facilitates efficient management of human resources and enhances organizational effectiveness by centralizing employee information in a structured and accessible format, ultimately contributing to smoother administrative processes and improved decision-making.

Download QR code image: The "Download QR Code Image" module facilitates administrators in downloading QR code images, which are then distributed to employees. Employees can save these images on their mobile devices and utilize them to mark their attendance by showing the QR code to a webcam. This innovative method eliminates the need for physical attendance registers or sign-in sheets, offering a convenient and efficient solution for attendance tracking. By leveraging QR code technology, this module enhances accessibility and flexibility, allowing employees to conveniently record their attendance using their smartphones and webcams, thereby streamlining the attendance monitoring process.

View employee details: The "View Employee Details" module empowers administrators to access and review comprehensive information regarding all employees within the system. Admin can effortlessly navigate through the database to retrieve vital details such as personal information, contact details, employment history, and other relevant data. This module provides a centralized platform for administrators to gain insights into the workforce, facilitating informed decision-making and efficient management of human resources. By offering a comprehensive overview of employee details, this module enhances organizational transparency and accountability while enabling administrators to address employee-related inquiries or concerns effectively.

View attendance: The "View Attendance" module enables administrators to access and review the attendance records of all employees within a specified timeframe. Admins can conveniently select a start and end date to generate a comprehensive report displaying employee attendance for the selected duration. This feature

provides administrators with valuable insights into employee attendance patterns, facilitating performance evaluation and resource allocation. By offering a user-friendly interface to navigate attendance data, this module enhances administrative efficiency and enables informed decision-making. Administrators can utilize this functionality to monitor attendance trends, identify potential issues, and implement appropriate measures to ensure workforce productivity and compliance.

Get attendance: The "Get Attendance" module enables administrators to retrieve attendance data, which serves as the basis for salary calculation and payroll processing. By accessing this module, admins can generate reports detailing the number of days each employee has been present within a specified period. This information is crucial for accurately determining employee compensation, as salaries are often calculated based on attendance records. The **module** streamlines the payroll process by providing administrators with the necessary data to calculate salaries efficiently, ensuring fair compensation for employees in accordance with their attendance performance.

b) User:

User login: The "User Login" module facilitates user access to the application through authentication using unique username and password credentials. Users, whether employees or other designated individuals, utilize this module to securely log in to the system. By requiring authentication, the module ensures that only authorized users can access the application's functionalities, protecting sensitive information and maintaining data integrity. This module serves as the entry point for users to engage with the application, providing a seamless and secure login experience while enabling access to personalized features and data based on individual user roles and permissions.

View your attendance: The "View Your Attendance" module empowers employees to access and review their own attendance records within a specified timeframe. Through this module, employees can conveniently select a start and end date to generate a personalized report displaying their attendance history for the selected period. By offering this functionality employees gain transparency and accountability regarding their attendance performance, facilitating self-assessment and compliance with organizational attendance policies. This user-friendly interface enhances employee engagement and satisfaction by providing easy access to pertinent attendance information, ultimately fostering a culture of responsibility and productivity within the workforce.

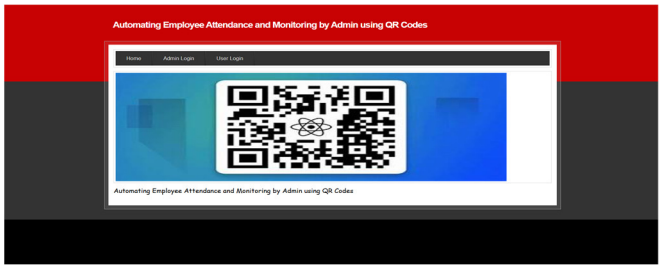
c) QR code webcam scanner:

The "QR Code Webcam Scanner" module allows employees to mark their attendance by presenting their unique QR code image from their mobile device to a webcam. The webcam scans the QR code, registering the attendance of the employee. This efficient process ensures that only one attendance record is marked for each employee per day, enhancing accuracy and preventing duplicate entries. By leveraging QR code technology and webcam integration, this module streamlines the attendance tracking process, offering a convenient and reliable solution for both employees and administrators while minimizing manual efforts and errors in attendance management.

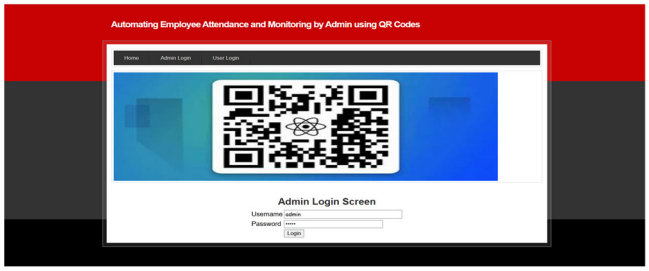
IV.EXPERIMENTAL RESULTS

To start the Python web server and see the screen below, double-click the "Run.bat" file

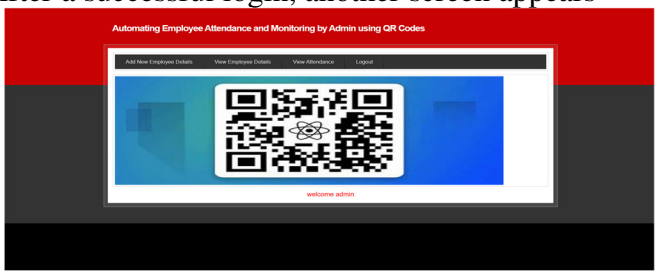
The python web server started on the screen above, "Now open a web browser and enter the URL as "127.0.0.1: 8000/index.html" and press ENTER to see the page below



Click the "admin-login" link on the screen above to display the login screen below

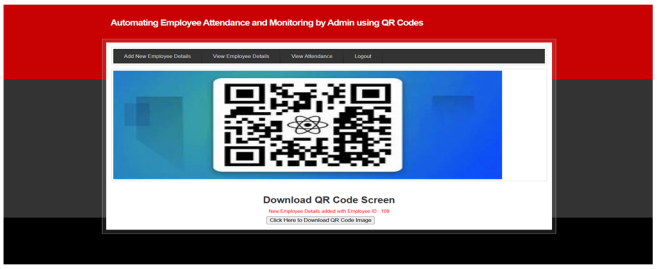


The administrator signed up on the screen above. After a successful login, another screen appears

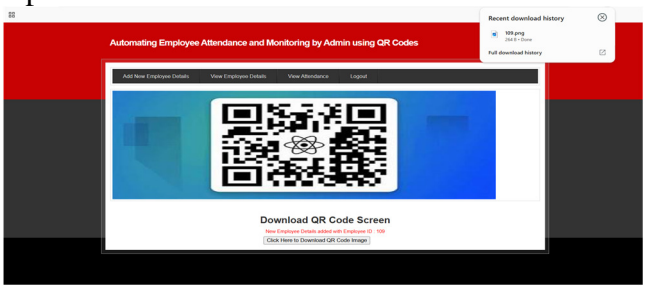


The administrator can click on the "Add New Employee Details" link on the open screen

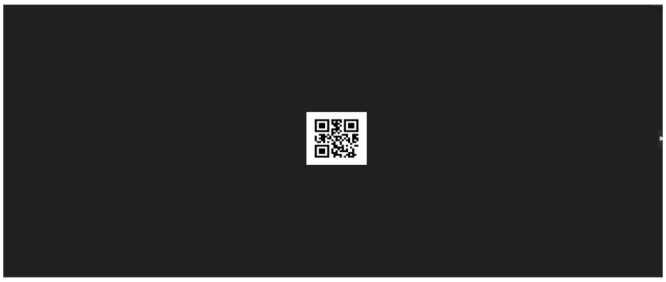
The administrator adds information about the new employee on the screen above. Then click the button to display the screen below



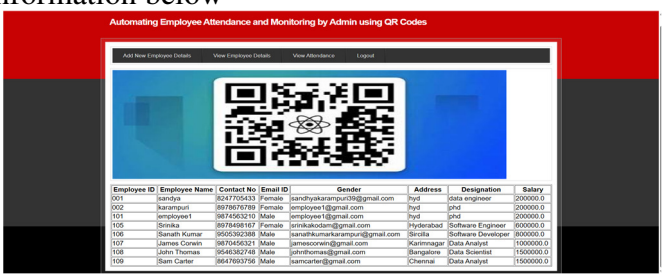
Employee information was added to the above screen. Click on "Click here to download the QR code image", to get a QR code image and see the output below



The browser status order in the picture above shows that the QR image has been downloaded. The administrator will provide this image to an employee who can then keep it on the phone and later show the camera to mark their participation. Now open the image and display the QR code as shown on the screen below



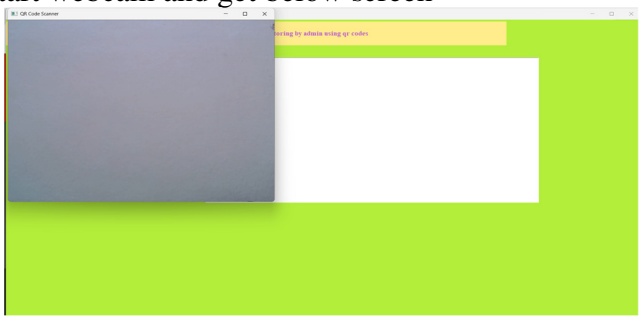
You can see the QR code on the screen above. Now, click "View Employee Details" link to see the information below



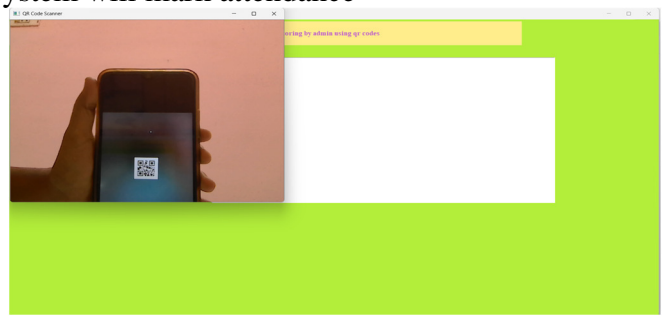
The administrator can see all the information about

the employees on the screen above. To participate, double-click the "Runwebcam.bat" file to display the screen below

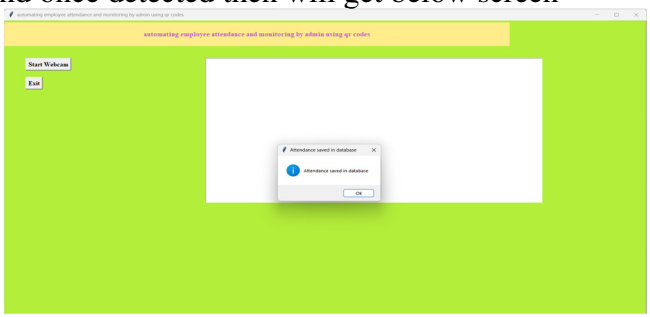
In above screen click on 'Start Webcam' button to start webcam and get below screen



The above screen webcam started and now employee has to show QR code from his mobile like below screen and once QR code detected then system will mark attendance

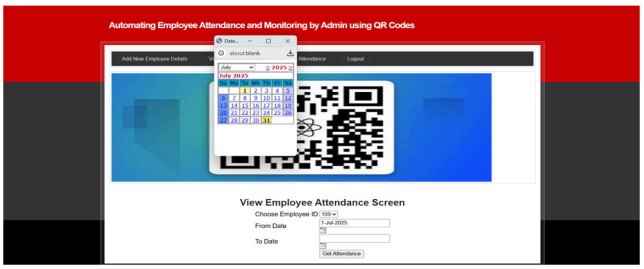


In above screen to webcam I am showing QR code and once detected then will get below screen

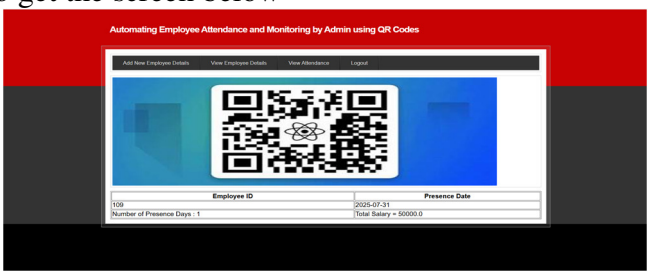


In above screen we got dialog box saying 'attendance saved in database' and the webcam can only scan the QR code of each employee once a day. If you need to scan again, you must first clear all the records associated with it from the database. Then return to the app and lick the "View attendance" link that is shown on the screen below

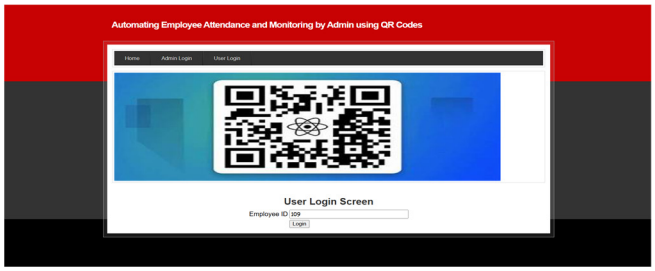
The administrator can see a list of employees' names on the View Employee Attendance screen. You can choose the desired employee and then select the start and end dates as shown below



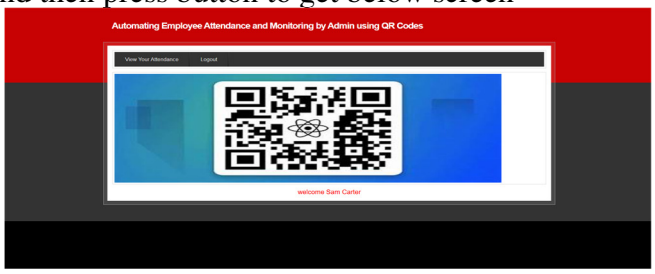
The administrator selects the Employee ID, start and end date and then click the 'Get Attendance' button to get the screen below



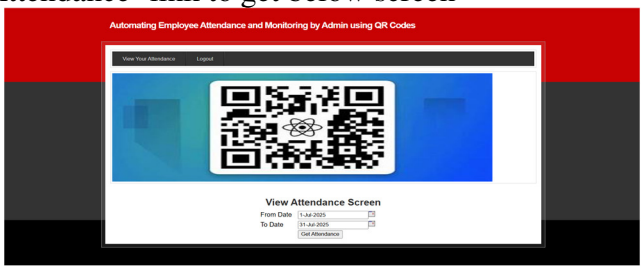
The first column of the above screen indicates the employee's ID; and the second column shows the days present and last column shows the salary that is due on all the days it was there. Now log out and back in as an employee



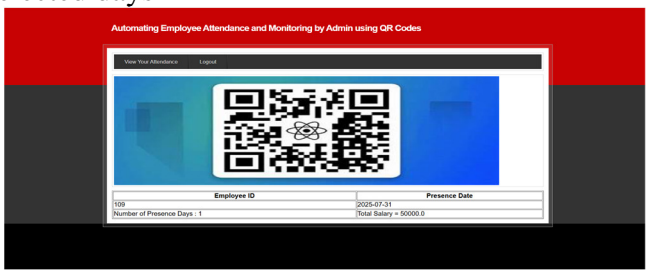
In above screen employee can login by using his ID and then press button to get below screen



In above screen employee can click on 'View Your Attendance' link to get below screen



In above screen employee can select start and end date then press button to view his attendance for selected days



In above screen employee can view all present days and current payable salary.

Similarly, you can add any number of employees and go for attendance and view it.

V.CONCLUSION

The project, Automating Employee Attendance and Monitoring by Admin Using QR Codes, shows that its goals are much greater than just monitoring participation. It is a great way to improve efficiency by replacing slow and error-susceptible human processes with fast and accurate scanning of QR codes. Administrators can gain rapid knowledge through real-time monitoring, helping them proactively manage employee attendance. The system also places great emphasis on maintaining employee data security by assigning unique QR codes for storing records in a centralized database. Its easy-to-use interface makes it easier for administrators and employees to use QR codes in their daily lives and get rid of problems with traditional ways of participation. The study shows how the technology can modernize and simplify the management of attendance by facilitating access and usage immediately. The system adds a layer of security by using encoding for employee information, ensuring the records remain safe from direct exposure.

VI.FUTURE SCOPE

To enhance the project, several features can be integrated. Firstly, blockchain integration can offer heightened security and transparency to the attendance system, ensuring immutable records and mitigating tampering risks. Secondly, improving QR code generation by providing administrators with the ability to regenerate lost codes adds flexibility and convenience for both employees and administrators. This ensures seamless access to attendance tracking, even in the event of misplaced codes. Lastly, implementing voice recognition technology can offer an alternative method for attendance marking, enhancing accessibility and accommodating diverse user preferences. These enhancements collectively bolster the projects efficiency, security and user experience.

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