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# QR Code Attendance System

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**ABSTRACT:** The attendance system using QR codes is an Android-based application developed using Kotlin to automate and improve the management of attendance in educational institutes. Traditional methods of attendance are often inefficient, time consuming and Error prone such as proxy marking. This system provides a secure and efficient way for educators to create specific, time-bound QR codes for each session, which students can scan with their smartphones to record their presence instantly. The application uses validation methods such as session expiration and duplicate entry detection to prevent misuse and ensure accuracy. The system is developed based on the MVVM architecture and Android Jetpack components such as Room Database, Live Data, and View Model, which makes the system scalable, maintainable, and responsive. The application can work without the internet because it uses data storage. This project shows that using Android development methods can create a reliable and easy to use attendance solution that does not cost a lot.

**KEYWORDS:** Android Application, Kotlin, Attendance Management, QR Code Generation, MVVM Architecture, Room Database, Automation, Anti-Proxy Attendance, Offline Data Storage, Educational Technology, Mobile App Development.

## I. INTRODUCTION

The use of software technologies has changed how everyday administrative tasks are done in schools and colleges. This has made tasks more accurate, efficient and automated. One important task that still uses methods is managing attendance. This usually involves calling out names or using paper registers. These methods are time-consuming. Require a lot of effort. They also have problems like errors mismanaging data and fake attendance. To solve these problems a new attendance system with QR codes was created. It is an Android app made with Kotlin. This system offers an digital way to track attendance. In this system teachers can: Manage classes, start attendance sessions, Generate QR codes for each session, Students can then scan these QR codes using their mobile devices to record their attendance instantly. This makes the process quick and easy.

The system has features like: Session expiration, Prevention of entries, This makes the system secure and prevents misuse.

The application is designed using: MVVM architecture, Android Jetpack components, Room Database, Live Data, View Model ensures the code is clean easy to maintain and can grow. The system can store data locally. This means it can work without internet. This makes it reliable in environments. Overall this project shows how modern mobile technologies can be used to create a easy-to-use and efficient attendance management system. The attendance system with QR codes is an example of this. It makes managing attendance easy and efficient. The QR code attendance system is a tool, for schools and colleges.

## II. SYSTEM MODEL AND ASSUMPTIONS

The QR Code Attendance System is designed as an Android app that works on its own. It is based on the Model-View-View Model pattern. The system has two parts: one for Teachers and one for Students. The Teacher part is used to manage classes start sessions and create special QR codes that're only good for a short time. These QR codes have a code for each session. The Student part uses the phone camera to scan the QR code and figure out what session it is for. When a student scans the code the app checks to make sure it is a session that it has not expired and that the student has not already signed in for that session. If everything checks out the app saves the attendance record on the phone using a kind of storage called Room. This way all the information about users, classes, sessions and attendance is kept organized.

The app works completely on the phone without needing to connect to the internet. It uses tools called Live Data and View Model to make sure everything runs smoothly and the screen looks right. We assume that all users have Android phones that can run the app and have a camera to scan the QR codes. We also assume that the QR codes are used in a place and that they expire quickly like after 5 minutes so someone else cannot use them. Each user has an identity in the system so we can keep track of who is signing in for which sessions. We also assume that the phone can store information safely without needing to connect to the internet and that users will use the app correctly without trying to cheat. It is also important that the time, on the phone is set correctly. The app can tell when a session has expired. We think it is important to be fair, honest and respectful of users privacy when designing the system so everyone can trust it and work together smoothly. The QR Code Attendance System is a way for Teachers and Students to keep track of attendance using QR codes. The system is designed to be easy to use and to keep everyones information safe.

### III. EFFICIENT COMMUNICATION

The QR Code Attendance System makes communication more efficient. It replaces manual attendance processes with a new QR code method. This system lets students mark attendance at the time by scanning a QR code. It reduces delays. Gets rid of extra communication problems. When students scan they see a confirmation on their screen. This way they know their attendance was recorded correctly. There is no confusion.

Instructors can see attendance status in time. They can monitor student participation instantly without having to intervene The system works well without internet because it uses local processing and Room-based storage. This means network delays are avoided. The app is designed to be easy to use for both educators and learners. Overall the QR Code Attendance System makes communication faster more reliable and transparent in the attendance process. The QR Code Attendance System helps to improve the way attendance is recorded. The QR Code Attendance System provides an experience, for everyone involved.

### IV. SECURITY

#### 1. Time-Bound QR Code Generation:

Each attendance session uses a dynamically generated QR code with a limited validity period (e.g., 5 minutes), preventing reuse and replay attacks.

#### 2. Session Validation Mechanism:

The system verifies whether scanning of the QR code within the active session time to ensure authenticity.

#### 3. Duplicate Entry Prevention:

Attendance is restricted to one entry for each pupil session using unique user-session mapping.

#### 4. Role-Based Access Control (RBAC):

Only authorized teachers can initiate sessions and generate QR codes, while students are restricted to attendance marking functions.

#### 5. Secure Data Storage:

All data is stored locally using the Room Database with structured schema enforcement and compile-time query validation.

#### 6. Timestamp Verification:

Attendance records are validated against device timestamps to ensure accurate session participation.

#### 7. Controlled Session Lifecycle:

Attendance sessions are explicitly started and terminated by the teacher, preventing unauthorized access outside the session window.

#### 8. Data Integrity Constraints:

Primary and foreign key relationships in the Room Database ensure consistency and prevent orphan records.

#### 9. Secure Camera Access:

QR scanning is performed using controlled camera permissions, preventing unauthorized background usage.

#### 10. Application-Level Validation:

Business logic ensures only valid operations (e.g., valid user, valid session) are executed.

#### 11. Protection Against Proxy Attendance:

Combined use of time-limited QR codes, physical presence requirement, and real-time scanning reduces impersonation risks.

## V. RESULT AND DISCUSSION

In the proposed QR Code Attendance System we tested it on Android devices with API level 24 and above in both emulator and real-device environments. The system worked well generating and scanning QR codes in a few seconds. Compared to roll-call methods our system greatly reduces the time it takes to mark attendance as multiple students can participate at the same time. The QR code is only valid for a time and we have a system, in place to prevent duplicate scans, which helps prevent proxy attendance and ensures the data is accurate.

We used the Room Database to store data which provides fast access and allows the system to work smoothly even when offline. Also updating attendance in time helps instructors keep track of who is participating and reduces the administrative burden. When we evaluated the systems performance we found that it operates stably with little delay even when multiple scans are happening at the same time. However the systems performance can be affected by the quality of the camera. How well the devices time is synced, which can impact how accurately the QR code is scanned and validated.

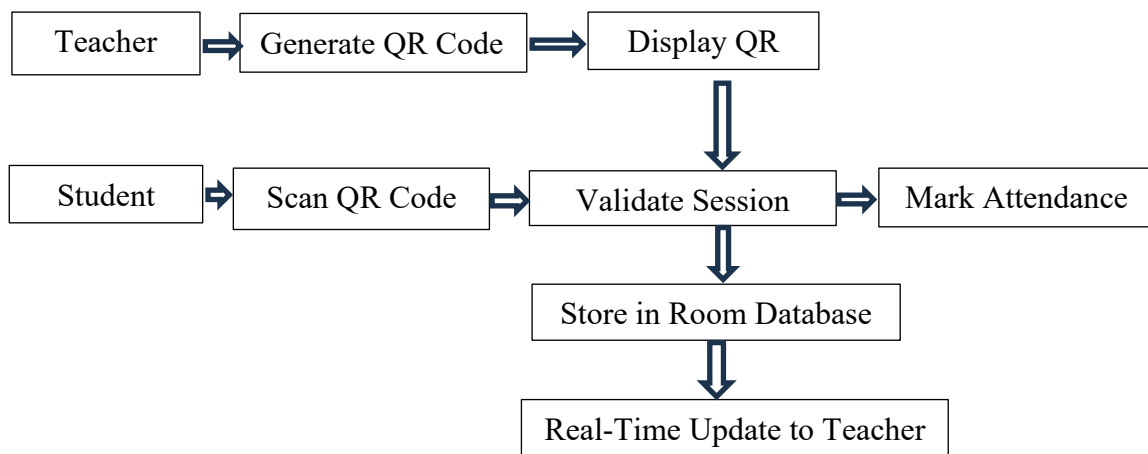


Fig. 1: System Workflow

The teacher starts the attendance process by creating a QR code that is only valid for a short time. This QR code is then shown to the students. Students scan the QR code, with their phones. The system checks if the QR code is still valid and makes sure that no one tries to scan it. If everything checks out the students attendance is recorded in the Room Database. This record includes the students ID and the time they scanned the QR code. The student gets confirmation that their attendance has been marked. The teacher can see who's attended in time. This makes taking attendance quick, safe and easy. The teacher can keep track of attendance without any hassle. The system ensures that attendance is taken smoothly. The QR code helps to speed up the attendance process.

## VI. CONCLUSION

The QR Code Attendance System provides an efficient, secure, and automated solution for attendance management in educational institutions. By leveraging QR code technology, the system eliminates the limitations of traditional methods such as time consumption, manual errors, and proxy attendance. The implementation using Kotlin, MVVM architecture, and Android Jetpack components ensures a scalable, maintainable, and high-performance application. The system's offline capability, real-time updates, and user-friendly interface further enhance its practicality and usability. Results from experiments show increased accuracy, reduced processing time, and reliable performance under various conditions. Overall, the project accomplishes its goals with success and presents a modern, cost-effective approach to attendance tracking, with possibility for upcoming improvements like cloud integration and advanced security features.

#### REFERENCES

- [1] D. Eastlake and P. Jones, "US Secure Hash Algorithm 1 (SHA1)," IETF RFC 3174, Sep. 2001.
- [2] ZXing Developers, "ZXing (Zebra Crossing) Barcode Scanning Library," GitHub Repository, 2023.
- [3] Google Developers, "Android Developers Documentation," 2024. [Online]
- [4] Google, "Room Persistence Library," Android Jetpack, 2024.
- [5] Google, "Guide to App Architecture," Android Jetpack MVVM, 2024.
- [6] J. Smith and A. Kumar, "QR Code-Based Smart Attendance System Using Mobile Applications," International Journal of Applied Computing, vol. 185, no. 12, pp. 25–30, 2023.
- [7] R. Patel et al., "Automated Attendance Management System Using QR Code and Android Technology," IEEE Access, vol. 11, pp. 45678–45689, 2023.
- [8] S. Lee and K. Park, "Secure Mobile-Based Attendance Systems Using QR Codes," IEEE Transactions on Mobile Computing, vol. 22, no. 4, pp. 1123–1135, 2024.
- [9] Kotlin Team, "Kotlin Programming Language Documentation," 2024.
- [10] Google, "Material Design 3 Guidelines," 2024.
- [11] A. Sharma and P. Singh, "Offline Mobile Attendance Systems: Design and Implementation," Advanced Research in Computer Science International Journal, vol. 14, no. 2, pp. 45–52, 2023.
- [12] M. Gupta and R. Verma, "Improving Attendance Systems Using QR Code Technology," International Conference on Smart Computing, 2025.



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