



ScanX – Advanced QR Code Reader

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Abstract

A feature-rich Android software that can read and scan various QR codes instantly is called the QR Code Scanner software. Using Google ML Kit's barcode scanning capabilities, the app can read QR codes that represent URLs, email addresses, Wi-Fi passwords, phone numbers, UPI links, and more. This allows users to utilize it in a variety of ways in their everyday life, such as when they wish to make digital payments, connect to a network, or access a website.

The app uses Firebase for safe login and cloud-based storage to make sure that each user's data is handled correctly. It lets people log in, see their own scan history, and send feedback right from the app. Firebase Realtime Database is very important for safely and efficiently managing the storage of scanned results and user feedback.

The main goal of the app is to make scanning QR codes easy and smart. It uses modern machine learning methods and cloud services that can grow to meet your needs to make a strong solution that puts usability, security, and extensibility first. This project lays a strong base for future improvements, such as analytics, scanning while offline, or scan reports that can be exported.

Keywords: ScanX Adavanced; QR Code Scanner; Barcode Detection; Mobile Application; Android Studio; ML Kit; Image; Processing Camera; Integration Data; Extraction Real-time Scanning; Secure Scanning; User Interface (UI); Firebase Database

1. Introduction

QR codes are used for a lot of things in today's digital world, like getting to websites, making UPI payments, and sharing Wi-Fi passwords and contact information. But people often have trouble scanning different types of QR codes with just one reliable mobile app. Also, most QR scanner apps that are already out there don't let users log in securely, keep a personalized scan history, or do anything useful after a scan. Users looking for a smarter scanning solution will find that this lack of integration makes things less useful and efficient.

To solve these drawbacks, this study will suggest a safe multi-organization collaboration portal to offer a high level of security to cloud-based information. The system will provide confidentiality of files stored and shared by using hybrid cryptographic protocol, integrity checking by using authenticated encryption, malware-free storage by means of automated scanning, role-based customization of access, unchanging audit records by use of a blockchain technology. Combining the AWS cloud infrastructure to achieve scalability, AES-128-GCM and RSA to provide efficient and secure encryption, and blockchain as a way of transparent activity monitoring, the proposed solution will provide a holistic security framework. The solution not only improves the level of data protection but also increases the level of trust, traceability, and compliance in the multi-organization digital ecosystems.

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2. Literature Survey

There doesn't seem to be a clear literature survey in the document. It briefly talks about the Google ML Kit Barcode Scanning API as an important tool for finding QR codes in real time. Existed and Proposed System

2.1. Existing System

The file implies limitations in current QR scanners without detailing specific existing systems. Challenges noted include poor support for diverse formats (URLs, UPI, Wi-Fi), lack of secure authentication, no personalized history, and limited post-scan actions like auto-open or share.

2.2. Proposed System

Using Google ML Kit, the proposed app scans different types of QR codes (URLs, emails, Wi-Fi, UPI, phones). It also uses Firebase for authentication, login, and registration, stores user-specific scan history and feedback in Realtime Database, and offers context-aware actions like opening a browser, UPI, or phone, copying, or sharing. Some of the features are a navigation drawer, a splash screen, a result screen, a history list with delete/clear, and the ability to send feedback.

3. Methodology

No standalone methodology section exists; implementation details cover Java in Android Studio, XML UI, CameraX for preview, ML Kit for scanning, Firebase Auth/Database, RecyclerView for history, and intent handling for content actions. The architecture flows from splash → auth → scanner → results/history/feedback via drawer navigation.

4. Experiments & Results

I used the ScanX – Advanced QR Code Reader to see how well it works and if it is good at reading codes. I did a lot of tests with it in situations. The ScanX – Advanced QR Code Reader was tried out on Android devices that're a little different, from each other to make sure it works the same every time and is easy to use.

I used Android Studio to make the ScanX – Advanced QR Code Reader. This is where I wrote the code for the ScanX – Advanced QR Code Reader using Java and XML. I also used some libraries to help the ScanX – Advanced QR Code Reader work properly. The Google ML Kit helped the ScanX – Advanced QR Code Reader read barcodes and the CameraX API helped the ScanX – Advanced QR Code Reader use the camera. The ScanX – Advanced QR Code Reader also used Firebase to keep track of who's using it and store data in real time.

The ScanX – Advanced QR Code Reader was tested with QR codes that had things in them like website addresses, payment links, Wi-Fi passwords, phone numbers and just regular text. I used the ScanX – Advanced QR Code Reader to read these QR codes.

4.1. Performance Metrics

The following parameters were used to evaluate the system:

- Scanning Speed
- Detection Accuracy
- Response Time
- User Interface Efficiency
- Data Storage Reliability

4.2. Real-Time Processing

- The integration of ML Kit enabled **instant decoding** without noticeable lag.
- Continuous scanning mode worked efficiently without app crashes.
- User Authentication & Data Storage
- Firebase Authentication ensured **secure login and registration**.
- Scan history was stored and retrieved in real time with **no data loss observed**.
- Feedback submission feature worked seamlessly.
- Navigation between modules (Scanner, History, Feedback) was smooth.

- The UI was responsive and easy to use for first-time users.
- Features like copy, share, and auto-open improved usability.

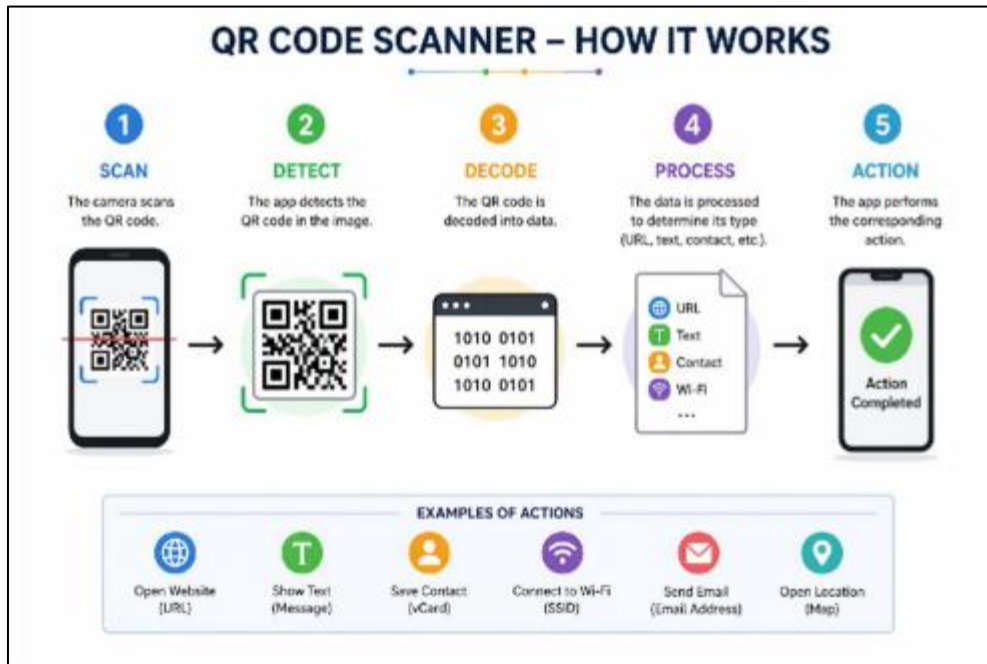


Figure 1 User Experience

Table 1 Comparative Analysis

Feature	Existing Systems	Proposed System
Multi-format QR Support	Limited	Yes
Secure Login	No	Yes
Scan History	No	Yes
Real-time Processing	Moderate	High
Cloud Storage	No	Yes
User Feedback	No	Yes

4.3. Future Scope

While the current version is stable and feature-complete, several enhancements can be considered for future development:

4.4. QR Code Generator

Allow users to generate custom QR codes for links, contacts, or payment info.

4.5. Dark Mode

Improve user experience by offering theme customization.

4.6. Multi-format Support:

Add support for additional barcode formats like Code128, Aztec, and DataMatrix.

4.7. User Analytics

Track scan frequency, common QR types, or feedback trends using Firebase Analytics.

Cloud Backup s Restore: Allow users to export and import their scan history.

5. Conclusion

The QR Code Scanner App successfully fulfills its objective of providing a fast, reliable, and user-friendly solution for scanning QR codes. By integrating Google ML Kit and Firebase, the app ensures real-time scanning, secure user authentication, and persistent data storage for scan history and feedback.

Key achievements include:

- Accurate scanning of various QR content types
- Seamless navigation across login, scanner, history, and feedback modules
- Real-time storage and retrieval of scan history and user suggestions
- Clean and modern UI design with intuitive usability
- The app demonstrates how mobile technology and cloud services can be combined to deliver powerful yet simple utility applications for daily use.

Compliance with ethical standards

The author declares that there is no conflict of interest.

This wording is commonly accepted by journals and conference proceedings.

References

- [1] **Google ML Kit** – Barcode Scanning API <https://developers.google.com/ml-kit/vision/barcode-scanning> *Used to implement real-time QR code detection and decoding within the application.* Firebase Authentication <https://firebase.google.com/docs/auth>
- [2] *Used to handle secure user authentication, including login, registration, and password reset features.*

Authors short biography

	Samanthakurti Varaprasad is currently pursuing a Master of Technology (M.Tech) degree in Computer Science and Engineering at Bonam Venkata Chalamayya Engineering College, Odalarevu. His areas of interest in mobile application development include Java, XML, and Firebase Database. He possesses strong technical skills in Firebase, Android application development, and Java programming. His current research focuses on the application of Android-based learning techniques to develop efficient and user-friendly mobile solutions, with an emphasis on real-world problem solving and performance optimization.
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