



## QR Code Based Hall Ticket Verification and Evaluation System

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**Abstract:**

This paper presents a secure and efficient system for verifying hall tickets via QR codes and logging attendance in examination centers. The system allows invigilators or external staff to scan a candidate's QR-coded hall ticket that encodes a signed token, validate the candidate's identity and eligibility against a backend database, mark attendance, detect potential fraud (such as duplicate scans, expired tickets, or identity mismatches), and trigger automated email alerts to authorities. All transactions are logged in a relational database (MySQL) and administered via a PHP + Bootstrap dashboard. The proposed solution offers rapid verification (under 500 ms), audit-ready logs, and integration into existing institutional infrastructure.

**Keywords:** QR Code, Hall Ticket Verification, Attendance System, Fraud Detection, PHP, MySQL, Bootstrap, Secure Token, HMAC-SHA256, Email Alerts, Web Application, Examination Management, QR Code Scanning, Real-Time Validation, Database Logging

### 1. Introduction

Examination centers face significant challenges related to ticket forgery, impersonation, manual errors in attendance marking, and delayed verification at entry gates. Traditional paper-based hall tickets are prone to duplication and manipulation, and manual verification causes bottlenecks at large entry points. QR-code technology provides a compact, machine-readable format that can encode secure payloads and enable automated verification. In this work, we design and implement a system where each candidate receives a hall ticket embedded with a QR code containing a securely signed token. At examination entry, a scan triggers server-side validation, attendance marking and fraud detection in near real-time.

The system comprises three layers: ticket generation (admin portal), scanning and verification (gate staff), and back-end logging & alerting. Functional requirements include candidate and ticket management, verification API, auditing, and email notifications. Non-functional requirements include performance (verification latency < 500 ms), security (signed payloads, HTTPS), scalability (hundreds of concurrent scans), and auditability (immutable logs). This paper describes the methodology, architecture, implementation, evaluation plan, and relevant prior work.

## 2. Related Work

In recent literature, multiple systems address QR code-based ticketing and verification in educational or event contexts:

B. Balakrishnan and A. Shalini (2024) proposed the “Hall Ticket Generation System with Integrated QR Code” which automates hall ticket distribution embedding QR codes and allows scanning at entry, improving monitoring of attendance and reducing paperwork. (IJRSET)

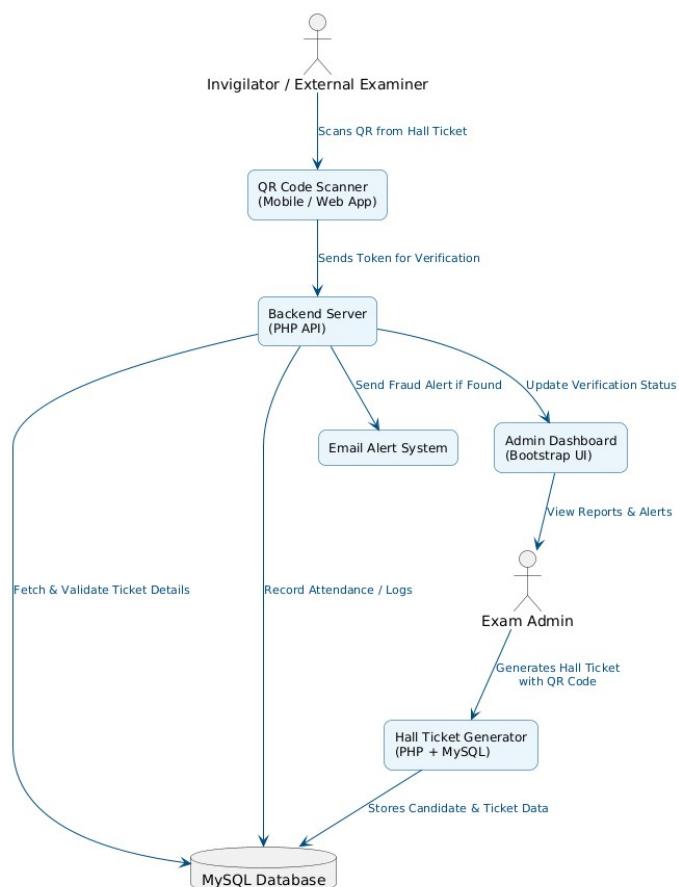
Harish B. G., Chetan Kumar G. S., Akshatha D. B. & Soniya R. S. (2023) developed “A Study on Exam Hall with QR Code” where QR codes encode examination seating information (date, time, row & column) for student seating layout and validation. (IJSDR)

Zulfakar Ali and Abdul Maalik Khan (2024) in “Conduct Online CET and Generate QR Code Featuring Hall Tickets” presented a system for generating QR-coded hall tickets for online CETs, integrating secure login and result generation. (IJRPR)

These prior works primarily focus on ticket generation and scanning for verification. However, they do not comprehensively address fraud detection via duplicate entry monitoring, attendance logging, and automated email alerts as a full solution — the gap this work addresses.

## 3. Proposed System

### A. Architecture



## B. Methodology

1. **Ticket Generation:** Admin uploads candidate list; system generates hall tickets with QR codes encoding a token (e.g., ticket\_id|expiry|signature). Token signed via HMAC-SHA256. Tickets printed/distributed.
2. **Verification & Attendance:** At gate, invigilator scans QR via scanner device (mobile or PC). Scanner sends token + device info to backend over HTTPS. Backend verifies signature, checks ticket status (issued/unrevoked), candidate eligibility, and applies fraud rules (duplicate scan within time window, expired ticket, wrong center). If valid, attendance is marked.
3. **Fraud Handling & Alerts:** If any anomaly arises, the system logs audit event and triggers an email alert to configured authorities.
4. **Admin Dashboard & Logging:** All transactions (verifications, marks, alerts) are stored in MySQL tables AttendanceLogs and AuditLogs. Admin views dashboard built with PHP and Bootstrap to see live stats and export audit logs.

## C. Database Schema (excerpt)

Candidates(candidate\_id, name, reg\_no, photo\_hash, center\_id, email)  
Tickets(ticket\_id, candidate\_id, exam\_id, token\_hash, issued\_at, status)  
AttendanceLogs(log\_id, ticket\_id, scanner\_id, timestamp, device\_info, outcome)  
AuditLogs(audit\_id, event\_type, details, timestamp)

## D. Fraud Detection Rules

The fraud detection logic is simple yet effective. Each scanned QR token is validated against the database records of authorized candidates.

If the candidate record does not exist, or the hall ticket is invalid or unauthorized, the system flags the scan as suspicious.

Immediately, the backend triggers an email alert to the exam administrator for verification and necessary action.

## 4. Implementation

The backend is implemented in PHP (Laravel or core PHP) with MySQL as DB. Admin dashboard uses Bootstrap for responsive UI. QR codes generated via PHP QR library embedding signed token. Scanner device is a web page or mobile webapp that reads QR via webcam (jsQR library), posts to API. The email service uses SMTP or SendGrid for alerts. All API requests secured via HTTPS; signature validation uses secret key stored in backend environment settings.

## 5. Evaluation

To evaluate performance, we propose:

**Latency test:** measure time from QR scan to verification response; target < 500 ms under load of 200 concurrent scans.

**Functional correctness:** test valid ticket flows vs invalid/forged tokens; evaluate false acceptance/false rejection.

**Fraud detection efficacy:** simulate duplicate scans, revoked tickets, incorrect center access and measure alert triggering.

**Usability:** measure average verification time per candidate, error rate, and invigilator feedback in pilot deployment.

## 6. Discussion & Future Work

The system focuses on QR-coded tickets and server-side validation. Future enhancements include:

- Dynamic QR codes (valid for few seconds) to reduce replay attacks.
- Device binding (scanner registration) to prevent unauthorized scanning.
- Face-recognition integration for identity match.
- Blockchain-backed audit log for tamper-proof record keeping.

## 7. Conclusion

We have presented a comprehensive system for hall ticket verification, attendance marking, and fraud alerting using QR codes, as well as an admin dashboard built with PHP/MySQL/Bootstrap. The modular architecture, signed token design, audit-ready logs and real-time alerting provide a practical, scalable solution for educational institutions. With further extensions, the system can enhance exam integrity and streamline verification workflows.

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