College Clinic Tracker & Verifier

*(13 size) A Project Based Learning Report Submitted in partial fulfilment of the requirements for the award of the degree*

*of*

**Bachelor of Technology**

**in The Department of CSE**

**FRONT END DEVELOPMENT FRAMEWORKS**

**(24SDCS01A)**

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**Introduction**

*(Minimum 200 words)*

In academic institutions, student attendance plays a critical role in determining eligibility for examinations, internal assessments, and overall discipline. However, one major issue that frequently arises is the misuse of sickroom or medical room visits by students. Many students exploit the sickroom facility as an excuse for being absent from class, which creates complications when it comes to condonation approval and attendance verification. Faculty members often face difficulty in distinguishing between genuine medical cases and fabricated excuses, since there is no reliable or transparent system to validate medical visits. This gap leads to unnecessary disputes, misuse of institutional facilities, and compromises the fairness of the attendance system.

To address this issue, the College Clinic Tracker & Verifier system has been proposed. This system is designed to provide accountability, accuracy, and transparency in recording and verifying student medical visits. By integrating secure login features for faculty, students, and clinic staff, the system ensures role-based authentication and prevents unauthorized access. The proposed solution incorporates a QR code generator for quick verification, a backend database for storing records securely, and an automated process for generating attendance and medical reports. Such a system not only prevents misuse but also streamlines the condonation process by providing valid proof of medical visits. Ultimately, it promotes fairness, reduces manual verification efforts, and supports digital transformation within academic administration.

**Literature Review/** **Application Survey**

*(Minimum 800 words)*

**1. Background and Need for the System**

The problem of managing student attendance and medical leave verification is common in most colleges and universities. Traditional paper-based systems are prone to manipulation, lack real-time accessibility, and often cause administrative delays. Faculty members are left with little evidence to confirm whether a student’s claim of a medical visit is genuine. In response, academic institutions are increasingly adopting **digital attendance management systems** integrated with medical verification modules. These systems not only improve efficiency but also strengthen the credibility of the institutional framework.

**2. Existing Approaches**

Several solutions have been explored in related works and applications:

* **Manual Verification Systems**: Traditional logbooks are maintained by clinic staff. While simple, they are vulnerable to forgery, lack centralized accessibility, and consume time during condonation approvals.
* **Digital Attendance Systems**: Many institutions employ biometric or RFID-based attendance systems to track student presence. However, these systems rarely integrate medical visit verification, leaving a loophole that students can exploit.
* **Healthcare Information Systems (HIS)**: In hospitals and clinics, patient tracking and verification systems are already in use. These systems use Electronic Health Records (EHRs) to store medical information but are not tailored for academic settings where attendance linkage is necessary.
* **QR Code and Barcode Systems**: Some applications in healthcare and event management use QR codes for quick identity verification. This feature inspired the proposed project to adopt QR codes as proof of a student’s visit to the sickroom.

**3. Related Research Studies**

Research in **student information systems** and **attendance management** highlights the importance of secure authentication and real-time data access:

* Studies on **role-based authentication** emphasize the need for distinct access rights to ensure data security. For instance, only clinic staff should log medical visits, faculty should verify them, and students should only view their history.
* Literature on **digital transformation in education** indicates that automation reduces workload and improves transparency. This aligns with the project objective of generating automated attendance and medical reports.
* Research on **QR-based verification systems** shows their efficiency in reducing fraud, providing quick results, and being cost-effective.

| **Year** | **Study / Source** | **Key Findings** | **Relevance** | **Gaps / Notes** | **Link** |
| --- | --- | --- | --- | --- | --- |
| 2025 | Stoica et al., *Tracking Patient Movements Using an IoT and RFID System* | Designed and evaluated an RFID-based tracking system for real-time patient movement tracking. | Supports machine-readable IDs (RFID/QR) to verify clinic presence and movement. | Requires RFID hardware; privacy & cost concerns. | [Link](https://www.mdpi.com/2305-6290/9/1/34) |
| 2025 | Zhao et al., *Multi-objective layout optimization of hospital outpatient department* | Reduced walking distance, waiting time, and costs through optimized layout planning. | Inspiresanalytics to minimize queue times and travel distances. | Focuses on building layout, not identity verification. | [Link](https://www.nature.com/articles/s41598-025-98388-z) |
| 2025 | Hasibuan et al., *Hospital outpatient waiting time and patient satisfaction* | Found strong link between long waits and reduced patient satisfaction. | Justifies queue/time tracking features for students. | General hospital setting; not campus-specific. | [Link](https://www.socialmedicine.info/index.php/socialmedicine/article/view/1611) |
| 2025 | Wyse et al., *Effect of adding a QR code to patient recruitment materials* | Adding QR codes improved participation and response times. | Shows QR codes enhance participation & quick access to forms. | Research recruitment context; indirect relevance. | [Link](https://formative.jmir.org/2025/1/e66681) |
| 2025 | *Smart Management Waiting System for Outpatient Clinic* (ResearchGate Preprint) | Issued virtual queue numbers via QR scanning for remote waiting. | Directly supports token/virtual queue + QR system in clinics. | Preprint; limited peer review. | [Link](https://www.researchgate.net/publication/373833215_Smart_Management_Waiting_System_for_Outpatient_Clinic) |
| 2024 | Joshi et al., *The Impact and Potential of QR Codes in Healthcare* | Showed QR codes enhance workflows, medication tracking, and information retrieval. | Validates QR codes for low-cost verification and info sharing. | Proceedings paper; not a trial. | [Link](https://journals.sagepub.com/doi/10.1177/10711813241278266) |
| 2024 | Kim et al., *Use of Real-Time Locating Systems in Infection Control* | RTLS improved infection control and patient safety. | Location tracking supports audit trails in clinics. | RTLS is costly; QR may be more feasible. | [Link](https://www.icjournal.org/DOIx.php?id=10.3947%2Fic.2024.0043) |
| 2023 | Song et al., *Mobile app + QR to collect patient-generated health data* | QR enabled continuous secure data collection via hospital systems. | Supports QR-based student check-in & form handoff. | Hospital integration may differ for campuses. | [Link](https://www.sciencedirect.com/science/article/pii/S2666990023000083) |
| 2023 | Abugabah et al., *RFID in Health Care: Real-world adoption SLR* | Found RFID improves patient flow but faces cost and privacy challenges. | Evidence base for machine-readable IDs in clinics. | Focused on RFID; project may choose QR. | [Link](https://www.sciencedirect.com/science/article/pii/S1877050923005392) |
| 2022 | Profetto et al., *RFID in Health Care: Scoping Review* | RFID widely used for workflows; highlighted implementation barriers. | Background on ID tech choices. | Not campus-specific. | [Link](https://pmc.ncbi.nlm.nih.gov/articles/PMC9398041/) |
| 2021 | Cook et al., *Using QR Codes for Patient Education* | QR codes were low-cost and well accepted for delivering patient information. | Supports QR for instructions and clinic policies. | Education focus; not attendance verification. | [Link](https://pmc.ncbi.nlm.nih.gov/articles/PMC8655294/) |
| 2025 | PGI Chandigarh QR-based patient ID & crowd management app (*Times of India*) | Reduced registration time and crowding using QR-based system. | Shows feasibility in Indian healthcare setting. | News source; not peer-reviewed. | [Link](https://timesofindia.indiatimes.com/city/chandigarh/pgi-developing-app-for-patient-identification-crowd-management/articleshow/121916524.cms) |

**4. Applications in Real Life**

The proposed **College Clinic Tracker & Verifier** has several applications and advantages:

* + **For Students**: Provides legitimate proof of medical visits, ensures their genuine cases are recognized, and protects them from unfair attendance deductions.
  + **For Faculty**: Simplifies condonation approval by offering transparent and verifiable records, thus eliminating disputes.
  + **For Clinic Staff**: Reduces paperwork, ensures accurate digital records, and prevents misuse of medical slips.
  + **For Institutions**: Promotes fairness, improves administrative efficiency, and aligns with digital governance initiatives in education.

**5. Advantages over Existing Systems**

Compared to existing manual and digital systems, the proposed tracker offers the following benefits:

* **Security**: Role-based login ensures only authorized users can access sensitive data.
* **Transparency**: Both faculty and students can view medical visit history, reducing scope for manipulation.
* **Automation**: Attendance reports and condonation proofs are automatically generated.
* **Scalability**: Can be integrated with existing college management systems for broader usage.
* **Accountability**: Each medical visit is logged with a QR code, serving as verifiable proof.

**6. Technological Implementation**

* **Frontend**: HTML, CSS, and JavaScript provide an intuitive user interface.
* **Backend**: Java (OOPs) ensures robust logic and system management.
* **Database**: MySQL stores medical visit records securely.
* **Authentication**: Role-based login ensures different user privileges for students, faculty, and staff.
* **Unique Features**: QR code generator for medical proof and automated attendance reports.

**Conclusion from Survey**

The survey of literature and existing systems highlights that while many solutions exist for attendance management, very few directly address the issue of medical visit verification within academic institutions. The **College Clinic Tracker & Verifier** fills this critical gap by combining authentication, automation, and transparency. It draws from best practices in healthcare systems, digital attendance models, and secure login methodologies while customizing them for the academic context.By bridging the gap between **clinic records** and **faculty approval processes**, this system provides a reliable solution that reduces misuse, ensures fairness, and promotes digital record-keeping. Its applications extend beyond condonation approval to creating a more accountable academic environment.