Android Based Visitors Gatepass App with Web Dashboard

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ABSTRACT

The proposed system automates the visitor entry and exit process at institutions like Hari Om Institute using an Android application and a web-based dashboard. The Android app allows employees to register, log in, and request visitor gate passes, while the admin dashboard (developed using ASP.NET and jQuery) handles approvals, QR code generation, and real-time visitor tracking. Once approved, a unique QR code is generated and sent to the visitor for secure gate verification. This digital solution enhances operational efficiency, ensures accurate record-keeping, and minimizes manual errors in the gate management process.

Keywords: *Android, Visitor Management System, Gate Pass, QR Code, Web Dashboard, C#, ASP.NET, jQuery, SQL Server, Security Automation, Real-Time Tracking.*

1. INTRODUCTION

The **Android-based Visitor Gate Pass App** is a smart digital solution designed to modernize and automate visitor management in institutions such as *Hari Om Institute*. It replaces traditional paper-based systems with a more secure, efficient, and organized method for tracking visitor entry and exit. The system is divided into two primary modules: the **User Module** and the **Admin Module**, which work together to streamline the entire visitor process. The application is developed using **Flutter (Dart)** with a local **SQLite database** for offline storage, and it optionally supports a **REST API** for cloud synchronization enabling scalability and real-time data access. The **User Module** is built with a focus on simplicity and usability. Visitors can easily register or log in, submit gate pass requests by entering their details, visit purpose, and date, and then receive a unique **QR code** (generated using the *qr_flutter* library) once their request is approved. This QR code serves as a digital entry pass that can be scanned for entry and exit verification. After their visit, the system displays a confirmation page containing the visitor's entry and exit timestamps. The **Admin Module** offers an intuitive dashboard that provides staff members with complete control over visitor management. After secure authentication, administrators can access features like *View All Requests*, *Approve/Reject Requests*, *Scan Visitor QR Code*, and *View Inside Visitors*. Using the integrated QR scanner, admins can mark visitor entry and exit times and maintain an updated list of visitors currently within the premises. By eliminating manual registers and delays, the system enhances security, transparency, and accuracy through **real-time digital record-keeping**. This centralized platform ensures smoother gate operations, improved visitor tracking, and a more professional environment for institutions adopting smart digital infrastructure.

2. OBJECTIVES

1. To design and develop a complete Android application with distinct User and Admin modules to manage visitor gate passes.

2. To enable users to securely register, submit gate pass requests with their details, and receive a digital pass with a unique QR code.

3. To provide administrators with an intuitive interface to review, approve, or reject visitor requests and to manage visitor flow.

4. To implement a QR code scanning functionality that allows administrators to accurately mark visitor entry and exit times in real-time.

5. To maintain a searchable and organized digital record of all visitor data, including requests, check-in, and check-out times, thereby improving auditability and reporting.

3. LITERATURE REVIEW

Visitor management systems have evolved from manual registers to fully digital platforms that enhance security and streamline operations. Several research works and practical implementations have contributed to this domain.

3.1 Traditional Manual Systems:

Earlier systems relied on handwritten gate registers for visitor entries. These were prone to errors, difficult to maintain, and offered no real-time verification. Manual processes also increased waiting time and lacked data security. Such limitations created the need for automated, digital visitor management [2], [3].

3.2 Web-Based Visitor Management Systems:

Studies such as *Patel et al. (2019)* proposed a web-based visitor tracking system using PHP and MySQL to automate record keeping. Although it improved data storage and accessibility, it lacked mobile accessibility and real-time QR verification, limiting its flexibility for gate operations [3], [4].

3.3 Android-Based Visitor Management Systems:

Recent works like *Kumar and Reddy (2021)* introduced Android applications for visitor registration and entry tracking. These systems allowed visitors to submit details through mobile apps, but most lacked synchronization with a centralized database or admin dashboard, reducing administrative control [4], [5], [7].

3.4 QR Code and Mobile App Integration:

A common approach in modern visitor management is the use of QR codes. These systems generate a unique QR code for each visitor, which can then be scanned for entry and exit. Mobile applications, like the ones proposed in [5] and [6], are particularly effective as they allow users to generate and manage their gate passes on their smartphones, which can also serve as the scanner. The use of mobile apps and QR codes is highlighted as a user-friendly and contactless solution [6], [9].

3.5 System Components and Modules:

Research into gate pass management systems often outlines a modular structure, including components for user registration, admin verification, and data management. These systems typically consist of a User Module where visitors can submit their details and a Gate Pass Generation Module that produces a digital pass [2], [4], [7], [8].

3.6 Advantages of a Digital System:

Literature consistently points to several benefits of digital visitor management systems. They are seen as a way to enhance security by preventing unauthorized entry and providing an accurate log of who enters and exits a premises [2], [5], [8]. Such systems also reduce paperwork, save time for both visitors and staff, and give a positive impression of a well-organized institution. The ability to store records for years and easily search them for reports is a significant advantage over manual methods [1], [9].

3.7 Proposed System Contribution:

The proposed system overcomes these gaps by integrating an Android app for visitor registration with a web-based admin dashboard built using ASP.NET and jQuery. It employs QR code-based validation, real-time entry/exit logging, and optional cloud synchronization through REST APIs. This combination provides a more secure, organized, and scalable approach to visitor management, ensuring both mobility and administrative control [5], [6], [9].

4. PROPOSED METHODOLOGY

The methodology adopted for developing the Android-Based Visitor Gate Pass System involves the integration of a mobile application, web dashboard, and database to create a seamless, secure, and automated visitor management process. The system follows a modular, data-driven, and iterative design approach to ensure scalability, real-time synchronization, and ease of use for both visitors and administrators.

4.1 Frontend Layer:

Android App (User Module):

Developed using Flutter for cross-platform capability. It provides a simple interface for employees or visitors to register, log in, and request gate passes.

Web Dashboard (Admin Module):

Developed using ASP.NET and jQuery, this component enables the admin or security personnel to approve requests, scan QR codes, and monitor visitor movement.

4.2 Backend Layer:

The backend handles all data processing and synchronization between the Android app and the web dashboard. It supports REST APIs for communication and cloud connectivity when deployed on a remote server.

4.3 Database Layer:

The mobile app uses a local SQL Server database for offline storage and caching of visitor data. The backend or cloud system (optional) uses Firebase Realtime Database or SQL Server for maintaining centralized visitor records, approvals, and logs.

4.4 Modules and Workflow:

The system operates through two main modules:

A. User Module (Employee App)

1. Registration and Login:

New users register using their name, mobile number, and email.

Authentication is verified locally or via Firebase.

2. Request Gate Pass:

Users fill a digital form containing fields like visitor name, company, purpose of visit, date, host name, and items carried.

The request is stored in the local or cloud database with the status set as "Pending."

B. Admin Module (Web Dashboard)

1. Admin Authentication:

Admin logs in using secure credentials.

Access is role-based to ensure security.

2. Dashboard View:

Displays categorized visitor requests: *Pending*, *Approved*, *Rejected*.

Admin can filter and search for specific records easily.

3. Approval or Rejection:

Admin reviews the visitor's details and either approves or rejects the request.

Upon approval, a QR code is automatically generated and linked to that visitor's record.

4. QR Scanning and Validation:

When a visitor arrives, the admin or security scans the QR code using the web dashboard scanner.

The system validates the QR code and marks the Entry Time in the visitor log.

Upon exit, the QR is scanned again to record Exit Time and update the status to "Completed."

5. Data Management and Reports:

All visitor activities are logged and stored digitally.

Admin can generate visitor history or audit reports for specific dates or time periods.

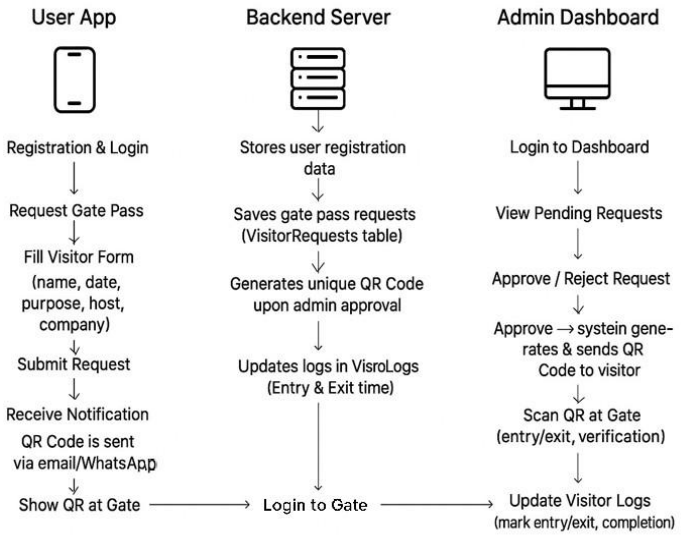

Fig. 1. Flow Chart of Visitor's Gatepass App

5. CONCLUSION

This study presents an Android-based Visitor Gate Pass System that efficiently automates the visitor entry and exit process within institutional premises. By integrating Android technology, QR code generation, and a web-based administrative dashboard, the system enhances the efficiency, accuracy, and security of gate operations. The modular design, with separate User and Admin interfaces, ensures a simple and user-friendly experience for both visitors and staff, while real-time QR verification minimizes manual work and ensures a smooth, error-free process.

The implementation results show that the system provides a reliable and scalable digital solution for managing visitor records, helping institutions maintain accurate and transparent data while reducing paperwork and human errors. Overall, it supports the shift toward a smarter, paperless, and more secure campus environment, with future scope for cloud integration, biometric authentication, and AI-based visitor analytics to enhance scalability and intelligence.

6. REFERENCES

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