

# Hostel Entry-Exit Record digitalization

A project report  
submitted by

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In partial fulfillment of  
the requirements for the degree of  
Bachelor of Technology (Information Technology)

To the  
Department of Information Technology  
Indian Institute of Information Technology, Allahabad



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# Chapter 1

## Introduction

The management of hostel entry and exit records is a fundamental requirement for any residential institution. Traditionally, this process has been handled using manual pen-and-paper methods. Although these methods have been relied upon for decades, they come with inherent limitations and inefficiencies that are increasingly evident in today's fast-paced digital world. The manual system not only consumes a significant amount of time but also leaves room for errors in recording details, leading to discrepancies and lack of trust among stakeholders.

One of the most pressing challenges in the traditional system is the time-consuming nature of recording student movement details. For instance, every time a student enters or exits the hostel premises, a gatekeeper must manually note their details in a register or the student needs to enter his/her details in the record book. This process not only creates delays but also becomes cumbersome during peak hours when multiple students are arriving or departing simultaneously. Moreover, manual data entry is prone to errors, such as illegible handwriting or incorrect entries, which can lead to disputes or difficulties during audits.

Another significant drawback of the manual system is the transparency. Administrators are often unable to verify a student's records. Administrators should be quickly access or analyze records to confirm who is present or absent from the hostel.

Modern technological advancements provide an opportunity to address these challenges effectively. A digital solution leveraging mobile applications and centralized databases can streamline the process of managing student's Entry-Exit records. By incorporating features like real-time photo capture, Geo-location validation ensures that the process is both secure and user-friendly.

# Chapter 2

## Problem Statement

### 2.1 Overview

The current system for managing hostel entry and exit records relies heavily on manual processes, which are outdated and inefficient. In this traditional approach, gatekeepers or students record movements in a register, which becomes challenging to manage, especially in institutions with a large number of students. The absence of digital records and improper validation leads to inconsistencies and a lack of trust among students, gatekeepers and administrative staff.

### 2.2 Challenges

The manual system for hostel entry and exit management presents several significant challenges, as outlined below:

- **Time-Consuming Manual Processes:** Recording each student's entry and exit manually is tedious and time-intensive. During peak hours, when several students are leaving or entering simultaneously, the process becomes chaotic, leading to delays and frustration for both students and gatekeepers.
- **Error-Prone Data Entry:** Manual data entry increases the likelihood of mistakes, such as incorrect or incomplete details, illegible handwriting or misplaced records. These errors can create disputes or complicate audits, thereby reducing the reliability of the system.
- **Lack of Validation Mechanisms:** The absence of robust validation increases the risk of fraudulent entries. Students can easily manipulate records to their advantage, leading to discrepancies in attendance or leave records.
- **Limited Accessibility and Transparency:** Administrators often struggle to quickly access or analyze records. This lack of transparency creates inefficiencies and makes it difficult to verify attendance or address disputes effectively.

By addressing these challenges, a modernized digital solution can significantly improve the efficiency, accuracy, and transparency of hostel entry and exit management.

# Chapter 3

## Proposed Solution

Our proposed solution is a mobile application that digitalizes the process of hostel entry and exit management. The system introduces automation, efficiency, and transparency by leveraging modern technological tools and practices. The key features of the app include:

- Integration of geo-location restrictions to validate requests.
- Real-time photo capture to ensure authenticity.
- Role-based functionality for students and administrators.
- Restrictions on the type of requests a student can make, based on their current status.

### 3.1 Geo-Location Restriction

The application employs geo-location validation to ensure that entry and exit requests are legitimate and aligned with the student's physical presence. This feature adds a layer of security and authenticity to the process.

- Requests are permitted only if the student is within a 50-meter radius (this can be change based on the accuracy of location) of the hostel gate.
- The app enforces the following rules:
  - A *Leave Request* can only be made if the student is currently inside the hostel.
  - An *Arriving Request* can only be made if the student is outside the hostel.

**Implementation Details:** The system tracks a variable called `inHostel`, which is stored in the user database. This variable governs the visibility of the *Leave Request* and *Arriving Request* buttons in the app:

- When a student registers for the first time, the `inHostel` value is set to `true`, making the *Leave Request* button visible.
- After a *Leave Request* is made, the `inHostel` value is updated to `false`, and only the *Arriving Request* button becomes visible.

- Conversely, when an *Arriving Request* is made, the `inHostel` value is toggled back to `true`, making the *Leave Request* button visible again.

This restriction ensures logical flow and prevents unauthorized or invalid requests.

## 3.2 Camera Integration

To further enhance the system's reliability and accuracy, the app requires students to capture a photo while making entry or exit requests. The captured photo is verified alongside the location to ensure that the request is authentic.

- Students can use either the front or back camera to take a photo.
- After capturing the photo, the app displays a verification screen where students can review the photo and their location.
- Once the student confirms by pressing the *Proceed* button, the app sends the request to the backend.
- The backend validates the request by cross-checking the location and provides appropriate feedback in case of discrepancies.

### **Benefits:**

- Ensures that requests are made only from valid locations.
- Provides a seamless and secure experience for both students and administrators.

## 3.3 Role-Based Functionality

The application also introduces role-based access to cater to different stakeholders effectively:

- Students can make *Leave* and *Arriving* requests as per the defined restrictions.
- Administrators have access to detailed records and can review the status of students in real-time.

By implementing these features, the proposed solution aims to eliminate the inefficiencies of manual record-keeping, reduce human error, and provide a secure and transparent system for managing hostel entry and exit records.



# Chapter 4

## System Architecture

The system architecture of the Hostel Entry-Exit Management System is designed to facilitate smooth operations while ensuring security and transparency. Below is a high-level view of the architecture:

### 4.1 Client-Side

- The client-side application, developed using React Native, will be installed on students' mobile phones.
- Students interact with the application to make requests for entry or exit, upload photos, and use geo-location features.
- Admins will have a dedicated app view to monitor student activities and manage requests.

### 4.2 Server-Side

- The server-side is powered by Node.js, handling all API requests and ensuring the validation of user credentials, geo-location, and photos.
- It also interacts with the MongoDB database for storing and retrieving student records and request statuses.
- The server will communicate with external services, such as OTP verification and image processing tools, if required for additional validations.

### 4.3 Database

The MongoDB database stores all student details, entry/exit requests, timestamps, photos, and other related data. The data is structured to support efficient querying and retrieval.

- **User Collection:** Stores student credentials and profile details.
- **Request Collection:** Stores the history of entry and exit requests, including timestamps, status, and associated photos.

# Chapter 5

## Technologies Used

- **Expo Go:**

- **Use:** Provides a platform for testing and building the application without requiring extensive setup or configuration.
- **Benefits:**
  - \* Simplifies app development with a streamlined development environment.
  - \* Offers a preview feature to test the app instantly on mobile devices.
  - \* Enables faster debugging with hot-reload capabilities.

- **React Native:**

- **Use:** Used for building a cross-platform mobile application that works on Android.
- **Benefits:**
  - \* Saves time by allowing code reuse for multiple platforms.
  - \* Provides a rich ecosystem of libraries and pre-built components.

- **MongoDB:**

- **Use:** Serves as the primary database to store user details, request records, and other app-related data.
- **Benefits:**
  - \* NoSQL database structure makes it flexible for handling dynamic data.
  - \* Provides powerful querying capabilities to retrieve and manipulate data efficiently.

- **Node.js:**

- **Use:** Handles backend operations such as API integration, user authentication, and location validation.
- **Benefits:**
  - \* Provides an extensive package ecosystem through npm (Node Package Manager).

# Chapter 6

## Features

### 6.1 Student Features

- Login and signup functionality.
- Request *Arriving* or *Leaving* status with geo-location and photo validation.
- Real-time request status updates (approved, denied, or pending).
- View history of past requests with timestamps.
- Secure authentication using OTP during signup.
- In-app guidelines for creating valid requests (e.g., location and photo requirements).
- Editable profile information such as phone number and emergency contact.

### 6.2 Admin Features

- View all student requests with details such as name, status, and timestamp.
- Share request records, including duration and timestamps, as required.

### 6.3 General Features

- Geo-location validation to ensure requests are made only within the specified radius.
- Secure backend integration to validate user credentials and requests.
- Photo capture functionality with validation to ensure requests are legitimate.
- Responsive design for seamless use on different device sizes.
- Offline mode for viewing request history when no internet is available.
- Scalable architecture to support multiple hostels or institutions in the future.

# Chapter 7

## Future Enhancements

- **Mess Rebate Calculation:** Implement a feature that calculates mess rebate based on the number of days a student is away, ensuring accuracy in billing.
- **Event Reminders and Notifications:** Notify students about upcoming events, exams, or deadlines through automated reminders.
- **Emergency Alerts:** Implement a system where students can send emergency alerts with their location to the gatekeeper or admin in case of an urgent situation.
- **Activity Logs and History:** Maintain a detailed history of student movements and interactions with the app, allowing both students and admins to review past actions.
- **Student Feedback System:** Allow students to provide feedback about their experiences and suggestions for improvements, helping to refine the app's features.
- **Integration with Campus Systems:** Integrate with existing campus systems like attendance and transportation schedules for seamless student management.

# Chapter 8

## Conclusion

In conclusion, the Hostel Entry-Exit Record digitalization project aims to provide a streamlined, secure, and error-free process for managing student movements in and out of the hostel. By replacing the outdated manual system with a mobile-based solution, the project significantly reduces human errors, time delays, and inefficiencies.

This digital solution not only enhances the management of hostel records but also brings about a higher level of transparency and accountability. Students can easily access and track their movement history, while administrators can efficiently monitor and manage requests.

The system provides a solid foundation for future upgrades, including the addition of biometric authentication, facial recognition for added security.