ROOMIEBAE
(A PG Finder Platform)

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Abstract: Our project, **RoomieBae,** is developed to make the process of finding and managing student accommodation easier, faster, and more reliable. Many students face challenges when moving to a new city, such as lack of verified information, difficulty in connecting with landlords, or uncertainty about roommates. **RoomieBae** aims to solve these problems by providing a single platform where students can browse room and PG listings, check details, communicate directly with landlords, and even find compatible roommates. The app also integrates features like location-based search, user reviews, and secure booking options to ensure transparency and trust. Technically, the project is built using **Flutter** for a smooth cross- platform experience, **Firebase** for real-time updates and secure authentication, and Node.js to support scalable backend operations. With a clean interface and simple navigation, even first-time users can easily explore and finalize accommodation options. By saving time and reducing stress, **RoomieBae** not only improves the student housing experience but also helps create a more connected and reliable student community.

Index Terms: Student Accommodation, Room-Finding App, Flutter, Firebase, Android Application, Property Listing, Rental Platform, Student Housing, Landlord Management, Mobile Application

I. INTRODUCTION

A. Background

In today's digital era, students moving to new cities for higher education often face significant challenges in finding safe and affordable accommodation near their colleges. Existing rental platforms typically provide generic listings that lack verification, locality-based filtering, and direct landlord communication. RoomieBae addresses this issue by offering a dedicated mobile application tailored specifically for student housing. Built using Flutter and Firebase, the system enables students to search for rooms near their institutions, view detailed listings with images, and directly contact landlords. At the same time, landlords can easily add, update, and manage room listings. By centralizing accommodation information into a single platform, RoomieBae enhances accessibility, reliability, and efficiency in the student housing search process.

B. Problem Statement

Traditional accommodation search methods and generic rental platforms provide static listings and lack personalization based on students' specific needs, preferences, and proximity to their colleges. This often results in time-consuming searches, unreliable information, and difficulty in directly contacting landlords, leading to a stressful housing experience for students relocating to new cities. The RoomieBae system addresses this issue by offering a dedicated mobile application that enables students to discover verified rooms near their institutions, apply filters such as rent and availability, and communicate directly with landlords. At the same time, landlords can easily list properties, upload images, and manage room availability in real time, thereby improving transparency, convenience, and overall efficiency in the student accommodation process.

C. Objectives

The primary objective of the RoomieBae system is to simplify and improve the process of finding student accommodation through a centralized digital platform. Specifically, the system aims to:

• Enable students to search for rooms or PG accommodations near their colleges.
• Provide detailed room information including rent, location, availability, and images.

• Allow landlords to easily list and manage available rooms.
• Facilitate direct communication between students and landlords.
• Improve transparency, convenience, and efficiency in the student housing process.

II. PURPOSE AND PROBLEM DEFINITION

A. Purpose of the System

The purpose of RoomieBae is to develop a smart, user-friendly accommodation platform that helps students find suitable rooms near their colleges quickly and efficiently. The system enhances traditional rental search methods by providing verified listings, detailed information, and direct landlord contact within a single mobile application, making the housing search process more convenient, reliable, and student-focused.

B. Operational Challenges

• **Dependence on Landlord Updates:** Room availability information relies on landlords regularly updating listings, which may sometimes result in outdated data.

• **Lack of property Verification:** Absence of strict verification mechanisms can affect the authenticity and reliability of some room listings.

• **Inconsistent Listing Quality:** The quality of images and completeness of room details vary depending on the information provided by landlords.

• **Internet Dependency:** The application requires a stable internet connection to access real-time database information and load images.

• **Data Privacy Concerns**: Handling user details such as contact information raises privacy and security considerations.

• **Limited Functional Features :** The system does not include advanced functionalities like online payments or automated verification, making it suitable mainly for basic accommodation search.

SCOPE

The system is designed for use by students and landlords to simplify the process of finding and managing rental accommodations. It includes the following modules:

• Student module for searching rooms based on location, college proximity, rent, and availability.
• Room listing module for landlords to add, update, and manage property details and images.
• Detailed room view providing information such as rent, location, room type, and availability.
• Direct contact feature enabling communication between students and landlords.

RoomieBae is modular and scalable, allowing future integration of additional features such as verification systems, advanced filtering, and expanded housing services.

B. Technical Scope

● **Frontend Framework:** Flutter (Dart)

● **Backend Services:** Firebase

● **Authentication:** Firebase Authentication (Email/Password)

● **Database:** Cloud Firestore (NoSQL Real-time Database)

● **Storage:** Firebase Storage (Room Image Uploads)

● **Platform:** Android Mobile Application

C. Limitations

• Room availability accuracy depends on landlords regularly updating listings, which may sometimes result in outdated or incorrect information.
• Property details and images provided by landlords may vary in quality, affecting the reliability of room descriptions.
• The system relies on user-provided data without strict verification, which may allow misleading or incomplete listings.
• Internet dependency affects real-time data retrieval, image loading, and application responsiveness in low-connectivity environments.
• The current platform offers basic search and filtering, limiting personalization compared to advanced recommendation-based housing systems.
• Privacy concerns arise while handling user information such as contact details, requiring secure data storage and access control.
• System performance may vary depending on device specifications such as processing power, memory, and network capability.

IV. EXISTING SYSTEM / LITERATURE REVIEW

• Traditional accommodation search methods rely on manual inquiries and static listings, lacking centralized digital access for students.
• Existing rental platforms provide general property listings but are not specifically tailored to student needs or college proximity.
• Many systems depend on third-party brokers, increasing costs and reducing direct communication between students and landlords.
• Some online platforms offer filters, but they often lack real-time availability updates and verified information.
• Most existing solutions do not provide a dedicated interface for landlords to easily manage room listings.
• RoomieBae improves existing systems by offering a centralized platform that connects students and landlords directly with location-based search and real-time listing management.

V. SYSTEM DESIGN AND ARCHITECTURE

A. Architecture Overview

The system follows a modular and layered architecture to ensure scalability and maintainability.

B. Key Modules

• Authentication Module

Manages user registration and login using email and password with role-based access for students and landlords.

• **Student Module**
Allows students to search rooms based on college proximity, rent, location, and availability, and view detailed room information.

• **Room Listing Module**
Enables landlords to add, update, delete, and manage room details including rent, location, room type, and images.

• **Room Detail & Contact Module**
Displays complete room information and provides direct contact details of landlords for communication.

• **Landlord Dashboard Module**
Provides an interface for landlords to monitor and manage their listed rooms and update availability status in real time.

VI. METHODOLOGY AND ALGORITHMS

Methodologies

- Modular system design
- Role-based user authentication
- Location-based room search and filtering
- Real-time room listing management
- Secure user data handling

Algorithms

- User authentication and role verification algorithm
- Room search and filtering algorithm
- Room listing and data storage algorithm
- Image upload and retrieval algorithm
- Real-time room availability update algorithm

VII. IMPLEMENTATION DETAILS

A. Technology Stack

- Developed using **Flutter (Dart)**

- Backend implemented using **Firebase**

- User authentication using Firebase Authentication **(Email/Password)**

- Room data management using **Cloud Firestore**

- Room image upload and storage using **Firebase Storage**

- Mobile user interface built with **Flutter Material UI**

- Real-time data synchronization using **Firestore**

- Role-based access system for **Students and Landlords**

B. Security Considerations

- **User authentication** is implemented using Firebase Authentication to prevent unauthorized access.

- **Role-based** access control ensures proper separation between Student and Landlord functionalities.

- **Secure database** access is maintained through Firebase security rules and controlled permissions.

- **User data** such as email and contact details are stored securely in Cloud Firestore.

- **Input validation** is applied to registration and room listing forms to prevent invalid or malicious data entry.

- **Access to room** management features is restricted only to the respective landlord who created the listing.

VIII. CHALLENGES AND SOLUTIONS

• **Challenge:** Outdated or incorrect room listings due to irregular landlord updates
Solution: Implemented room availability toggle and encouraged real-time listing management through the landlord dashboard.

• **Challenge:** Lack of strict property verification
Solution: Restricted room management access to respective landlords and applied structured data entry forms for consistency.

• **Challenge:** Managing image uploads and storage efficiently
Solution: Integrated Firebase Storage with optimized image upload and URL retrieval methods.

• **Challenge:** System performance and real-time data synchronization
Solution: Utilized Cloud Firestore's real-time database capabilities and optimized queries for faster data retrieval.

XI. RESULTS AND DISCUSSION

The RoomieBae system successfully enabled students to search and discover suitable accommodations near their colleges while allowing landlords to manage room listings efficiently. The application demonstrated reliable performance with secure user authentication, real-time database updates, and smooth image upload functionality. The integration of Flutter and Firebase ensured quick response times and effective data synchronization between users. These results confirm the effectiveness of a centralized mobile platform in simplifying the student accommodation process and improving accessibility, transparency, and overall user convenience..

X. CONCLUSION AND FUTURE WORK

The RoomieBae system effectively utilizes mobile and cloud technologies to simplify the process of student accommodation search and management. By integrating secure authentication, real-time database services, and structured room listing features, the application enhances accessibility, transparency, and overall user experience for both students and landlords. The modular design ensures reliable performance, scalability, and ease of future enhancement.

In future work, the system can be expanded to include advanced features such as room verification mechanisms, in-app chat functionality, online payment integration, rating and review systems, and intelligent room recommendation algorithms. These improvements would further strengthen the platform and enhance its practical applicability in the student housing domain.

Future Enhancements

• Implementation of advanced recommendation algorithms to provide personalized room suggestions based on user preferences and search history.

• Integration of in-app chat functionality for direct communication between students and landlords.

• Addition of room verification and document validation mechanisms to improve listing authenticity and trust.

• Integration of online payment gateway for secure booking and rent transactions.

• Development of a rating and review system for rooms and landlords to enhance transparency.

• Expansion of the platform to support multiple cities and broader housing categories beyond student accommodation.

• Enhancement of the landlord dashboard with analytics features such as listing performance and occupancy trends.

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