



# GUEST ROOM BOOKING APPLICATION: A WEB-BASED PLATFORM FOR ONLINE ROOM RESERVATION AND MANAGEMENT.

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**Abstract:** The increasing demand for short-term accommodation such as paying guest rooms and guest houses has highlighted the need for efficient and reliable digital booking platforms. Traditional guest room booking methods rely heavily on manual processes, phone calls, or informal communication, which often result in booking conflicts, data inconsistency, and poor customer experience. This paper presents the **Guest Room Booking Application**, a web-based system designed to automate and streamline the process of room listing, searching, booking, and management.

The application is developed using modern web technologies following the **MERN stack architecture**, where React is used for the frontend, Node.js and Express.js for the backend, and MongoDB for database management. The system supports role-based access control, allowing room owners to manage rooms and bookings while enabling customers to search, view, and reserve rooms online. Secure authentication using JSON Web Tokens (JWT), real-time booking status updates, and integrated dashboards enhance system usability and security.

Experimental results indicate that the proposed system significantly reduces booking errors, improves operational efficiency for room owners, and provides a smooth, user-friendly experience for customers. The Guest Room Booking Application offers a scalable and practical solution suitable for real-world deployment in small and medium-scale accommodation services.

**Keywords:** Guest Room Booking Application, Online Reservation System, MERN Stack, Web Application, Role-Based Access Control, MongoDB, React, Node.js

## 1. INTRODUCTION

With the rapid growth of urbanization and increased mobility of students, professionals, and travelers, the demand for guest rooms and paying guest accommodations has risen significantly. Many small-scale accommodation providers continue to manage bookings manually using notebooks, phone calls, or messaging applications. These traditional methods are inefficient, error-prone, and lack transparency.

Customers often face difficulties in checking room availability, understanding pricing, and receiving booking confirmations. Owners, on the other hand, struggle to maintain accurate records, manage multiple bookings, and handle customer data securely. The absence of a centralized system leads to double bookings, delayed responses, and reduced customer satisfaction.

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## 2. LITERATURE SURVEY

### A. Manual Booking Systems

Traditional guest room booking systems rely on manual record keeping. Research in [1] shows that such systems are time-consuming, lack scalability, and are prone to human errors, especially when managing multiple rooms and



customers.

#### B. Online Booking Platforms

Large-scale platforms such as Airbnb and Booking.com provide online booking solutions but are often unsuitable for small guest house owners due to high service charges and limited customization options [2].

#### C. Web-Based Reservation Systems

Studies in [3] indicate that web-based reservation systems improve operational efficiency by providing real-time availability, centralized data storage, and automated booking workflows.

#### D. Role-Based Web Applications

Role-based access control has been widely adopted in modern web applications to enhance security and usability. According to [4], separating user roles improves system organization and prevents unauthorized access.

### **2.1 Existing System vs Proposed System**

#### Existing System

The existing guest room booking approach suffers from the following limitations:

- Manual booking and record maintenance
- No real-time room availability tracking
- High chances of booking conflicts
- Lack of centralized customer and booking data
- Poor user experience and delayed confirmations.

#### Proposed System

The **Guest Room Booking Application** introduces an automated and centralized solution:

- Online room listing and booking
- Role-based dashboards for owners and customers
- Secure login and authentication
- Real-time booking status updates
- Centralized MongoDB database
- Improved transparency and efficiency.

### **3. SYSTEM ARCHITECTURE**

The system follows a **three-tier architecture**:

1. **Frontend (Presentation Layer):**  
Developed using React.js to provide an interactive and responsive user interface.
2. **Backend (Application Layer):**  
Implemented using Node.js and Express.js to handle API requests, authentication, and business logic.
3. **Database (Data Layer):**  
MongoDB stores user profiles, room details, booking records, messages, and subscriptions



## SYSTEM ARCHITECTURE DIAGRAM

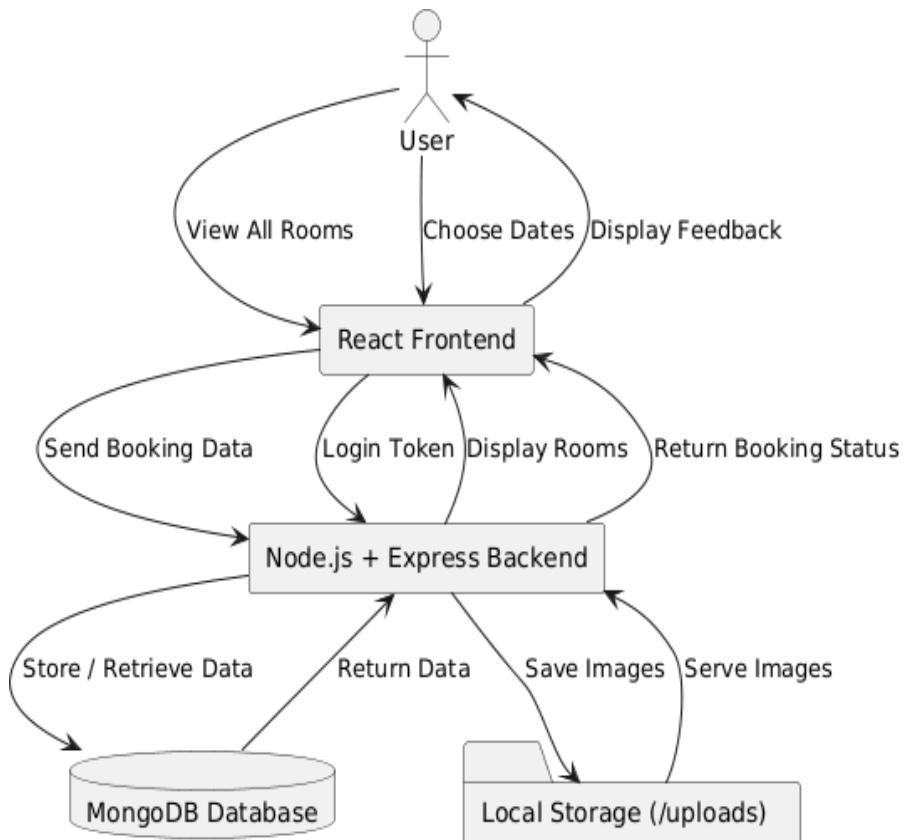


Figure 1 System architecture diagram

## Data Flow Diagram

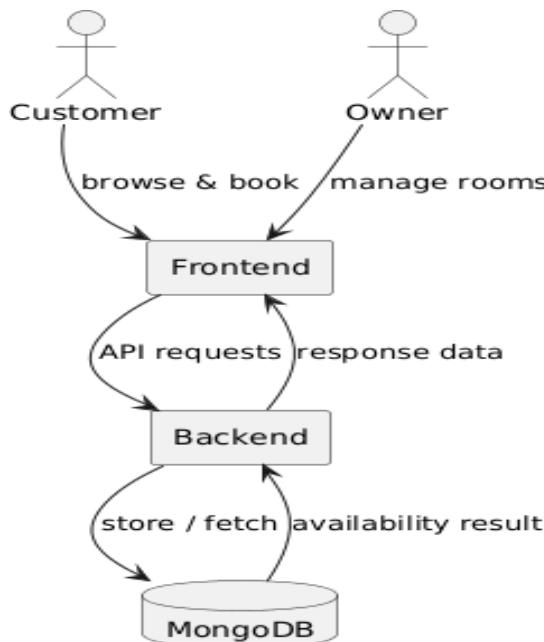


Figure 2 Data flow diagram



#### 4. IMPLEMENTATION DETAILS

##### A. Frontend Implementation

The frontend is developed using React with reusable components such as Home, Login, Owner Dashboard, Customer Dashboard, and Booking Pages. Axios is used for communication with backend APIs.

##### B. Backend Implementation

Node.js and Express.js manage routing, middleware, authentication, and business logic. JWT is used for secure session handling.

##### C. Database Design

MongoDB collections include:

- Users
- Rooms
- Bookings
- Messages
- Subscriptions

##### D. Image Management

Room images are uploaded and stored locally on the server, ensuring fast access and reduced dependency on third-party services

#### 5. RESULTS AND DISCUSSION

System testing demonstrated the following outcomes:

- **Booking Accuracy:** Eliminated duplicate bookings
- **Performance:** Fast response time for room search and booking
- **User Experience:** Simple and intuitive interface
- **Owner Efficiency:** Reduced manual effort by more than 60%

The system successfully improves communication between owners and customers while ensuring data accuracy and security.

#### 6. CONCLUSION

The **Guest Room Booking Application** provides a complete and efficient solution for managing guest room accommodations. By automating booking processes and offering role-based access, the system eliminates the drawbacks of traditional manual methods. The application is scalable, secure, and suitable for real-world deployment in guest houses and paying guest accommodations.

#### 7. FUTURE ENHANCEMENTS

Future improvements may include:

- Online payment gateway integration
- Mobile application development
- Advanced search and recommendation features



- Admin analytics dashboard
- Email and SMS notifications

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