Naan Mudhalvan

Project Report

House Rent App Using the MERN Stack

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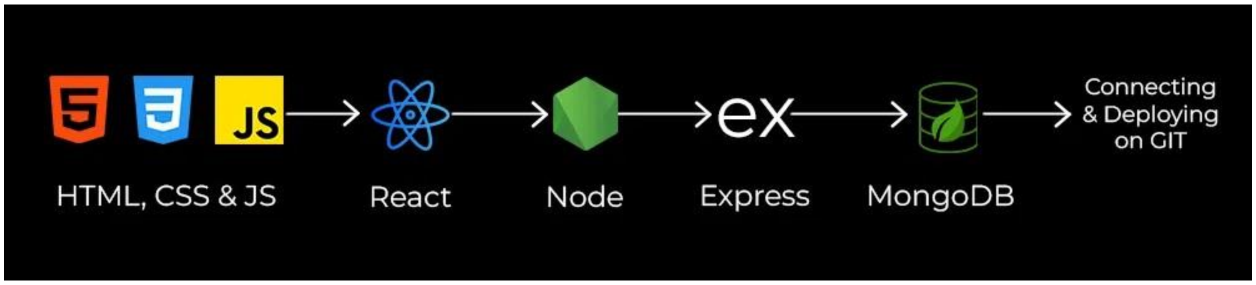
1. Introduction

This report outlines the design and development of a **House Rent App** using the **MERN stack** (MongoDB, Express.js, React, Node.js). The app allows users to rent houses, manage property listings, and handle user authentication. It offers two primary user roles: **Landlords** (who can list properties) and **Tenants** (who can search and view available properties).

The MERN stack is a popular full-stack development framework used to build scalable, high-performance web applications. Each part of the stack provides specific tools that complement each other:

- **MongoDB**: A NoSQL database used to store user and property data.
- **Express.js**: A web application framework for Node.js, used to create the server-side API.
- **React**: A frontend library to build interactive user interfaces.
- **Node.js**: A JavaScript runtime that enables backend development with JavaScript.



2. Objectives

The goal of the House Rent App is to:

- Provide a platform where **landlords** can list their properties for rent.
- Allow **tenants** to browse available properties and inquire about them.
- Implement user authentication to manage access.
- Create an intuitive interface for both landlords and tenants.

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3. System Architecture

The House Rent App follows a **client-server architecture** with a **single-page application (SPA)** frontend and a **RESTful API** backend. Below is a high-level overview of the system components:

- **Frontend (React)**: The user interface is developed using React.js. It interacts with the backend API through Axios for sending HTTP requests and receiving responses.

- **Backend (Node.js + Express)**: The backend is responsible for handling business logic, such as user registration, login, and property management. The backend exposes APIs for the frontend to interact with.
- **Database (MongoDB)**: MongoDB is used to store user information and property data. It is a document-oriented database that is well-suited for handling dynamic data and relationships between documents.

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4. Technologies Used

- **MongoDB**: For data storage. It holds user and property data in collections like `users` and `properties`.
- **Express.js**: A web framework for Node.js used to handle routing and middleware for processing HTTP requests.
- **React**: A JavaScript library for building user interfaces. React is used to build the frontend of the application, which dynamically displays properties and manages user interactions.
- **Node.js**: A runtime environment for executing JavaScript code on the server-side.
- **Axios**: A promise-based HTTP client used to interact with the backend API from the frontend.
- **JWT (JSON Web Tokens)**: Used for authenticating users and managing secure sessions.
- **Bcrypt.js**: A library for hashing passwords before storing them in the database.

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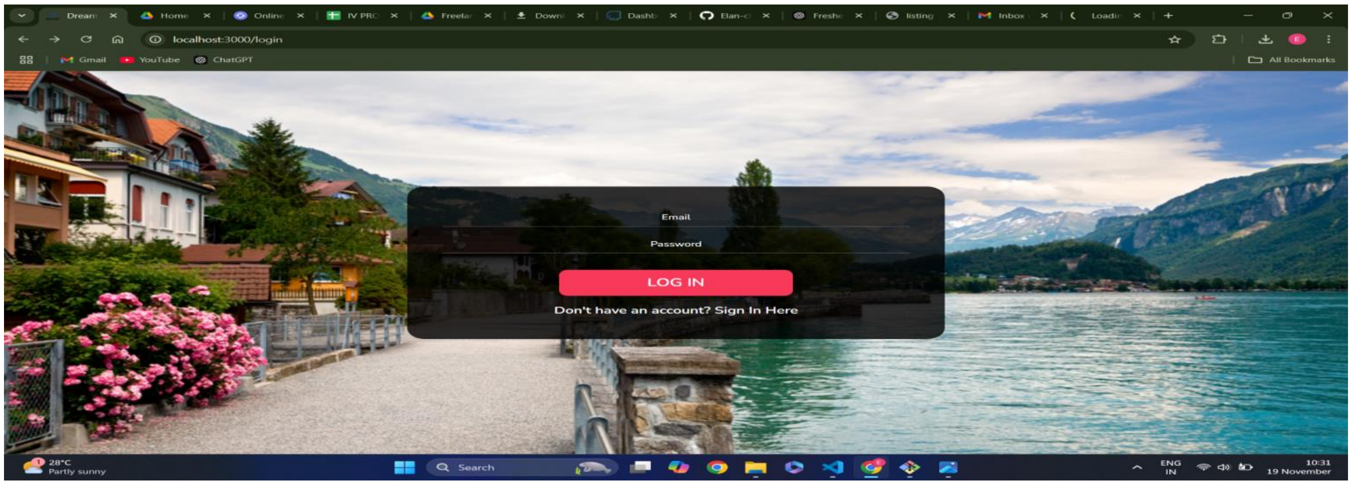
5. Features

The House Rent App provides the following key features:



1. **User Authentication**

   - **Registration**: Users can register with their name, email, password, and role (landlord or tenant).
   - **Login**: Users can log in with their credentials and receive a JWT token, which they use for authenticated requests.
   - **JWT-based Authentication**: The app uses JWT tokens to secure routes, ensuring only authorized users can access certain features (e.g., creating property listings).
2. **Property Listings**
   - **Landlords** can list properties by providing details such as the title, description, price, and location.
   - **Tenants** can view available properties, including details like price, description, and location.
3. **User Roles**
   - **Landlords**: Can add, update, and remove property listings.
   - **Tenants**: Can browse properties, filter based on criteria, and inquire about renting a property.
4. **Responsive UI**:
   - The frontend is designed to be mobile-friendly, ensuring users can access the app on various devices.
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6. Database Schema

- **User Model**
  - `name`: String (user's name)
  - `email`: String (user's email, must be unique)
  - `password`: String (hashed password)
  - `role`: String (either "tenant" or "landlord")
- **Property Model**
  - `title`: String (property title)
  - `description`: String (property description)
  - `price`: Number (price of the property per month)
  - `location`: String (location of the property)
  - `landlordId`: ObjectId (references the user who is the landlord of the property)
  - `imageUrl`: String (URL of the property image)

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7. Backend (Node.js + Express)

The backend handles the business logic, such as authenticating users, adding and retrieving properties, and managing user sessions.

1. **User Routes (Authentication)**
   - `POST /api/auth/register`: Registers a new user.

    - `POST /api/auth/login`: Authenticates a user and generates a JWT.
2. **Property Routes**
    - `POST /api/properties`: Adds a new property (Landlord only).
    - `GET /api/properties`: Retrieves a list of all available properties for tenants.
3. **Authentication Middleware**
    - Ensures that only authenticated users can access certain routes, like posting properties.

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8. Frontend (React)

The frontend provides an interface for users to interact with the app:

1. **Login and Registration**:
    - Users can create an account or log in to access the system.
    - JWT tokens are stored in localStorage to persist the user's session.
2. **Property Listing Page**:
    - A page that displays all available properties with search and filter options.
3. **Create Property Page (for Landlords)**:
    - A form where landlords can submit new property listings with details such as title, description, price, and location.
4. **Responsive Design**:
    - The app is built with responsive design principles, using CSS Grid and Flexbox, ensuring that the interface works well on both desktop and mobile devices.

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9. Authentication and Security

The app uses **JWT (JSON Web Token)** to secure user sessions. When a user logs in, the backend issues a JWT that must be included in the `Authorization` header of subsequent requests. This token is then verified on the server to authenticate the user.

Password Security:

- Passwords are hashed using **bcryptjs** before being stored in the database. This ensures that even if the database is compromised, users' passwords remain secure.

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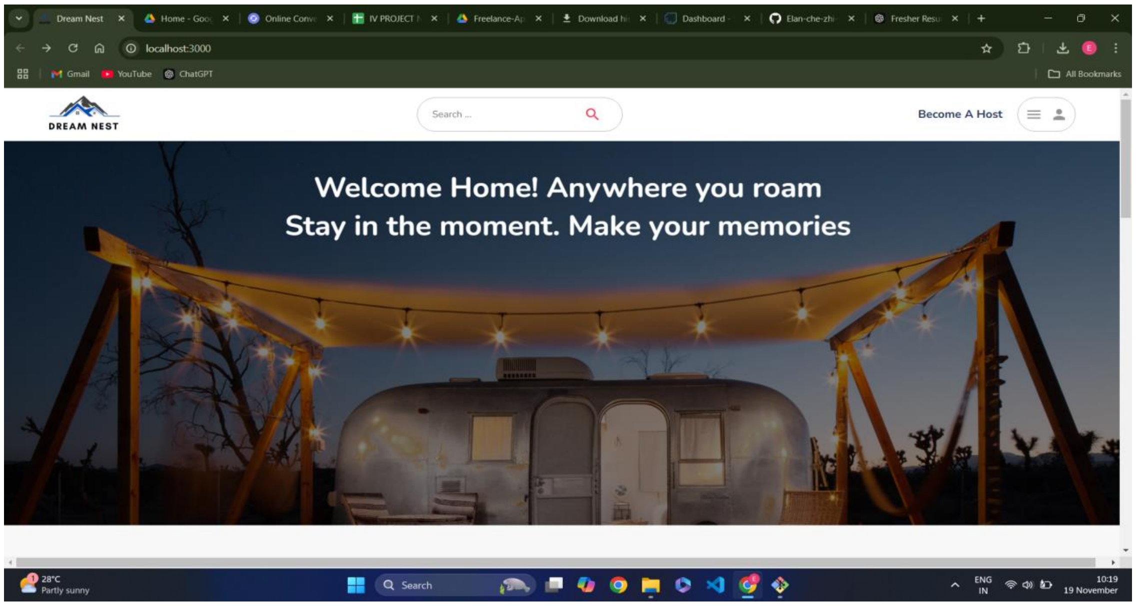
10. Challenges Faced

- **Handling Authentication**: Ensuring secure authentication and authorization of users based on their roles (tenant or landlord) required careful implementation of JWT and middleware.

- **Responsive UI**: Designing a responsive UI that works seamlessly across different screen sizes involved using CSS frameworks like **Bootstrap** and custom media queries.
- **Error Handling**: Proper error handling in both the backend and frontend was crucial to provide clear feedback to users, especially during login and property creation.


localhost:3000
DREAM NEST
Search ...
Become A Host
Welcome Home! Anywhere you roam
Stay in the moment. Make your memories

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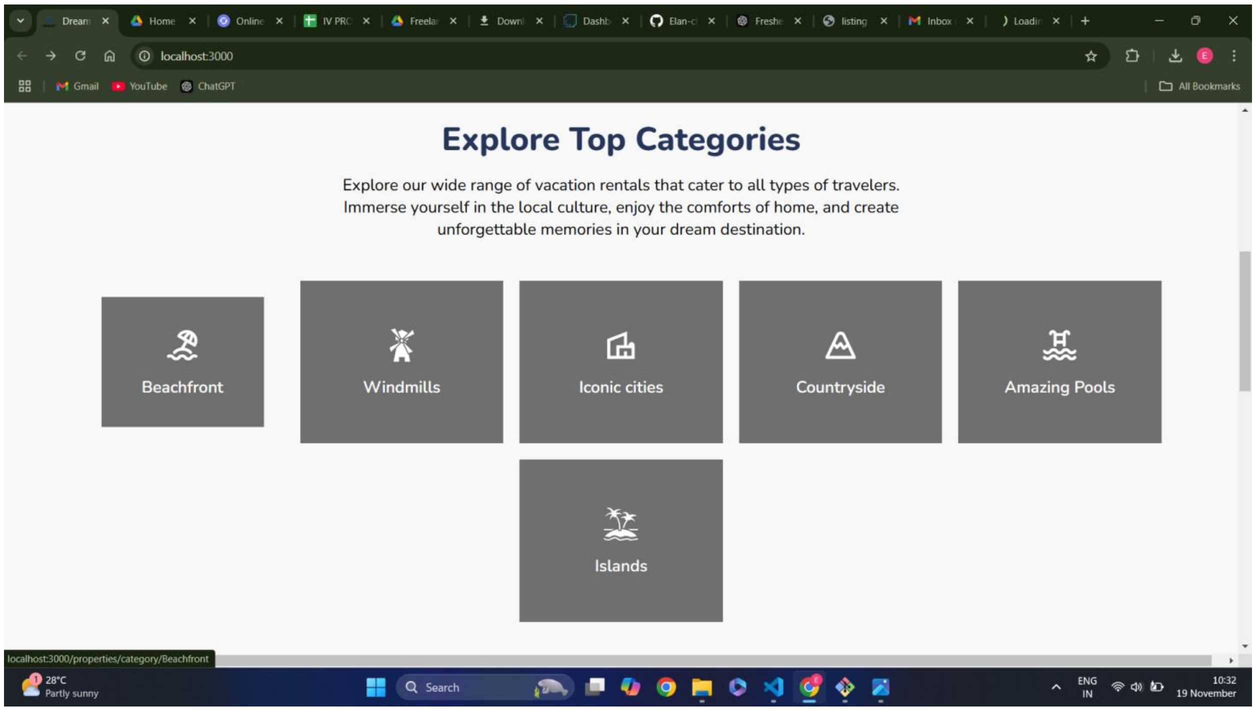
11. Conclusion

The House Rent App successfully demonstrates the use of the **MERN stack** to create a full-stack application for managing property rentals. By integrating MongoDB for data storage, Express.js for API handling, React for the frontend, and Node.js for the backend, this app provides a functional and scalable solution for landlords and tenants. The app supports secure user authentication and provides a simple, intuitive interface for managing property listings.

With additional features such as property search filters, messaging between tenants and landlords, and reviews, this app could be expanded into a full-fledged property rental platform.



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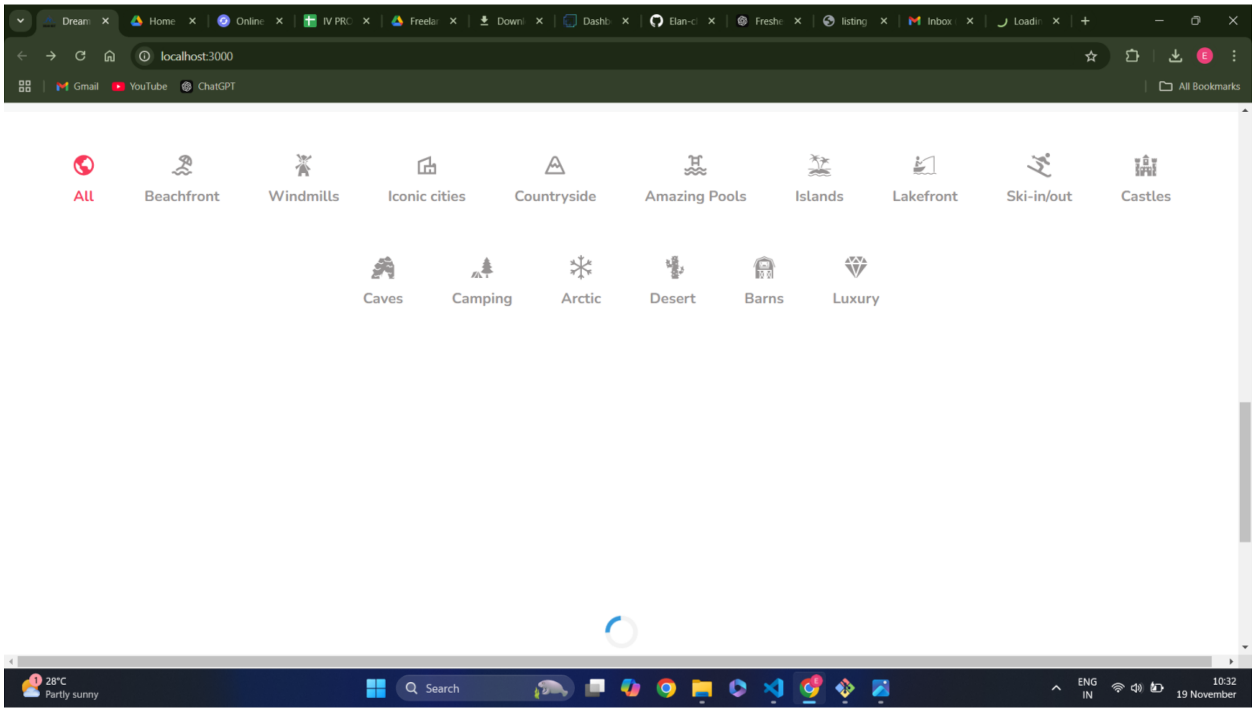

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Iconic cities
Countryside
Amazing Pools
Islands
Lakefront
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