PropEase - Real Estate Management System

Business Requirements Document

Functional Requirements (FRs)

User Management & Authentication

- User Registration: Users must be able to sign up for an account using their name, email, and password.
- User Login: Registered users must be able to log in securely.
- Role-Based Access Control (RBAC): The system must support different user roles (e.g., Admin, Owner/Agent, Buyer/Renter) with distinct permissions.
- Profile Management: Users must be able to view and edit their own profile information.

Property Listing & Management

- Create Listings: Authenticated Owners and Agents must be able to create new property listings with details like location, price, type, amenities, etc.
- Upload Media: Users must be able to upload property photos, legal documents, and link 360° virtual tours.
- Manage Listings: Owners and Agents must be able to update, edit, or delete their own property listings from their dashboard.
- Admin Approval: An administrator must approve all new property listings before they become visible to the public.

Search & Discovery

- Smart Search: Users must be able to search for properties using advanced filters (location, budget, property type, amenities, furnishing).
- Map-Based Browsing: Search results must be displayed on an interactive map with clickable property markers.
- Detailed View: Users must be able to click on a property to see a detailed page with all its information, images, and virtual tour.

Communication & Interaction

- Real-Time Chat: The system must include a WebSocket-based chat feature for instant messaging between buyers, sellers, and agents.
- Appointment Scheduling: Users must be able to book property visits through an integrated calendar system.
- Notifications: The system must send automated email and push notifications for important events like new messages, appointment confirmations, and listing approvals.

Tools & Financials

- EMI Calculator: A built-in calculator must be available for users to estimate their home loan installments.
- Secure Payments: The platform must integrate a payment gateway (like Stripe/Razorpay) to process booking fees or charges for premium listings.

Admin Panel

- User Management: Admins must be able to view, verify, and manage all user accounts on the platform.

- Platform Monitoring: The admin dashboard should provide an overview of platform activity, including new listings and user registrations.

Non-Functional Requirements (NFRs)

Performance

- Fast Load Times: Property search results and listing pages should load in under 3 seconds.
- High Concurrency: The system must support a minimum of 1,000 users at the same time without performance issues.
- Low Latency: Real-time chat messages should be delivered instantly (e.g., under 500ms).

Security

- Secure Authentication: User sessions must be managed using secure methods like JWT (JSON Web Tokens).
- Data Encryption: All sensitive user data (like passwords) must be encrypted both at rest (in the database) and in transit (using HTTPS).
- Vulnerability Protection: The application must be protected against common web attacks like SQL Injection and Cross-Site Scripting (XSS).

Usability & Accessibility

- Responsive Design: The website must provide an excellent user experience on all devices, including desktops, tablets, and smartphones.

- Intuitive Interface: The platform's navigation and layout should be simple and easy for non-technical users to understand.
- Accessibility: The site should be developed to meet basic accessibility standards (WCAG).

Reliability & Availability

- High Uptime: The system should be available to users 99.9% of the time.
- Data Integrity: Automated database backups must be in place to prevent data loss in case of a failure.

Scalability

- Growth Ready: The MERN stack architecture must be designed to handle future growth in the number of users and property listings.

Maintainability

- Clean Code: The source code should be well-organized, documented, and modular to make future updates and bug fixes easier.

User Stories

1. User (Buyer/Renter)

Registration & Account Management

- **As a new user**, I want to create an account using my email and password, so I can access all the features of the platform.

- **As a user,** I want to log in to my account securely, so I can access my saved preferences and information.
- **As a user,** I want to be able to reset my password if I forget it, so I can regain access to my account.
- **As a registered user,** I want to manage my profile information, like my name and contact details, so I can keep my information up to date.

Property Search & Viewing

- **As a user,** I want to search for properties by specific criteria, such as location, price, or type, so I can quickly find what I need.
- **As a user,** I want to filter and sort a list of properties by parameters like relevance or date listed, to narrow down my search results.
- **As a user,** I want to view a list of properties in a gallery format, so I can easily browse available listings.
- **As a user,** I want to see properties displayed on an interactive map, so I can understand their exact location and proximity to landmarks.
- **As a user,** I want to view detailed information about a specific property, including photos, amenities, and a 360° virtual tour, so I can decide if I'm interested.

Interaction & Personalization

- **As a user,** I want to schedule a property visit through a calendar system, so I can arrange a viewing without back-and-forth emails.
- **As a user,** I want to communicate with the property owner or agent through a real-time chat, so I can ask questions directly.
- **As a user,** I want to receive notifications for appointment confirmations and new chat messages, so I stay informed about my activities.

Financial & Planning Tools

- **As a user,** I want to use a mortgage calculator to estimate my monthly payments based on property price, down payment, and loan terms.
- **As a user,** I want to see a detailed breakdown of monthly payments, including principal, interest, property tax, and insurance, so I can understand the full cost of ownership.

2. Property Owner / Agent

Dashboard & Property Management

- **As an owner**, I want to see a dashboard with a quick overview of my properties, including total listings, active listings, and pending approvals.
- **As an owner,** I want to view a list of all my properties with their current status, so I can manage them easily.
- **As an owner,** I want to add a new property listing by providing detailed information, photos, documents, and virtual tour links.
- **As an owner,** I want to edit or delete my existing property listings, so I can keep my information accurate.
- **As an owner,** I want to mark a property as "Sold" or "Rented," so it is removed from active search and I no longer receive inquiries for it.

Analytics & Performance

- **As an owner,** I want to see performance analytics for each property, including how many views and inquiries it is getting, so I can gauge interest.

- **As an owner,** I want to view a summary of my earnings over time, so I can track my revenue from sold or rented properties.
- **As an owner,** I want to have the option to pay to "boost" my listing, so it appears higher in search results for a period of time.

Communications & Scheduling

- **As an owner,** I want to see recent messages from potential buyers or agents in an inbox, so I can respond to inquiries promptly.
- **As an owner,** I want to receive and manage visit requests from my dashboard, so I can approve, reject, or propose new times.
- **As an owner,** I want to see upcoming appointments related to my properties in a calendar view, such as viewings or appraisals.

3. Administrator

Dashboard & Analytics

- **As an admin**, I want to see a dashboard that provides an overview of the platform's key metrics, such as total users, active listings, and revenue.
- **As an admin,** I want to view a graph of weekly performance, including new users and new listings, to track platform growth.
- **As an admin,** I want to see a list of recent activities, such as new registrations or listing submissions, to stay informed about platform events.
- **As an admin,** I want to generate detailed reports on user growth, property performance, and financial transactions.

User & Listing Management

- **As an admin,** I want to view, edit, and manage all user accounts on the platform.

- **As an admin,** I want to filter users by role (e.g., buyer, owner) or status (e.g., active, suspended) to manage them more efficiently.
- **As an admin,** I want to see a list of listings and owner verifications that are pending approval in a dedicated queue.
- **As an admin,** I want to approve or reject new property listings and owner verifications to maintain platform quality.
- **As an admin,** I want to investigate and act on user-submitted reports about fraudulent listings or inappropriate behavior.

Platform Settings & Security

- **As an admin,** I want to manage platform-wide settings, such as the available property types or amenity options in the filters.
- **As an admin,** I want to manage content on static pages like the FAQ and "About Us."
- **As an admin,** I want to update my personal information and change my password.

Interface requirements

1. User Interface (UI) Requirements

This section defines the visual design, user experience, and on-screen elements of the platform.

- **General Design Principles**
  - The UI must be modern, clean, and intuitive, ensuring users can navigate and perform key actions with minimal effort.
  - Design consistency must be maintained across all pages and user dashboards, including consistent use of colors, fonts, and component styles.
  - The system must provide immediate visual feedback for user actions, such as loading spinners during data fetching, success toasts/snackbars on form submission, and clear error messages.
- **Layout and Responsiveness**
  - The interface must be fully responsive, adapting seamlessly to provide an optimal experience on desktops, tablets, and mobile devices.
  - Navigation menus, property grids, and forms must reflow and resize intelligently based on screen size.
- **Key Screens and Components**
  - **Homepage:** Must feature a prominent property search bar that handles location inputs like "Sargasan, Gandhinagar."
  - **Search Results Page:** Must include a toggleable list view and an interactive map view. It needs to display property cards, active filters, and sorting options.
  - **Property Details Page:** A well-organized layout to display the image gallery, virtual tour, property description, amenities, owner/agent details, and action buttons ("Schedule Visit", "Chat").
  - **User Dashboard (Buyer/Renter):** A personalized space with sections for managing profile settings, viewing "My Favorites," and tracking "My Appointments" (pending and confirmed).
  - **Owner Dashboard:** Must feature the specific widgets defined in the user stories: quick overview stats (total listings, active listings), a list of properties with their status, a calendar for appointments, and a message inbox.

- **Admin Dashboard:** A comprehensive interface displaying platform analytics (user growth graphs), moderation queues (pending listings, user reports), and user management tables.
- **Forms:** All forms (Registration, Login, Add Property) must have clear labels, placeholder text, and real-time validation feedback for required or incorrectly formatted fields.

2. System Interface Requirements (External APIs)

This section defines the interfaces between PropEase and external third-party services.

- **Google Maps API**
  - The system will interface with the Google Maps Platform for displaying property locations, converting addresses to coordinates (geocoding), and providing location-based search suggestions.
- **Payment Gateway API (e.g., Stripe, Razorpay)**
  - An interface is required to a secure payment gateway to handle financial transactions for features like "boosting" a property listing. This interface must manage payment processing, success/failure callbacks, and transaction security.
- **Cloud Storage API (e.g., Cloudinary, AWS S3)**
  - The system must interface with a cloud storage provider for all user-generated media. This API will handle the secure upload, storage, and delivery of property photos and legal documents.
- **Transactional Email API**
  - An interface to a dedicated email service is required to send all automated, non-marketing emails, including:
    - Welcome email upon registration.
    - Password reset links.
    - Appointment request and confirmation notifications.
    - New chat message alerts.
    - Saved search alerts.
- **Real-time Communication Interface (WebSockets)**

    - The client and server will interface via WebSockets (e.g., using Socket.IO) to enable the real-time, bi-directional communication required for the instant messaging feature.

3. Hardware Interface Requirements

This section describes the hardware on which the software will operate.

- **Client-Side:** The application must run on standard consumer hardware (desktops, laptops, tablets, smartphones) and support standard input devices (keyboard, mouse, touchscreen). No specialized hardware is required.
- **Server-Side:** The application will be deployed on a cloud platform (e.g., AWS, Google Cloud). The server hardware interface will be managed by the cloud provider's infrastructure.

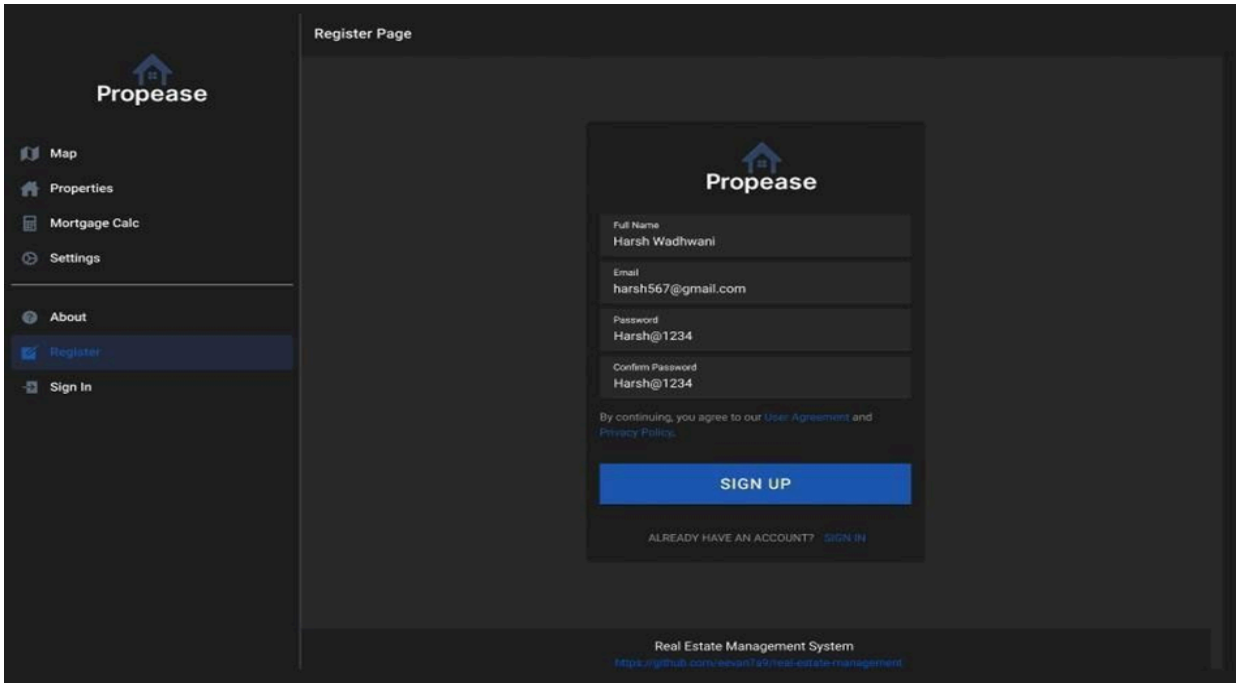
4. Software Interface Requirements

This section defines the software environment and dependencies.

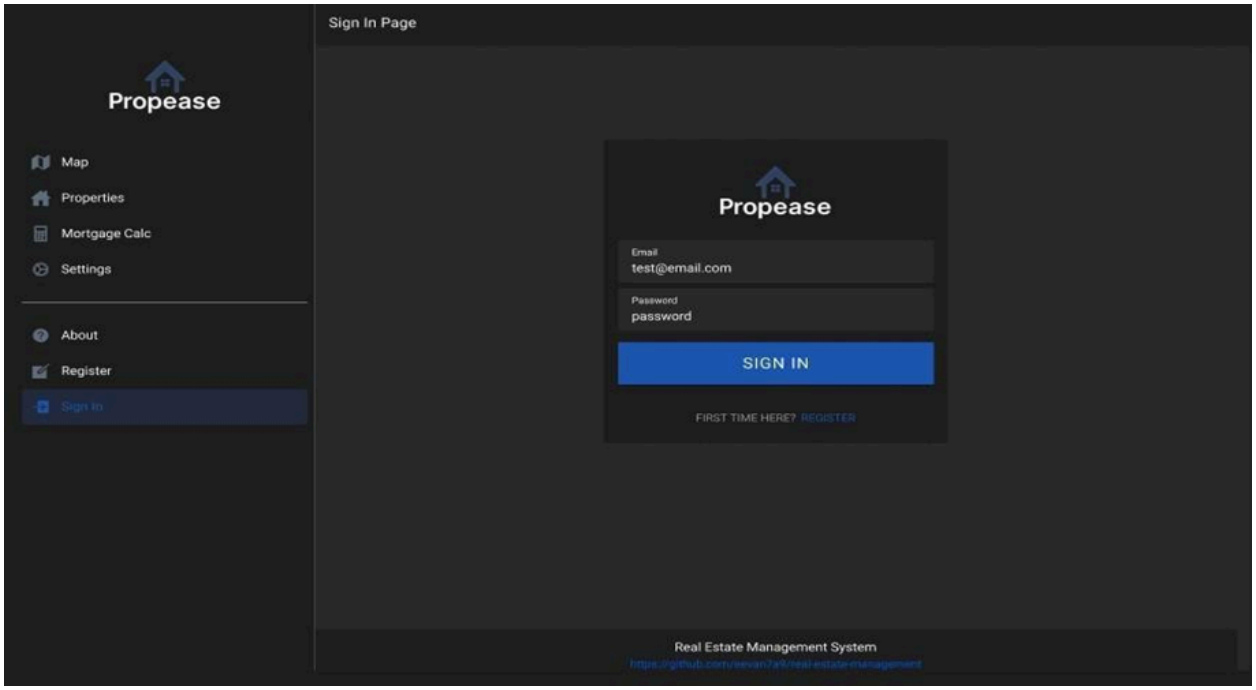
- **Client-Side (User's Device)**
    - **Operating System:** The application must be OS-independent (runs on Windows, macOS, Linux, iOS, Android).
    - **Web Browser:** Full compatibility is required with the latest stable versions of major browsers: Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge. JavaScript must be enabled.
- **Server-Side**
    - **Technology Stack:** The backend will be built on the defined MERN stack (MongoDB, Express.js, React.js, Node.js), and all internal components will interface accordingly.
    - **Database:** The application will interface with a MongoDB database for all data storage and retrieval operations.

Wireframes or UI/UX mockups (Initial Draft)

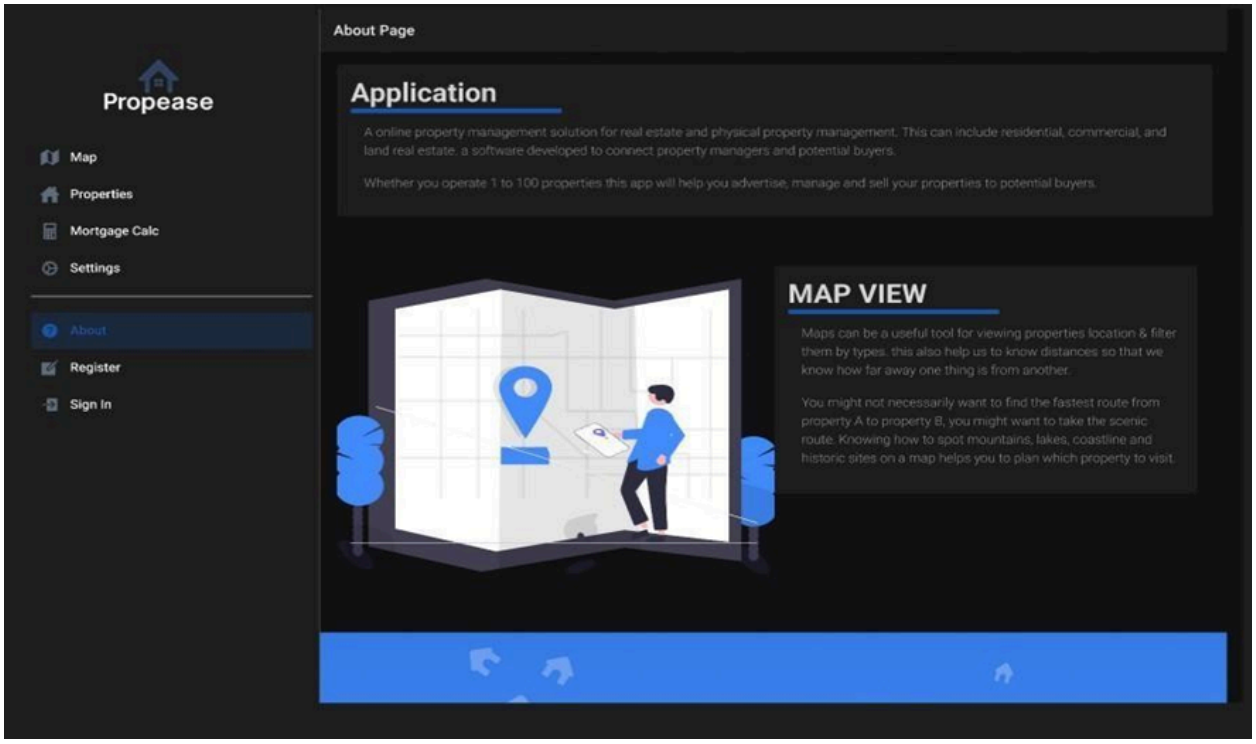
User Side Register Page



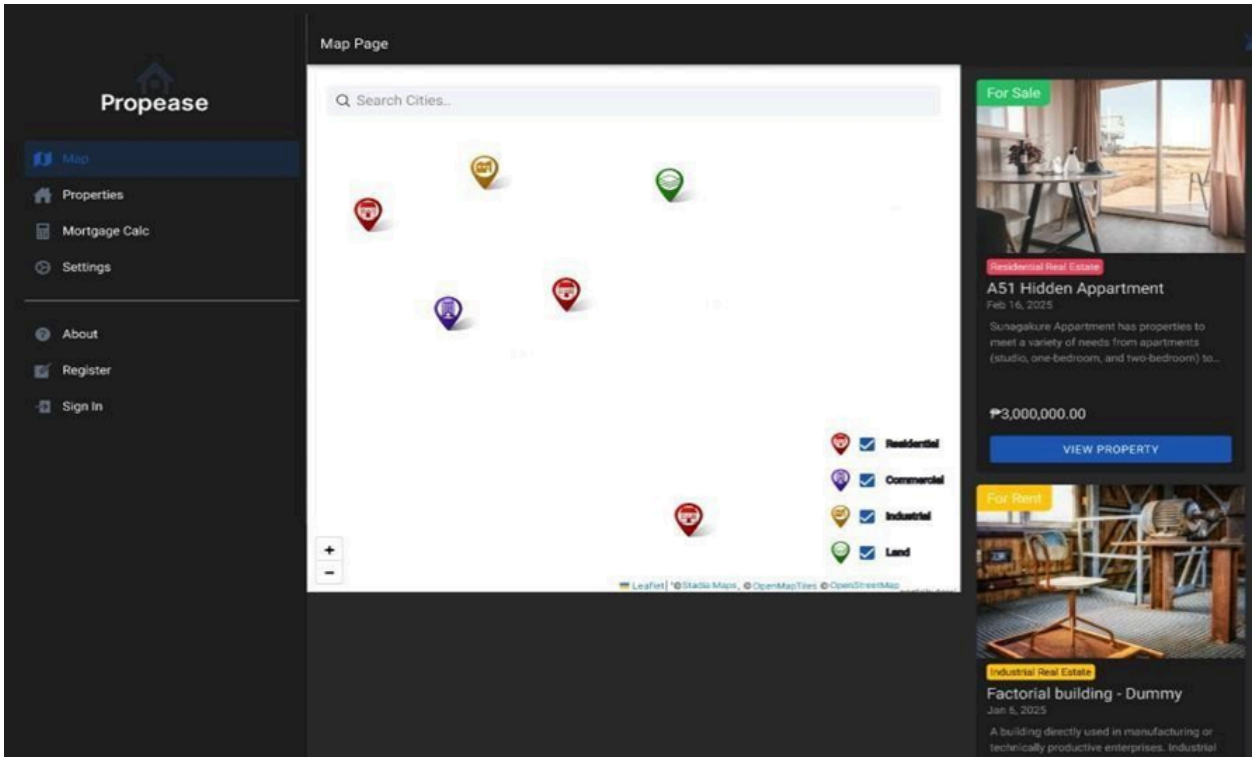
User Side Login Page



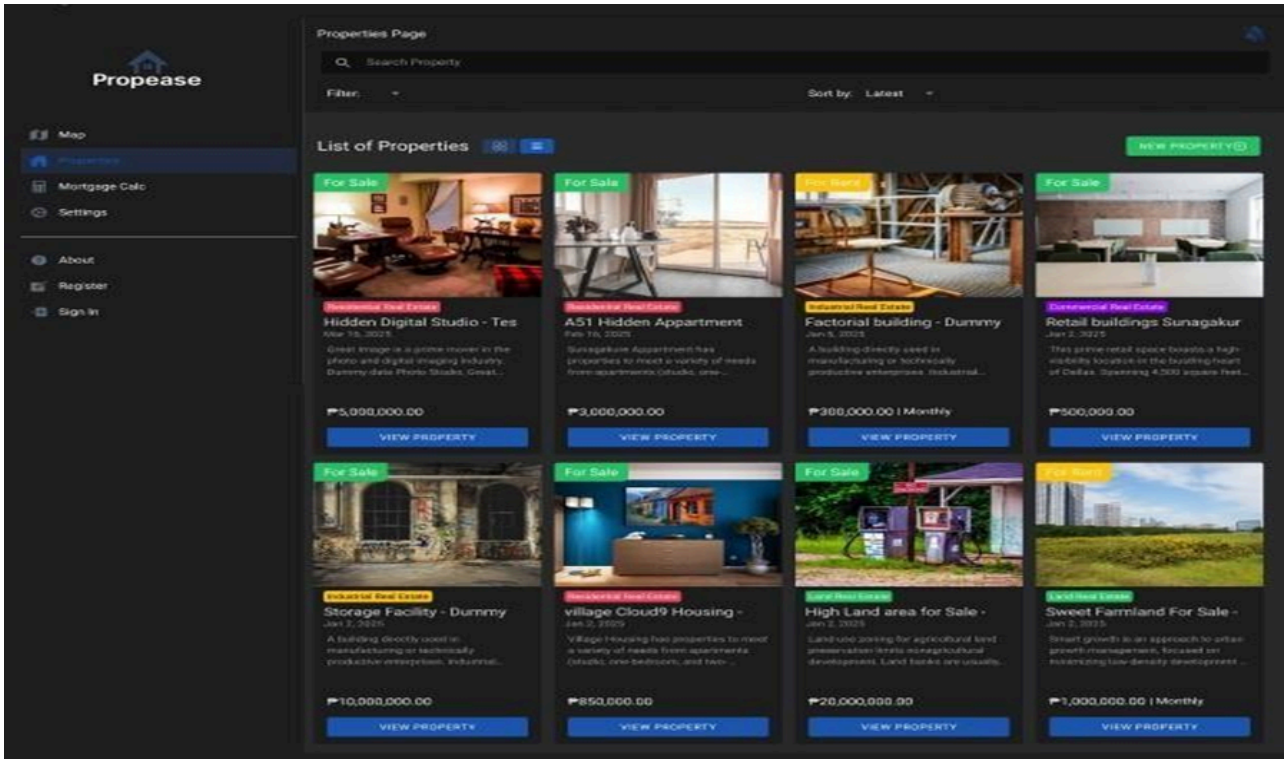
User Side About Page



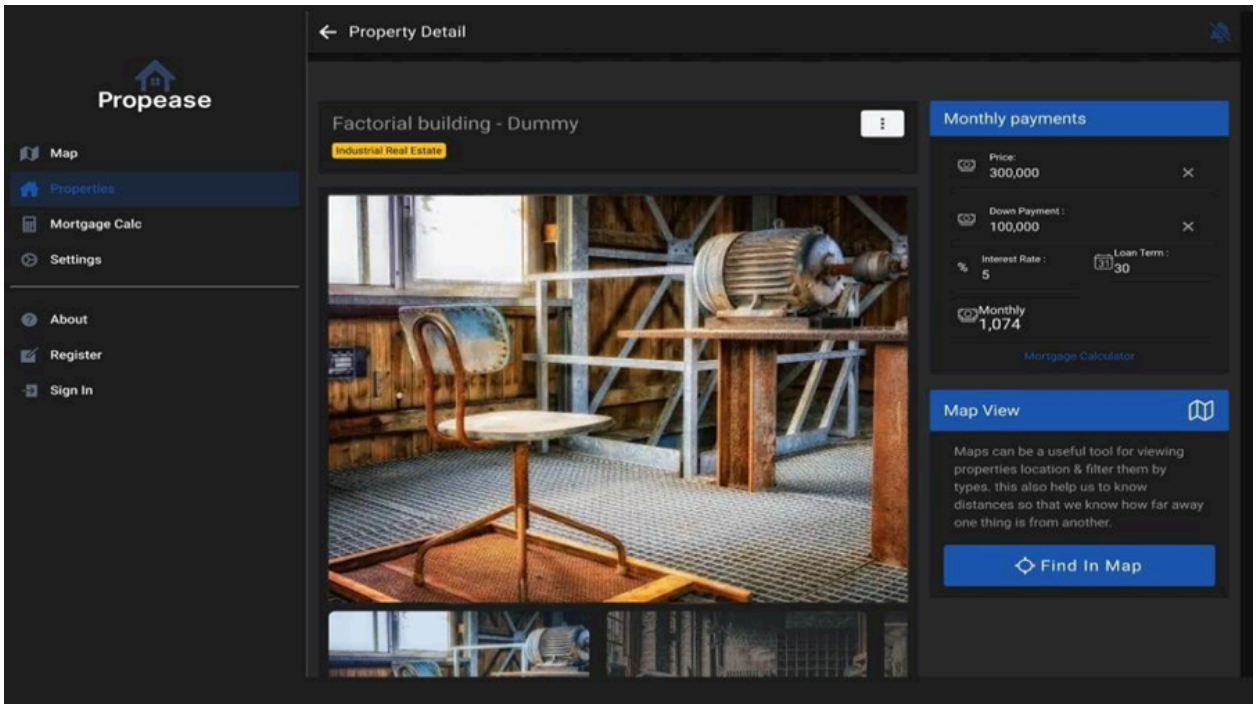
User Side Map Page



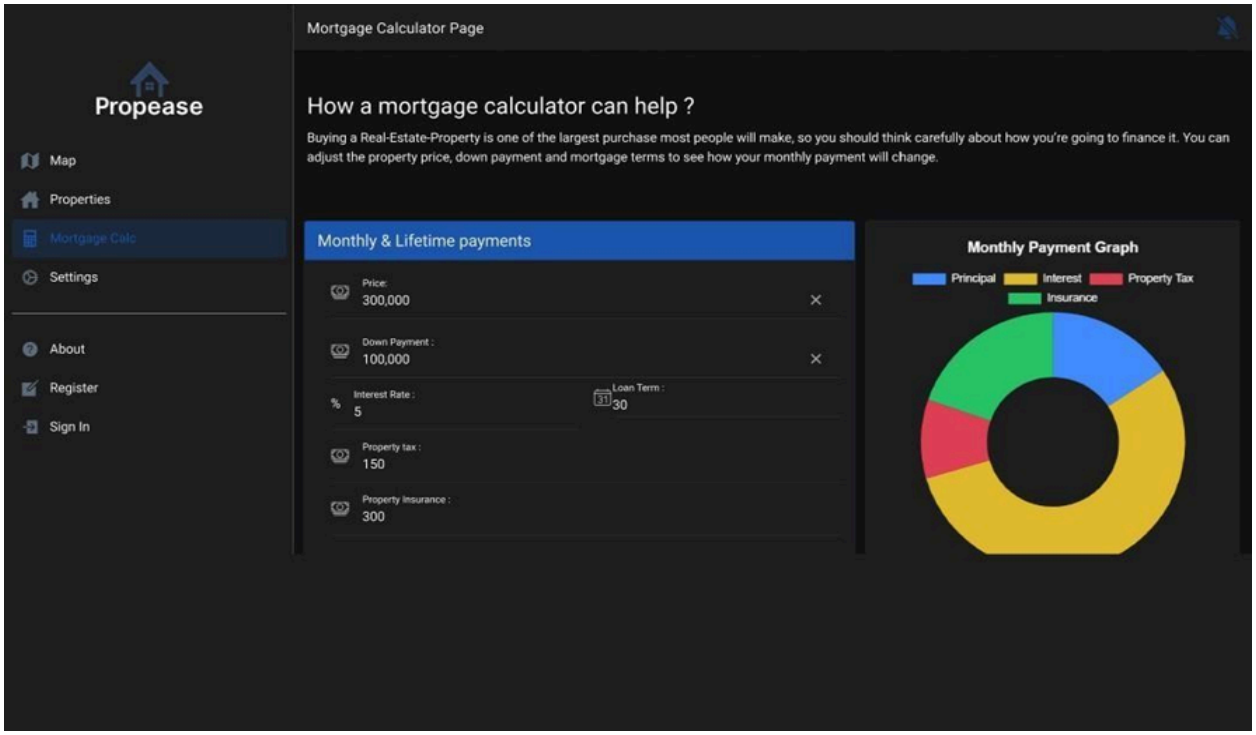
User Side Property Page



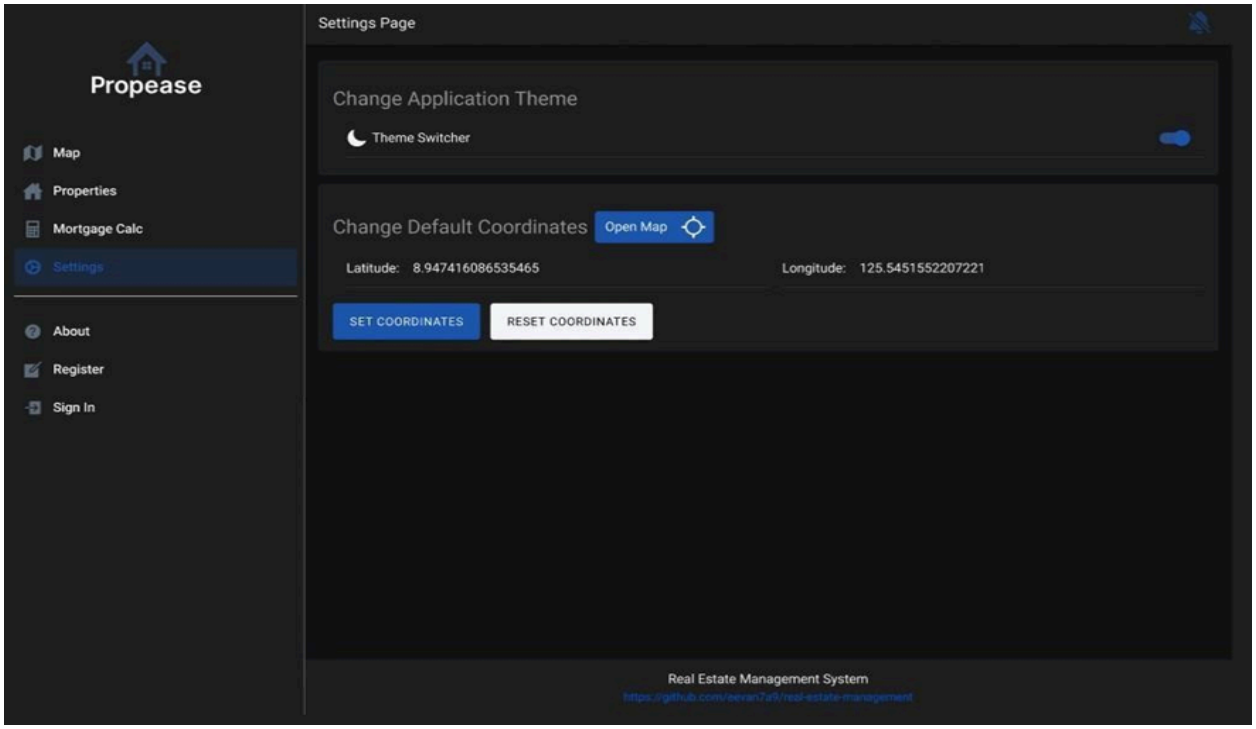
User Side Property Detail Page



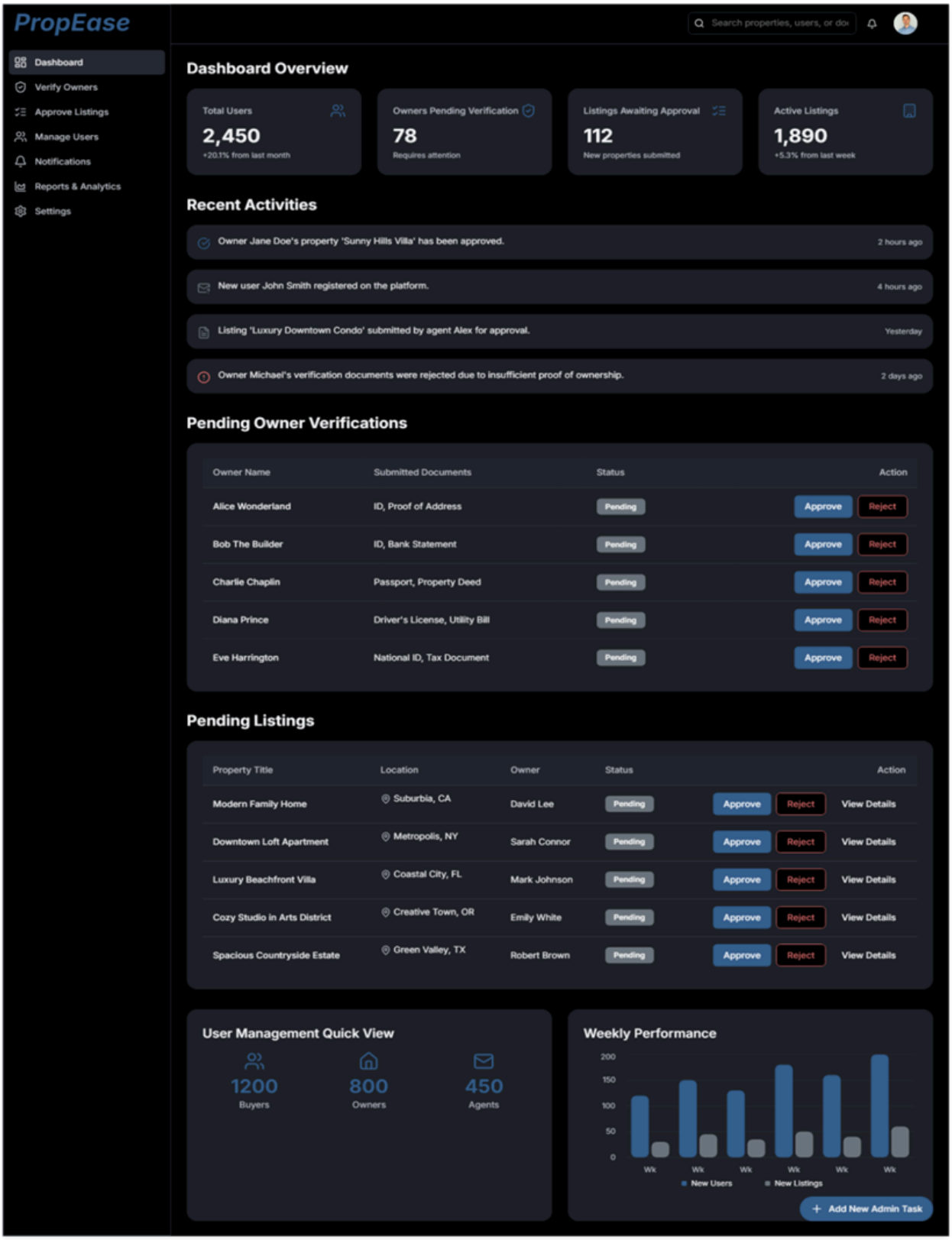
User Side EMI Calculator Page



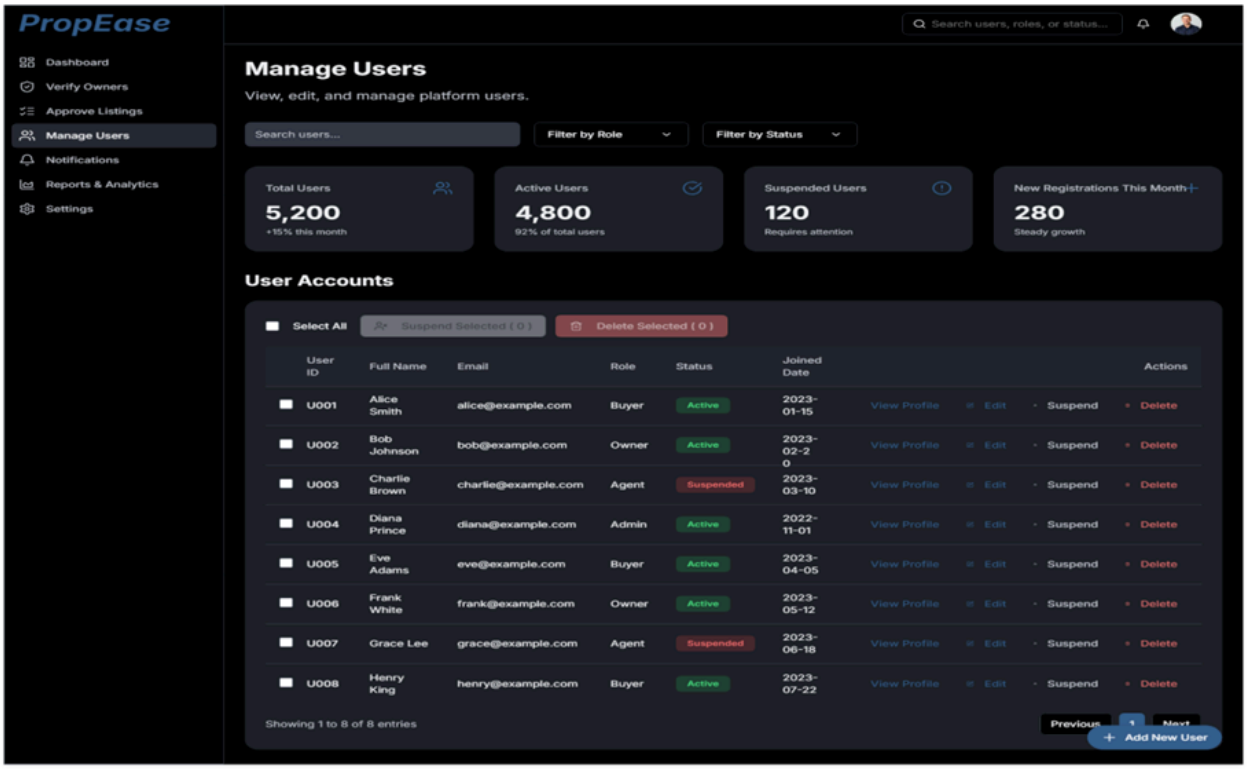
User Settings Page



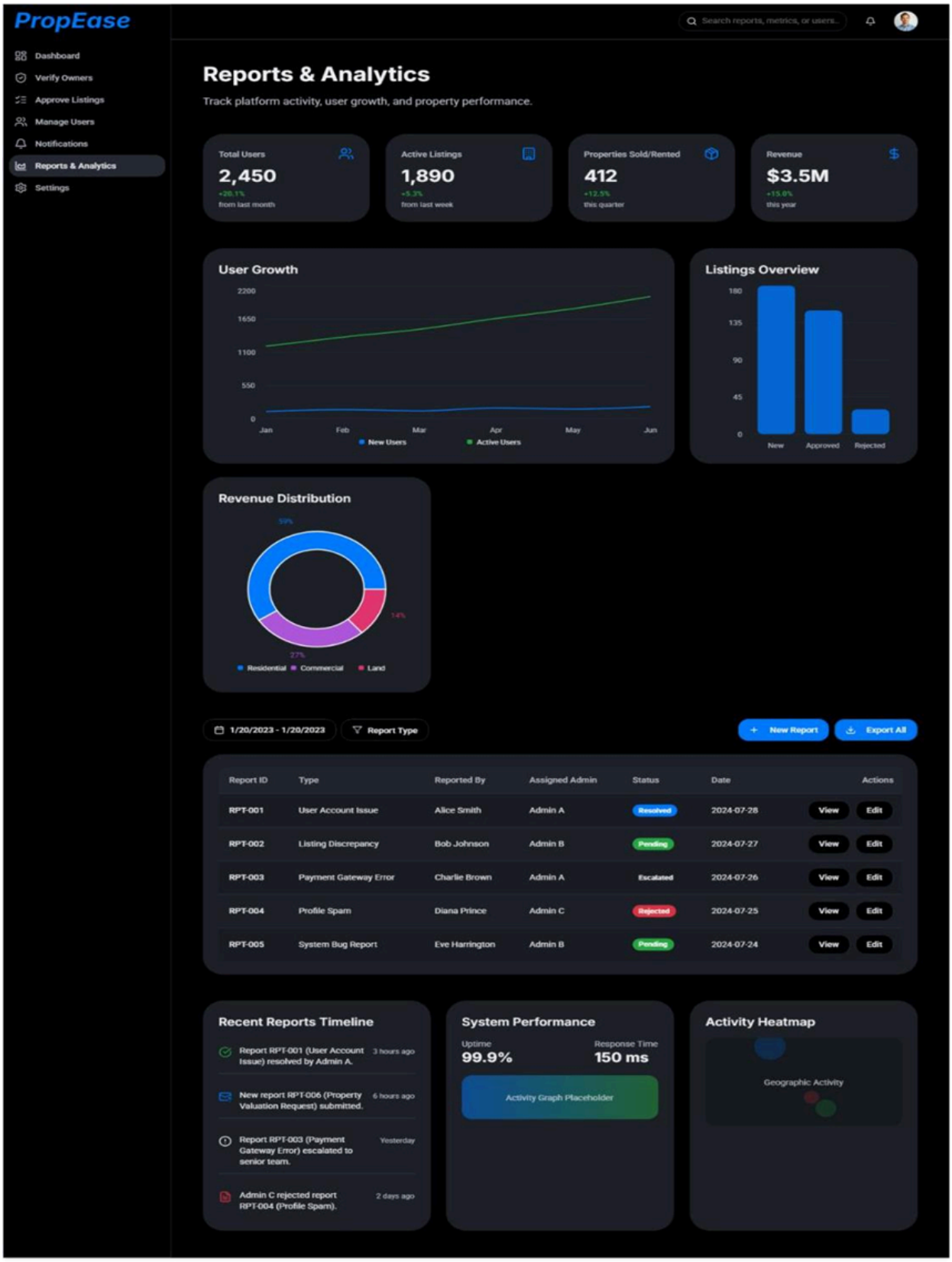
Admin Side Dashboard



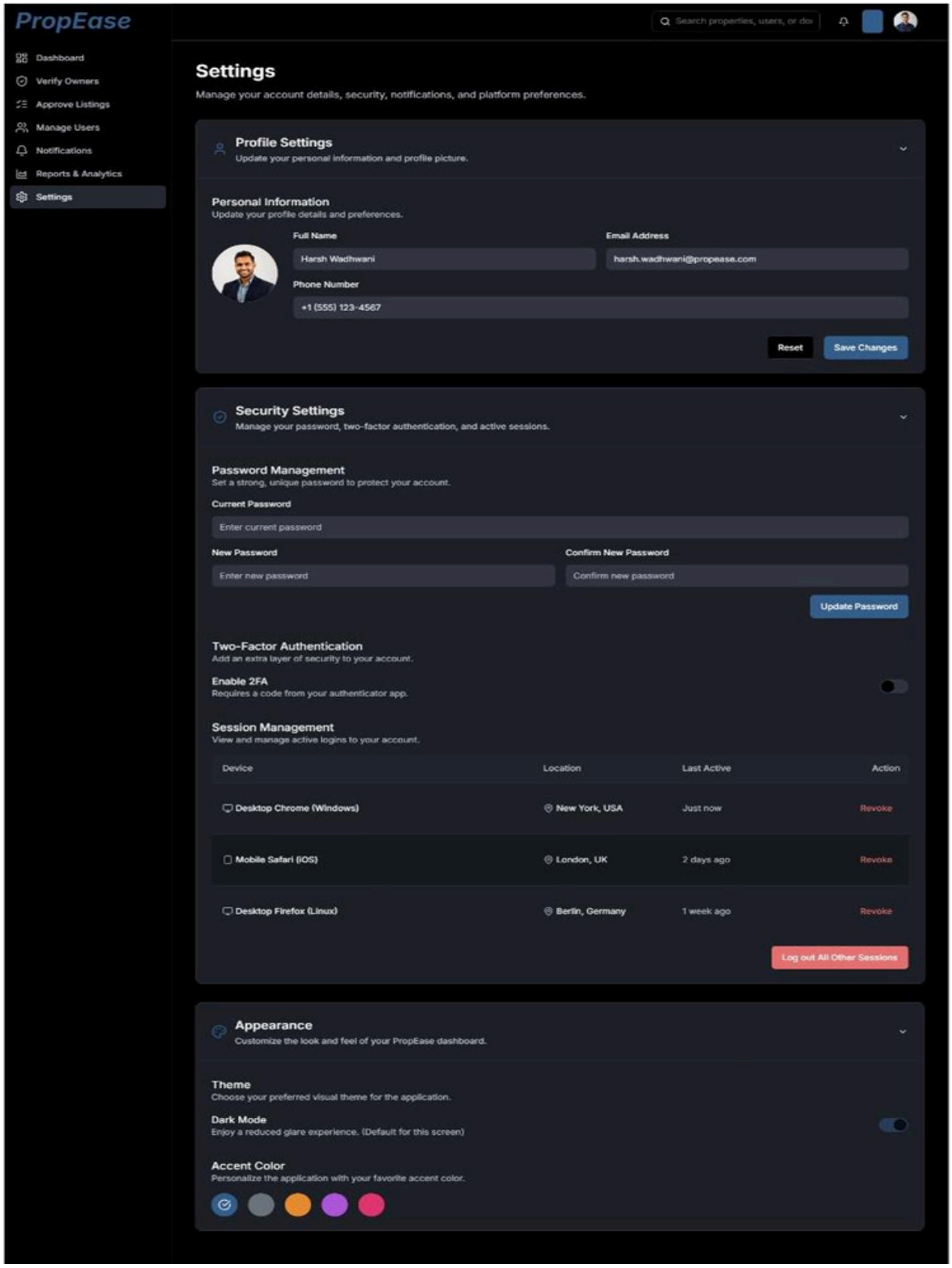
Admin Side Manage Users



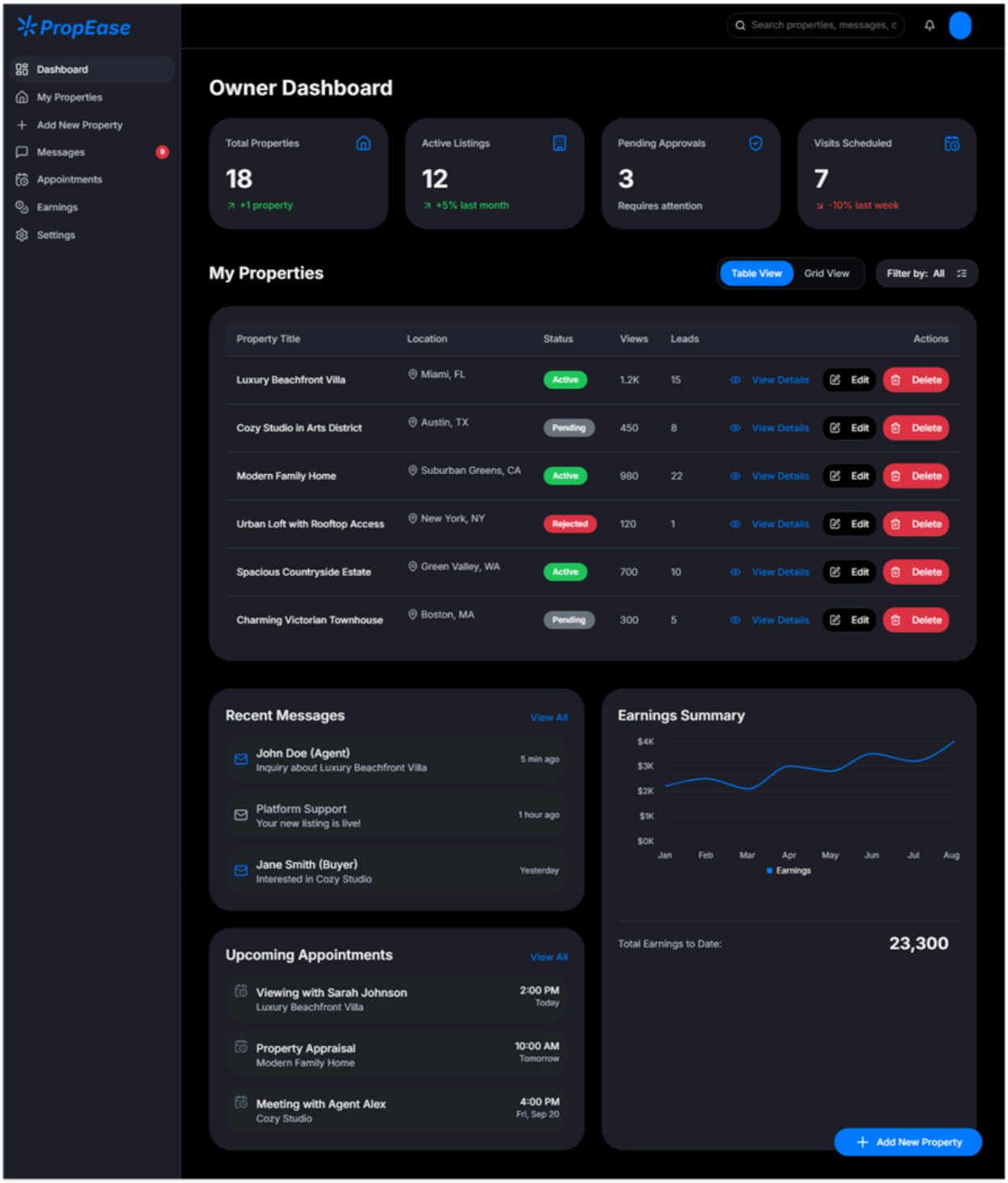
Admin Side Reports and Analytics



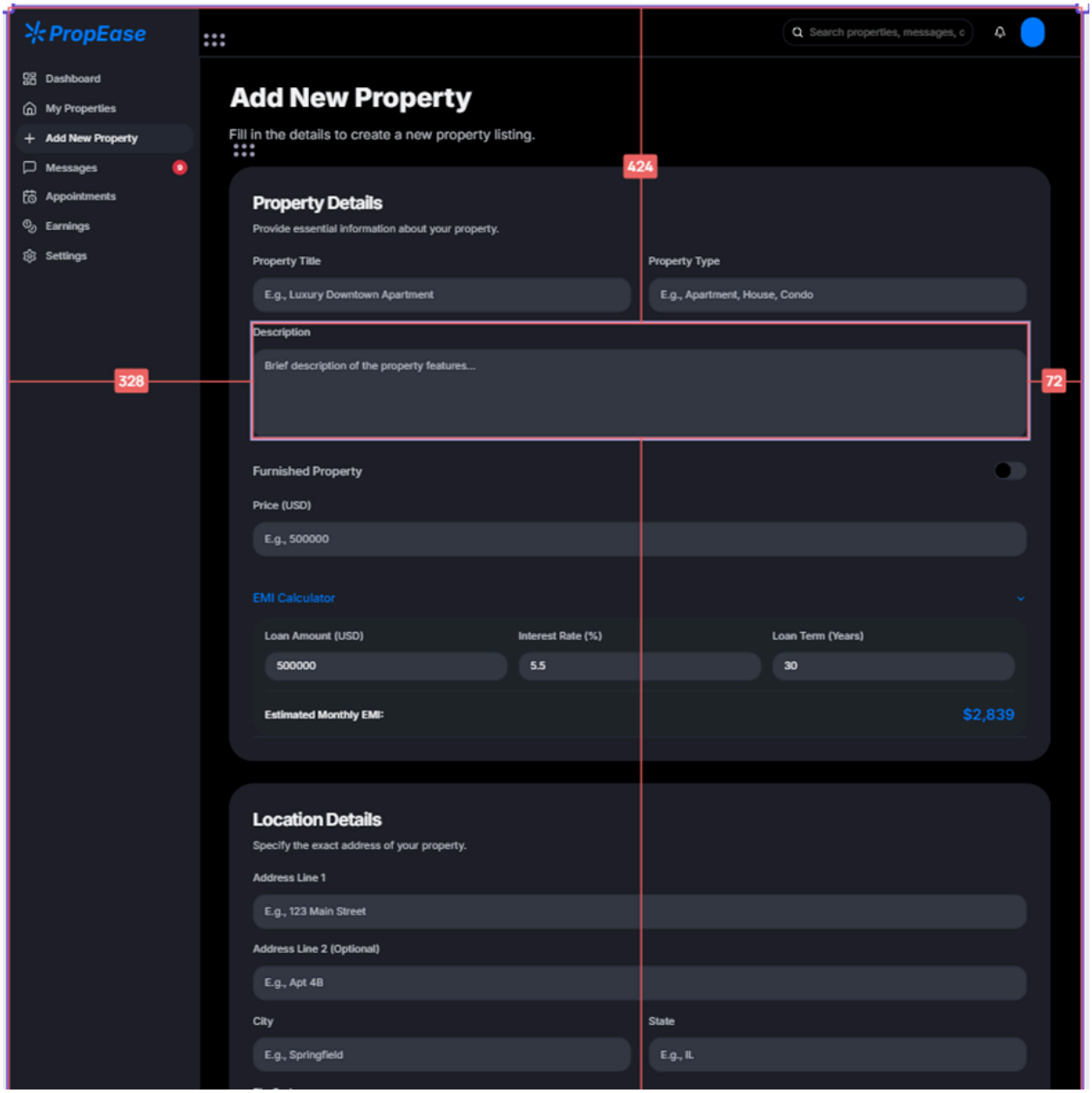
Admin Side Settings Page



Owner / Agents Side



Owner Side Add New Property Page



Property Features

Select available features and add custom ones.

- [ ] Air Conditioning
- [ ] Swimming Pool
- [ ] Parking Space
- [ ] Gym/Fitness Center
- [ ] Balcony/Patio
- [ ] Wi-Fi Ready
- [ ] Pet Friendly
- [ ] Mountain View

Add Custom Feature

E.g., Smart Home System

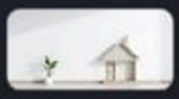
Add

Media Upload

Add high-quality photos and essential documents.

Drag & drop images/documents here or click to upload

Uploaded Photos



Availability & Appointments

Set when your property is available for viewing.

Property Available for Viewing

Visiting Hours

09:00 - 17:00

Cancel | Save as Draft | Save & Submit for Approval

• Acceptance criteria

1. User (Buyer/Renter)

Registration & Account Management

- **As a new user, I want to create an account using my email and password, so I can access all the features of the platform.**
    - The registration form must contain fields for Name, Email, and Password.
    - The email field must validate for a correct email format (e.g., harsh12@gmail.com).
    - The system must check if the email is already registered and display an error message if it is.
    - The password field must have a minimum length requirement (e.g., 8 characters) and be masked.
    - Upon successful registration, the user is automatically logged in and redirected to their dashboard.
- **As a user, I want to log in to my account securely, so I can access my saved preferences and information.**
    - The login form must have fields for Email and Password.
    - A successful login with correct credentials redirects the user to their dashboard.
    - An unsuccessful login attempt with incorrect credentials displays a clear error message (e.g., "Invalid email or password").
    - A "Forgot Password?" link must be present on the login page.
- **As a user, I want to be able to reset my password if I forget it, so I can regain access to my account.**
    - The "Forgot Password" page must have a field to enter a registered email address.
    - Upon submitting a valid email, the system sends a password reset link to that email.
    - The reset link must be unique, secure, and have a limited time validity (e.g., 1 hour).
    - The link directs the user to a page where they can enter and confirm their new password.

- **As a registered user, I want to manage my profile information, like my name and contact details, so I can keep my information up to date.**
    - The user dashboard must have a "Profile" or "Settings" section.
    - The profile page must display the user's current information (Name, Email, Contact Number).
    - The user can edit their name and contact number in an editable form.
    - Upon saving, a success message is displayed, and the information is updated across the platform.

Property Search & Viewing

- **As a user, I want to search for properties by specific criteria, such as location, price, or type, so I can quickly find what I need.**
    - The search bar must accept location inputs (e.g., "Sargasan, Gandhinagar").
    - Advanced search options allow filtering by price range, property type, number of bedrooms, etc.
    - Executing a search displays a results page with properties matching the selected criteria.
- **As a user, I want to filter and sort a list of properties by parameters like relevance or date listed, to narrow down my search results.**
    - The search results page must have filter controls that update the results in real-time.
    - Sorting options must be available (e.g., "Price: Low to High," "Newest First").
    - Applying a sort order correctly reorganizes the list of displayed properties.
- **As a user, I want to view a list of properties in a gallery format, so I can easily browse available listings.**
    - Search results are displayed as individual "property cards".
    - Each card must show essential information: a primary image, property title, price, location, and key specs (e.g., beds, baths).
    - Clicking on a card navigates to the detailed property page.

- **As a user, I want to see properties displayed on an interactive map, so I can understand their exact location and proximity to landmarks.**
    - The search results page includes a map view.
    - A pin is displayed on the map for each property in the current search results.
    - Clicking a map pin opens a small info window with basic property details and a link to the full listing.
- **As a user, I want to view detailed information about a specific property, including photos, amenities, and a 360° virtual tour, so I can decide if I'm interested.**
    - The property detail page must display a photo gallery or carousel.
    - It must list all property details: description, price, address, features, and a list of amenities.
    - If a virtual tour link is provided, it must be embedded and playable on the page.

Interaction & Personalization

- **As a user, I want to communicate with the property owner or agent through a real-time chat, so I can ask questions directly.**
    - A "Chat" button is available on the property detail page for logged-in users.
    - The chat interface allows sending and receiving messages in real-time.
    - Chat history is saved and accessible from the user's dashboard.
    - Unread message indicators are shown to the user.
- **As a user, I want to receive notifications for appointment confirmations and new chat messages, so I stay informed about my activities.**
    - The system generates an in-app and/or email notification when a visit is confirmed or rescheduled by the owner.
    - The system generates a notification when a new chat message is received.

Financial & Planning Tools

- **As a user, I want to use a mortgage calculator to estimate my monthly payments based on property price, down payment, and loan terms.**
    - The calculator must have input fields for Property Price, Down Payment, Interest Rate, and Loan Tenure.
    - The estimated monthly payment (EMI) is calculated and displayed automatically as values are changed.
    - The calculation must be accurate based on standard EMI formulas.
- **As a user, I want to see a detailed breakdown of monthly payments, including principal, interest, property tax, and insurance, so I can understand the full cost.**
    - The calculator results must show a clear breakdown of the EMI components.
    - A pie chart or graph visualizing the principal vs. total interest paid over the loan tenure is displayed.

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2. Property Owner / Agent

Dashboard & Property Management

- **As an owner, I want to see a dashboard with a quick overview of my properties, including total listings, active listings, and pending approvals.**
    - The dashboard must display clear "stat cards" or widgets for each key metric.
    - The numbers displayed must be accurate and reflect the current state of the owner's properties in the database.
- **As an owner, I want to view a list of all my properties with their current status, so I can manage them easily.**
    - The "My Properties" section lists all properties created by the owner.
    - Each listing in the list displays its title, primary image, and current status (e.g., Active, Pending Approval, Rented/Sold).
- **As an owner, I want to add a new property listing by providing detailed information, photos, documents, and virtual tour links.**

    - The "Add Property" form must be a guided, multi-step process.
    - It must include fields for all necessary property details and support uploading multiple images and documents.
    - Upon successful submission, the property is saved with a "Pending Approval" status.
- **As an owner, I want to edit or delete my existing property listings, so I can keep my information accurate.**
    - Each property in the owner's list has an "Edit" and a "Delete" option.
    - The "Edit" button opens the property form pre-filled with existing data.
    - The "Delete" button shows a confirmation modal to prevent accidental deletion.
- **As an owner, I want to mark a property as "Sold" or "Rented," so it is removed from active search and I no longer receive inquiries for it.**
    - The owner can change the status of an "Active" listing.
    - Changing the status to "Sold" or "Rented" removes it from all public search results.
    - The property remains in the owner's dashboard under an "Archived" or "Inactive" tab.

Analytics & Performance

- **As an owner, I want to see performance analytics for each property, including how many views and inquiries it is getting, so I can gauge interest.**
    - The property dashboard shows the total number of page views for each listing.
    - It displays the number of chat inquiries initiated and visit requests received.
    - The owner can filter these analytics by a date range (e.g., last 30 days).
- **As an owner, I want to view a summary of my earnings over time, so I can track my revenue from sold or rented properties.**
    - An "Earnings" tab or widget is available on the dashboard.
    - The owner can manually input sale/rent prices for their "Sold/Rented" properties to track revenue.

    - The data is displayed in a graph or table, filterable by month or year.
- **As an owner, I want to have the option to pay to "boost" my listing, so it appears higher in search results for a period of time.**
    - A "Boost Listing" button is available on each active property.
    - Clicking it initiates a payment flow via the integrated payment gateway.
    - A successfully boosted listing is given priority in search results and visually marked as "Featured" or "Premium".

Communications & Scheduling

- **As an owner, I want to see recent messages from potential buyers or agents in an inbox, so I can respond to inquiries promptly.**
    - A dedicated "Inbox" or "Messages" section is available in the dashboard.
    - It lists all conversations, with unread messages clearly highlighted.
    - The owner can click on a conversation to view the chat history and send a reply.
- **As an owner, I want to receive and manage visit requests from my dashboard, so I can approve, reject, or propose new times.**
    - New visit requests trigger a notification and appear in an "Appointment Requests" queue.
    - Each request shows the user's name, requested date/time, and has "Approve" and "Reject" buttons.
    - Approving or rejecting a request sends an automated notification back to the user.
- **As an owner, I want to see upcoming appointments related to my properties in a calendar view, such as viewings or appraisals.**
    - An "Appointments" calendar in the dashboard displays all confirmed visits.
    - Each calendar event shows the property name, user name, and time of the visit.

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3. Administrator

Dashboard & Analytics

- **As an admin, I want to see a dashboard that provides an overview of the platform's key metrics, such as total users, active listings, and revenue.**
    - The admin dashboard displays high-level KPIs in a clear, easy-to-read format.
    - The data is accurate and reflects real-time platform statistics.
- **As an admin, I want to view a graph of weekly performance, including new users and new listings, to track platform growth.**
    - The dashboard includes line or bar charts visualizing key growth trends over time.
    - The admin can adjust the time frame of the graphs (e.g., weekly, monthly).
- **As an admin, I want to see a list of recent activities, such as new user registrations or listing submissions, to stay informed about platform events.**
    - An "Activity Log" or "Recent Events" feed is present on the dashboard.
    - The log is updated in real-time.
- **As an admin, I want to generate detailed reports on user growth, property performance, and financial transactions.**
    - A "Reports" section allows the admin to generate custom reports.
    - The admin can filter report data by date ranges and other parameters.
    - Reports can be exported in standard formats like CSV or PDF.

User & Listing Management

- **As an admin, I want to view, edit, and manage all user accounts on the platform.**
    - A "Users" tab lists all registered users with key details.
    - The admin can search for specific users by name or email.
    - The admin has actions to "Suspend," "Activate," or "Delete" a user account.

- **As an admin, I want to filter users by role (e.g., buyer, owner, agent) or status (e.g., active, suspended) to manage them more efficiently.**
    - The user management page includes filter dropdowns for role and status.
    - Applying filters correctly updates the displayed list of users.
- **As an admin, I want to see a list of listings and owner verifications that are pending approval in a dedicated queue.**
    - The dashboard has a prominent link to a "Moderation Queue."
    - This queue lists all properties and owner accounts awaiting admin approval.
- **As an admin, I want to approve or reject new property listings and owner verifications to maintain platform quality.**
    - The admin can view the full details of any pending item.
    - "Approve" and "Reject" buttons are available for each item.
    - The appropriate status change and user notification are triggered upon action.
- **As an admin, I want to investigate and act on user-submitted reports about fraudulent listings or inappropriate behavior.**
    - A dedicated queue for user-submitted reports is available.
    - The admin can view the report details, the reported content/user, and take action (e.g., remove listing, suspend user, dismiss report).

Platform Settings & Security

- **As an admin, I want to manage platform-wide settings, such as the available property types or amenity options in the filters.**
    - A "Settings" area allows the admin to manage dynamic data lists.
    - The admin can add, edit, or delete options that appear in user-facing forms and filters.
- **As an admin, I want to manage content on static pages like the FAQ and "About Us."**
    - A simple Content Management System (CMS) interface is available for designated pages.
    - The admin can edit and save text content without needing to deploy new code.

- **As an admin, I want to update my personal information and change my password.**
    - The admin has a personal profile page accessible from the dashboard.
    - They can securely change their own password and update their details.