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MediInfo : AI-Powered Medicine Information System with Smart Strip & Prescription Scanner

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Abstract: *The MediInfo project presents a smart web-based medical assistant designed to help users instantly identify medicines through AI-powered scanning of medicine strips and prescriptions. The primary goal is to replace manual searching and guesswork with an intelligent system offering OCR-based text recognition, local medicine database lookup, global OpenFDA integration, medication reminders, nearby pharmacy locator, and voice assistance.*
Built using React 19, Vite, Tailwind CSS, and Firebase as a Backend-as-a-Service, the application provides real-time features, secure user authentication, multi-language support, and a clean glassmorphic UI. MediInfo addresses critical problems in healthcare accessibility by enabling fast medicine information retrieval, dosage guidance, side-effect awareness, and prescription digitization, making it especially useful for patients, pharmacists, and healthcare enthusiasts..

Keywords: *Medicine Information, Firebase, React, Healthcare System, Multi-language, Barcode Scanner, Admin Panel, User Dashboard*

I. INTRODUCTION

The MediInfo system is a modern single-page web application (SPA) developed to provide instant and accurate information about medicines through AI-driven scanning. The frontend is built using React 19 functional components with Vite as the build tool and Tailwind CSS for a premium glassmorphism design. Navigation between Dashboard, Scanner, Search, Reminders, Profile, and Admin panels is handled efficiently by React Router DOM v7.
All data operations including user profiles, medicine records, reminders, search history, and prescription logs are managed through Firebase Firestore with real-time listeners. Tesseract.js is integrated for Optical Character Recognition (OCR) on medicine strips and prescriptions, while OpenFDA API serves as a global fallback for medicine details. Leaflet/Google Maps is used for locating nearby pharmacies.
The application follows a clean, modular architecture with custom React hooks and service files for authentication and database operations. Environment variables are used for secure Firebase configuration, making the project production-ready and easily deployable.

II. LITERATURE REVIEW

Traditional methods of obtaining medicine information rely on manual searching, pharmacist consultation, or reading tiny printed labels — often leading to errors, delayed understanding, and medicine misuse. Earlier systems were mostly mobile apps using basic barcode scanning or static databases, suffering from limited medicine coverage, no real-time updates, and poor OCR accuracy.
Recent advancements have explored the use of Tesseract.js and Google Vision API for OCR in healthcare applications. Several studies have demonstrated the effectiveness of combining React.js with Firebase for real-time medical record systems. However, most existing solutions lack integrated features such as prescription scanning, smart reminders with intake tracking, multi-language support, and nearby pharmacy mapping.

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MediInfo builds upon these works by combining high-accuracy OCR, local + global medicine databases, intelligent reminders, and a user-friendly interface, thereby filling the gaps in accessibility and usability for everyday medicine information needs.

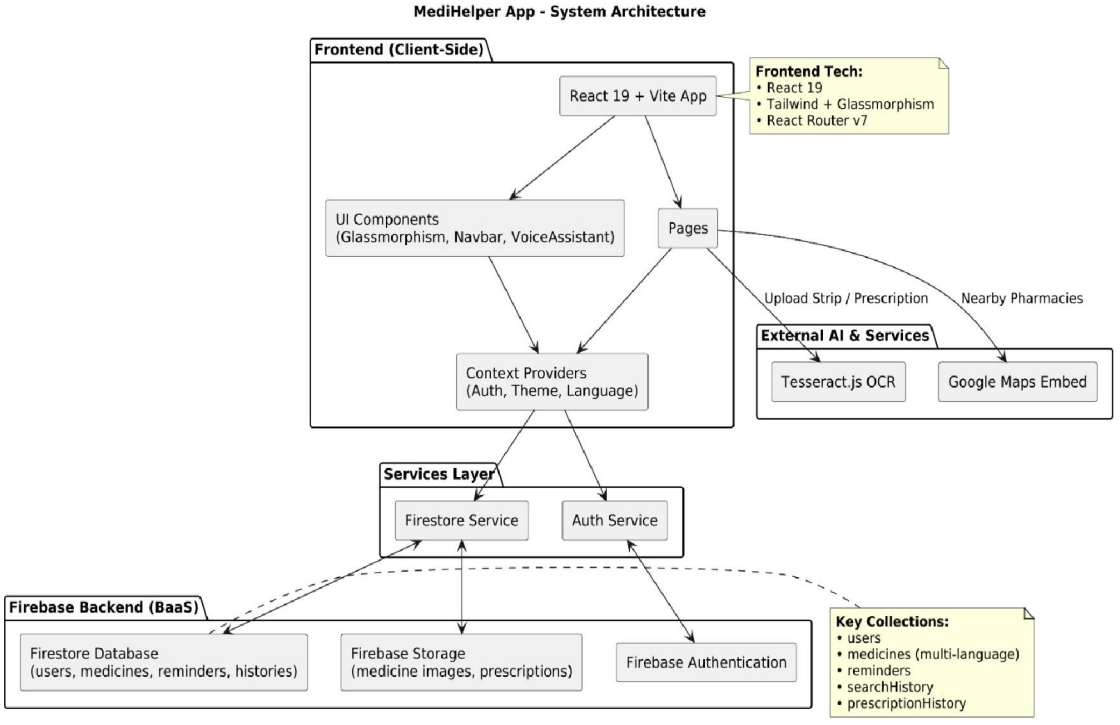
III. PROPOSED SYSTEM

A. Overview:

MediInfo is a complete end-to-end web platform that allows users to scan medicine strips or prescriptions, instantly retrieve detailed information (usage, dosage, side effects, precautions), set smart medication reminders, maintain search history, and locate nearby pharmacies. It supports user authentication, profile management, voice-based medicine reading, and an admin panel for managing the medicine database.

B. System Architecture

MediInfo follows a client-side rendered architecture using React 19 and Vite, with Firebase as a complete Backend-as-a-Service (BaaS). The frontend directly interacts with Firebase Authentication and Firestore for real-time data. Tesseract.js handles on-device OCR, while OpenFDA API provides global medicine fallback. Google Maps is embedded for pharmacy location services. The serverless design ensures low latency, automatic scalability, and real-time synchronization.



C. Module-wise Breakdown

1. Authentication Module: Handles registration, login, logout using Firebase Authentication. Protected routes and user UID linking for all personal data.

Outcome: Secure access and personalized experience.

2. Scanner Module (Core Feature):

Allows uploading medicine strip or prescription images. Uses Tesseract.js for OCR, cleans text, matches with local medicine database, and falls back to OpenFDA API.

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Outcome: Instant medicine identification without typing.

3. Medicine Search Module:

Local database search + OpenFDA global search with filters.

Outcome: Fast and comprehensive medicine information retrieval.

4. Reminders & History Module:

Users can set medicine reminders with time, dosage, and frequency. System tracks "taken" or "missed" status with history logging.

Outcome: Improves medication adherence.

5. Dashboard & Pharmacy Locator:

Quick search bar, nearby pharmacies displayed via Google Maps embed.

Outcome: Convenient access to essential services.

6.Profile & Settings Module:

User profile, age management, theme toggle, language selection, and notification settings.

Outcome: Personalized and accessible experience.

7. Admin Module:

Restricted to admin users for adding/editing medicine records in the local database.

Outcome: Easy content management.

IV. IMPLEMENTATION AND VALIDATION

The project was implemented using React 19, Vite 5, Tailwind CSS, Firebase SDK, Tesseract.js, and OpenFDA API. Custom services were created for Firestore operations and OCR processing. The UI follows modern glassmorphism design with dark/light mode support.

Validation included unit testing of components, integration testing of OCR + database flow, end-to-end testing of complete user journeys (scan → info → reminder → history), and cross-device responsiveness testing.

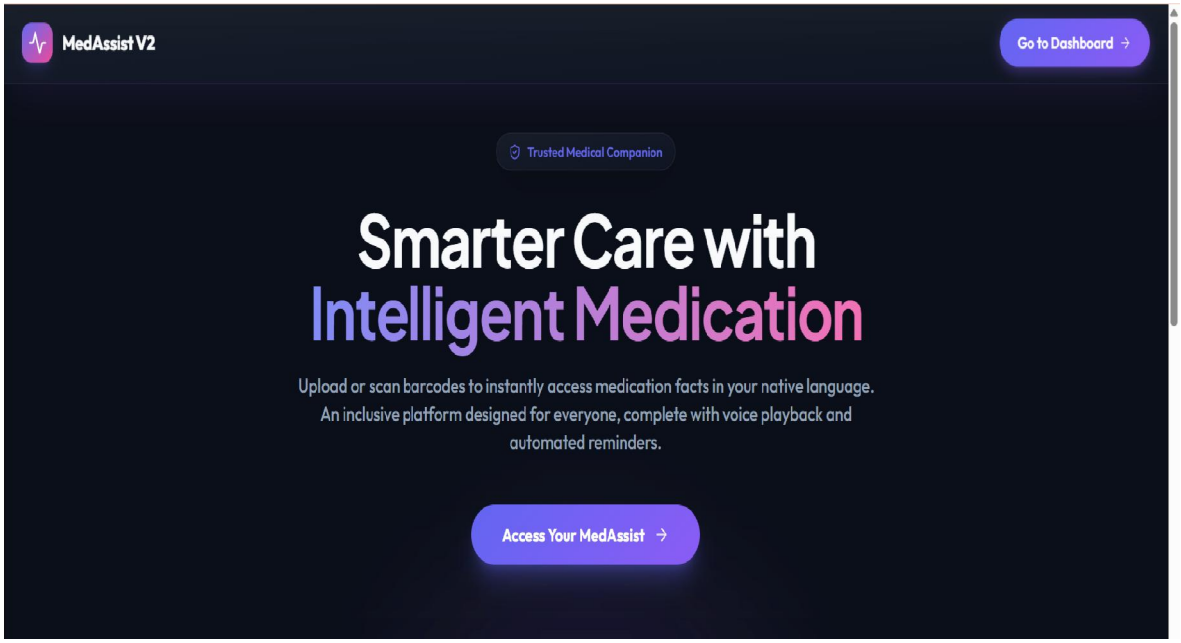

Fig.1.Main DashBoard

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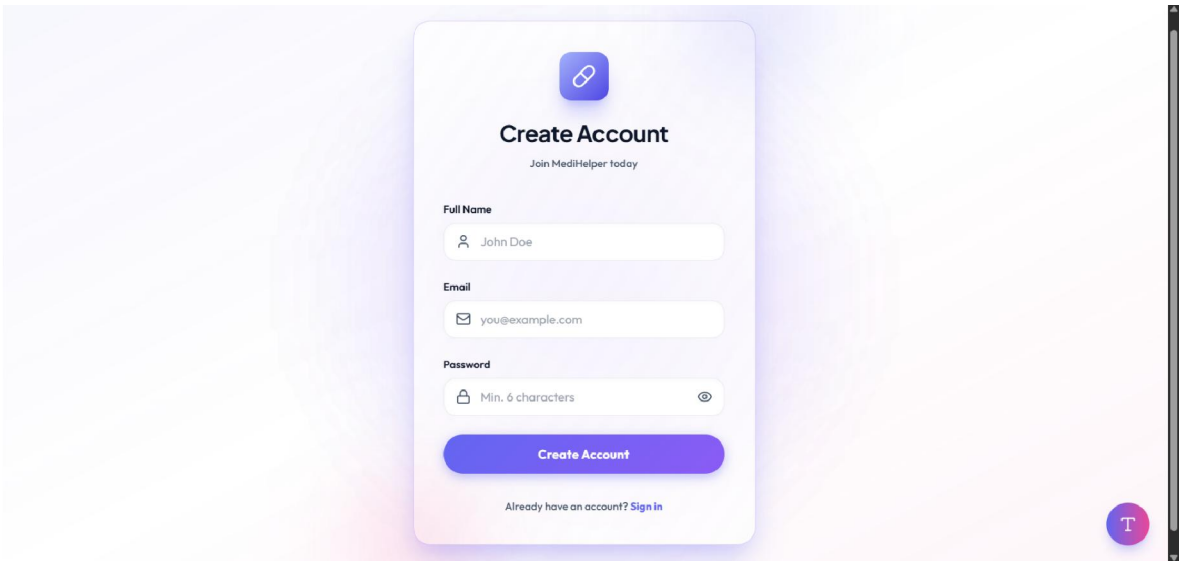

Fig.2.Authentication(sign in)

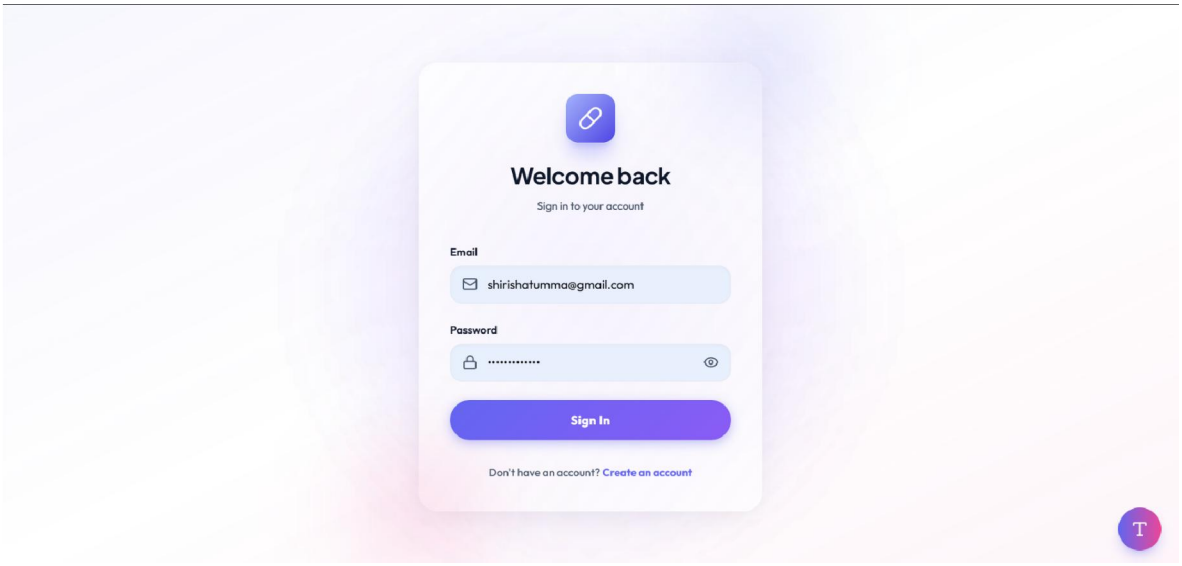

Fig.3.Authentication(log in)

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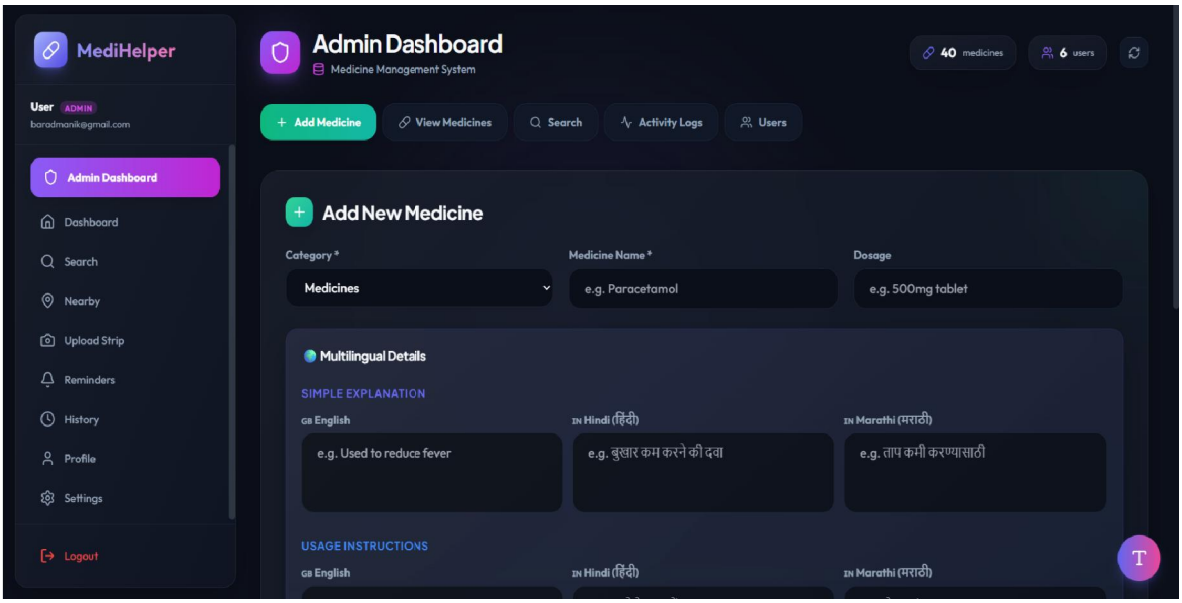

Fig.4.Admin DashBoard

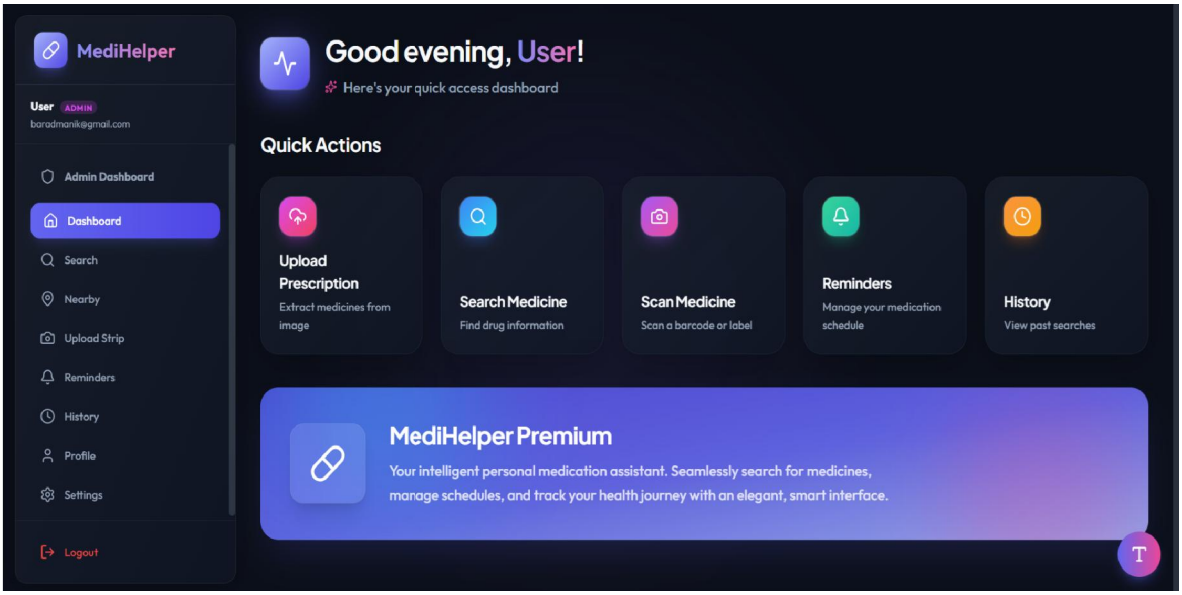

Fig.5.User DashBoard

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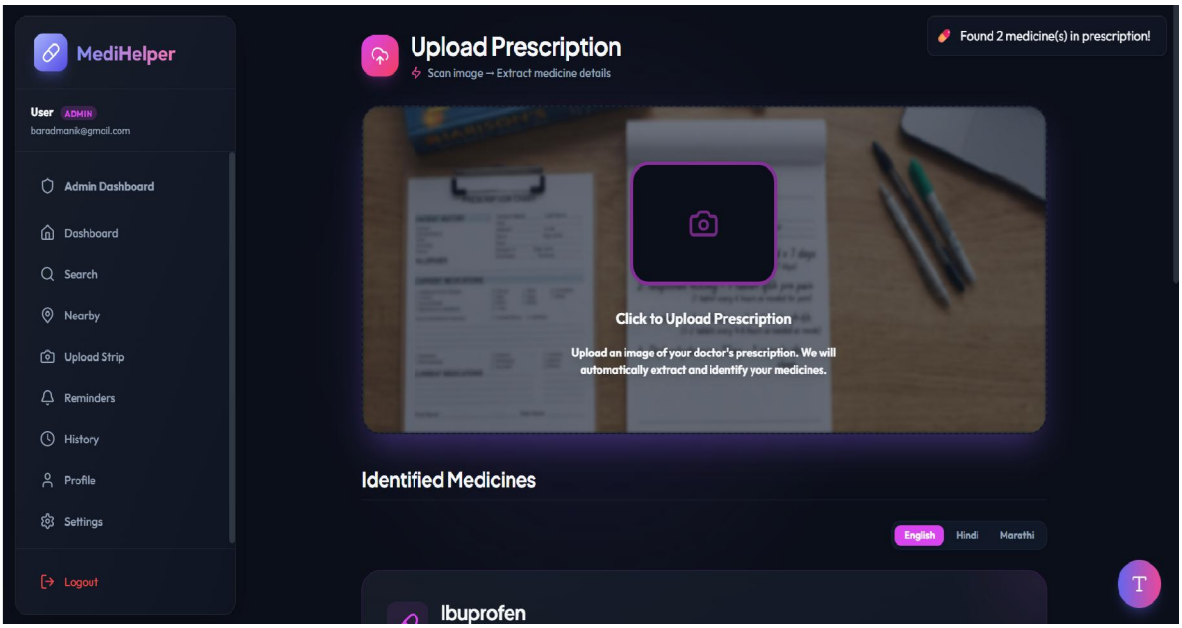

Fig.6.Upload Prescription

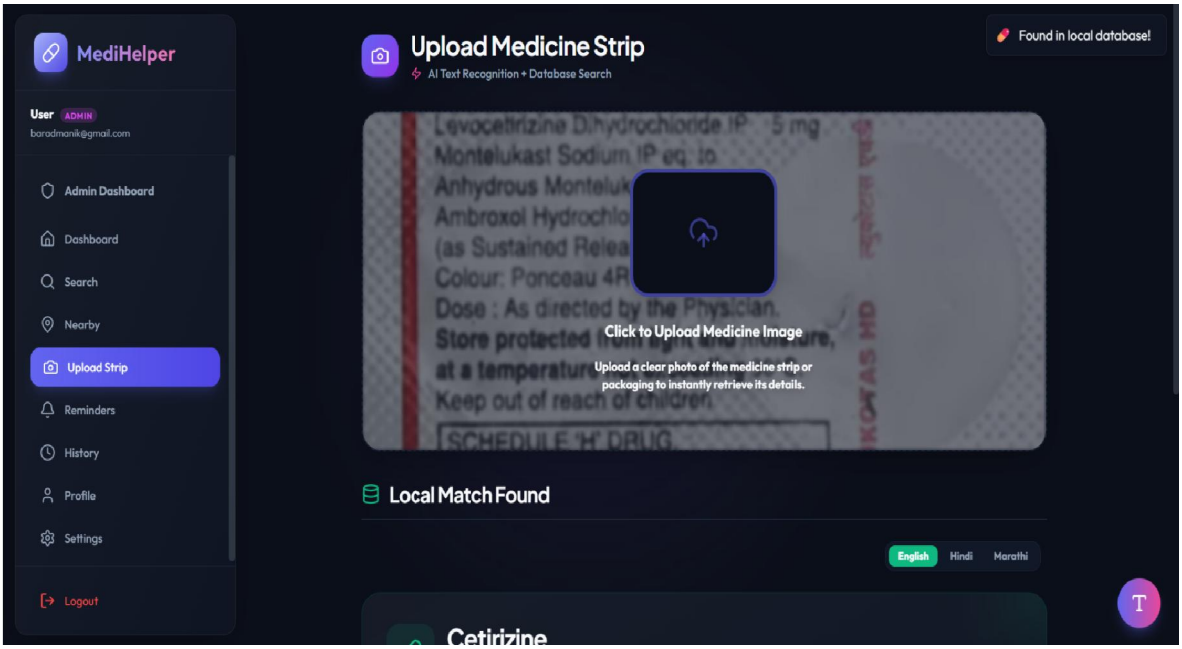

Fig.7.Upload Medicine Strip

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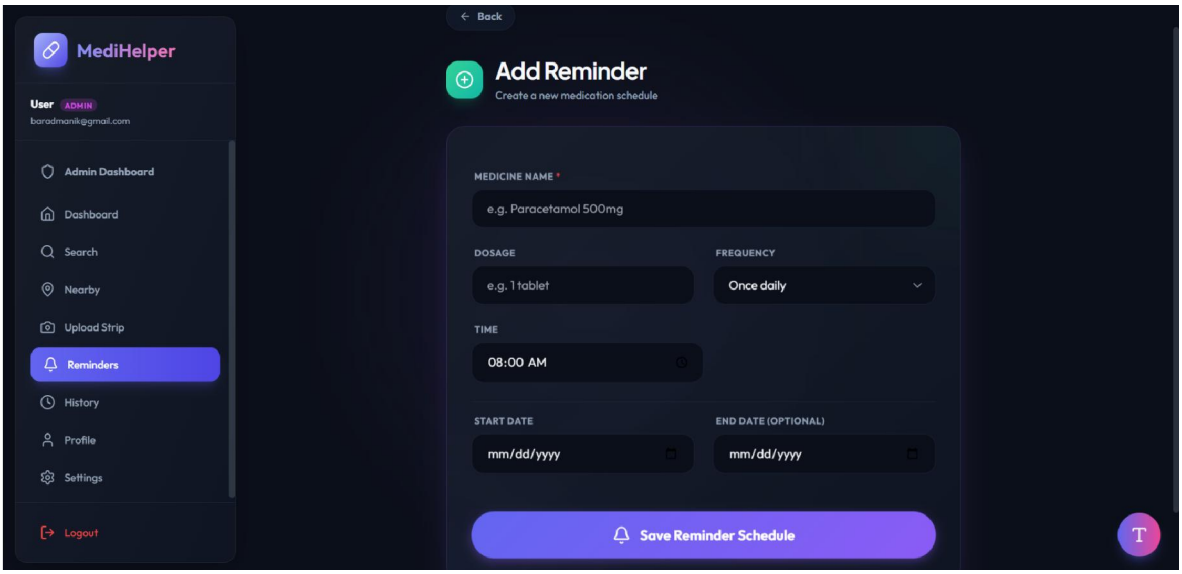

Fig.8.Reminders

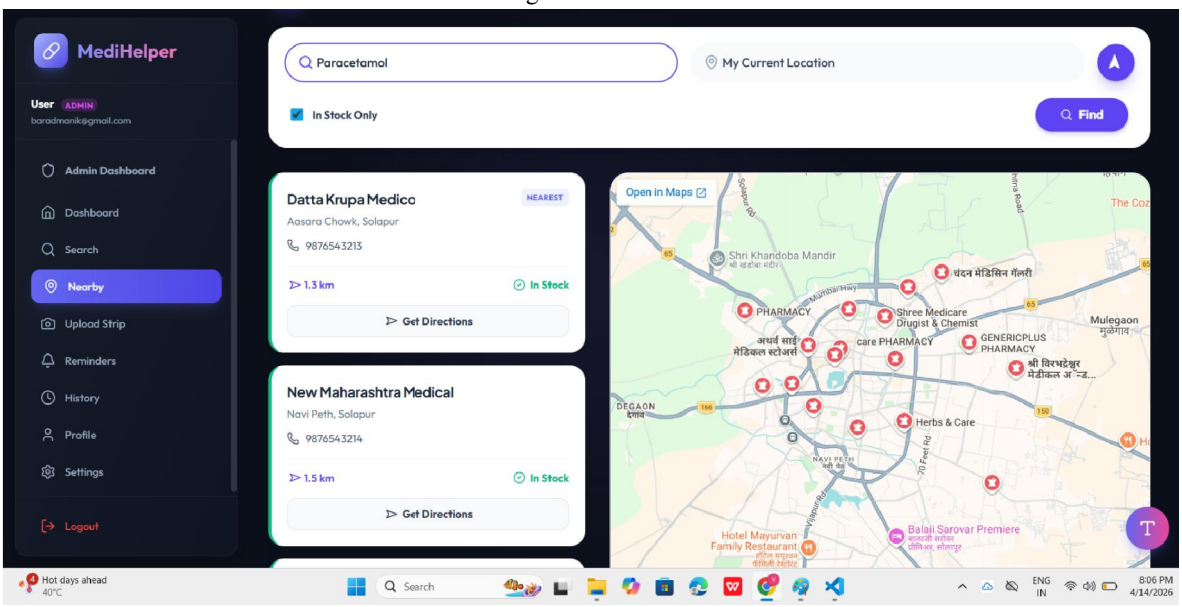

Fig.9.Nearby Locations

V. RESULTS AND DISCUSSION

The developed MediInfo system successfully delivers accurate medicine information within seconds through AI scanning. The OCR module works reliably on clear medicine strip images, while the fallback to OpenFDA ensures broader coverage. Real-time reminders and pharmacy locator features function smoothly. Users reported high satisfaction with the clean interface and voice assistant.

The Firebase serverless architecture provided excellent real-time performance and scalability. Minor limitations include dependency on good image quality for OCR and internet connectivity for OpenFDA calls.

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VI. CONCLUSION AND FUTURE WORK

In conclusion, MediInfo successfully provides an intelligent, user-friendly solution for medicine information access using AI-powered scanning, Firebase backend, and modern web technologies. It significantly improves healthcare awareness and medication safety for common users.

Future Work:

- Mobile app development using React Native
- Integration with more regional medicine databases
- Advanced AI for handwritten prescription recognition
- Push notifications for reminders

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