A Solution/Application to Regulate Private Healthcare Sector

IBM PROJECT REPORT

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Ganpat University

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Ganpat University
॥ विद्यया समाजोत्कर्षः ॥
Institute of Computer Technology

CERTIFICATE

This is to certify that the IBM/ Industry Project work entitled "Develop Solution/Application to Regulate Private Health Care Sector" by Krish Patel (Enrolment No. 21162171023), Aakarsh Vyas (Enrolment No. (21162121038) and Yash Sathwara (Enrolment No. 22162122009) of Ganpat University, towards the partial fulfillment of requirements of the degree of Bachelor of Technology – Computer Science and Engineering, carried out by them in the CSE(BDA/CS) Department. The results/findings contained in this Project have not been submitted in part or full to any other University / Institute for award of any other Degree/Diploma.

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Prof. Dharmesh Darji

Place : ICT – GUNI

Date :

ACKNOWLEDGEMENT

Industry Internship project is a golden opportunity for learning and self-development. I consider myself very lucky and honored to have so many wonderful people lead me through in completion of this project. First and foremost, I would like to thank Dr. Rohit Patel, Principal, ICT, and Prof. Dharmesh Darji, Head, ICT who gave us an opportunity to undertake this project. My grateful thanks to Prof. Ravindra Patel for their guidance in project - A Solution to Healthcare, who despite being extraordinarily busy with academics, took time out to hear, guide and keep us on the correct path. We do not know where would have been without his help. CSE department monitored our progress and arranged all facilities to make the process easier. We choose this moment to acknowledge their contribution gratefully.

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ABSTRACT

The private healthcare sector plays a crucial role in providing medical services, but challenges like lack of transparency, uneven service distribution, and difficulty in finding the right healthcare facility still exist. This project aims to develop a web-based solution that helps patients find hospitals based on their medical needs, check doctor and bed availability, and make informed healthcare decisions. Using React for the frontend and Django with MongoDB for the backend, the system enables users to search for hospitals based on disease specialization, ensuring they receive timely and appropriate care. Additionally, the project integrates AI-driven forecasting to predict future patient admissions, helping hospitals manage resources effectively. The solution not only streamlines hospital selection and booking but also improves healthcare accessibility, making the private healthcare system more efficient, transparent, and user-friendly.

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INTRODUCTION

Access to quality healthcare is essential, yet many patients struggle to find the right hospital or doctor when they need urgent medical attention. The private healthcare sector, while offering advanced medical facilities, often lacks a streamlined system for hospital discovery, doctor availability, and resource management. Patients frequently face challenges in identifying which hospital specializes in treating their condition and whether necessary resources like beds are available.

This project addresses these challenges by developing a web-based platform that simplifies the hospital search process. Using React for the frontend and Django with MongoDB for the backend, the application allows users to find hospitals based on their disease, check doctor availability, and make informed decisions. Additionally, AI-based forecasting helps hospitals predict patient inflow, enabling better resource management.

By integrating modern technology, this solution enhances transparency, accessibility, and efficiency in private healthcare, making it easier for patients to receive timely and appropriate care.

PROJECT SCOPE

This project aims to streamline the private healthcare sector by providing a web-based platform that connects patients with hospitals efficiently. The scope includes:

Hospital Discovery & Disease-Based Search

Patients can search for hospitals based on the disease they need treatment for. Each hospital's specialization and available treatments are listed to help patients make informed choices.

Doctor & Bed Availability Tracking

The system provides real-time information on doctor availability for specific diseases. Patients can check bed availability before visiting a hospital, reducing last-minute inconvenience.

User-Friendly Booking System

Patients can book appointments with doctors through the platform. The system ensures smooth scheduling and reduces waiting times.

AI-Powered Patient Forecasting

The platform utilizes Artificial Neural Networks (ANN) to predict future patient admissions. Helps hospitals manage resources efficiently based on demand trends.

Admin & Hospital Management Features

Hospitals can update their availability status, ensuring up-to-date information. Admin functionalities allow regulation and monitoring of private healthcare services.

Secure & Scalable Architecture

Built using React for the frontend and Django with MongoDB for the backend, ensuring scalability. Secure authentication and data handling to protect user privacy.

SOFTWARE & HARDWARE REQUIREMENTS

Software Requirements:

Web Browser: Google Chrome (recommended), Mozilla Firefox, Microsoft Edge, Safari (latest version).

Operating System: Windows 10+, macOS Mojave+, Linux (Ubuntu 20.04+).

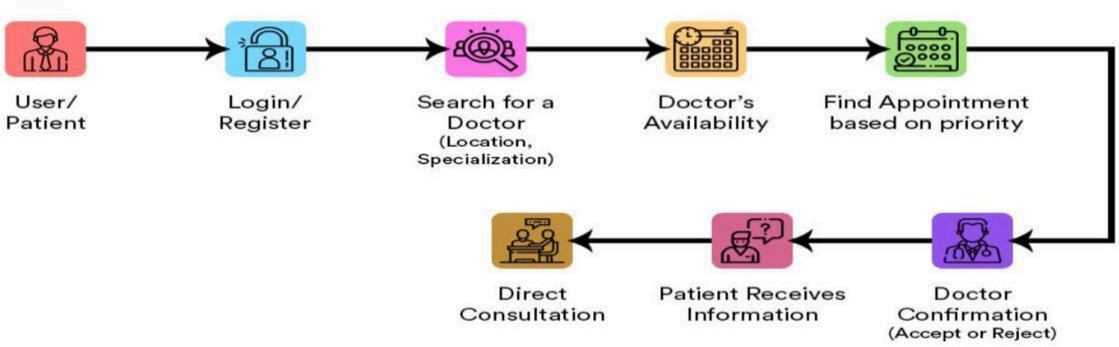
Internet Connection: Stable connection (min. 3Mbps) for smooth browsing and transactions.

Hardware Requirements:

PC/Laptop: Intel Core i3+, 4GB RAM+, 10GB free storage.

Mobile Devices: Android 6.0+ or iOS 12+, with a stable internet connection

PROCESS MODEL:



IMPLEMENTATION DETAILS

Frontend Implementation

1. **Develop Pages:**
    - **Home Page: Add a simple layout with key details about healthcare platforms and featured hospitals.**
    - **Login/Register: Build forms with basic validation (e.g., valid email, password).**
    - **User's Page: Show a list of hospitals, allow filtering and searching.**
    - **Find Specialists : Show Doctors based on your requirement.**
    - **About Page: Show About our website.**
    - **Dashboard: analyze based on data.**

2. **Integrate APIs:**
    - **Fetch user data from the backend (using Axios).**
    - **Display the data on the User(patient's) page, handling loading and error states.**
    - **Create one API for Doctors creating and Recommendation.**

3. **UI/UX:**
    - **Make sure the design looks good on both mobile and desktop.**
    - **Add some cool features like hover effects, smooth transitions, and easy-to-navigate forms.**

Backend Implementation

1. **Set Up the Server:**
    - **Used Django.**
    - **Set up the database (MongoDB) and connect it to the backend.**
2. **User Authentication:**
    - **Implement login and registration.**
    - **Encrypt passwords and protect routes that need authentication (future implementation).**
3. **API for User(patient) & Hospitals:**
    - **Build APIs to create, fetch, update, and delete.**
    - **Add search and filter functionality to help users find specific hospital.**
4. **Connect Frontend and Backend:**
    - **Ensure the frontend can communicate with the backend (fetch data, post forms, etc.).**

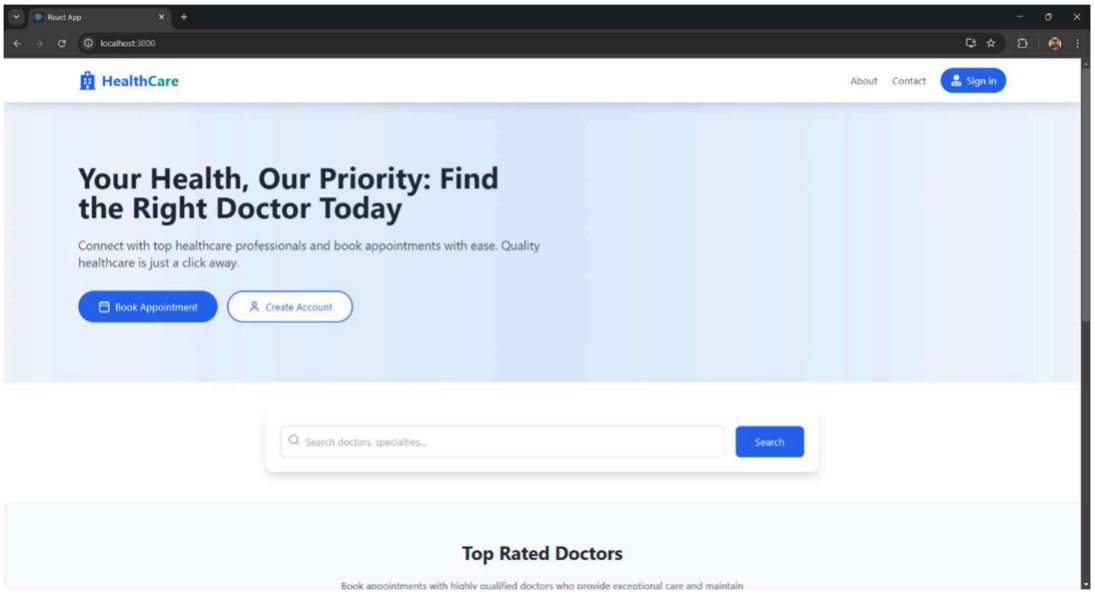
Machine Learning Part:

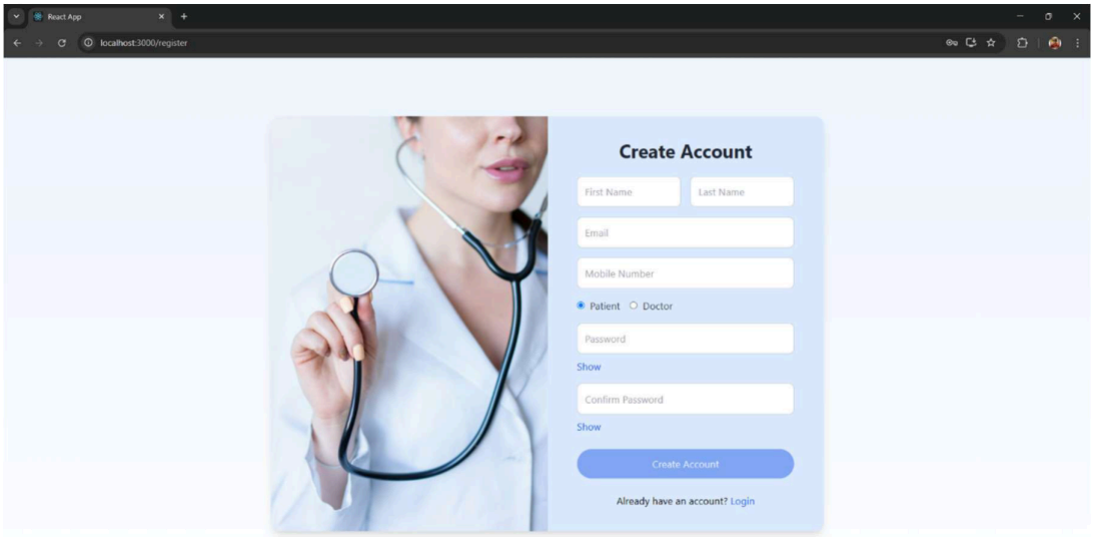
1. **Developed a Recurrent Neural Network (RNN)-based recommendation system to enhance personalized suggestions by leveraging sequential user interaction data.**
2. **Designed and implemented a regression model to accurately predict the number of hospital beds required, utilizing historical data and relevant predictive features for improved resource planning.**
3. **Designed and implemented a KNN model for accurately recommended doctors.**

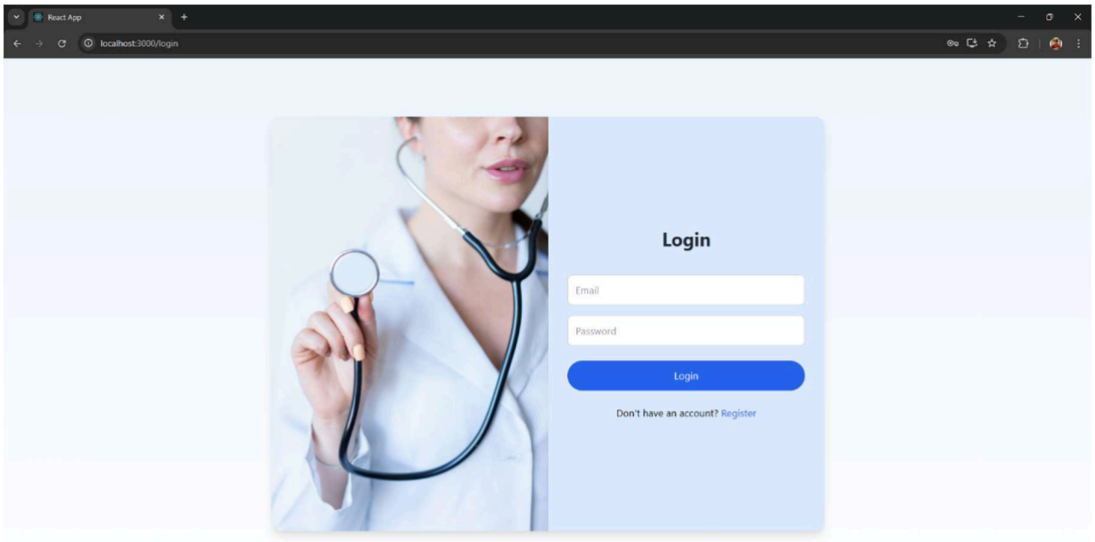
Deployment (future implementation)

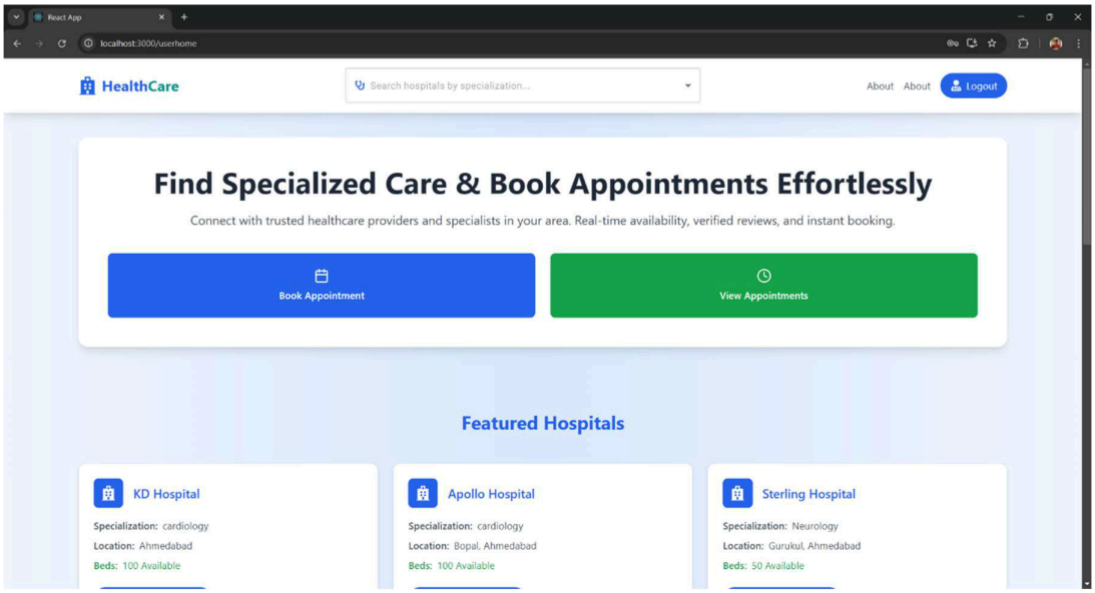
1. **Frontend:**
    - **Build and deploy the React app on platforms like Heroku, Netlify, or Vercel.**
    - **Make sure everything works smoothly on the live site.**
2. **Backend:**
    - **Set up the backend on Heroku or AWS.**
    - **Connect the live backend to the frontend and make sure everything is synced.**
3. **Final Testing:**
    - **Test the app thoroughly (check on different devices, fix bugs, and ensure everything works).**

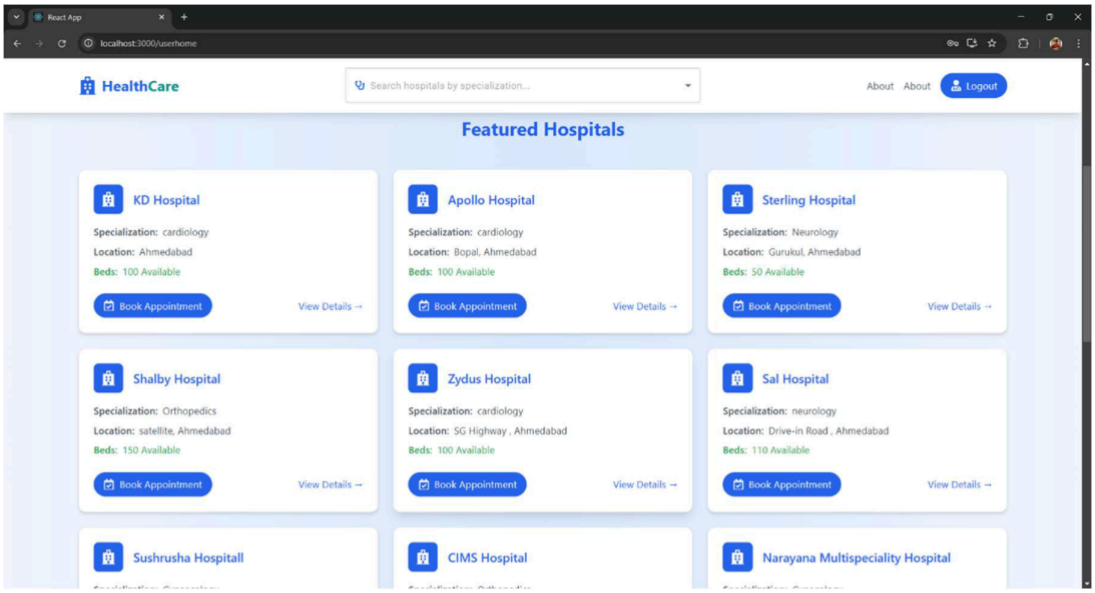
SCREENSHOTS

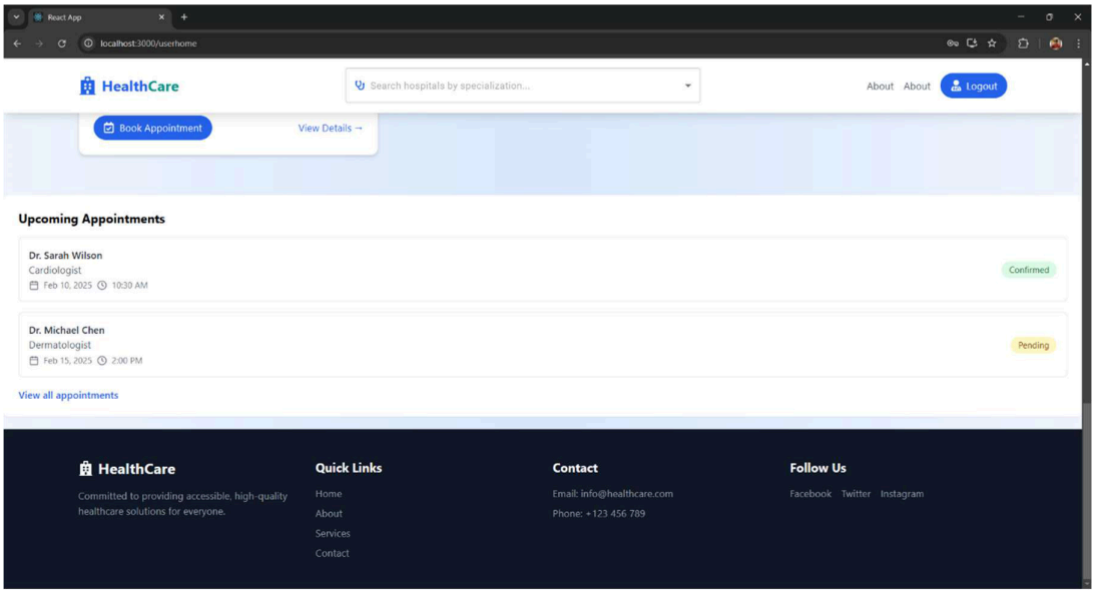


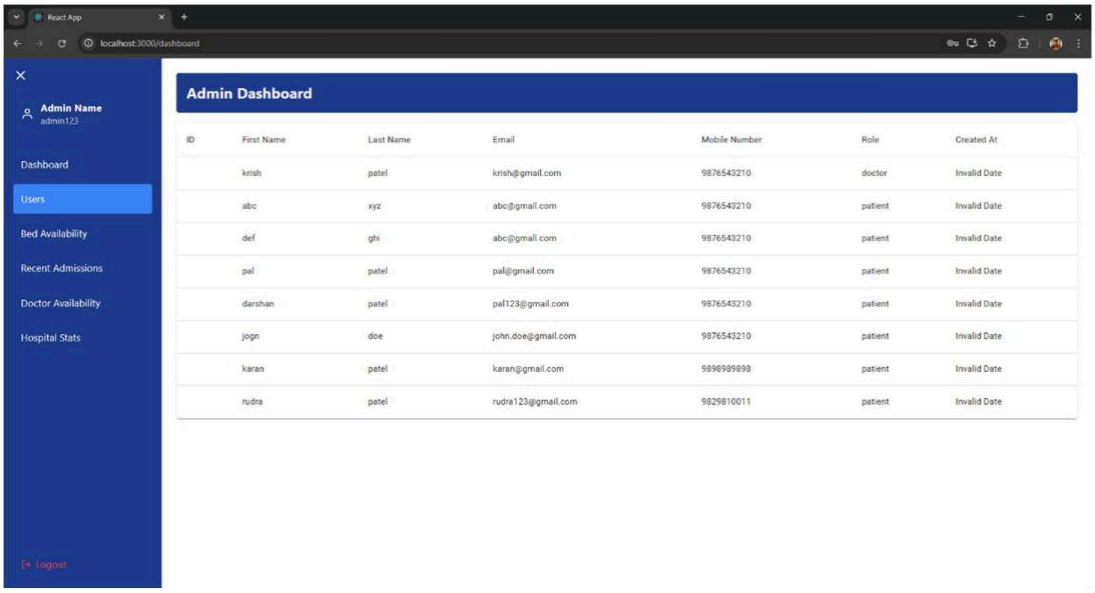


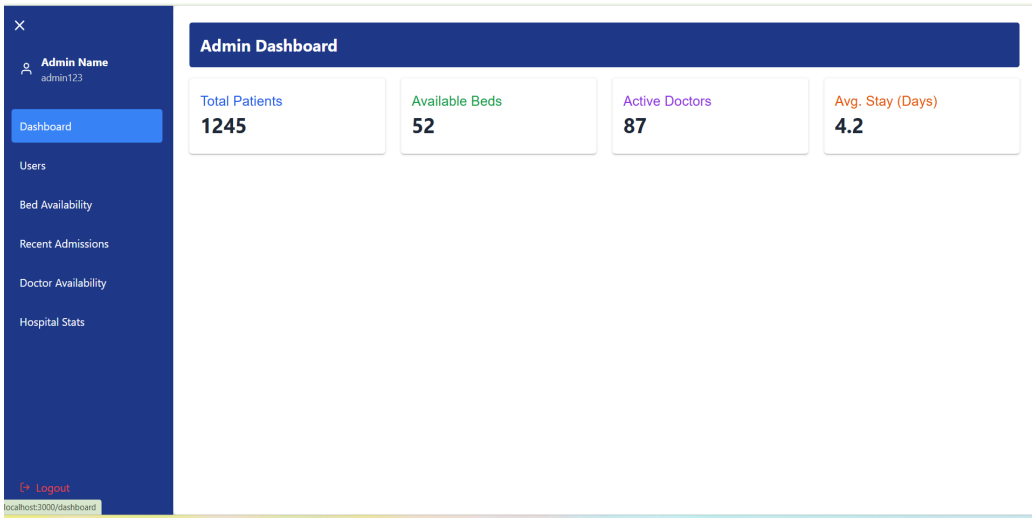

React App
localhost:3000/login
Login
Email
Password
Login
Don't have an account? Register

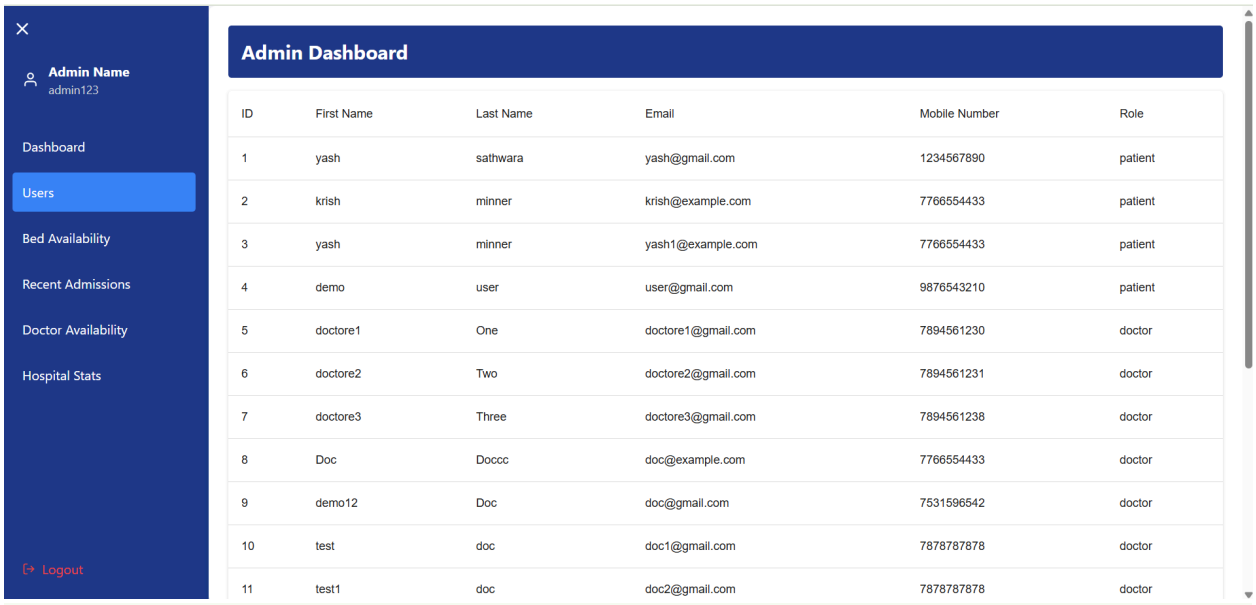

React App
localhost:3000/userhome
HealthCare
Search hospitals by specialization...
About
About
Logout
Find Specialized Care & Book Appointments Effortlessly
Connect with trusted healthcare providers and specialists in your area. Real-time availability, verified reviews, and instant booking.
Book Appointment
View Appointments
Featured Hospitals
KD Hospital
Specialization: cardiology
Location: Ahmedabad
Beds: 100 Available
Apollo Hospital
Specialization: cardiology
Location: Bopal, Ahmedabad
Beds: 100 Available
Sterling Hospital
Specialization: Neurology
Location: Gurukul, Ahmedabad
Beds: 50 Available


React App
localhost:3000/userhome
HealthCare
Search hospitals by specialization...
About
About
Logout
Featured Hospitals
KD Hospital
Specialization: cardiology
Location: Ahmedabad
Beds: 100 Available
Book Appointment
View Details →
Apollo Hospital
Specialization: cardiology
Location: Bopal, Ahmedabad
Beds: 100 Available
Book Appointment
View Details →
Sterling Hospital
Specialization: Neurology
Location: Gurukul, Ahmedabad
Beds: 50 Available
Book Appointment
View Details →
Shalby Hospital
Specialization: Orthopedics
Location: satellite, Ahmedabad
Beds: 150 Available
Book Appointment
View Details →
Zydus Hospital
Specialization: cardiology
Location: SG Highway , Ahmedabad
Beds: 100 Available
Book Appointment
View Details →
Sal Hospital
Specialization: neurology
Location: Drive-in Road , Ahmedabad
Beds: 110 Available
Book Appointment
View Details →
Sushrusha Hospitall
CIMS Hospital
Narayana Multispeciality Hospital

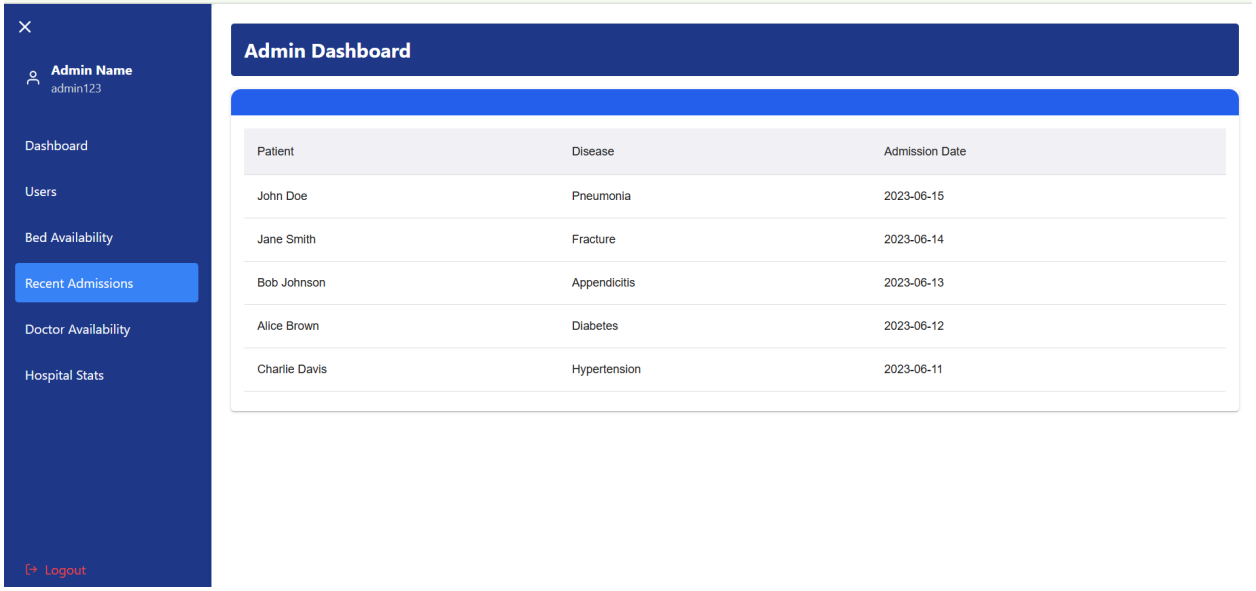

React App
localhost:3000/userhome
HealthCare
Search hospitals by specialization...
About
About
Logout
Book Appointment
View Details →
Upcoming Appointments
Dr. Sarah Wilson
Cardiologist
Feb 10, 2025 10:30 AM
Confirmed
Dr. Michael Chen
Dermatologist
Feb 15, 2025 2:00 PM
Pending
View all appointments
HealthCare
Committed to providing accessible, high-quality healthcare solutions for everyone.
Quick Links
Home
About
Services
Contact
Contact
Email: info@healthcare.com
Phone: +123 456 789
Follow Us
Facebook
Twitter
Instagram

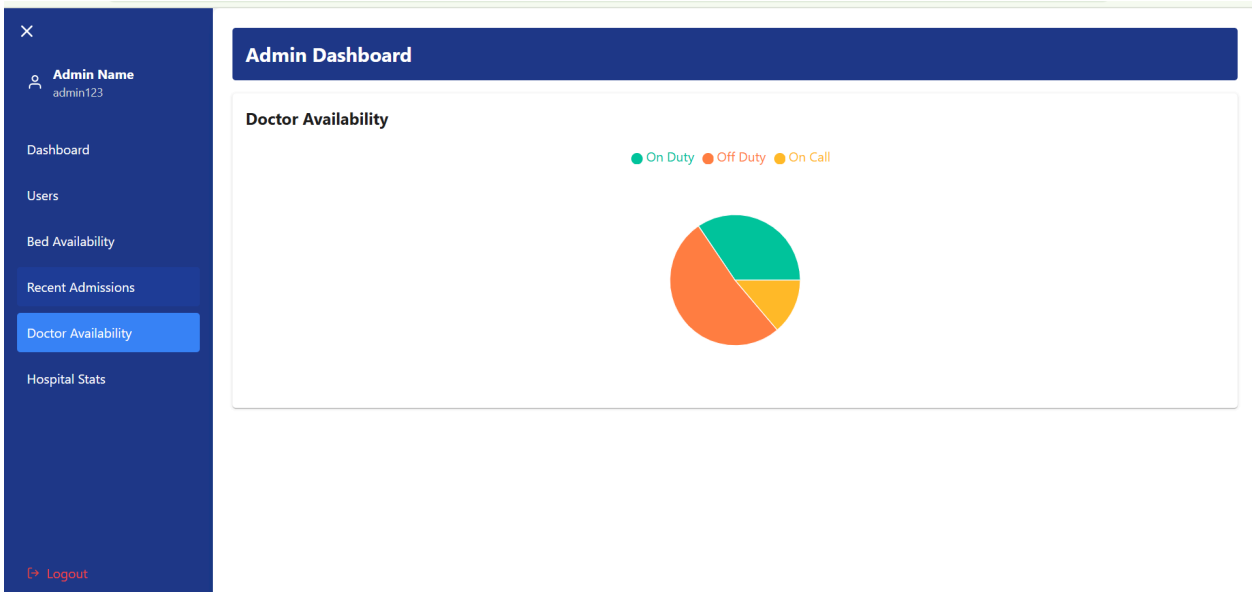

React App
localhost:3000/dashboard
Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
ID
First Name
Last Name
Email
Mobile Number
Role
Created At
krish patel krish@gmail.com 9876543210 doctor Invalid Date
abc xyz abc@gmail.com 9876543210 patient Invalid Date
def ghi abc@gmail.com 9876543210 patient Invalid Date
pal patel pal@gmail.com 9876543210 patient Invalid Date
darshan patel pal123@gmail.com 9876543210 patient Invalid Date
jogn doe john.doe@gmail.com 9876543210 patient Invalid Date
karan patel karan@gmail.com 9898989898 patient Invalid Date
rudra patel rudra123@gmail.com 9829810011 patient Invalid Date

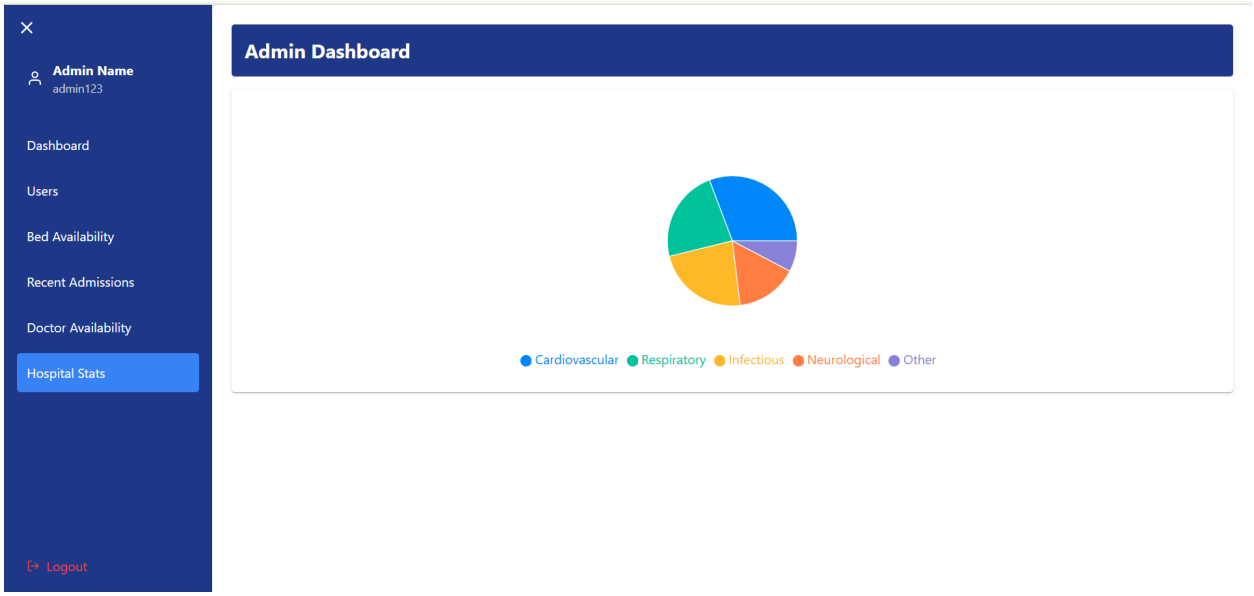

Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
localhost:3000/dashboard
Admin Dashboard
Total Patients
1245
Available Beds
52
Active Doctors
87
Avg. Stay (Days)
4.2

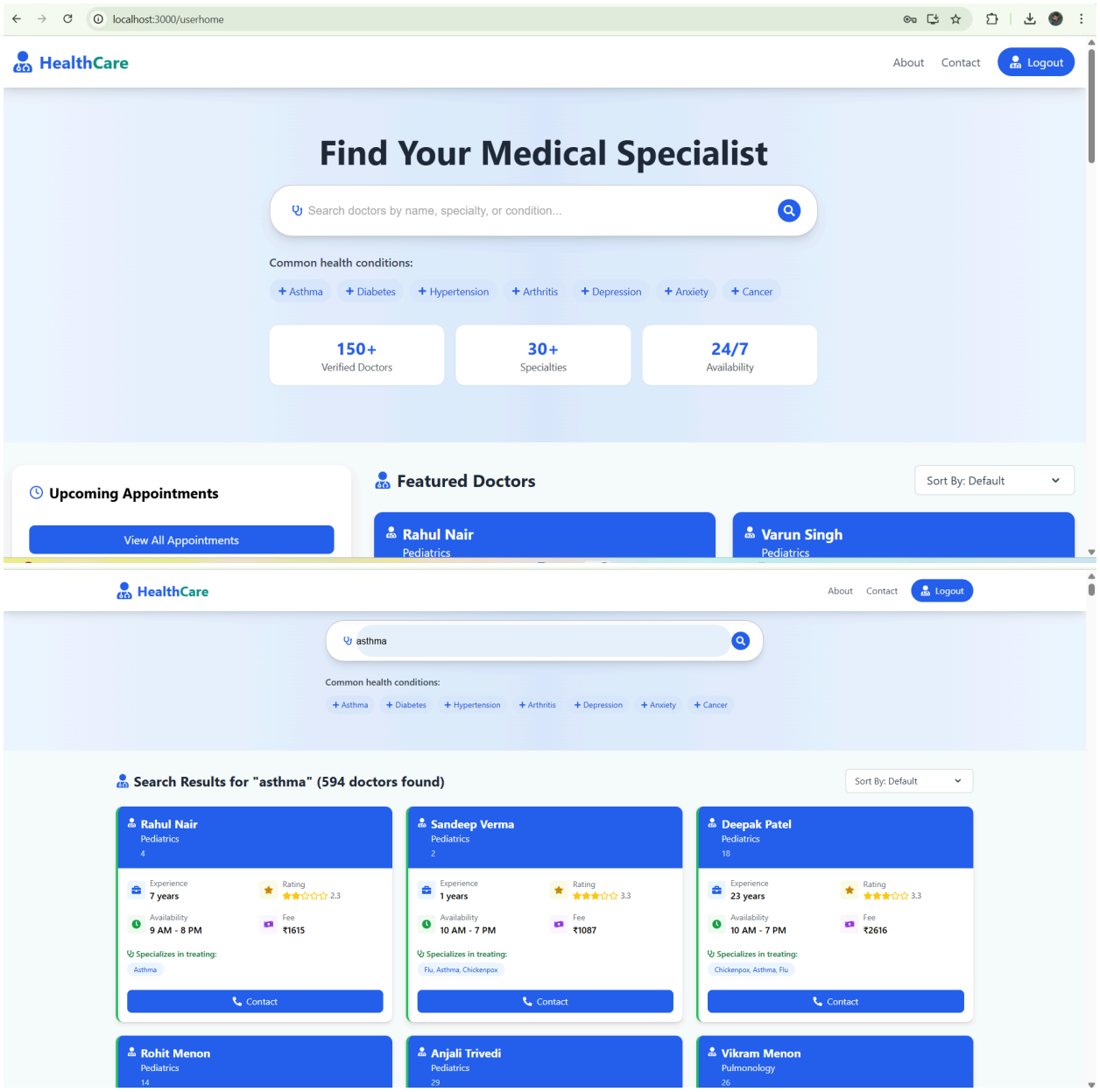

Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
ID First Name Last Name Email Mobile Number Role
1 yash sathwara yash@gmail.com 1234567890 patient
2 krish minner krish@example.com 7766554433 patient
3 yash minner yash1@example.com 7766554433 patient
4 demo user user@gmail.com 9876543210 patient
5 doctore1 One doctore1@gmail.com 7894561230 doctor
6 doctore2 Two doctore2@gmail.com 7894561231 doctor
7 doctore3 Three doctore3@gmail.com 7894561238 doctor
8 Doc Doccc doc@example.com 7766554433 doctor
9 demo12 Doc doc@gmail.com 7531596542 doctor
10 test doc doc1@gmail.com 7878787878 doctor
11 test1 doc doc2@gmail.com 7878787878 doctor

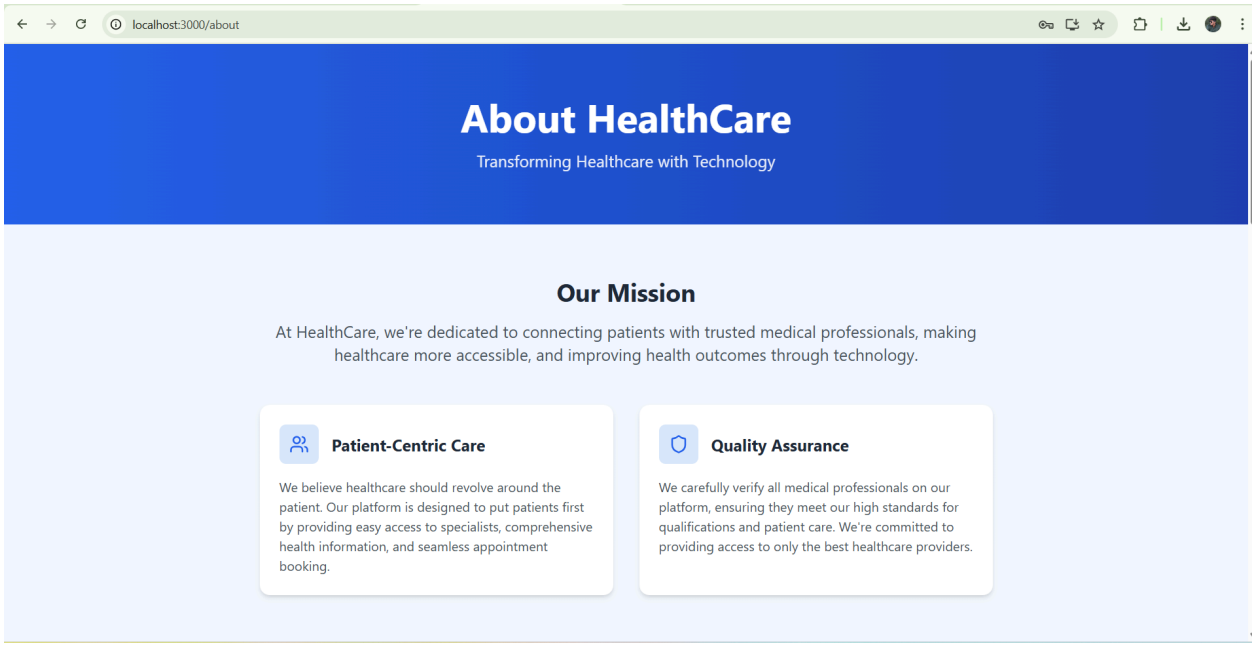
Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
Bed Availability
200
150
100
50
0
ICU
Total Beds : 50
Available Beds : 10
ICU
General
Pediatric
Maternity


Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
Patient Disease Admission Date
John Doe Pneumonia 2023-06-15
Jane Smith Fracture 2023-06-14
Bob Johnson Appendicitis 2023-06-13
Alice Brown Diabetes 2023-06-12
Charlie Davis Hypertension 2023-06-11


Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
Doctor Availability
On Duty
Off Duty
On Call


Admin Name
admin123
Dashboard
Users
Bed Availability
Recent Admissions
Doctor Availability
Hospital Stats
Logout
Admin Dashboard
Cardiovascular
Respiratory
Infectious
Neurological
Other


localhost:3000/userhome
HealthCare
About
Contact
Logout
Find Your Medical Specialist
Search doctors by name, specialty, or condition...
Common health conditions:
+ Asthma
+ Diabetes
+ Hypertension
+ Arthritis
+ Depression
+ Anxiety
+ Cancer
150+
Verified Doctors
30+
Specialties
24/7
Availability
Upcoming Appointments
View All Appointments
Featured Doctors
Sort By: Default
Rahul Nair
Pediatrics
Varun Singh
Pediatrics
HealthCare
About
Contact
Logout
asthma
Common health conditions:
+ Asthma
+ Diabetes
+ Hypertension
+ Arthritis
+ Depression
+ Anxiety
+ Cancer
Search Results for "asthma" (594 doctors found)
Sort By: Default
Rahul Nair
Pediatrics
4
Experience
7 years
Rating
2.3
Availability
9 AM - 8 PM
Fee
₹1615
Specializes in treating:
Asthma
Contact
Sandeep Verma
Pediatrics
2
Experience
1 years
Rating
3.3
Availability
10 AM - 7 PM
Fee
₹1087
Specializes in treating:
Flu, Asthma, Chickenpox
Contact
Deepak Patel
Pediatrics
18
Experience
23 years
Rating
3.3
Availability
10 AM - 7 PM
Fee
₹2616
Specializes in treating:
Chickenpox, Asthma, Flu
Contact
Rohit Menon
Pediatrics
14
Anjali Trivedi
Pediatrics
29
Vikram Menon
Pulmonology
26


localhost:3000/about
About HealthCare
Transforming Healthcare with Technology
Our Mission
At HealthCare, we're dedicated to connecting patients with trusted medical professionals, making healthcare more accessible, and improving health outcomes through technology.
Patient-Centric Care
We believe healthcare should revolve around the patient. Our platform is designed to put patients first by providing easy access to specialists, comprehensive health information, and seamless appointment booking.
Quality Assurance
We carefully verify all medical professionals on our platform, ensuring they meet our high standards for qualifications and patient care. We're committed to providing access to only the best healthcare providers.

Machine Learning Model Link:

https://colab.research.google.com/drive/1v34uA29EthdL7NbCEkrHLwDJ-tvm5u4_?usp=sharing

https://colab.research.google.com/drive/1iq62xw0n1_B3hbxlJeQx18wpTLEVh5Lb?usp=sharing

https://colab.research.google.com/drive/19zLRXFFTQ-wv89mnXPZwTrELP2zxILVo?usp=sharing

CONCLUSION & FUTURE WORK

In conclusion, our project presents a tech-driven solution aimed at effectively regulating private healthcare.
By ensuring transparency in medical services, enhancing compliance with health regulations, and strengthening patient data security and accessibility, our system fosters a more reliable healthcare ecosystem.
Additionally, the platform enables seamless online appointment booking and intelligent doctor/hospital recommendations, ultimately improving healthcare accessibility and efficiency for patients and providers alike.

Future Work:

Improving Security, Integrating the Machine Learning Part

REFERENCES

https://docs.djangoproject.com/en/5.1/

https://youtube.com/playlist?list=PLu71SKxNbfoDOf6vAcKmazT92uLnWAgy&si=9lIZ-NsnshMscQe_

https://youtu.be/y2HkM1E5iwc?si=tpZdg9S-oJKja

HY8 https://studygyaan.com/tag/django-models

https://youtu.be/GION2LJ7aRc?si=Xrw-Sc-lMmb8

Po-1 https://tailwindui.com/components

https://www.npmjs.com/package/

http://react.dev/learn

https://youtube.com/playlist?list=PLu71SKxNbfoDqgPchmvIsL4hTnJIrtige&si=eoAY1BS-gVwVO_3h

https://youtu.be/RGKi6LSPDLU?si=OIlcm-hf1U8mHSxN