A Solution/Application to Regulate Private Healthcare Sector

IBM PROJECT REPORT

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Submitted to

Faculty of Engineering and Technology Institute of Computer Technology

Ganpat University

Ganpat University, Mehsana

[June 2025]

CERTIFICATE

This is to certify that the IBM 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 fulfilment 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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Name & Signature of Head

Prof. Dharmesh Darji

Place: ICT – GUNI

Date:

ACKNOWLEDGEMENT

The IBM Project has been a valuable journey of learning, growth, and self-development. I feel truly fortunate and honored to have had the support and guidance of so many inspiring individuals throughout this experience.

I would like to express my sincere gratitude to Dr. Rohit Patel, Principal of ICT, and Prof. Dharmesh Darji, Head of the ICT Department, for providing us with the opportunity to work on this project.

A heartfelt thanks to Mr. Parwinder S & Prof. Ravindra Patel for his constant support and mentorship on the project *"A Solution to Healthcare."* Despite his busy academic schedule, he always made time to guide us, listen to our ideas, and help us stay on track. His insights were incredibly valuable, and I genuinely appreciate his encouragement at every step.

I am also thankful to the CSE Department for regularly monitoring our progress and providing the necessary resources and support that made this journey smoother. This moment feels right to express my appreciation for everyone who contributed to making this project a success.

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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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CHAPTER 1: INTRODUCTION

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Finding the right hospital or doctor during a health emergency can be a stressful and confusing experience for many patients. While private hospitals offer excellent medical care, there's often no centralized way for patients to quickly search for hospitals that treat specific conditions or to check if doctors and beds are available. This leads to delays in treatment and a lot of unnecessary back-and-forth, especially in busy cities like Ahmedabad.

This project aims to solve that problem by creating a smart, user-friendly web platform that makes it easier for people to find hospitals and doctors based on the disease they're dealing with. Built using **React.js** on the frontend and **Django** with **PostgreSQL** on the backend, the system allows users to search for healthcare providers, view doctor availability, and book appointments directly from the platform.

The platform supports both **patient and doctor roles**, offering custom dashboards for each. Patients can manage their bookings and view hospital details, while doctors can update their availability and track appointments.

Overall, this project enhances healthcare accessibility by combining modern technology with practical solutions to real-world problems. It bridges the gap between patients and private healthcare services, making the process of finding and receiving medical care faster, smarter, and more reliable.

CHAPTER 2: PROJECT SCOPE

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This project focuses on simplifying access to private healthcare by building a web-based platform that bridges the gap between patients and hospitals. The goal is to make it easier for users to find the right hospital and doctor based on their health needs, all from a single, user-friendly interface. Here's what the project covers:

1. Disease-Based Hospital Search

Patients can search for hospitals based on the illness or condition they're dealing with. The platform shows each hospital's specialization and available treatments to help users choose the most suitable option.

2. Real-Time Doctor Availability

The system provides up-to-date information on the availability of doctors for different conditions. Patients can view the doctor's availability before visiting, helping avoid last-minute surprises or overcrowding and wastage of time.

3. Smooth Appointment Booking

Users can directly book appointments with doctors through the platform. This not only reduces waiting times but also brings more convenience and clarity to the scheduling process.

4. Doctor Recommendation Using Machine Learning

To assist patients in making better choices, the system recommends doctors using machine learning techniques based on the entered disease or symptoms, improving the relevance of search results.

5. Doctor Dashboard Panel

Doctor has access to a dedicated panel where they can update information like manage appointment.

6. Secure and Scalable Technology Stack

The platform is built using **React.js** for the frontend and **Django with PostgreSQL** for the backend, offering a secure and scalable architecture. Strong authentication mechanisms are in place to protect user data and ensure privacy.

CHAPTER 3: SOFTWARE AND HARDWARE REQUIREMENT

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Software Requirements:

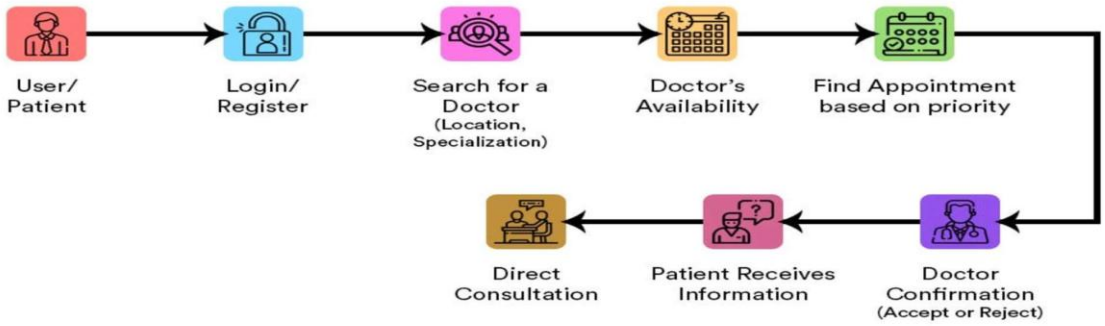
- Web Browser: Google Chrome (recommended), Mozilla Firefox, Microsoft Edge, Safari (latest version).
- Operating System: Windows 10+, macOS Mojave+, Linux (Ubuntu 20.04+).
- Internet Connection: Stable connection (min. 3Mbps) for smooth browsing and transactions.

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

CHAPTER 4: PROCESS MODEL

CHAPTER 4: PROCESS MODEL



CHAPTER 5: IMPLEMENTATION DETAILS

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Frontend Implementation

Home Page: Displays essential details about the platform, featured hospitals, and a clean layout for easy navigation.

Login/Register Pages: Includes user-friendly forms with input validation (valid email, strong password, etc.).

Patient Dashboard: Shows a list of available doctors, with search and filter options based on disease and specialization.

Doctor Dashboard: Doctors can view and manage their availability, appointments, and profile.

API Integration

APIs are consumed using Axios to fetch and display real-time data. Proper handling of loading states, error messages, and dynamic content rendering.

UI/UX Enhancements

Responsive design optimized for mobile and desktop.

Smooth animations, interactive transitions, and clean form navigation for a modern experience.

Backend Implementation

Backend built using Django.

PostgreSQL for relational data handling and improved performance.

Authentication & Security

Secure OTP-based registration and login implemented for both users and doctors.

Passwords are encrypted, and protected routes are set up using JWT tokens.

Role-based access ensures that users, doctors, and admins have specific permissions and dashboards.

CHAPTER 5: IMPLEMENTATION DETAILS

API Development

RESTful APIs are developed for managing, users, appointments, and doctor profiles.

Includes advanced search and filter endpoints based on disease, specialization, and availability.

Doctor Management

Doctors can update their availability, number of patients treated, specialization, and hospital details.

Location data (latitude & longitude) is automatically detected from the hospital address for mapping or location-based search features.

Frontend-Backend Integration

All major frontend components communicate with the backend to fetch dynamic content, manage sessions, and process user actions.

Machine Learning Integration

A machine learning-based doctor recommendation system was implemented.

Based on the patient's entered disease, the system suggests suitable doctors by analysing available doctor data and matching specializations.

For analysing we have use XGBoost (eXtreme Gradient Boosting) algorithm.

We have use XGBoost because we have structured and mixed type (Numerical, Categorical, Text/Json) data.

XGBoost is powerful algorithm based on decision trees. It is ideal for this data because it can handle Tabular, Mixed, Robust to Missing data.

For Location Recommendation we have use Rule-Based Hybrid Recommendation System.

We have use custom scoring system that combines Distance-based filtering, Text similarity scoring and Weighted Rule-Based scoring.

CHAPTER 6: SCREENSHOTS

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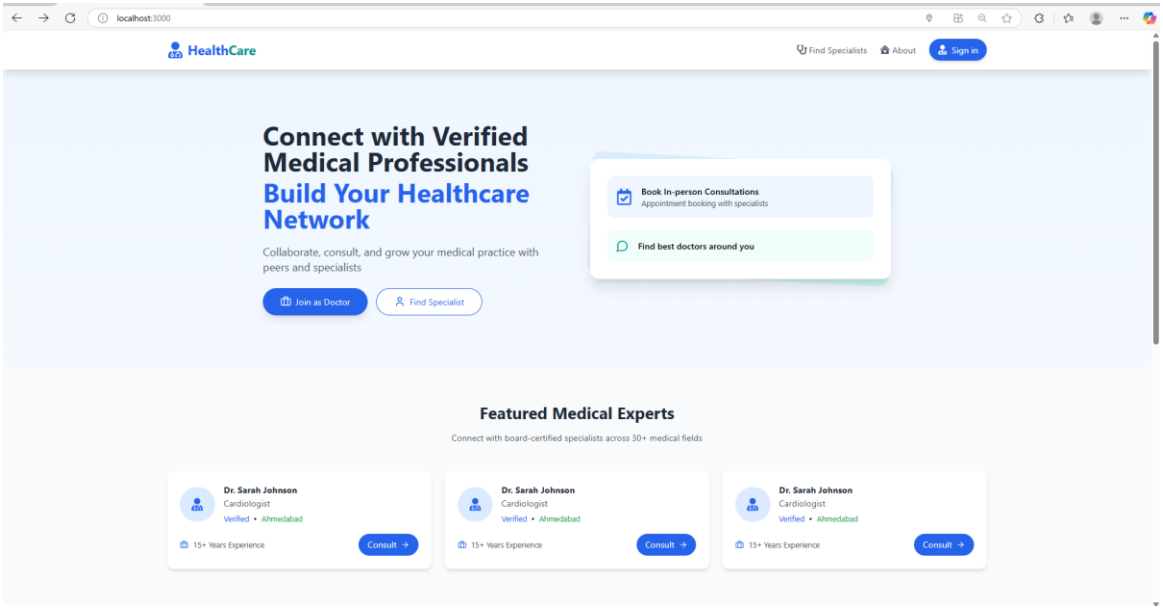
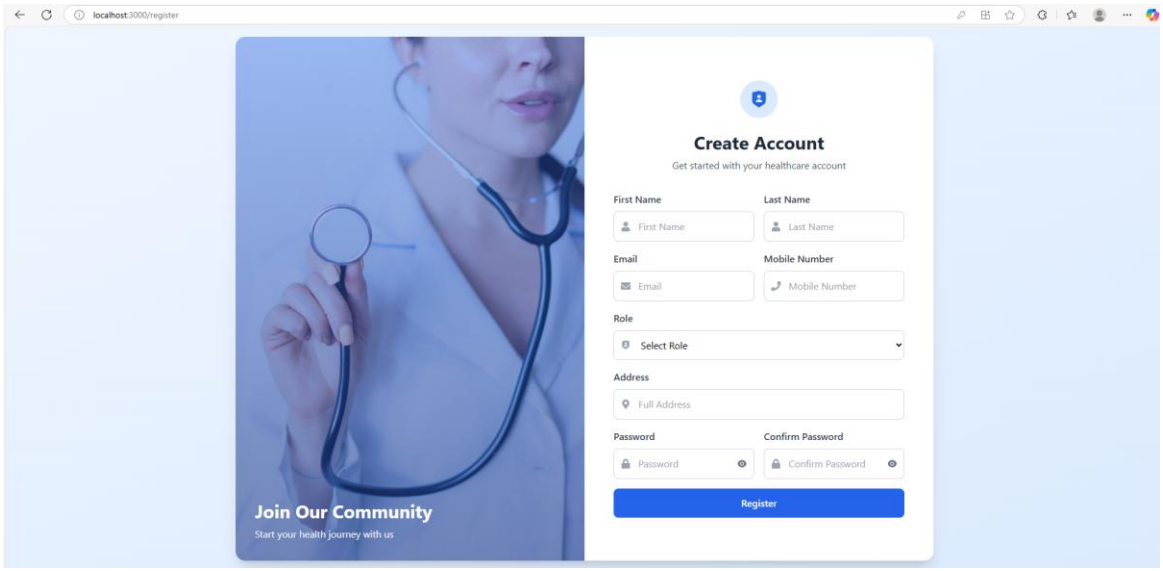
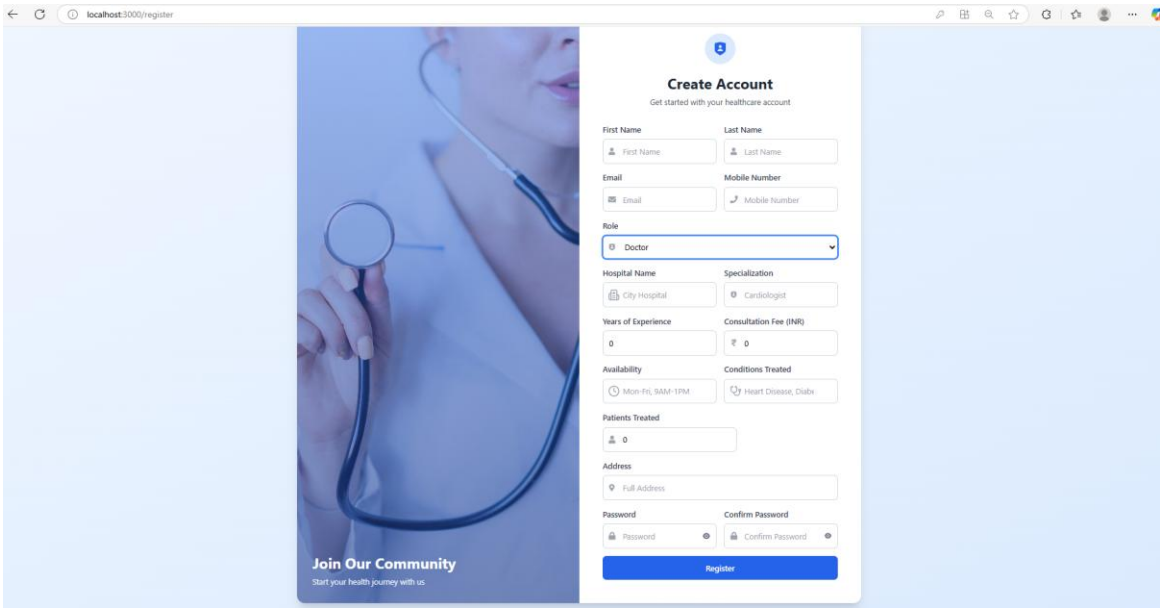
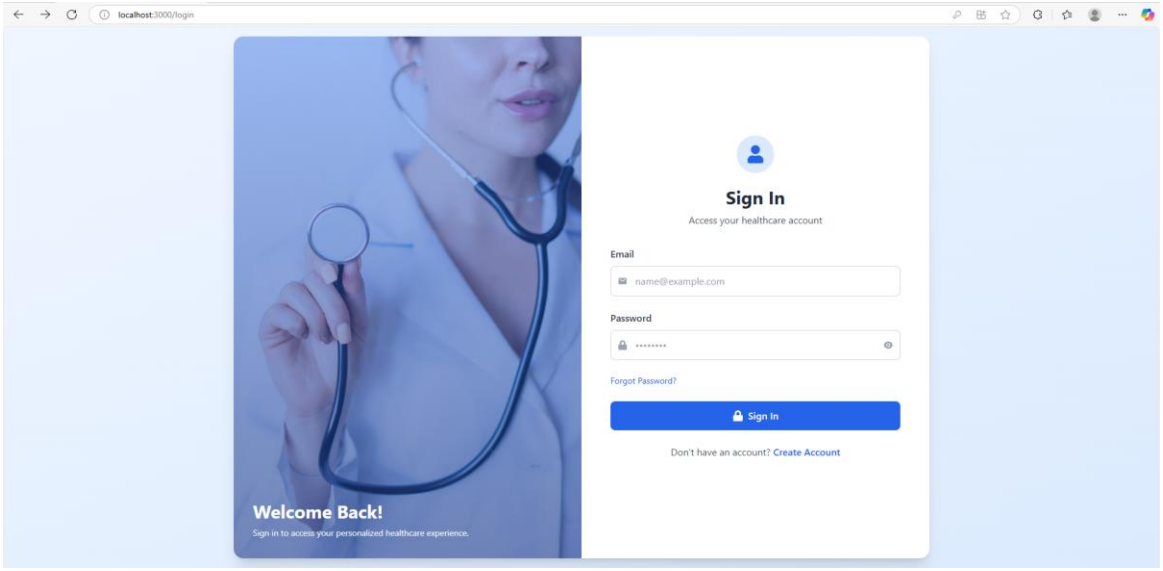
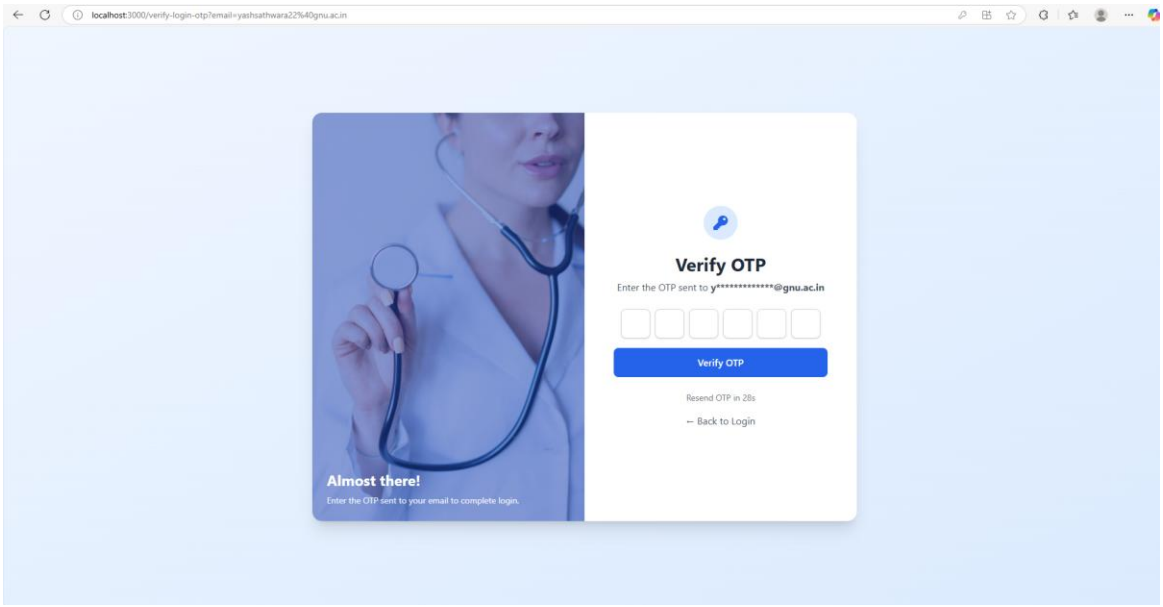





localhost:3000/register
Join Our Community
Start your health journey with us
Create Account
Get started with your healthcare account
First Name
Last Name
Email
Mobile Number
Role
Doctor
Hospital Name
Specialization
Years of Experience
Consultation Fee (INR)
Availability
Conditions Treated
Patients Treated
Address
Password
Confirm Password
Register


localhost:3000/login
Welcome Back!
Sign in to access your personalized healthcare experience.
Sign In
Access your healthcare account
Email
name@example.com
Password
Forgot Password?
Sign In
Don't have an account? Create Account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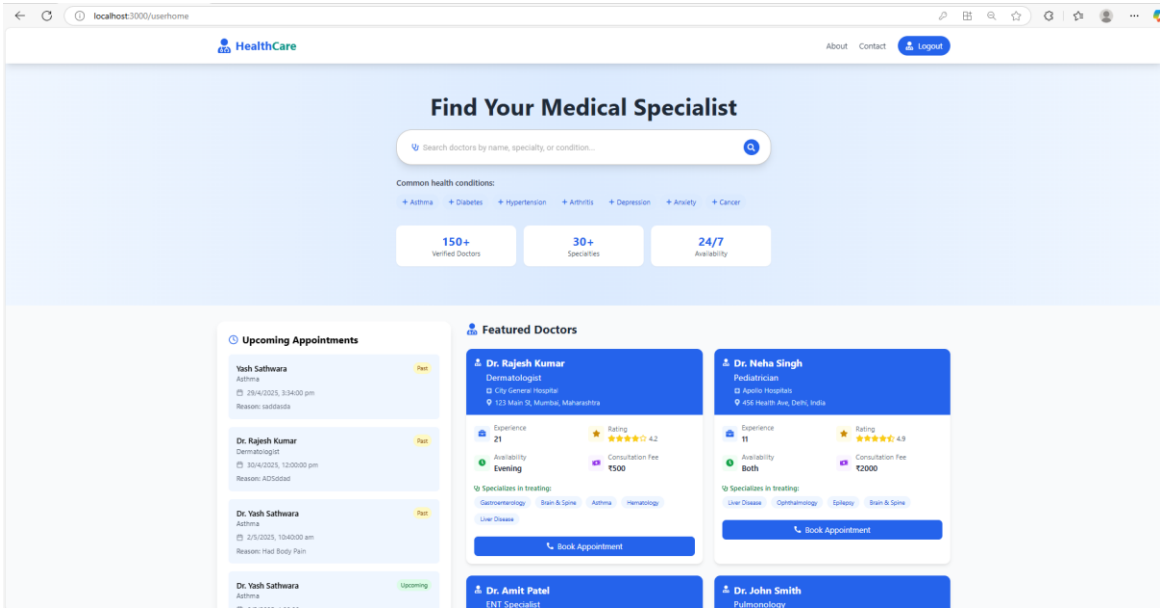
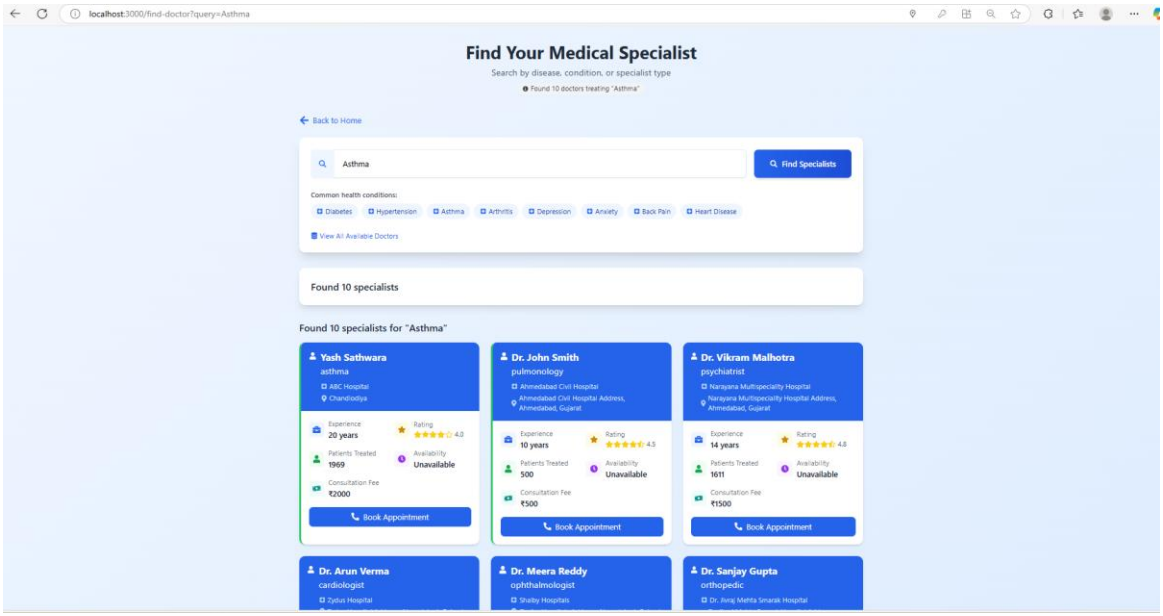
Almost there!
Enter the OTP sent to your email to complete login.
Verify OTP
Enter the OTP sent to y**********@gnu.ac.in
Verify OTP
Resend OTP in 28s
← Back to Login


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
Yash Sathwara
Asthma
Past
29/4/2025, 3:34:00 pm
Reason: saddasda
Dr. Rajesh Kumar
Dermatologist
Past
30/4/2025, 12:00:00 pm
Reason: ADSddad
Dr. Yash Sathwara
Asthma
Past
2/5/2025, 10:40:00 am
Reason: Had Body Pain
Dr. Yash Sathwara
Asthma
Upcoming
Featured Doctors
Dr. Rajesh Kumar
Dermatologist
City General Hospital
123 Main St, Mumbai, Maharashtra
Experience
21
Rating
4.2
Availability
Evening
Consultation Fee
₹500
Specializes in treating:
Gastroenterology
Brain & Spine
Asthma
Hematology
Liver Disease
Book Appointment
Dr. Neha Singh
Pediatrician
Apollo Hospitals
456 Health Ave, Delhi, India
Experience
11
Rating
4.9
Availability
Both
Consultation Fee
₹2000
Specializes in treating:
Liver Disease
Ophthalmology
Epilepsy
Brain & Spine
Book Appointment
Dr. Amit Patel
ENT Specialist
Dr. John Smith
Pulmonology


localhost:3000/find-doctor?query=Asthma
Find Your Medical Specialist
Search by disease, condition, or specialist type
Found 10 doctors treating "Asthma"
Back to Home
Asthma
Find Specialists
Common health conditions:
Diabetes
Hypertension
Asthma
Arthritis
Depression
Anxiety
Back Pain
Heart Disease
View All Available Doctors
Found 10 specialists
Found 10 specialists for "Asthma"
Yash Sathwara
asthma
ABC Hospital
Chandlodiya
Experience
20 years
Rating
4.0
Patients Treated
1969
Availability
Unavailable
Consultation Fee
₹2000
Book Appointment
Dr. John Smith
pulmonology
Ahmedabad Civil Hospital
Ahmedabad Civil Hospital Address, Ahmedabad, Gujarat
Experience
10 years
Rating
4.5
Patients Treated
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Availability
Unavailable
Consultation Fee
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Book Appointment
Dr. Vikram Malhotra
psychiatrist
Narayana Multispeciality Hospital
Narayana Multispeciality Hospital Address, Ahmedabad, Gujarat
Experience
14 years
Rating
4.8
Patients Treated
1611
Availability
Unavailable
Consultation Fee
₹1500
Book Appointment
Dr. Arun Verma
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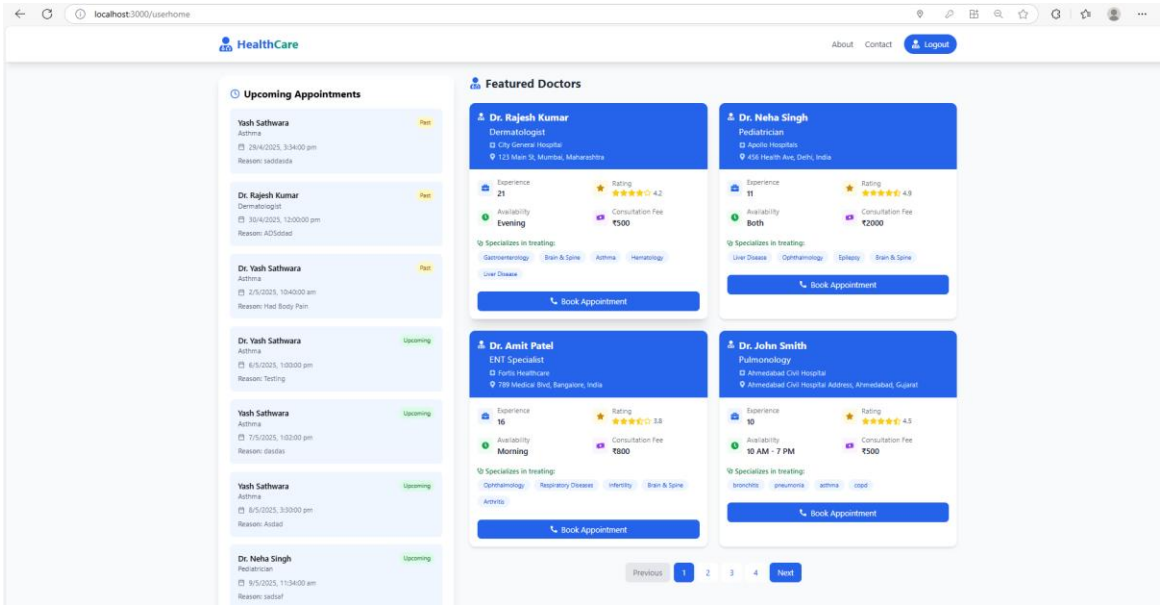
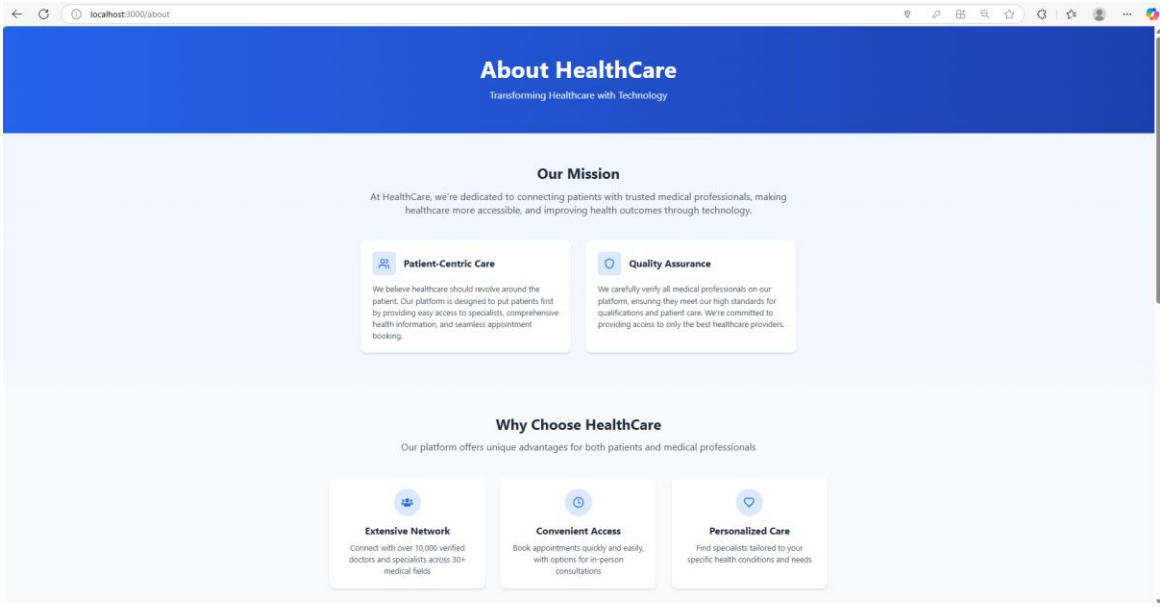
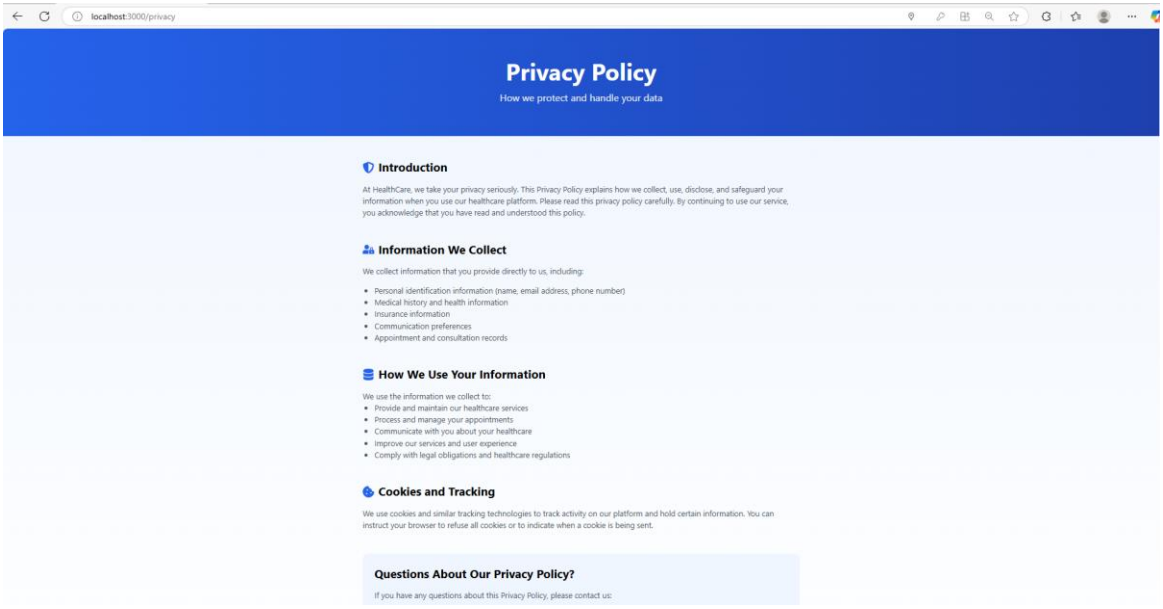
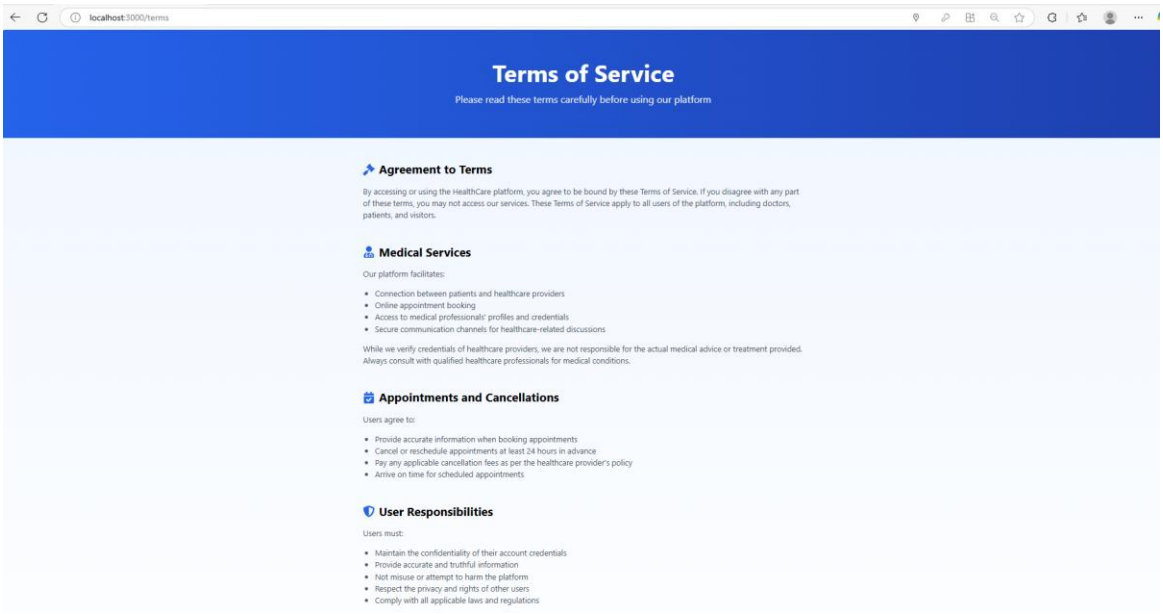
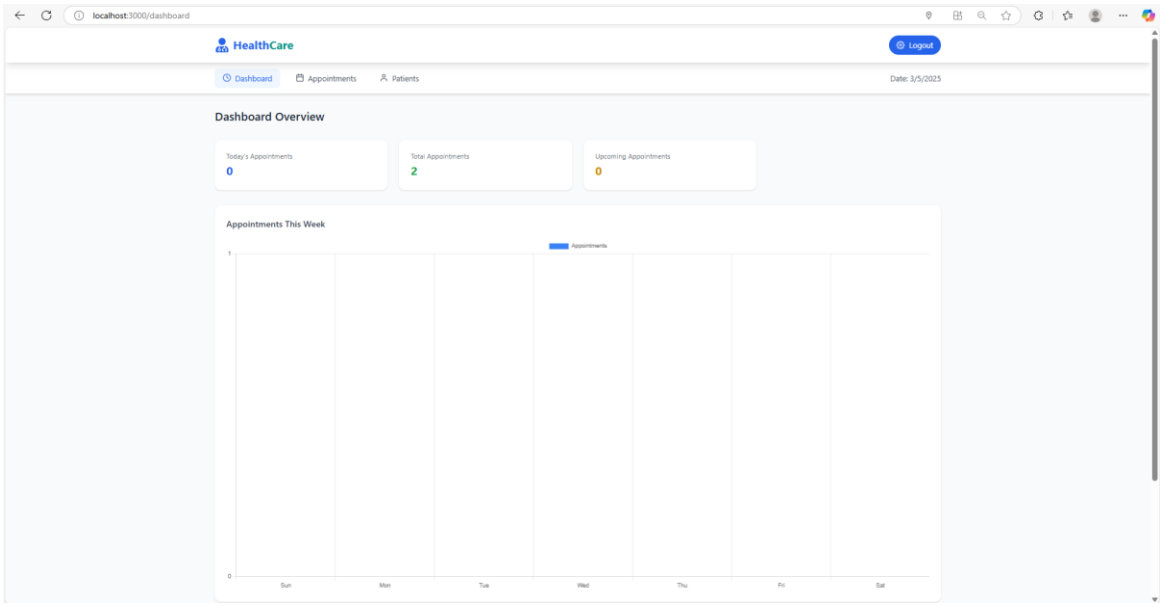
Zydus Hospital
Dr. Meera Reddy
ophthalmologist
Shalby Hospitals
Dr. Sanjay Gupta
orthopedic
Dr. Jivraj Mehta Smarak Hospital


localhost:3000/userhome
HealthCare
About
Contact
Logout
Upcoming Appointments
Yash Sathwara
Asthma
Past
29/4/2025, 3:34:00 pm
Reason: saddasda
Dr. Rajesh Kumar
Dermatologist
Past
30/4/2025, 12:00:00 pm
Reason: AOSddad
Dr. Yash Sathwara
Asthma
Past
2/5/2025, 10:40:00 am
Reason: Had Body Pain
Dr. Yash Sathwara
Asthma
Upcoming
6/5/2025, 1:03:00 pm
Reason: Testing
Yash Sathwara
Asthma
Upcoming
7/5/2025, 1:02:00 pm
Reason: dasdas
Yash Sathwara
Asthma
Upcoming
8/5/2025, 3:30:00 pm
Reason: Asdad
Dr. Neha Singh
Pediatrician
Upcoming
9/5/2025, 11:34:00 am
Reason: sadsaf
Featured Doctors
Dr. Rajesh Kumar
Dermatologist
City General Hospital
123 Main St, Mumbai, Maharashtra
Experience
21
Rating
4.2
Availability
Evening
Consultation Fee
₹500
Specializes in treating:
Gastroenterology
Brain & Spine
Asthma
Hematology
Liver Disease
Book Appointment
Dr. Neha Singh
Pediatrician
Apollo Hospitals
456 Health Ave, Delhi, India
Experience
11
Rating
4.9
Availability
Both
Consultation Fee
₹2000
Specializes in treating:
Liver Disease
Ophthalmology
Epilepsy
Brain & Spine
Book Appointment
Dr. Amit Patel
ENT Specialist
Fortis Healthcare
789 Medical Blvd, Bangalore, India
Experience
16
Rating
3.8
Availability
Morning
Consultation Fee
₹800
Specializes in treating:
Ophthalmology
Respiratory Diseases
Infertility
Brain & Spine
Arthritis
Book Appointment
Dr. John Smith
Pulmonology
Ahmedabad Civil Hospital
Ahmedabad Civil Hospital Address, Ahmedabad, Gujarat
Experience
10
Rating
4.5
Availability
10 AM - 7 PM
Consultation Fee
₹500
Specializes in treating:
bronchitis
pneumonia
asthma
copd
Book Appointment
Previous
1
2
3
4
Next


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.
Why Choose HealthCare
Our platform offers unique advantages for both patients and medical professionals
Extensive Network
Connect with over 10,000 verified doctors and specialists across 30+ medical fields
Convenient Access
Book appointments quickly and easily, with options for in-person consultations
Personalized Care
Find specialists tailored to your specific health conditions and needs


localhost:3000/privacy
Privacy Policy
How we protect and handle your data
Introduction
At HealthCare, we take your privacy seriously. This Privacy Policy explains how we collect, use, disclose, and safeguard your information when you use our healthcare platform. Please read this privacy policy carefully. By continuing to use our service, you acknowledge that you have read and understood this policy.
Information We Collect
We collect information that you provide directly to us, including:
Personal identification information (name, email address, phone number)
Medical history and health information
Insurance information
Communication preferences
Appointment and consultation records
How We Use Your Information
We use the information we collect to:
Provide and maintain our healthcare services
Process and manage your appointments
Communicate with you about your healthcare
Improve our services and user experience
Comply with legal obligations and healthcare regulations
Cookies and Tracking
We use cookies and similar tracking technologies to track activity on our platform and hold certain information. You can instruct your browser to refuse all cookies or to indicate when a cookie is being sent.
Questions About Our Privacy Policy?
If you have any questions about this Privacy Policy, please contact us:


localhost:3000/terms
Terms of Service
Please read these terms carefully before using our platform
Agreement to Terms
By accessing or using the HealthCare platform, you agree to be bound by these Terms of Service. If you disagree with any part of these terms, you may not access our services. These Terms of Service apply to all users of the platform, including doctors, patients, and visitors.
Medical Services
Our platform facilitates:
Connection between patients and healthcare providers
Online appointment booking
Access to medical professionals' profiles and credentials
Secure communication channels for healthcare-related discussions
While we verify credentials of healthcare providers, we are not responsible for the actual medical advice or treatment provided. Always consult with qualified healthcare professionals for medical conditions.
Appointments and Cancellations
Users agree to:
Provide accurate information when booking appointments
Cancel or reschedule appointments at least 24 hours in advance
Pay any applicable cancellation fees as per the healthcare provider's policy
Arrive on time for scheduled appointments
User Responsibilities
Users must:
Maintain the confidentiality of their account credentials
Provide accurate and truthful information
Not misuse or attempt to harm the platform
Respect the privacy and rights of other users
Comply with all applicable laws and regulations


localhost:3000/dashboard
HealthCare
Logout
Dashboard
Appointments
Patients
Date: 3/5/2025
Dashboard Overview
Today's Appointments
0
Total Appointments
2
Upcoming Appointments
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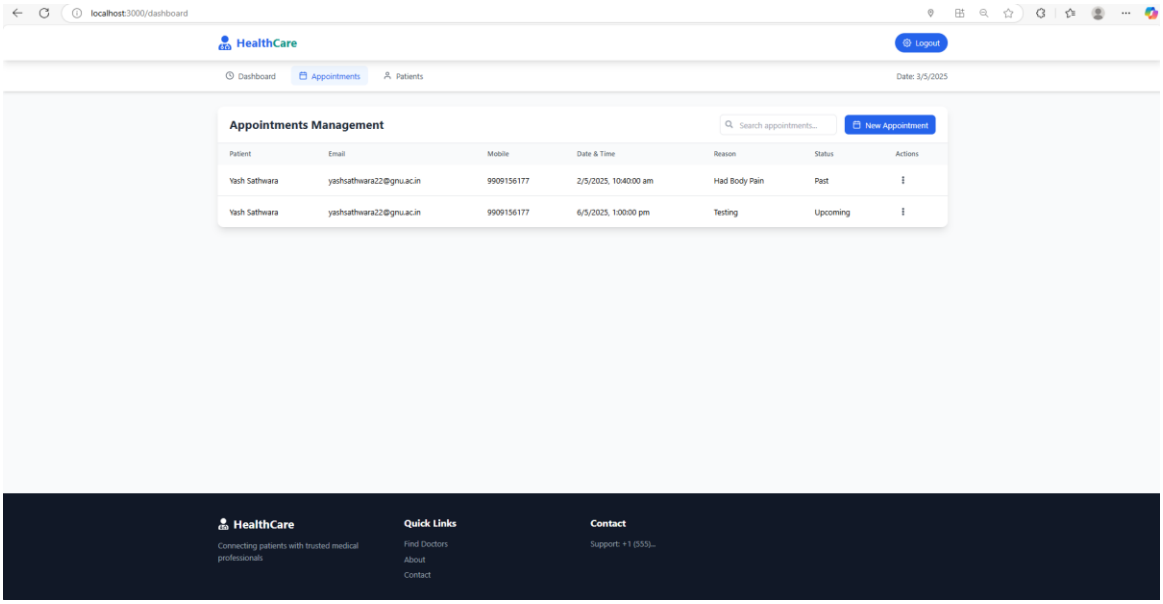
Appointments This Week
Appointments
1
0
Sun
Mon
Tue
Wed
Thu
Fri
Sat


localhost:3000/dashboard
HealthCare
Logout
Dashboard
Appointments
Patients
Date: 3/5/2025
Appointments Management
Search appointments...
New Appointment
Patient
Email
Mobile
Date & Time
Reason
Status
Actions
Yash Sathwara
yashsathwara22@gnu.ac.in
9909156177
2/5/2025, 10:40:00 am
Had Body Pain
Past
Yash Sathwara
yashsathwara22@gnu.ac.in
9909156177
6/5/2025, 1:00:00 pm
Testing
Upcoming
HealthCare
Connecting patients with trusted medical professionals
Quick Links
Find Doctors
About
Contact
Contact
Support: +1 (555)...

CHAPTER 7: CONCLUSION

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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.

CHAPTER 8: REFERENCES

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

https://youtube.com/playlist?list=PLu71SKxNbfoDOf6vAcKmazT92uLnWAgy&si=9llZ-NsnshMscQe_ https://youtu.be/y2HkM1E5iwc?si=tpZdg9S-oJKjaHY8

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http://react.dev/learn

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

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

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Krish Patel

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