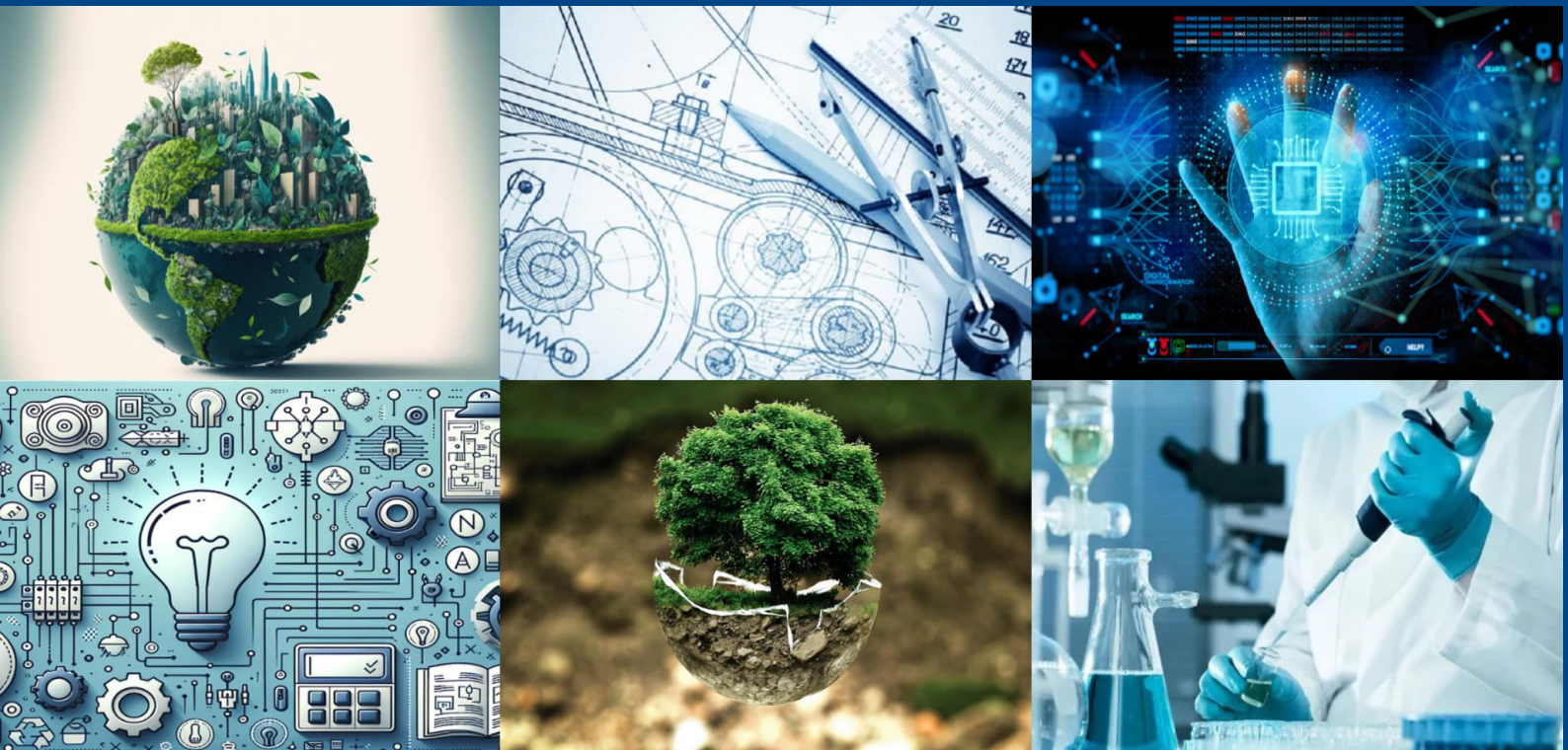# International Journal of Multidisciplinary
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Automated Smart Health Scheduler using Design Thinking

Faimida Attar, Kalyani Lugade, Sneha Powar

Dept. of CSE, D.Y. Patil College of Engineering & Technology Kasaba Bawada, Kolhapur, India

ABSTRACT: The Doctor Appointment Scheduler is a web-based application designed to facilitate seamless scheduling and management of patient appointments in healthcare facilities. The traditional appointment booking process often leads to inefficiencies such as long waiting times, missed appointments, and scheduling conflicts. This system aims to address these challenges by providing an intuitive and automated platform for both patients and healthcare providers. The system allows patients to register, browse available doctors, select time slots, and book appointments online. Doctors can manage their schedules, approve or reschedule appointments, and view patient details through an interactive dashboard. Additionally, the system integrates real-time availability checking, automated notifications via email or SMS, and appointment This system is highly beneficial for hospitals, clinics, and private practitioners, improving patient engagement, optimizing doctor availability, and reducing administrative workload. By automating appointment scheduling, the platform ensures better time management, minimal scheduling conflicts, and an improved patient-doctor interaction experience.

I. INTRODUCTION

In today's fast-growing world, smart organization of healthcare services is essential to ensure timely patient care. One of the major challenges faced by hospitals and clinics is the manual scheduling of appointments, which often leads to long waiting times, scheduling conflicts, and missed appointments. To address this issue, we propose a Doctor Appointment Scheduler, a web-based platform designed to automate and streamline the appointment booking process. This system allows patients to book, reschedule, or cancel appointments with doctors online, eliminating the need for physical visits just for scheduling. Doctors can manage their availability, track upcoming appointments, and provide updates to patients. The system also integrates automated email/SMS notifications to remind patients of their scheduled appointments, reducing the number of no-shows. The Doctor Appointment Scheduler enhances efficiency by providing a Easy-to-understand interface where patients can search for available doctors, choose a suitable time slot, and confirm their appointments in real time.

II. LITERATURE REVIEW

The increasing demand for convenient and efficient healthcare access has led to the development of online doctor appointment systems. These systems aim to reduce waiting times, avoid scheduling conflicts, and improve the overall patient experience. **A. Karthikeyan et al.** (JETIR, May 2023) described the benefits of online doctor appointment systems, allowing patients to schedule, reschedule, or cancel appointments without visiting clinics. This promotes better time management for both doctors and patients, ensuring timely medical attention.

Akingbade & Onwuasoanya (2022) focused on a web-based appointment and medical database system implemented at the Federal Polytechnic Ilaro Clinic. Their study highlighted how 24/7 online booking improves patient satisfaction, reduces dependency on reception staff, and ensures better management of doctors' availability. It also contributes to minimizing missed appointments and idle time slots.

Digvijay H. Gadhari et al. (2016) explored hospital management systems that integrate various healthcare services, supporting better record-keeping, streamlined workflows, and improved service delivery through digital solutions.
Dexter, F. (2015) reviewed the role of appointment system design in minimizing patient wait times. His work demonstrated the importance of simulation models and feedback from patient surveys in creating more effective scheduling strategies.
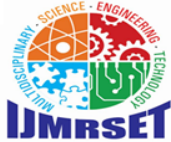
Shafaq Malik et al. (2016) proposed "Mr.Doc", a mobile-based doctor appointment application. It emphasized real-time appointment booking, enhanced communication between patients and doctors, and user-friendly interface features for ease of use.

Harper & Gamilin (2011) introduced simulation modeling approaches to optimize appointment scheduling. Their research showed significant reductions in outpatient waiting times and more efficient allocation of medical resources.

III. METHODOLOGY OF PROPOSED SURVEY

The methodology for developing an online doctor appointment scheduler website begins with requirement analysis, where key stakeholders such as patients, doctors, and admins are identified. The core features include user authentication for both patients and doctors, an appointment booking system, doctor availability management, notifications (email/SMS reminders), and an admin panel for user and appointment management. Next, the technology stack is selected, where React.js is used for the frontend, Node.js with Express.js for the backend, MongoDB for the database, and JWT (JSON Web Token) for user authentication. Hosting options such as AWS, Heroku, or Vercel are considered, while notifications can be handled using third-party services like SendGrid or Twilio.
The system consists multiple module

1. **Authentication Module**
   - JWT-based login/register.
   - Role-based access (patient, doctor, admin).

2. **Doctor Module**
   - Doctor profile creation and updates.
   - Set availability and consultation fees.

3. **Appointment Module**
   - Book, reschedule, or cancel slots.
   - Prevents double-booking.

4. **Payment Module**
   - Options: QR Code and Cash.
   - Status: paid_online, paid_cash, pending.

5. **Medical Section Module**
   - **Medical tab:** List medicines with description and price (high to low).
   - **Lab tab:** View and book doctor-recommended tests.

6. **Dashboard Module**
   - **Doctor Dashboard:** Schedule and patient/test info.
   - **Admin Dashboard:** Doctor approval and system control.

IV. OBJECTIVES AND STUDY

The project aims to create a user-friendly doctor appointment scheduling system that simplifies the booking process, prevents double bookings, and offers secure payment options (QR/UPI and cash). The platform also allows patients to explore medicines and book lab tests recommended by doctors. The system uses JWT for authentication, supports role-based access, and is built with React, Node.js, and MongoDB.

V. FUTURE WORK

With some modifications, this work can be used for:
1. **Appointment Booking**: Enhance the system to support advanced appointment scheduling features.
2. **Lab Test Booking**: Allow patients to book lab tests directly based on doctor recommendations.
3. **Medicine History Management**: Implement a feature for tracking and managing patients' medicine history.

VI. SYSTEM ARCHITECTURE

The system architecture consists
Front End (Graphical User Interface): Users can log in, register, view info, and see doctor profiles.
Process Layer: Handles security (authentication, data integrity), form handling (patient, doctor, hospital data), and report generation.
Back End (Database): Stores and manages all data securely, ensuring data control and integrity.

The system flows from user actions on the front end, through processing logic, and finally interacts with the database.
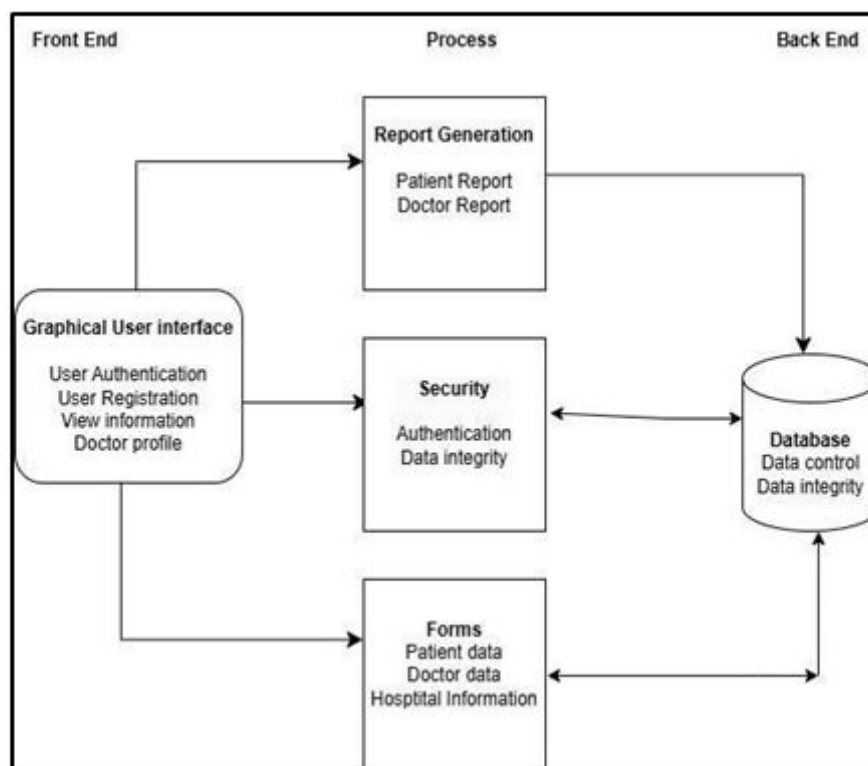
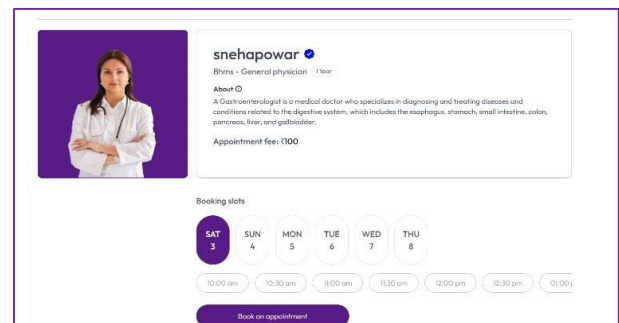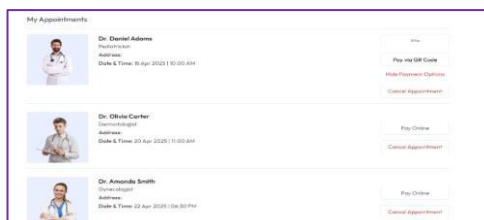
VII. RESULT

Login Sign up
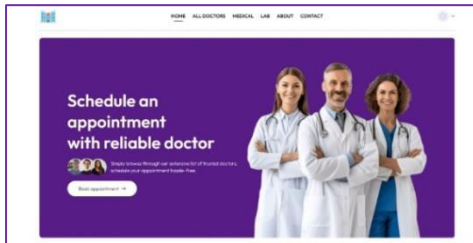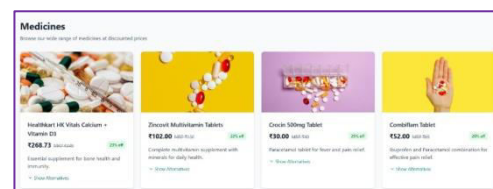
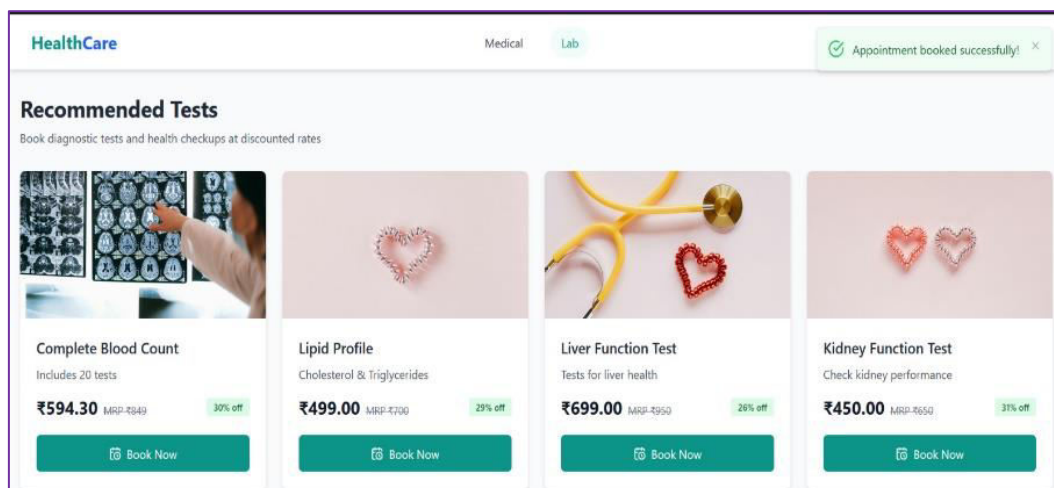Home page
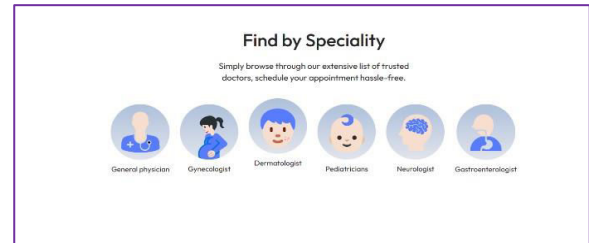
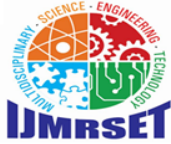Speciality
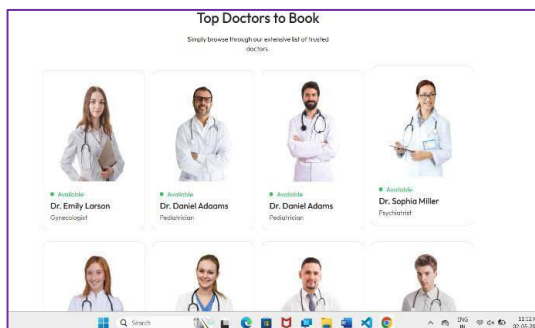
Top doctors to book appointment

Book appointment

Medicine information with high cost to affordable cost

My-appointment (booked appointments)

Doctor-Recommended Lab Test

VIII. CONCLUSION

The Appointment Scheduler makes booking and managing medical appointments easy and efficient. It reduces wait times, helps doctors and patients manage time better, and sends reminders to avoid missed appointments. With features like realtime availability and patient records, it ensures a smooth scheduling process

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| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

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