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DOCTOR'S APPOINTMENT BOOKING WEB APPLICATION

Namanshu Kumar 4th Year Department of CSE, Gandhi Institute For Technology, BPUT, India namanshu2021@gift.edu.in

Prabhat 4th Year, Department of CSE, Gandhi Institute For Technology, BPUT, India prabhat2021@gift.edu.in

Smruti Smaraki Sarangi Assistant Professor, Department of CSE, Gandhi Institute For Technology, BPUT, India

Abstract-

This paper presents a full-stack Doctor's Appointment Booking Web Application developed using the MERN stack (MongoDB, Express.js, React, and Node.js). The application serves as a centralized, digital platform connecting patients with healthcare providers. Patients can register, browse doctors by specialization, book appointments, and manage their medical visits. Doctors can manage schedules, view appointments, and interact with patients. The system ensures real-time availability updates, secure user authentication, and a responsive interface. Designed for scalability and accessibility, this application bridges the gap between patients and doctors, especially in remote or underserved regions, improving efficiency and healthcare accessibility.

Keywords:

MongoDB, Express.js, React, and Node.js, Healthcare, Appointment Booking

1. INTRODUCTION

With healthcare digitization gaining momentum, the need for an efficient and reliable appointment booking system has become crucial. This project addresses the inefficiencies in traditional appointment scheduling by offering an online platform where patients can seamlessly book appointments with doctors based on specialty, location, or availability. Built using the MERN stack, the platform ensures real-time updates, secure authentication, and user-friendly interfaces. Both patients and doctors benefit from streamlined communication and scheduling, reducing wait times and enhancing healthcare delivery.

2. LITERATURE REVIEW

Several healthcare systems have transitioned from manual to digital platforms, improving patient engagement and reducing administrative workload. Previous studies highlight the benefits of e-health solutions in improving access to care, especially in rural areas. Modern appointment systems emphasize responsive design, ease of access, and data privacy. Key challenges identified in earlier research include maintaining real-time synchronization, managing patient records securely, and ensuring a user-friendly interface. This project addresses these concerns with robust design principles and secure development practices.

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3. SYSTEM DESIGN

The Doctor's Appointment Booking Web Application follows a modular three-tier architecture:

- **Frontend (React):** Provides an interactive UI for users to register, log in, search doctors, and book appointments.
- **Backend (Node.js + Express.js):** Handles API requests, user sessions, appointment scheduling, and real-time status updates.
- **Database (MongoDB):** Stores user data, appointment records, and doctor availability.

Key design features include:

- JWT-based secure authentication
- RESTful API communication
- Role-based dashboards for patients and doctors
- Scalable structure for integration with telemedicine or payment APIs in the future

4. IMPLEMENTATION

React.js was used to build a responsive and dynamic front end with state management through the Context API. Patients can filter doctors based on location, specialty, or time slots. The backend was implemented using Node.js and Express.js, with MongoDB managing structured records of users, appointments, and schedules. Authentication is handled using JSON Web Tokens (JWT) to ensure secure login. Doctors have an admin panel to accept or cancel appointments. The application ensures mobile compatibility, essential for wider adoption.

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5. RESULTS

The application was successfully developed and tested across multiple devices. Key observations:

- Seamless user experience for both patients and doctors
- Efficient load handling under simultaneous appointment bookings
- Secure login, logout, and profile management
- Real-time appointment status updates

User feedback highlighted satisfaction with the intuitive UI and improved access to healthcare services.

6. CONCLUSION

The Doctor's Appointment Booking Web Application fulfils the need for a modern healthcare scheduling system. Developed with the MERN stack, it ensures:

- Real-time access to healthcare providers
- Reduction in manual scheduling errors
- Scalability for future integration (e.g., video consultations, prescriptions)

The platform can be a valuable tool in urban and rural settings, empowering patients and improving healthcare management.

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