

An Online Doctor Appointment Scheduling System with Real-Time Slot Availability and Patient History Management

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ABSTRACT: Healthcare institutions still rely heavily on offline processes for appointment scheduling, patient registration, and record management, which often results in long queues, delays, and poor patient experience. The manual approach increases administrative workload and makes it difficult for patients to access hospital services efficiently. This paper presents a web-based Hospital Online Appointment System that enables patients to book appointments online, view doctor availability, manage visit history, and receive notifications. The system also provides an admin and doctor interface for managing appointments, schedules, and patient data. The proposed solution improves healthcare service efficiency by reducing waiting time, minimizing paperwork, and increasing accessibility. The system demonstrates how digital platforms can make patient–hospital interaction faster, more reliable, and user-friendly.

KEYWORDS: Hospital Management, Online Appointment System, Web Application, Healthcare System, Database Management, Patient Scheduling.

I. INTRODUCTION

Hospitals serve a large number of patients daily, and managing appointments manually becomes inefficient as patient volume grows. Traditional systems involve patients physically visiting hospitals, waiting in lines, and filling out paper forms. This often leads to overcrowding, confusion, loss of records, and dissatisfaction. With advancements in information technology, hospitals can now leverage web-based systems to automate administrative procedures. Online appointment systems enable patients to book visits from any location without physically visiting the hospital. This paper proposes a Hospital Online Appointment System that provides patients with online access to doctor schedules, booking appointments, and managing health visits efficiently. Doctors can view their appointment lists, while administrators can monitor patient flow and update schedules. The system aims to improve overall hospital efficiency, reduce waiting time, and provide a better patient experience. This project is a web based management system for a doctor appointment. The project objective is to deliver the online shopping application into platform. Doctor appointment is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. It is a form of electronic commerce. This project is an attempt to provide the advantages of online shopping to customers of a real shop. It helps buying the products in the shop anywhere through internet by using an android device. Thus the customer will get the service of online shopping and home delivery from his favorite shop.

1.1. OUTLINE OF THE PROJECT

The objective of the project is to make an application in android platform to purchase items in an existing shop. In order to build such an application complete web support need to be provided. A complete and efficient web application which can provide the online shopping experience is the basic objective of the project. The web application can be implemented in the form of an android application with web view. This system can be implemented to any shop in the locality or to multinational branded shops having retail outlet chains. The system recommends a facility to accept the orders 24*7 and a home delivery system which can make customers happy. If shops are providing an online portal where their customers can enjoy easy shopping from anywhere, the shops won't be losing any more customers to the

trending online shops such as flipchart or eBay. Since the application is available in the Smartphone it is easily accessible and always available.

II. LITERATURE SERVEY

A. Historical Context

The integration of information technology into healthcare appointment management has evolved significantly over the last decade. Early doctor appointment systems lacked automation and were heavily dependent on manual scheduling and record-keeping, which reduced efficiency and accuracy. With advancements in web technologies and database management systems, healthcare applications gained the ability to manage patient data, doctor schedules, and appointment workflows more effectively. Researchers have highlighted that web-based appointment booking systems significantly improve scheduling efficiency, reduce waiting time, and enhance overall patient experience through centralized and automated healthcare service management.

B. Current State of Research

Recent studies indicate that web-based doctor appointment systems significantly improve scheduling efficiency through automation and real-time availability management. Advanced web frameworks reduce appointment conflicts and administrative workload. Research also shows that automated notifications and user-friendly interfaces enhance patient engagement and reduce missed appointments.

C. AI Technologies in Inventory Management

Diverse web technologies contribute to efficient healthcare appointment management:

- MERN Stack (MongoDB, Express.js, React.js, Node.js): Enables secure data storage, backend processing, and responsive user interfaces for appointment scheduling
- Database Management (MongoDB): Stores patient records, doctor profiles, and appointment details efficiently
- RESTful APIs: Support real-time communication between frontend and backend for booking and schedule updates.
- Authentication & Authorization (JWT): Ensures secure login and role-based access for patients, doctors, and administrators.

D. Methodological Approaches

Prior studies use AI models and real-world data to predict patient booking patterns and optimize appointment scheduling.

III. IMPLEMENTATION

EXISTING SYSTEM

- Appointment booking is primarily handled through manual processes, such as in-person visits or phone calls.
- Lack of real-time doctor availability information often results in scheduling conflicts and overbooking.
- Patients experience long waiting times due to inefficient appointment coordination and first-come-first-served approaches.
- Manual record maintenance leads to data redundancy, errors, and poor accessibility of patient information.
- Appointment rescheduling and cancellation require direct human intervention, increasing administrative workload.
- The absence of automated systems results in inefficient utilization of doctors' working hours and reduced service transparency.

3.1. DISADVANTAGES OF EXISTING SYSTEM

- ❖ Manual appointment booking requires significant time for patients and administrative staff.
- ❖ The system depends heavily on human involvement, increasing workload and operational costs.
- ❖ Manual scheduling and record handling are susceptible to human errors and data inconsistencies.
- ❖ Appointment rescheduling and cancellation require manual intervention, causing delays.
- ❖ Absence of real-time availability information leads to overbooking and inefficient slot usage.
- ❖ Patients lack clear visibility of doctor schedules and appointment status.

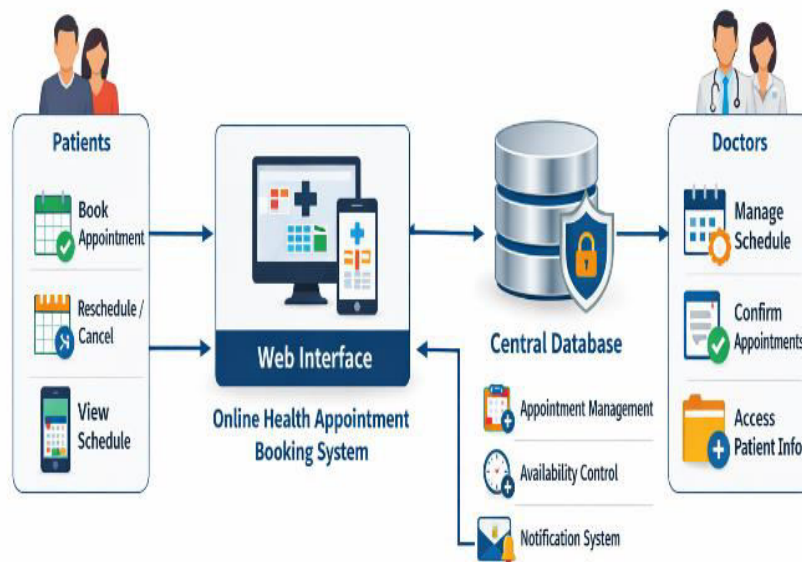
3.2. PROPOSED SYSTEM

- ❖ An online health appointment booking platform is designed to enable patients to schedule medical consultations through a user-friendly web interface.
- ❖ Doctor availability is managed dynamically by defining working hours, time slots, and appointment limits.
- ❖ Real-time patient scheduling ensures conflict-free appointment allocation and minimizes waiting time.
- ❖ A database-driven architecture is used to securely store and manage patient, doctor, and appointment records.
- ❖ Automated scheduling mechanisms reduce manual effort and improve coordination between doctors and patients.
- ❖ The system supports appointment booking, rescheduling, and cancellation, enhancing flexibility and transparency in healthcare services.

3.2.1. ADVANTAGES

- ❖ **Reduced waiting time:** Real-time appointment scheduling minimizes patient waiting and avoids overcrowding.
- ❖ **Efficient doctor utilization:** Dynamic availability management ensures optimal use of doctors' working hours.
- ❖ **Error-free scheduling:** Automated booking eliminates conflicts, overbooking, and manual scheduling errors.
- ❖ **Improved accessibility:** Patients can book, reschedule, or cancel appointments anytime through an online interface.
- ❖ **Secure data management:** Centralized database storage ensures reliable and secure handling of healthcare records.
- ❖ **Enhanced transparency:** Clear visibility of appointment status and doctor schedules improves trust and service quality.

BLOCK DIAGRAM



IV. MODULES DESCRIPTION

User Management Module

- ✓ Handles secure registration and authentication of patients and doctors
- ✓ Maintains user profiles with role-based access control
- ✓ Ensures authorized access to appointment-related services
- ✓ Supports secure storage of personal and professional details

Doctor Availability Management Module

- ✓ Manages doctors' working hours and availability schedules
- ✓ Allows dynamic configuration of consultation days and time ranges
- ✓ Controls appointment limits per doctor per day
- ✓ Prevents overbooking through real-time availability updates

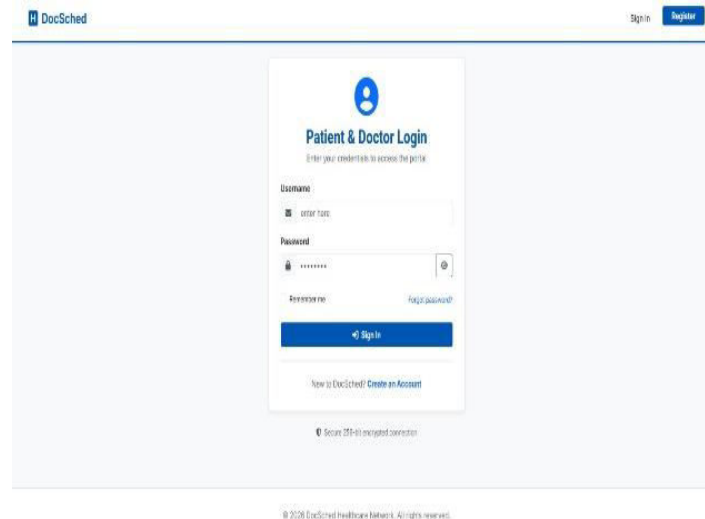
Time Slot Generation Module

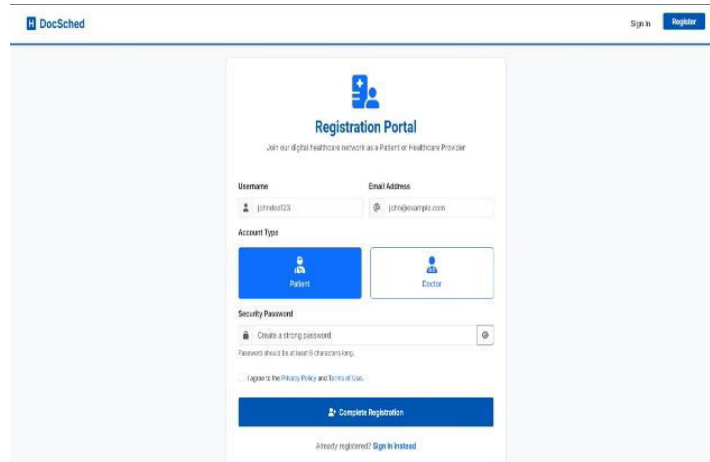
- ✓ Automatically generates consultation time slots based on working hours
- ✓ Divides working hours into fixed or configurable intervals
- ✓ Updates available slots dynamically after each booking
- ✓ Ensures accurate representation of real-time slot availability

Online Appointment Booking Module

- ✓ Enables patients to book appointments through a user-friendly web interface
- ✓ Allocates appointments in real time without scheduling conflicts
- ✓ Validates slot availability before confirmation
- ✓ Provides instant booking confirmation to users

V. OUTPUT SCREEN





DocSched Sign In Register

Registration Portal

Join our digital healthcare network as a Patient or Healthcare Provider

Username: Email Address:

Account Type:

Patient Doctor

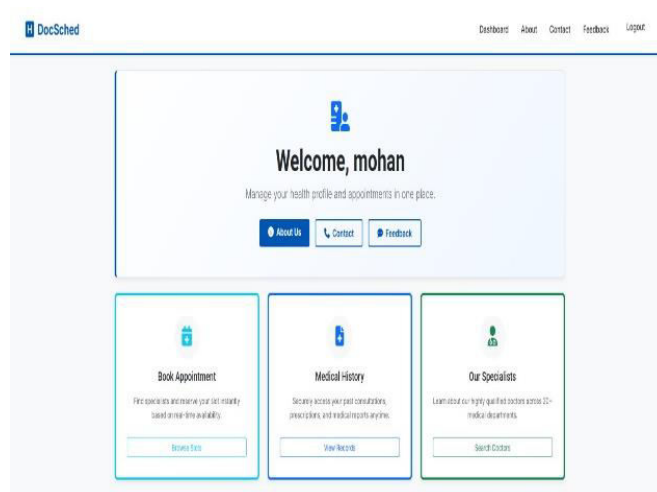
Security Password:

Passwords should be at least 8 characters long.

I agree to the Privacy Policy and Terms of Use.

Complete Registration

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Medical History

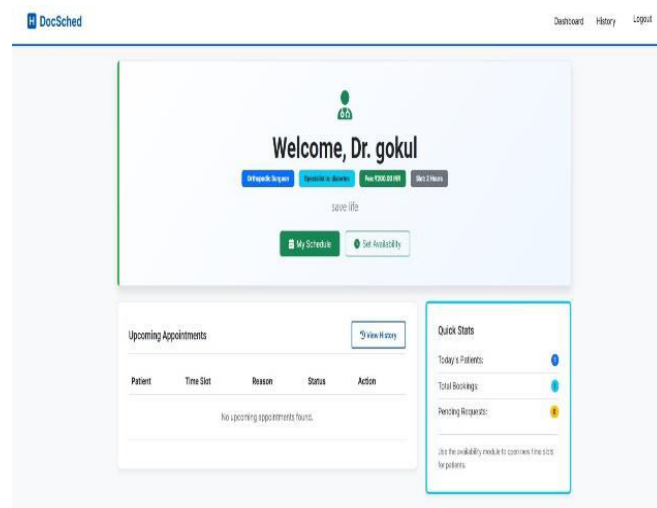
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save life

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[My Schedules](#) [Set Availability](#)

Upcoming Appointments [View History](#)

Patient	Time Slot	Reason	Status	Action
No upcoming appointments found.				

Quick Stats

Today's Patients: 0

Total Bookings: 0

Pending Requests: 0

Use the availability module to customize time slots for patients.

VI. CONCLUSION

- The proposed Sleep-Based Human Stress Detection System using Machine Learning effectively identifies stress levels by analyzing sleep behavior patterns such as sleep duration, efficiency, interruptions, and irregular sleep cycles.
- Machine learning techniques enable automatic analysis of large sleep datasets and help detect hidden stress-related patterns that are difficult to identify manually.
- Data preprocessing and feature selection improve dataset quality, leading to more accurate and reliable stress prediction.
- Experimental results show that the system can successfully distinguish between normal sleep patterns and stress-related sleep disturbances.

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