



Ayursutra Panchakarma Patient Management and Therapy Scheduling Software- AI Powered Chatbot Assistance

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ABSTRACT: AyurSutra is a cloud-based Panchakarma patient management and therapy scheduling system designed to address the limitations of manual record-keeping commonly followed in Ayurvedic clinical environments. Traditional paper-based processes often lead to fragmented patient data, scheduling conflicts, inaccurate Prakriti assessment, and limited accessibility. To overcome these issues, AyurSutra introduces a fully digital, secure, and scalable full stack solution for managing Panchakarma treatments. The system provides a centralized platform for storing patient details, therapy records, and appointment schedules with real-time updates. Automated Prakriti assessment, a custom health-scoring algorithm, and an AI-powered chatbot enhance diagnostic accuracy and personalized patient interaction. Role-based dashboards ensure that administrators, therapists, and patients access only features relevant to their roles, improving workflow clarity and data security.

A modern technical stack supports system reliability and scalability. The frontend is built using HTML, CSS, and JavaScript and deployed on Netlify for fast global access. The backend, developed using Python and Flask, manages core application logic, authentication, and scheduling, and is deployed on Render for secure and scalable cloud execution. Patient data is stored in MongoDB Atlas, enabling high-speed retrieval and strong protection through OTP and JWT-based authentication. The system also includes notification features for appointment reminders, therapy updates, and payment alerts, along with an integrated e-commerce module for purchasing Ayurvedic medicines.

By eliminating manual processes and introducing automation, real-time synchronization, and intelligent features, AyurSutra significantly improves operational efficiency, reduces human error, and enhances the overall patient experience in Panchakarma healthcare settings. The proposed system demonstrates the potential for modern web technologies to support the digital transformation of traditional Ayurvedic clinics and deliver more accurate, timely, and reliable patient care.

KEYWORDS: Panchakarma Management, Therapy Scheduling, Full Stack Web Application, AI Chatbot, Prakriti Assessment, Cloud-Based Healthcare System, MongoDB Atlas, JWT Authentication

I. INTRODUCTION

In the modern era, the healthcare industry is undergoing a significant transformation with the integration of digital technologies. Traditional systems that rely heavily on manual processes are increasingly being replaced by automated solutions that enhance efficiency, accuracy, and accessibility. Ayurveda, one of the oldest systems of medicine, continues to hold immense importance in holistic healing and wellness. Among its specialized treatments, Panchakarma therapy plays a crucial role in detoxification, rejuvenation, and overall health improvement. However, many Panchakarma centers still depend on conventional methods such as paper-based record keeping and manual scheduling, which often lead to inefficiencies and errors. The need for a digital solution in Ayurvedic centers has become more evident as the number of patients seeking natural and holistic treatments continues to grow. Managing patient information, therapy schedules, therapist availability, and treatment history manually can be time-consuming and prone to mistakes.



To address these issues, AyurSutra – Panchakarma Patient Management and Therapy Scheduling Software has been developed as an innovative and comprehensive system. The primary objective of this project is to provide a centralized platform that streamlines the management of patients and therapy processes in Panchakarma centers. By integrating modern software technologies with traditional Ayurvedic practices, AyurSutra ensures that healthcare providers can deliver better and more organized services.

AyurSutra is designed to handle multiple aspects of clinic management in a structured and efficient manner. The system allows administrators to maintain detailed patient records, including personal information, medical history, and therapy details. This eliminates the need for physical files and ensures that patient data can be easily accessed and updated whenever required. The digital storage of information also enhances data security and reduces the risk of data loss.

One of the key features of the system is its therapy scheduling capability. Panchakarma treatments often require careful planning and coordination between patients and therapists. Manual scheduling can lead to issues such as overlapping appointments, underutilization of resources, or delays in treatment. AyurSutra addresses these challenges by providing an automated scheduling system that efficiently manages appointments, allocates therapists based on availability, and ensures smooth workflow within the center.

In addition to scheduling, the system also supports therapist management by assigning tasks according to specialization and workload. This helps in optimizing resource utilization and ensures that patients receive the appropriate treatment from qualified professionals. The system also maintains a complete record of therapy sessions, enabling healthcare providers to track patient progress and make informed decisions regarding treatment plans.

The important aspect of AyurSutra is its user-friendly interface, which is designed to be easily accessible for administrators, therapists, and patients. Patients can book appointments, view their therapy schedules, and access treatment details, while administrators can monitor overall operations and manage system activities effectively. The system also provides notifications and reminders for upcoming appointments, reducing the chances of missed sessions. Web programming is the process of developing websites and web applications by writing code that runs on the internet. It involves creating interactive and dynamic web pages that respond to user actions. Using technologies such as HTML, CSS, and JavaScript on the client side, web programming helps design user-friendly interfaces that work smoothly across different browsers and devices.

On the server side, web programming uses languages and frameworks to handle application logic, user authentication, and data processing. The server communicates with databases to store, retrieve, and update information securely. This backend functionality ensures that web applications can manage large amounts of data and support multiple users at the same time.

II. LITERATURE SURVEY

The literature survey on AyurSutra – Panchakarma Patient Management and Therapy Scheduling Software highlights the increasing role of digital transformation in healthcare, including traditional systems like Ayurveda. Modern healthcare management systems replace manual processes with digital solutions, improving patient record management, appointment scheduling, and overall efficiency while reducing errors and data redundancy.

Recent studies emphasize the need for specialized software in Ayurvedic practices, particularly for Panchakarma therapies, which require detailed patient tracking, personalized treatment plans, and continuous monitoring. However, most existing systems lack features such as therapy sequencing, therapist allocation, and treatment duration tracking. Research by Ajayi Oluwabukola F (2025) highlights the benefits of web-based patient management systems but notes challenges like usability and integration. Similarly, Khan Anas Waqar (2024) demonstrates improved workflow efficiency in hospital systems, though issues like data security and user resistance persist. Dr. Amit Khare (2025) shows that AI-based scheduling enhances efficiency but raises concerns about privacy and transparency. Other studies, such as Vishwesh Deshmukh (2025), present web-based solutions that improve hospital coordination but lack advanced analytics.

A Patient Management System (PMS) is a software solution designed to automate and streamline hospital operations by replacing traditional paper-based processes. This study presents the design and implementation of a web-based Patient Management System aimed at improving efficiency, data accuracy, and accessibility in healthcare institutions.



The system provides a centralized platform for managing patient registration, appointment scheduling, billing, and Electronic Medical Records (EMRs). It is developed using modern web technologies and follows an incremental software development approach to ensure flexibility and user-driven improvements. Security features such as role-based access control, encryption, and secure authentication are incorporated to protect sensitive patient data and ensure compliance with healthcare regulations. The system was evaluated in a simulated clinical environment, where it demonstrated improved operational efficiency, secure data handling, and user satisfaction. The proposed web-based PMS offers a scalable and reliable solution that supports the digital transformation of healthcare services and enhances overall patient care delivery.

III. PROBLEM STATEMENT

Traditional Ayurvedic clinics, especially those offering Panchakarma therapies, primarily rely on manual and paper-based systems for managing patient records, therapy schedules, and prescriptions. This approach leads to several challenges such as inefficient data handling, difficulty in retrieving patient history, appointment scheduling conflicts, and increased chances of human errors. Managing multiple therapy sessions for different patients becomes complex due to the lack of a centralized system, resulting in delays and miscommunication between therapists and patients. Additionally, there is no proper mechanism to securely store and access patient data, which raises concerns about data loss and confidentiality. The absence of role-based access control makes it difficult to differentiate responsibilities among admin, therapists, and patients. Furthermore, manual tracking of treatment progress and prescriptions is time-consuming and often inaccurate. Hence, there is a need for a reliable, efficient, and scalable digital system that can automate patient management, therapy scheduling, and data handling while ensuring security, accuracy, and ease of use. The proposed AyurSutra system aims to address these issues by providing a web-based platform that streamlines clinical operations and improves overall healthcare service delivery.

3.1 TRADITIONAL SYSTEM

The proposed system, AyurSutra, is a modern, cloud-integrated web application designed to digitize Ayurvedic patient management without the need for a traditional local server. It utilizes a Client-Side Architecture where the core logic—including the Prakriti assessment engine and therapy scheduling—is handled directly within a responsive frontend built with Tailwind CSS and JavaScript. This approach ensures a lightning-fast user experience and reduces the complexity of server maintenance.

For data persistence, the system connects directly to a Cloud-Based NoSQL Database (MongoDB Atlas) via secure API calls. This allows the application to store and retrieve Electronic Health Records (EHR) in real-time, ensuring that patient data is accessible across multiple devices. The system features a custom-built Health Scoring Algorithm that visualizes a patient's holistic vitality, alongside a Panchakarma Scheduling Module that organizes therapy sessions and room allocations. By hosting the platform on Netlify, the proposed system provides a secure, HTTPS-encrypted environment that is always accessible to practitioners, eliminating the limitations of physical registers and local file storage.

In this project, system requirements are identified to support a full stack web-based healthcare management system that includes frontend interfaces, backend services, database connectivity, and cloud deployment. These requirements ensure compatibility across different devices and platforms, provide secure data handling, and enable seamless interaction between users and the system.

The system requirements are broadly classified into hardware requirements and software requirements, covering development, testing, and deployment environments. Meeting these requirements ensures optimal performance, scalability, and maintainability of the application in real-world usage.



Figure 1: Traditional System

Figure 1 illustrates the traditional workflow followed in Panchakarma patient management and therapy scheduling, where most processes are handled manually. Initially, users such as patients, therapists, and administrators access the system through basic login procedures, followed by manual patient registration where personal details, medical history, and symptoms are recorded. Therapists then perform dosha assessment and diagnosis based on observation and experience, after which therapy scheduling is carried out by manually assigning therapists, rooms, and time slots. Herbal prescriptions are provided in written form, and appointment reminders are typically communicated through phone calls or basic messaging. Record management and dashboards are maintained manually or using simple tools, leading to inefficiencies in tracking patient progress and therapy outcomes. Reports and analytics are generated with difficulty due to scattered data, and security measures are minimal, increasing the risk of data loss or unauthorized access. Overall, the traditional system lacks automation, integration, and efficiency, highlighting the need for a more advanced digital solution.

IV. RESEARCH METHODOLOGY

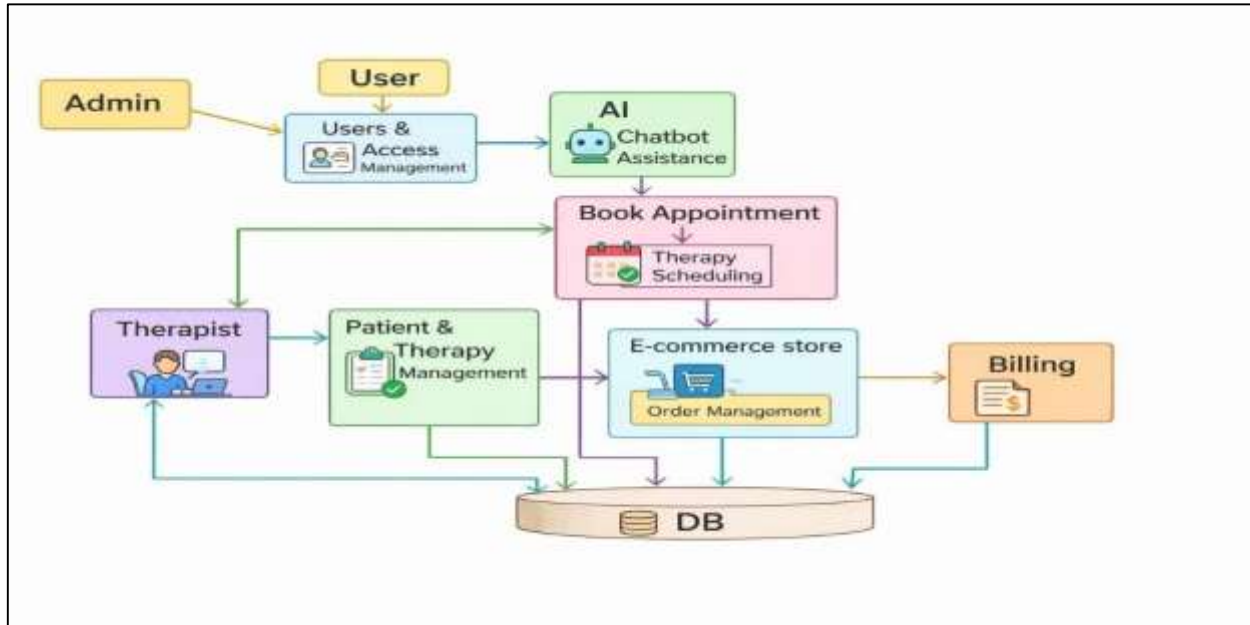


Figure 2 System Architecture Of Ayursutra Panchakarma Patient Management And Therapy Scheduling Software-AI Powered Chatbot Assistance

Figure 2 illustrates the overall architecture of the AyurSutra system, highlighting the interaction between different modules and users. The system involves three primary actors: Admin, User, and Therapist. The Admin manages user access and system control through the user and access management module, ensuring secure authentication and authorization. The User interacts with the system by accessing various services such as chatbot assistance, appointment booking, and e-commerce functionalities

The AI chatbot assistance module plays a key role in enhancing user experience by providing instant responses to queries related to symptoms, therapies, and general information. Based on user inputs, the system allows users to book appointments through the therapy scheduling module, where available time slots are managed efficiently. This ensures proper coordination between users and therapists for therapy sessions.

The Patient and Therapy Management module maintains detailed records of patient information and therapy sessions, enabling therapists to monitor and manage treatment effectively. The Therapist interacts with this module to update patient data, track progress, and provide personalized care. Additionally, the system includes an e-commerce store where users can order therapy-related products, and all orders are handled through an order management system.

Finally, the Billing module calculates the total cost based on therapy services and purchased products. All system data, including user details, appointments, therapy records, and transactions, are stored in a centralized database (DB). This architecture ensures smooth data flow, efficient system operation, and an integrated digital solution for therapy management.

1. USER & ACCESS MANAGEMENT MODULE

The Admin module is responsible for overseeing the entire system by managing users, assigning roles, and maintaining system security. It ensures proper access control and smooth functioning of all modules. The User & Access Management module acts as the authentication layer, enabling secure login, registration, and role-based access for users such as patients, therapists, and administrators.



2. AI CHATBOT ASSISTANCE MODULE

The AI Chatbot Assistance module enhances user interaction by providing intelligent responses, guiding patients in selecting suitable therapies, and assisting in the appointment booking process. This module improves user experience and reduces manual effort in handling queries.

2.1 AI Chatbot Algorithm

Algorithm Name: Rule-Based NLP Chatbot Algorithm

Step 1: Start the process.

Step 2: The user enters a query related to symptoms or therapy.

Step 3: The system preprocesses the input text by converting all characters to lowercase.

Step 4: The system removes stop words from the input text.

Step 5: The system extracts important keywords from the processed input.

Step 6: The extracted keywords are matched with a predefined dataset containing symptom-to-therapy mappings and frequently asked questions.

Step 7: If a match is found, the system retrieves the corresponding response or therapy suggestion.

Step 8: If no match is found, the system returns a default message such as "Please consult a therapist."

Step 9: The system displays the response to the user.

Step 10: The system stores the user query and response for future improvement.

Step 11: End the process.

III. APPOINTMENT BOOKING AND THERAPY SCHEDULING MODULE

The Appointment Booking and Therapy Scheduling module is the core component of the system. It allows patients to book appointments and schedules Panchakarma therapies efficiently by managing time slots, therapy sequences, and therapist allocation. This ensures optimal utilization of resources and minimizes scheduling conflicts.

3.1 Therapy Cost Calculation

$$T_c = B_c + (D \times C_h)$$

Where:

T_c= Total therapy cost

B_c= Base cost of therapy

D= Duration of therapy (in hours)

C_h= Cost per hour

3.2 Therapist Workload Calculation

$$W = \frac{H_a}{H_t}$$

Where:

W= Workload of therapist

H_a= Assigned working hours

H_t= Total available hours

IV. PATIENT & THERAPY MANAGEMENT MODULE

The Therapist module enables therapists to view assigned appointments, manage their schedules, and update patient treatment progress. The Patient & Therapy Management module maintains comprehensive patient records, including medical history, therapy details, and progress tracking, which is essential for delivering personalized Ayurvedic treatments.

4.1 Therapy Scheduling Calculation

$$T_{end} = T_{start} + D$$

Where:

T_start= Start time of therapy

D= Duration of therapy



T_end= End time

V. E-COMMERCE AND BILLING MODULE

The E-commerce module supports the sale of Ayurvedic medicines and therapy-related products, allowing users to place and manage orders seamlessly. The Billing module handles financial transactions, including therapy charges and product payments, and generates invoices for users. Finally, the Database module acts as the central repository that stores all system data, ensuring consistency, reliability, and easy retrieval of information. All modules interact with the database to maintain a unified and efficient system.

5.1 Total Billing Calculation

$$B = T_c + P_c + Tax - D_s$$

Where:

B= Total bill amount

T_c= Therapy cost

P_c= Product cost

Tax= Applicable tax

5.2 Product Order Calculation

$$P_c = \sum(P_i \times Q_i)$$

Where:

P_c= Total product cost

P_i= Price of product i

V. RESULTS

Figures 3 to 6 illustrate the core user interface of the AyurSutra system, designed to provide a seamless and user-friendly experience. Figure 3 presents the home page, which acts as the entry point of the application, offering navigation to key features such as therapy services, appointments, and user authentication. Figure 4 shows the appointment page, where users can conveniently schedule therapy sessions by selecting available dates and time slots. Figure 5 depicts the signup page, allowing new users to register by entering their personal details, while Figure 6 displays the login page, enabling registered users to securely access their accounts.

Figures 7 and 8 focus on the intelligent and administrative components of the system. Figure 7 represents the chatbot page, which integrates an AI-based assistant to handle user queries related to symptoms, therapies, and general FAQs. This chatbot enhances user interaction by providing instant responses and guidance, thereby improving accessibility to healthcare information. Figure 8 illustrates the user dashboard, which serves as a centralized interface where users can view their appointments, therapy details, and personal information in an organized manner.

Together, these figures demonstrate the complete workflow of the system, starting from user entry and authentication to service utilization and support. The design ensures that users can easily navigate through different modules without complexity. The appointment and dashboard functionalities improve efficiency by reducing manual intervention, while the chatbot feature adds an intelligent layer of assistance, making the system more interactive and responsive.

Overall, Figures 3 to 8 highlight the practical implementation of the proposed system, emphasizing usability, accessibility, and functionality. The integration of user interface components with backend processing ensures smooth operation and effective management of therapy services. These modules collectively contribute to enhancing user experience and demonstrate how the system successfully meets its objective of providing a digital solution for therapy management.



Figure 3 Home Page

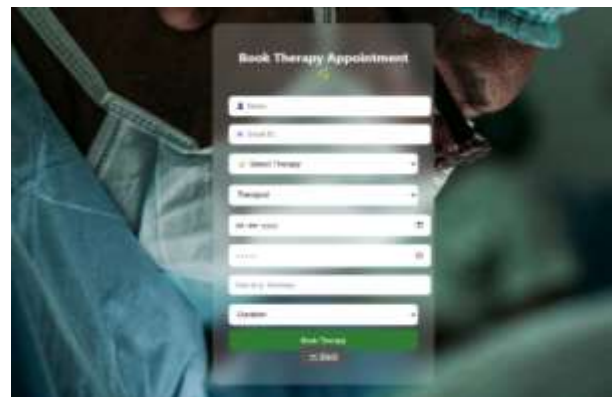


Figure 4 Appointment Page

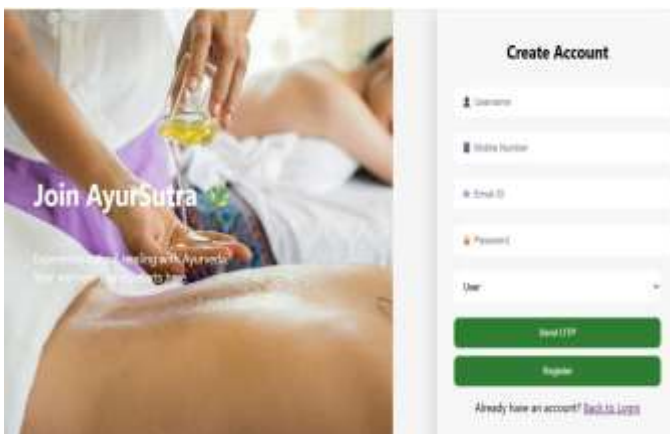


Figure 5 Signup Page



Figure 6 Login Page



Figure 7 Chatbot Page

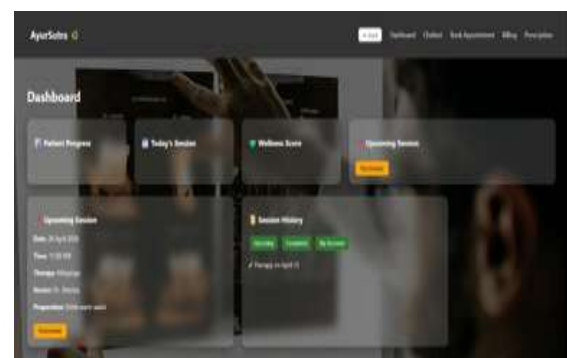


Figure 8 User Dashboard Page

VI. CONCLUSION AND FUTURE ENHANCEMENTS

The AyurSutra project successfully presents a digital solution for managing Panchakarma therapies and patient records, simplifying the traditional manual processes followed in Ayurvedic clinics. The system efficiently handles patient registration, therapy scheduling, and billing operations, thereby reducing paperwork and minimizing human errors in data management. It improves accuracy, speed, and overall efficiency of healthcare services while ensuring proper allocation of therapists and avoiding scheduling conflicts. The application provides a user-friendly interface for both staff and patients, along with secure login and data handling to protect sensitive information. The integration of various modules makes the system reliable, efficient, and easy to use. Additionally, the optional AI chatbot enhances



user interaction by offering basic guidance and support. This project clearly demonstrates how modern technology can effectively support and enhance traditional Ayurvedic practices. Furthermore, it has the potential for future enhancements such as cloud integration and mobile application development. Overall, AyurSutra significantly improves the quality of service and operational efficiency in clinics. Thus, the project proves to be a valuable and practical solution for modernizing Panchakarma management systems. The AyurSutra system can be further enhanced by integrating advanced technologies to improve its functionality and user experience. One major enhancement is the development of a mobile application to allow patients and doctors to access the system anytime and anywhere. Cloud integration can be implemented to enable secure data storage, scalability, and real-time access across multiple clinics. The system can also be improved by incorporating advanced AI features such as personalized treatment recommendations based on patient history and Ayurvedic principles. Integration with wearable devices can help monitor patient health parameters in real time. Additionally, multilingual support can be added to make the application accessible to users from different regions. Online payment gateways and automated billing systems can further streamline financial transactions. The inclusion of telemedicine features can allow remote consultations between doctors and patients. Data analytics and reporting tools can be enhanced to provide better insights into treatment outcomes and clinic performance.

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