
Hospital management through AI: smart health assistant app

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ABSTRACT:

Hospital tasks are often performed manually, making them inefficient and time-consuming. The proposed smart health assistant uses artificial intelligence to improve hospital services through a role-based mobile application for administrators, doctors, and patients. It supports symptom analysis, appointment scheduling, medical record management, health tracking, diet planning, pregnancy care, and visual health statistics. Testing demonstrated improved coordination, efficient appointment management, and reduced dependence on manual operations.

Keywords: Hospital Management, Artificial Intelligence, Healthcare Application, Role Based Access, and Smart Health System.

1. INTRODUCTION

Hospitals increasingly adopt digital solutions to improve daily operations, yet many still rely on traditional methods for appointments, patient records, and communication, causing delays, workload, and potential errors that may affect care quality [1-5]. Artificial intelligence (AI) offers opportunities to automate routine tasks, improve information management, support data analysis, and assist healthcare professionals in decision-making. This project proposes a smart health assistant application with role-based access for administrators, doctors, and patients. The system supports appointment booking, electronic health record management, basic symptom assistance, health monitoring, and supervised patient guidance. The goal is to develop a practical, secure, and user-friendly platform for efficient digital healthcare management.

2. RELATED WORK

The healthcare sector is rapidly adopting digital technologies to improve efficiency and quality of care. Artificial intelligence (AI) can support clinical decision-making, reduce routine workload, and analyze patient data to retrieve essential information for diagnosis [1]. Cloud computing and Internet of Things (IoT) technologies further support smart hospital development

by enabling real-time information sharing among healthcare units [2]. Electronic health records (EHRs) have also become essential in modern hospitals, with machine learning increasingly applied to EHR data to identify clinically relevant patterns and relationships [3]. In addition, digital symptom checkers and online health assistants can provide basic guidance based on user inputs, improving access to health information and preliminary support [9]. These developments demonstrate the potential of integrated digital healthcare systems to improve hospital management and patient services. Existing studies [6-9] rarely integrate doctor care, appointment management, medical records, and health monitoring within one platform. The proposed system addresses this gap by combining AI with role-based access for secure hospital management. It integrates appointments, records, symptom guidance, health visualization, and doctor-supervised care into a unified mobile healthcare platform..

4. SYSTEM ARCHITECTURE

Figure 1 illustrates the architecture of the proposed smart health assistant, designed as a client-server system. Administrators, doctors, and patients access the system through a mobile application connected to a centralized database. Role-based access controls information and functions according to user responsibilities. The application processes requests centrally and provides relevant services, including appointment management, patient records, prescriptions, and system monitoring.



Figure 1. System Architecture Diagram

5. METHODOLOGY

The system was developed to address hospital management challenges, including appointment procedures and disorganized patient records. Role-based access was implemented for administrators, doctors, and patients, with functions tailored to their responsibilities. Developed using Flutter, the application includes authentication, appointment scheduling, medical records, chatbot, health tracking, diet planning, and pregnancy care modules. An AI-based chatbot provides basic health guidance, while appointment management supports scheduling and token generation. Testing demonstrated reduced manual effort, smooth task execution, and improved hospital management efficiency.

6. RESULTS

The developed system was evaluated using four user roles: Admin, Senior Doctor, Junior Doctor, and Patient. Each role was tested with its assigned features to verify module functionality. The system efficiently supported appointment booking, medical record management, and overall interaction through role-specific dashboards. Testing also confirmed effective data security and

privacy. The centralized platform simplified user tasks by providing essential functions in one system. Interfaces for each user role are presented in Figures 2.1–2.4.

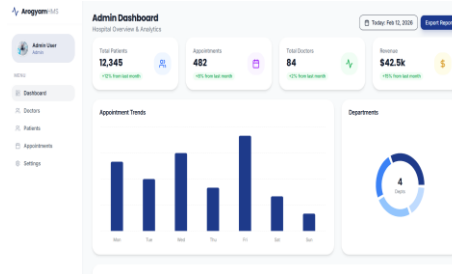


Figure 2.1. Admin Dashboard

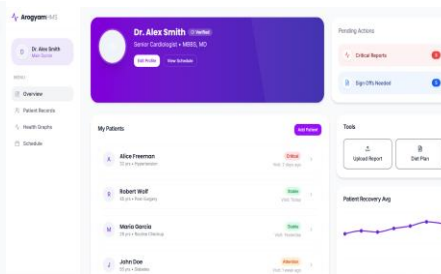


Figure 2.2. Senior Doctor Dashboard

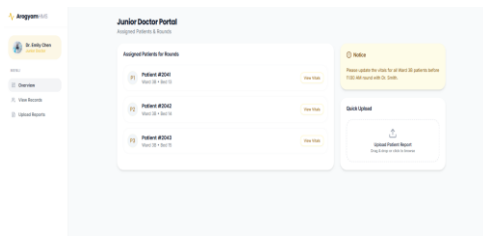


Figure 2.3. Junior Doctor Dashboard

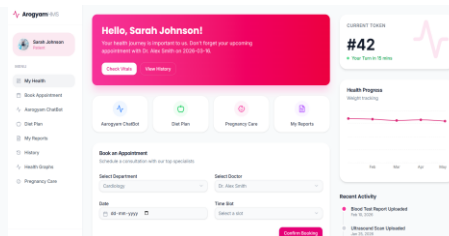


Figure 2.4. Patient Dashboard

8. CONCLUSION

The proposed smart health assistant simplifies digital hospital management by integrating role-based access for administrators, doctors, and patients with appointment scheduling, medical record management, and AI-based assistance. Testing showed improved organization, reduced manual tasks, faster information access, and effective collaboration among user roles. Health tracking and assistant guidance also supported patient engagement. Future development should incorporate real-time database connectivity, advanced AI capabilities, and improved scalability to support larger healthcare environments and enable practical hospital-wide deployment.

9. REFERENCES

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Biographies



Prof. Priyanka Waghmare is an Assistant Professor in the Department of Artificial Intelligence and Data Science Engineering at Ajeenkya DY Patil School of Engineering Pune. With nearly a decade of experience in academia, Prof. Priyanka has been instrumental in shaping the AI and Data Science curriculum and fostering a research-driven environment at ADYPOSE, Pune. Prof. Priyanka is currently pursuing a Ph.D. in Neural Networks.



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