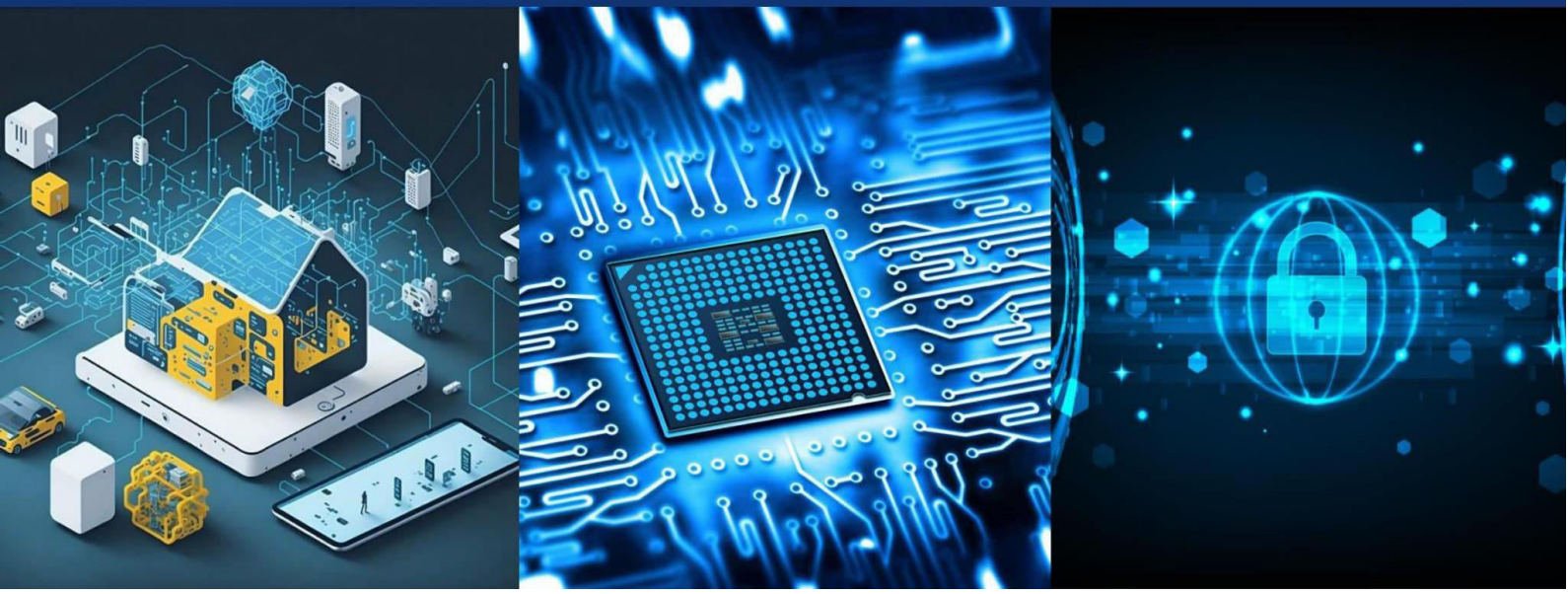
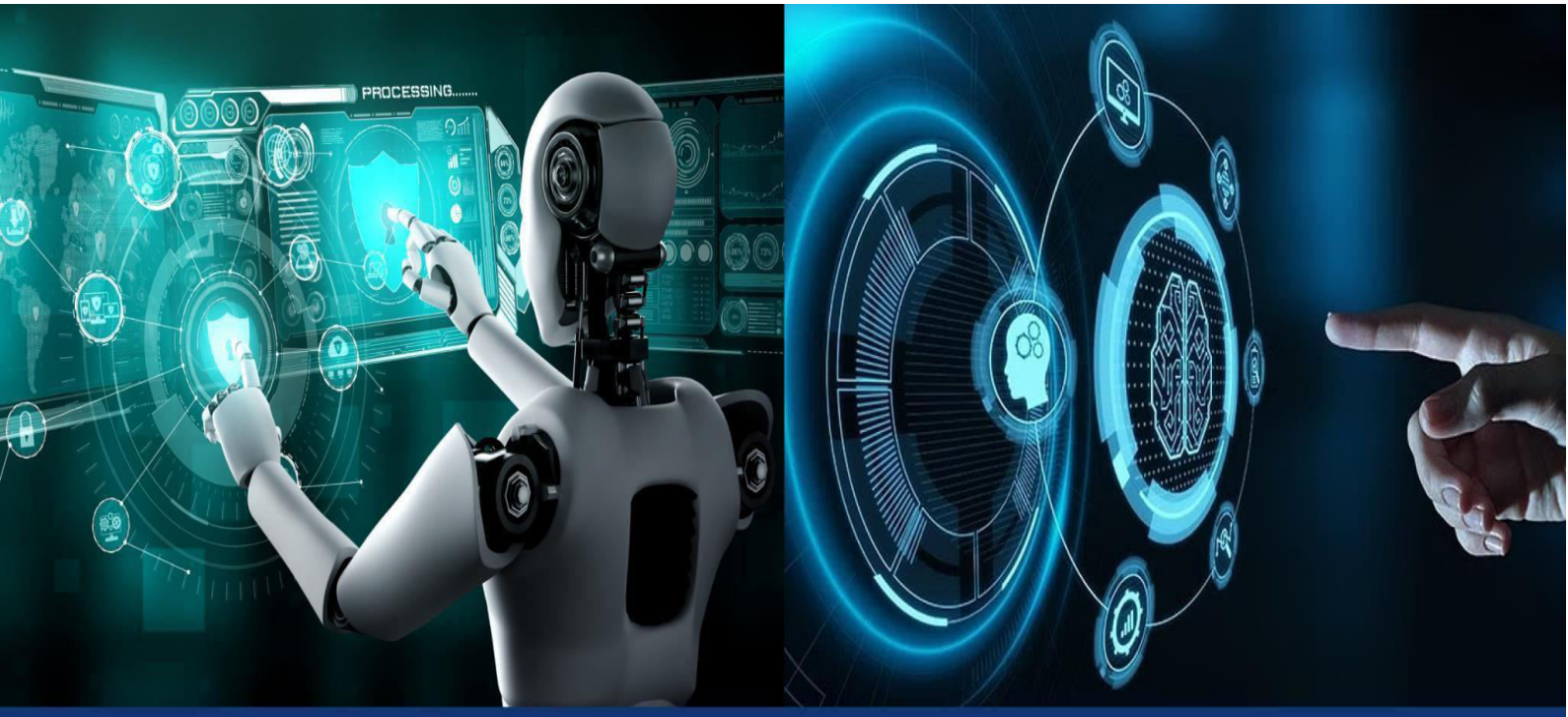
ISSN(O): 2320-9801
ISSN(P): 2320-9798



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.771 **Volume 14, Issue 1, January 2026**

© 2026 IJIRCCE | Volume 14, Issue 1, January 2026| DOI:10.15680/IJIRCCE.2026.1401011

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Hospital Management System

Shivakumar M T[1], Afnaan ahamed R N[1], Praveen H P[1], Tejaswini K[2]

Student Dept. of IS&E, JIT, Davanagere, India[1]

Assistant Professor, Dept. of IS&E, JIT, Davanagere, India[2]

ABSTRACT: In the contemporary healthcare sector, hospitals manage a vast volume of sensitive information, including patient records, doctor schedules, and diagnostic reports. Traditional manual or semi-computerized systems often suffer from data redundancy, high error rates, and significant delays in information retrieval. This research paper proposes a comprehensive **Hospital Management System (HMS)** designed to automate and streamline day-to-day hospital operations. The proposed system creates a centralized platform integrating disparate modules such as patient registration, appointment scheduling, billing, pharmacy, and laboratory management. Developed using web technologies like PHP and MySQL, the system ensures data integrity through role-based access control, allowing secure interaction for administrators, doctors, and support staff. The implementation of this system significantly enhances operational efficiency, minimizes human error, and improves the overall quality of patient care by facilitating real-time data accessibility.

KEYWORDS: Hospital Management System (HMS), Web-based Application, Electronic Health Records, Role-Based Access Control, Healthcare Automation, PHP, MySQL.

I. INTRODUCTION

A hospital is a complex organization that involves the coordination of patients, doctors, administrative staff, and various medical departments. As the healthcare industry grows rapidly, the effective management of hospital operations has become essential to ensure timely and quality service delivery. However, many healthcare centres still rely on manual processes or disparate semi-computerized systems to handle daily activities. Managing these activities manually often leads to significant delays, operational errors, data loss, and overall inefficiency.

The primary challenge in existing manual systems is the handling of large volumes of sensitive information, such as patient records, doctor schedules, and laboratory results. Reliance on paper-based records results in time-consuming data retrieval and increases the likelihood of human errors in prescriptions and billing. Furthermore, unorganized methods lead to difficulties in appointment scheduling, causing long waiting times and poor resource utilization. The lack of a centralized information system often results in poor communication between departments and delays in critical decision-making.

To overcome these limitations, this research proposes a web-based **Hospital Management System (HMS)**. The HMS is designed to automate day-to-day hospital processes and serves as a centralized platform where information related to patients, doctors, staff, appointments, billing, laboratory tests, and pharmacy can be managed seamlessly. By replacing traditional paper-based methods with a digital system, the HMS ensures accuracy, provides faster access to information, and facilitates better coordination among departments. Additionally, the system implements role-based access control to ensure data security and confidentiality for administrators, doctors, and receptionists.

II. LITERATURE REVIEW

[1] Laudon, Kenneth C., and Laudon, Jane P. (2018) analyzed the transformation of traditional business models into digital firms through Management Information Systems (MIS). Their work explored how digital integration enhances organizational efficiency and decision-making processes. The key contribution of this study is the theoretical framework for digitizing record-keeping systems to reduce redundancy. However, the study focuses on general business environments, and its principles require significant adaptation to address the specific complexities and privacy regulations of the healthcare sector.

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

[2] Wager, Karen A., Lee, Frances Wickham, and Glaser, John P. (2017) presented a practical approach to Health Care Information Systems (HCIS). The authors focused on the strategic management of information technology within healthcare organizations, emphasizing the need for alignment between clinical goals and IT infrastructure. The main strength of this research is its comprehensive guide on acquiring and implementing HCIS; however, it focuses largely on high-level administrative strategies rather than the technical execution and coding specifics required for small-to-medium scale hospital deployments.

[3] Pressman, Roger S. (2014) introduced structured Software Engineering methodologies, specifically the Waterfall and Agile models, for developing robust software applications. His work highlights the importance of requirements analysis, system design, and testing in creating error-free software. The key contribution is the standardization of the software development life cycle (SDLC). Despite its fundamental value, the general methodologies discussed need to be integrated with strict medical data security protocols (such as HIPAA) to be effective in a sensitive hospital environment.

[4] Research regarding Digital Health by the World Health Organization (WHO) (2020) investigated the impact of digital health interventions on health system strengthening. The study highlighted the global shift towards electronic health records (EHR) and telemedicine to improve patient accessibility. While the report provides a strong global perspective and policy guidelines, it acknowledges that implementation is often hindered by infrastructure limitations and digital literacy gaps in developing regions.

[5] A study on HIPAA Compliance in Healthcare Systems (2019) examined the security challenges associated with digitizing patient records. The research aimed to identify vulnerabilities in web-based hospital systems and proposed encryption standards to safeguard data. Although the study provides critical security guidelines, the strict compliance measures suggested can be computationally intensive and may impact system performance if not optimized for lightweight web applications.

Ref. No.	Authors & Year	Method / Approach	Key Contribution	Limitations in Present Context
[1]	Laudon & Laudon (2018)	Management Information Systems (MIS) Analysis	Framework for digitizing business operations and reducing data redundancy	General business focus; lacks specific healthcare workflow adaptation
[2]	Wager, Lee, & Glaser (2017)	Strategic Health Care Information Systems planning	Guidelines for aligning clinical goals with IT infrastructure	Focuses on high-level management rather than technical implementation
[3]	Pressman, Roger S. (2014)	Software Development Life Cycle (SDLC)	Standardization of software design and testing phases	General engineering principles; lacks specific medical compliance focus
[4]	World Health Organization (2020)	Survey on Digital Health Interventions	Global standards for Electronic Health Records (EHR)	Implementation challenges in resource-constrained environments
[5]	HIPAA Journal (2019)	Security & Compliance Analysis	Protocols for data encryption and patient privacy	Strict security measures may impact system speed and performance

© 2026 IJIRCCE | Volume 14, Issue 1, January 2026| DOI:10.15680/IJIRCCE.2026.1401011

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

III. SYSTEM ANALYSIS AND ARCHITECTURE

The proposed Hospital Management System (HMS) is designed as a centralized, web-based application that automates critical hospital workflows. The system analysis phase focuses on understanding the operational data flow—from patient registration to discharge—and defining the specific requirements needed to ensure operational efficiency and data security.

A. System Flow and Architecture The system operates on a modular architecture where distinct functionalities interact with a centralized database. The workflow begins with **Patient Registration**, where personal details are captured and a unique Patient ID is assigned . Following registration, the flow proceeds to **Appointment Scheduling**, where patients are matched with available doctors .

The core clinical process involves the **Doctor Consultation** module, where diagnoses and prescriptions are recorded. If diagnostic tests are required, the **Laboratory Module** processes requests and uploads results directly to the patient's record . Concurrently, the **Pharmacy Module** manages inventory and issues prescribed medicines . The process concludes with the **Billing Module**, which consolidates charges from consultations, lab tests, and pharmacy usage into a final invoice for payment and discharge .

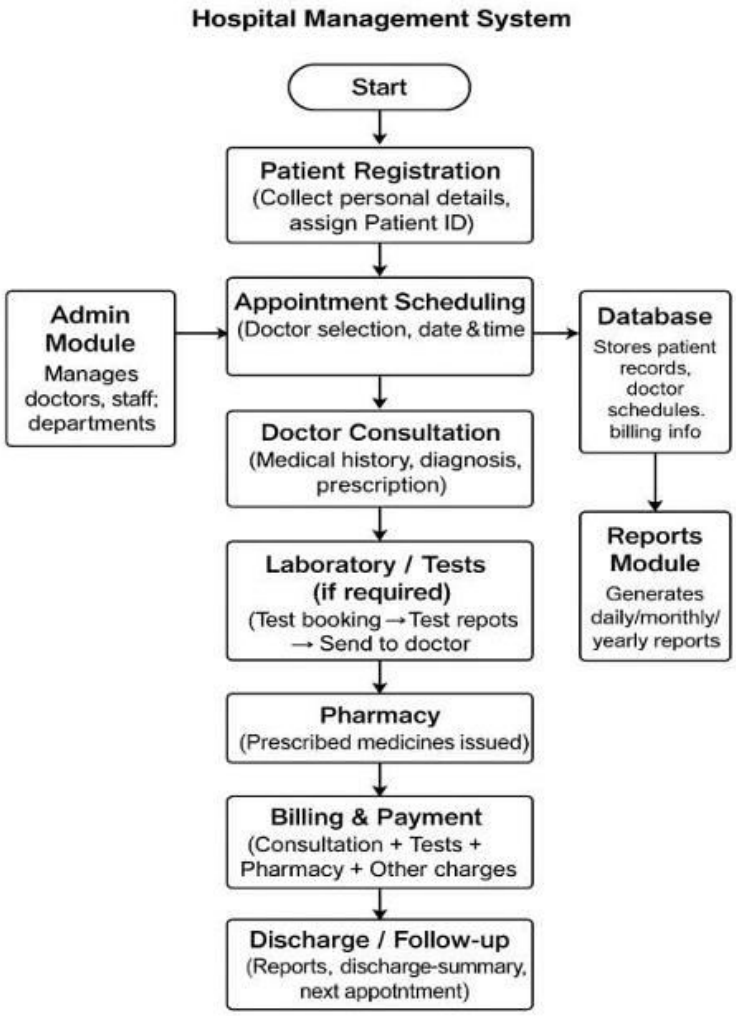


Fig 1. System Flowchart of the Proposed Hospital Management System

© 2026 IJIRCCE | Volume 14, Issue 1, January 2026| DOI:10.15680/IJIRCCE.2026.1401011

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

B. Functional Requirements The system is built to satisfy specific functional demands to ensure smooth operations:

- **User Authentication:** Implements secure login with role-based access control (RBAC) for Admins, Doctors, and Staff .
- **Patient & Doctor Management:** Allows for the registration of new patients and the management of doctor schedules and specialty details .
- **Billing & Reports:** Automates the generation of bills and provides administrative reports on patient inflow and revenue .

C. Non-Functional Requirements To ensure reliability and user satisfaction, the system adheres to strict quality standards:

- **Performance:** Designed to handle concurrent users with a response time of less than 2 seconds under normal load .
- **Security:** Utilizes encryption for sensitive patient data and maintains audit logs to track user activities .
- **Scalability & Availability:** The architecture supports future expansion (e.g., adding new departments) and ensures high uptime for emergency accessibility.

D. Hardware and Software Specifications The system is developed and deployed using the following technical configuration :

Category	Requirement
Processor	Intel i5 or higher
RAM	8 GB Minimum
Storage	100 MB (for code/datasets)
Front-End	HTML, CSS, JavaScript
Back-End	PHP
Database	MySQL
Platform	Windows 10

IV. SYSTEM DESIGN

The system design phase defines the architectural structure, components, and data flow required to achieve the desired functionality of the Hospital Management System (HMS). The design is categorized into High-Level Design (HLD) and Low-Level Design (LLD).

A. High-Level Design (Architecture) The system follows a multi-layered architecture to ensuring modularity and scalability.

- **User Layer:** The system supports multiple users including Patients, Doctors, Nurses, Receptionists, and Administrators.
- **Client Interface:** Access is provided via a web application interface accessible on desktops and mobile devices.
- **Application Layer:** This layer handles the core business logic, including appointment scheduling, billing calculations, and prescription management.
- **Database Layer:** A centralized database acts as the backbone, storing all hospital records securely.

B. Core Functional Modules The system is divided into several functional modules to handle specific hospital operations:

- **Patient Management:** Handles registration and storage of medical history .
- **Doctor Management:** Manages profiles, specialties, and schedules .

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

- **Appointment & Scheduling:** Facilitates online and offline booking based on doctor availability .
- **Laboratory & Pharmacy:** Manages test requests, results uploading, medicine stock, and prescription issuance .
- **Billing & Payment:** Generates consolidated bills including consultation, lab, and pharmacy charges .

C. Database Design (Low-Level Design) The database schema is designed to ensure data integrity and efficient retrieval. Key database entities include:

- **Patient Table:** Stores PatientID, Name, Age, Contact, Address, and MedicalHistory.
- **Doctor Table:** Stores DoctorID, Name, Specialty, Schedule, and Department.
- **Appointment Table:** Links patients and doctors via AppointmentID, Date, Time, and Status.
- **Billing Table:** Records financial transactions using BillID, ServicesUsed, Amount, and PaymentStatus.

D. Design Considerations To ensure the system is robust for a real-world hospital environment, several design constraints were prioritized:

- **Scalability:** The architecture allows for the addition of new departments and the handling of a growing number of records.
- **Security:** Role-based access ensures that sensitive patient records are protected from unauthorized viewing.
- **Integration:** The design facilitates seamless data flow between the lab, pharmacy, and billing departments.

V. IMPLEMENTATION AND RESULTS

The implementation phase involved transforming the system design into a functional application using **HTML, CSS, PHP, and MySQL**. The system was developed on the Windows 10 platform using VS Code as the development environment. The core functionality relies on PHP for server-side processing and MySQL for database management.

A. Core Implementation Logic The following code snippet demonstrates the logic used for submitting user queries or patient contact details into the database. It validates the input and executes an SQL insertion query to store the data securely.

B. Results and User Interface The successful implementation of the system is demonstrated through the following user interface screens. These interfaces were tested to ensure responsiveness and ease of use for patients, doctors, and administrators.

1. Home Page and Services The landing page serves as the entry point for all users, providing easy navigation to services, contact details, and login portals. **[INSERT SCREENSHOT HERE]**
Take the screenshot from **Page 30** of your report showing the "PCHMS Homepage" with the navigation bar and "Logins" section.

2. User Dashboards The system features distinct dashboards for different user roles:

- **Patient Dashboard:** Allows patients to view their profile, book appointments, and check appointment history .
- **Doctor Dashboard:** Provides doctors with a view of their profile and upcoming appointments .
- **Admin Dashboard:** Grants full control to manage users, doctors, patients, and system queries .

C. System Testing Outcomes The system underwent rigorous testing to validate its functionality:

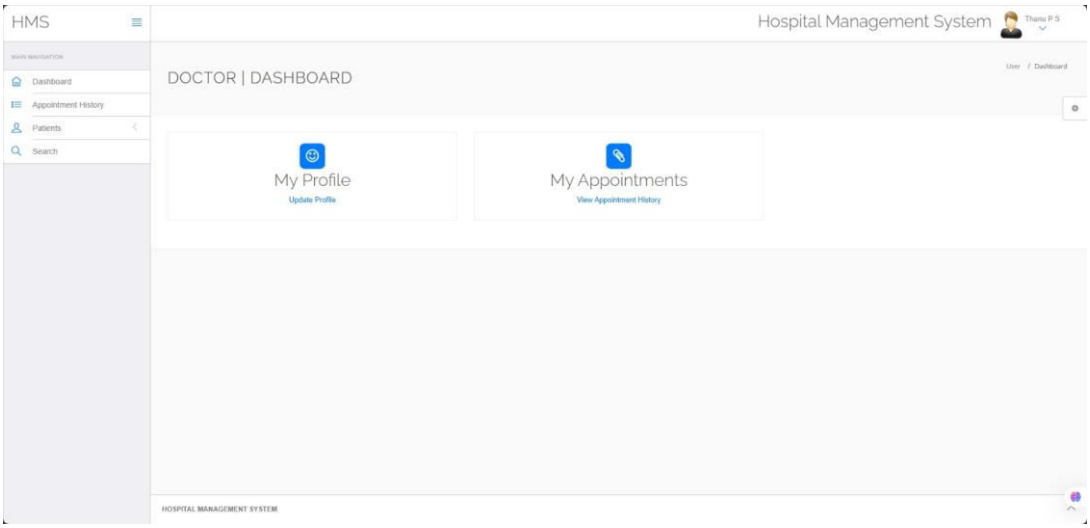
- **Unit Testing:** Individual modules like "Patient Registration" and "Appointment Booking" were tested in isolation to ensure data validity (e.g., ensuring date of birth is valid).
- **System Testing:** The integrated system was tested to verify the complete workflow from registration to billing. The system successfully handled concurrent user requests with a response time of under 2 seconds

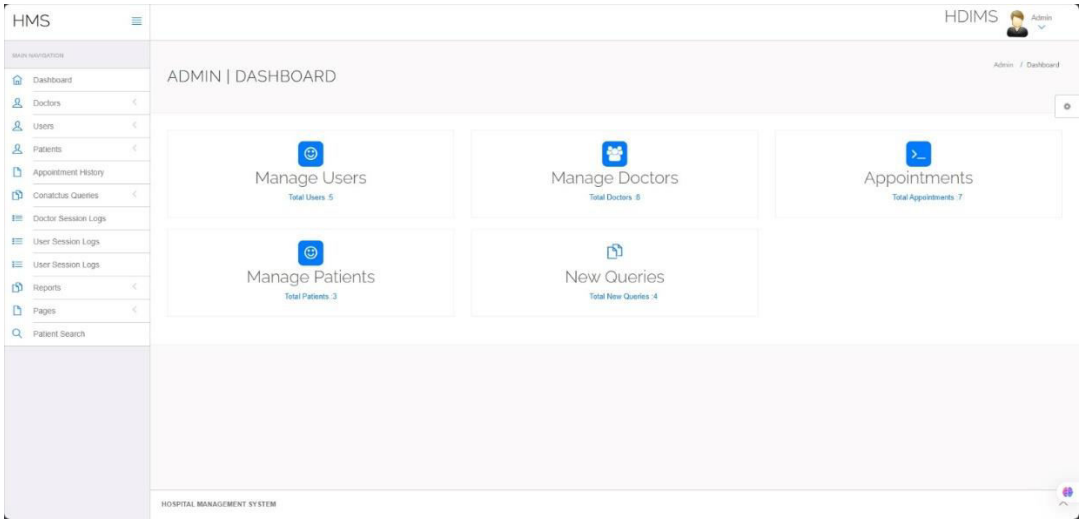
© 2026 IJIRCCE | Volume 14, Issue 1, January 2026| DOI:10.15680/IJIRCCE.2026.1401011

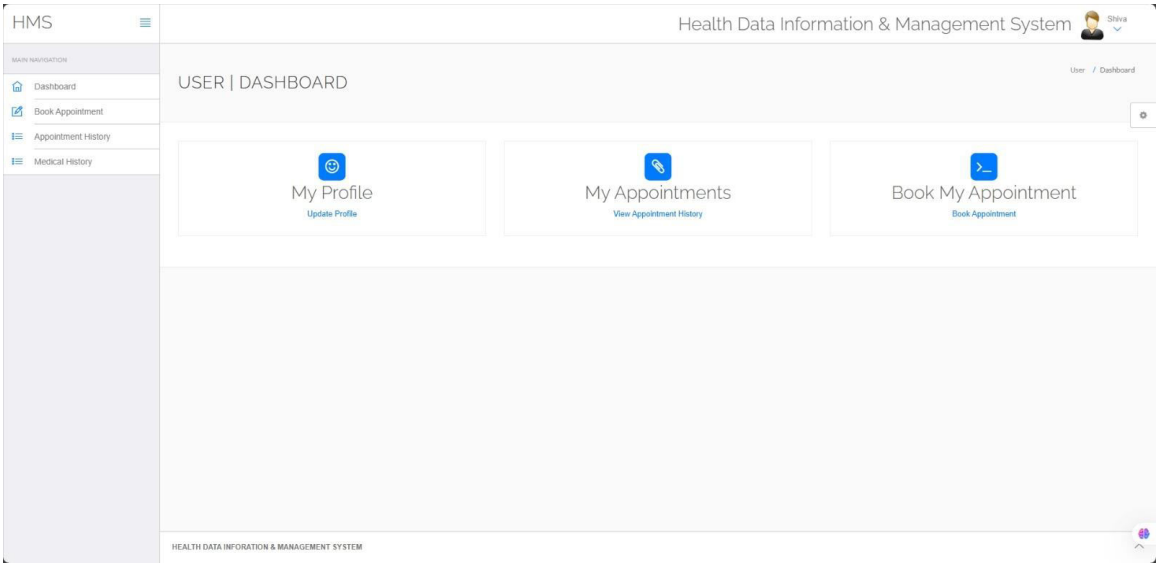
www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)







© 2026 IJIRCCE | Volume 14, Issue 1, January 2026| DOI:10.15680/IJIRCCE.2026.1401011

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VI. CONCLUSION AND FUTURE SCOPE

A. Conclusion

The Hospital Management System (HMS) developed in this research serves as a comprehensive solution to the challenges faced by traditional, manual healthcare administration. By integrating critical modules such as patient registration, appointment scheduling, pharmacy, and billing into a centralized platform, the system effectively eliminates data redundancy and minimizes manual errors .

rigorous system testing validated the application's reliability, confirming that it can handle concurrent user requests with high efficiency. Furthermore, the implementation of role-based access control and data encryption ensures that sensitive patient information remains confidential and secure from unauthorized access. Overall, the proposed HMS enhances operational efficiency, reduces paperwork, and provides hospital administrators with the transparency needed to make informed decisions, ultimately improving the quality of patient care .

B. Future Scope

While the current system offers robust functionality for day-to-day operations, there is significant potential for future enhancements to meet the evolving demands of the healthcare industry:

- **Telemedicine Integration:** Future iterations can include video consultation features to connect patients with doctors remotely, benefiting rural areas .
- **Mobile Application:** Developing a dedicated mobile app for patients to book appointments and view reports, and for doctors to manage schedules on the go .
- **Artificial Intelligence (AI):** AI and Machine Learning modules could be integrated to provide diagnostic support and predictive analytics for patient admission trends .
- **Cloud Deployment:** Migrating the system to a cloud-based infrastructure would facilitate better scalability and centralized management across multiple hospital branches .
- **IoT Integration:** Real-time monitoring of patients using IoT-enabled devices (e.g., heart rate sensors) could automatically update vital signs in the HMS database .

REFERENCES

[1] R. S. Pressman, *Software Engineering: A Practitioner's Approach*, 8th ed. New York, NY, USA: McGraw-Hill Education, 2014.

[2] I. Sommerville, *Software Engineering*, 10th ed. London, UK: Pearson, 2015.

[3] K. C. Laudon and J. P. Laudon, *Management Information Systems: Managing the Digital Firm*, 14th ed. Pearson, 2018.

[4] K. A. Wager, F. W. Lee, and J. P. Glaser, *Health Care Information Systems: A Practical Approach for Health Care Management*, 4th ed. San Francisco, CA: Jossey-Bass, 2017.

[5] World Health Organization (WHO), "Digital Health and Health Information Systems," [Online]. Available: https://www.who.int.

[6] National Institute of Standards and Technology (NIST), "Health IT Security Guidelines," [Online]. Available: https://www.nist.gov.

[7] HIPAA Journal, "HIPAA Compliance in Healthcare Information Systems," [Online]. Available: https://www.hipaajournal.com.

[8] Tutorials Point, "Hospital Management System Project Documentation," [Online]. Available: https://www.tutorialspoint.com.

[9] ResearchGate, "Hospital Information System: Architecture and Design Papers," [Online]. Available: https://www.researchgate.net.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details