HOSPITAL MANAGEMENT SYSTEM

[1]Students: M. Namitha, P.Saishivani,G. Rahul,MD. Afnaan, S. Suresh

[2]GUIDE: DR. Bandi Krishna, Korra Shobhan Babu

[1,2] Department of Computer Science Engineering, Balaji Institute of Technology and Science, Warangal, Telangana

ABSTRACT

A Hospital Management System (HMS) is a computer system used to automate hospital activities, make them more efficient, and enhance the delivery of care. It brings together central hospital operations including patient registration, scheduling appointments, billing, medical record handling, pharmacy, stock management, and personnel management.through automation, HMS eliminates paperwork, reduces errors, and provides real-time access to patient information. It enhances departmental coordination, resulting in quicker decision-making and improved healthcare services. Features such as electronic health records (EHR), laboratory management, and telemedicine also improve patient care.

Security is an essential part of HMS, protecting privacy of data through encryption and access restriction and adhering to healthcare regulations. Cloud and AI-based solutions ensure greater accessibility and predictive insights. an effective HMS maximizes hospital resources, minimizes waiting times, and improves patient satisfaction. It is an important tool for providing cost-effective, high-quality medical care in a contemporary healthcare.

1. INTRODUCTION

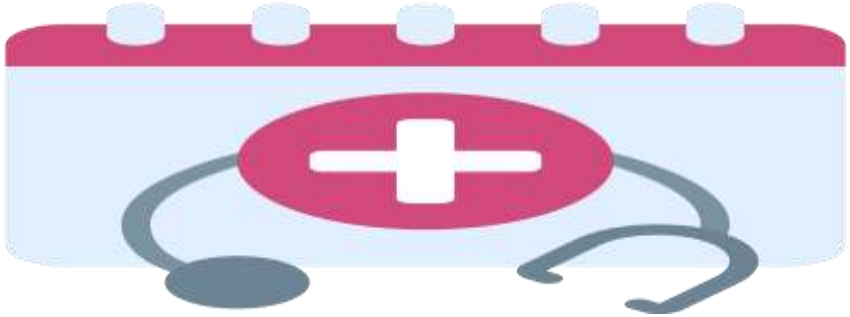
A Hospital Management System (HMS) is a computerized system that is meant to automate the activities of a hospital or medical facility. It assists in managing patient records, doctor schedules, billing, inventory, and other administrative functions. Hospitals can minimize paperwork, increase efficiency, and provide better quality care to patients by utilizing an HMS. one of the major responsibilities of an HMS is patient management. It keeps and organizes patient information, such as medical history, test reports, prescriptions, and treatment plans. This enables doctors and nurses to view patient information in a timely manner, resulting in quicker and correct diagnoses and treatments. another crucial feature is appointment scheduling. The system enables patients to schedule appointments online or with the hospital, minimizing long waiting times[1-32].

Doctors and personnel can also schedule their time effectively, allowing for the smooth continuity of consultation and treatment.the HMS also facilitates billing and payment, making financial services more efficient and transparent. It automates billing, payment tracking, and insurance claim management, minimizing errors and delays.In addition, the system has inventory management to monitor

Doi:10.48047/ijiee.2025.15.5.12

medical supplies, medicines, and equipment. This prevents hospitals from running out of supplies or stocking too much, so the necessary supplies are ready when the need arises. Hospital Management System increases the efficiency of hospitals, improves patient care, and makes hospital processes more organized. It is a necessary tool for today's healthcare facilities aiming to deliver improved services while easing administrative hassles.

A Hospital Management System (HMS) is a system which makes hospitals and clinics operate well. It records patient information, doctor schedules, medical supplies, and billing in a more coordinated and efficient way. Rather than depending on documents, hospitals have the option of using this system to save and retrieve vital details at a click. perhaps one of the greatest advantages of an HMS is patient record management. It houses all patient information in one database, including medical history, medications, and laboratory test results. This facilitates easier access to the appropriate treatment for doctors and nurses without having to sort through stacks of documents. another significant feature is appointment scheduling. Patients can schedule appointments with ease, and the schedule of doctors can be organized by hospitals without any confusion. This minimizes waiting times and ensures each patient receives proper care.



The system also takes responsibility for billing and payment. It computes treatment charges, produces bills, and monitors payments, making it faster and less error-prone. It can even process insurance claims, so patients don't have to go through cumbersome paperwork.Also, an HMS assists in the management of stock by monitoring drugs, medical equipment, and consumables. This means that hospitals are always in possession of whatever they require and never lack critical items.All in all, a Hospital Management System simplifies the lives of doctors, nurses, and patients. It ensures that hospitals function more effectively, enhances patient care, and makes life less stressful for all. A Hospital Management System (HMS) is a computer program that makes hospitals and clinics more efficient. It takes the place of old-fashioned paperwork with a well-organized system that tracks patient records, doctor appointments, billing, and medical supplies. This makes it easier for doctors, nurses, and hospital staff to work while making sure patients get better and faster care.One of the most significant aspects of an HMS is handling patient records. Hospitals treat a large number of patients every day, and manually maintaining their medical record can be an uphill task. With an HMS, all of a patient's details—like earlier treatment, medications, test results, and allergies—are maintained in a

Doi:10.48047/ijiee.2025.15.5.12

centralized location. This enables doctors to easily retrieve a patient's medical history, resulting in more precise diagnoses and treatments. It also minimizes the likelihood of critical information going missing.

Another major advantage of an HMS is scheduling appointments. Rather than waiting in long queues, patients can schedule their appointments online or at the hospital reception. The system ensures that doctor schedules are managed by hospitals, and there are no conflicting appointments or undue delays. This enhances the experience of both patients and doctors, making visits to the hospital less stressful.Billing and payment are also simplified with an HMS. Manual handling of hospital bills can result in errors and delays, but an HMS makes it automated. The system computes the cost of treatment, prepares bills, and monitors payments, keeping everything accurate. It can also process insurance claims, thus making the process easier for those that require coverage for medical charges. This eliminates confusion and ensures timely payment to hospitals.

Medical supplies and inventory are also managed by hospitals, for example, drugs, laboratory equipment, and the like. HMS keeps track of the levels and alerts when it is low, so that never in a hospital will they go out of any essential item, and there would be no wasteful overstocking. It is particularly ideal for pharmacies and laboratories, as timely availability of drugs and apparatus is of crucial importance.Communication among various hospital departments is also an area where an HMS proves to be useful. Hospitals have numerous teams of doctors, nurses, receptionists, pharmacists, and lab technicians. If they are not communicating well, it results in confusion and delays. An HMS links all the departments so that information travels freely. For instance, when a doctor writes a prescription, the pharmacy is updated instantly, and thus the medicine is ready when the patient comes.For patients, an HMS makes hospital visits a lot easier. They can schedule appointments easily, get proper treatment without any delay, and receive clear and accurate billing details. Their medical records are kept securely, so they don't have to carry old reports each time they go to the hospital. This makes the whole hospital experience more convenient and hassle-free.

Hospital Management System is an indispensable asset of contemporary hospitals and healthcare institutions. It assists in managing patient files, scheduling visits, billing, inventory control, and communication enhancement. Through reducing paperwork and minimizing tasks, it enables hospitals to concentrate more on what is actually important—maximizing patients' healthcare provision.

2. LITERATURE SURVEY

- Management practices and quality of care 2019,**Saylee Dongre,** systematic review of the quantitative evidence linking hospital management practices and quality of care.

- Maturity Models for Hospital Management 2020,**Shivani Choudhary,**Studies on maturity models provided frameworks for evaluating and improving hospital management practices.

Doi:10.48047/ijiee.2025.15.5.12

- Information systems integration 2021, **Saurabh Sonwane**,review of health information systems in health care focused on their role in supporting health management and operations.

- Artificial Intelligence in Decision-Making 2024, **Nikhil Thadani**, Researchers looked at the benefits of using artificial intelligence (AI) tools in the decision-making process of hospital management in order to improve efficiency and patient care.

- Challenges in Health Crises2020,**Anjalesh Gawaikar**, systematic study analysed the hospital management challenges during COVID-19 pandemic highlighting the importance of resource allocation.

3. PROBLEM STATEMENT

1. Ineffective Patient Record Handling: Hospitals deal with a high volume of patient records, which may be stored manually or in stand-alone systems.

2. Unnecessary Waiting Time and Appointment Issues:

Several hospitals have a tough time scheduling appointments effectively. The patients have to wait for an extended period due to overbooking, mismanagement, or inefficient tracking.

3. Billing and Payment Processing Errors: Billing in hospitals is often complex, involving various charges for consultations, tests, treatments, and medications.

4. Poor Inventory and Medicine Stock Management:

Hospitals require a regular influx of drugs, medical equipment, and other necessities. With no tracking in place, shortages or overstocking can happen, causing delay in treatment or losses.

5. Inadequate Coordination among Departments:

Hospitals have various departments, such as reception, outpatient, specialties, laboratories, pharmacies, and inpatient wards. Communication breakdown among these departments can cause delays, miscommunication, and inefficiencies in patient care.

6. Inability to Deal with Emergency Cases: In emergencies, immediate access to patient records, available physicians, and necessary medical equipment is essential. In manual systems, information retrieval is time-consuming, which can affect critical care. An HMS gives immediate access to patient history, staff availability, and inventory status, enabling quicker and better emergency response.

7. Security and Data Privacy Issues: Patient health records hold sensitive information, and manual systems are at risk of losing data, being stolen, or accessed by unauthorized personnel. An HMS offers safe, encrypted storage with role-based access so that only approved individuals can view or modify medical

Doi:10.48047/ijiee.2025.15.5.12

records. This enhances data security and regulatory compliance in healthcare.

4. METHODOLOGIES

1. Understanding Hospital Needs: First, we need to know what the hospital requires. This includes managing patient records, doctor appointments, billing, medicines, and reports. talking to doctors, nurses, and staff helps in understanding what features are needed.

2. Planning the System: After understanding the needs, a plan is made. This includes designing how the system will work, what information it will store, and how different departments (like reception, pharmacy, and labs) will be connected.

3. Choosing the Right Technology: The system should work well on hospital computers and mobile devices. Developers select programming languages, databases, and tools to build a system that is fast, secure, and easy to use.

4. Building the System: This is where the actual work starts. Developers write the code and create different sections like:

- **Patient section** for medical history
- **Appointment section** for scheduling visits
- **Billing section** for payments
- **Inventory section** for tracking medicines

5. Testing for Errors: Before using the system in the hospital, it is tested to make sure everything works correctly. This step ensures thereare no mistakes in booking appointments, generating bills, or storing patient data.

6. Training Hospital Staff: Since not everyone is familiar with new technology, doctors, nurses, and staff are trained on how to use tsystem to book appointments, check patient records, and handle billing.

7. Using and Maintaining the System: Once the system is ready and staff are trained, it is installed in the hospital. Regular updates andfixes keep the system working smoothly and securely.

5.CONCLUSION

Hospital Management System (HMS) is an efficient and effective tool which assists hospitals and health centers to function better. It takes the place of cumbersome paper-based working with an online system which streamlines managing patients' records, appointments, bills, stock, and hospital sections.Doctors have rapid access to the patient's history with an HMS, decreasing mistakes in treatment. Waiting time decreases for the patient as the appointment is neatly managed. Payment and billing turn smooth and exact, lowering the prospect of monetary errors. Even, hospital employees may maintain track of medication and consumables conveniently and prevent unexpected scarcity.Through an effectively designed HMS, hospitals are able to deliver improved and quicker healthcare services, enhancing patient satisfaction as well as hospital efficiency. In the long term, an HMS saves time, minimizes workload, and enables doctors and nurses to spend more time on what really matterspatient care.Perhaps the greatest advantage of an HMS is instant and simple

Doi:10.48047/ijiee.2025.15.5.12

access to patient records. Physicians and nurses no longer need to sort through stacks of paper to locate a patient's medical history. Instead, with a few keystrokes, they can review past treatments, test results, and prescriptions. This accelerates diagnosis and assists in rendering better care.

The system also enhances appointment management, eliminating long waiting times and overbooking. Patients can schedule their appointments effortlessly, and hospitals can keep doctors' schedules in order. This creates a more seamless experience for both patients and healthcare providers.From the perspective of billing and financial management, an HMS prevents hospitals from making payment and insurance claim errors. Billing is automated, ensuring correct calculations, and the process is transparent and convenient for both patients and hospitals. This prevents conflicts and enhances financial responsibility.Another important aspect of hospital management is inventory control. A hospital needs to have the right medicines and medical equipment available at all times. An HMS helps track stock levels, preventing shortages or overstocking. This ensures that necessary medical supplies are always available when needed.Second, an HMS streamlines the interdepartmental communications of hospitals and makes coordinating amongst doctors, nurses, receptionists, pharmacists, and lab personnel easier. It decreases errors in communication and ensures the optimal coordination of care for the patients in every area of the hospital.Nonetheless, implementing an HMS poses drawbacks, like employee training, the maintenance of a system, and security for their data. If properly trained and secured, nevertheless, such hurdles can easily be overcome. an HMS is a much-needed tool for hospital modernization and enhanced healthcare delivery. It speeds up hospital processes, organizes them better, and gets them more accurate, ultimately benefiting both healthcare professionals and patients. With less manual work and less room for human error, an HMS enables hospitals to concentrate on what is most importantits core business of delivering quality medical care to patients.

6. RESULT

Admin Dashboard:

Admin Login Fig.1

Doi:10.48047/ijiee.2025.15.5.12

User Login Fig.2

Admin Dashboard:

Hospital Management System Fig.3

Doi:10.48047/ijiee.2025.15.5.12

1. REFERENCE

Doi:10.48047/ijiee.2025.15.5.12

2. Shortliffe, E. H., & Cimino, J. J. (2014). *Biomedical Informatics: Computer Applications in Health Care and Biomedicine*. Springer.

3. Tan, J. (2010). *Healthcare Information Systems and Informatics: Research and Practices*. IGI Global.

4. Haux, R. (2006). *Health Information Systems – Past, Present, Future*. International Journal of Medical Informatics, **75(3–4)**, 268-281.

4. Kumar, S., & Aldrich, K. (2010). *Overcoming Barriers to Electronic Medical Record (EMR) Implementation in the US Healthcare System: A Comparative Study*. Health Informatics Journal, **16(4)**, 306-318.

5. Gajanayake, R., Iannella, R., & Sahama, T. (2014). *Security and Privacy Issues in Electronic Health Records*. Health Information Science and Systems, **2(1)**, 1-8.

6. World Health Organization (WHO). (2023). *Digital Health and Hospital Management Systems*.

7. HealthIT.gov. (2022). *Benefits of Hospital Management Systems*.

8. National Health Service (NHS). (2021). *Future of Digital Hospitals and Electronic Health Records*.

9. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima" A Brain Tumor Identification and Classification Using Deep Learning based on CNN-LSTM Method" Computers and Electrical Engineering , 101 (2022) 107960
10. Ramdas Vankdothu,.Mohd Abdul Hameed "Adaptive features selection and EDNN based brain image recognition on the internet of medical things", Computers and Electrical Engineering , 103 (2022) 108338.
11. Ramdas Vankdothu,.Mohd Abdul Hameed,Ayesha Ameen,Raheem,Unnisa " Brain image identification and classification on Internet of Medical Things in healthcare system using support value based deep neural network" Computers and Electrical Engineering,102(2022) 108196.
12. Ramdas Vankdothu,.Mohd Abdul Hameed" Brain tumor segmentation of MR images using SVM and fuzzy classifier in machine learning" Measurement: Sensors Journal,Volume 24, 2022, 100440 .
13. Ramdas Vankdothu,.Mohd Abdul Hameed" Brain tumor MRI images identification and classification based on the recurrent convolutional neural network" Measurement: Sensors Journal,Volume 24, 2022, 100412 .
14. Bhukya Madhu, M.Venu Gopala Chari, Ramdas Vankdothu,.Arun Kumar Silivery,Veerender Aerranagula " Intrusion detection models for IOT networks via deep learning approaches " Measurement: Sensors Journal,Volume 25, 2022, 100641

Doi:10.48047/ijiee.2025.15.5.12

15. Mohd Thousif Ahemad ,Mohd Abdul Hameed, Ramdas Vankdothu" COVID-19 detection and classification for machine learning methods using human genomic data" Measurement: Sensors Journal,Volume 24, 2022, 100537
16. S. Rakesh [a], NagaratnaP. Hegde [b], M. VenuGopalachari [c], D. Jayaram [c], Bhukya Madhu [d], MohdAbdul Hameed [a], Ra mdas Vankdothu [e], L.K. Suresh Kumar "Moving object detection using modified GMM based background subtraction" Measurement: Sensors ,Journal,Volume 30, 2023, 100898
17. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Efficient Detection of Brain Tumor Using Unsupervised Modified Deep Belief Network in Big Data" Journal of Adv Research in Dynamical & Control Systems, Vol. 12, 2020.
18. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Internet of Medical Things of Brain Image Recognition Algorithm and High Performance Computing by Convolutional Neural Network" International Journal of Advanced Science and Technology, Vol. 29, No. 6, (2020), pp. 2875 – 2881
19. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima "Convolutional Neural Network-Based Brain Image Recognition Algorithm And High-Performance Computing", Journal Of Critical Reviews,Vol 7, Issue 08, 2020(Scopus Indexed)
20. Ramdas Vankdothu, Dr.Mohd Abdul Hameed "A Security Applicable with Deep Learning Algorithm for Big Data Analysis",Test Engineering & Management Journal,January-February 2020
21. Ramdas Vankdothu, G. Shyama Chandra Prasad " A Study on Privacy Applicable Deep Learning Schemes for Big Data" Complexity International Journal, Volume 23, Issue 2, July-August 2019
22. Ramdas Vankdothu, Dr.Mohd Abdul Hameed, Husnah Fatima " Brain Image Recognition using Internet of Medical Things based Support Value based Adaptive Deep Neural Network" The International journal of analytical and experimental modal analysis, Volume XII, Issue IV, April/2020
23. Ramdas Vankdothu,Dr.Mohd Abdul Hameed, Husnah Fatima" Adaptive Features Selection and EDNN based Brain Image Recognition In Internet Of Medical Things " Journal of Engineering Sciences, Vol 11,Issue 4 , April/ 2020(UGC Care Journal)
24. Ramdas Vankdothu, Dr.Mohd Abdul Hameed " Implementation of a Privacy based Deep Learning Algorithm for Big Data Analytics", Complexity International Journal , Volume 24, Issue 01, Jan 2020
25. Ramdas Vankdothu, G. Shyama Chandra Prasad" A Survey On Big Data Analytics: Challenges, Open Research Issues and Tools" International Journal For Innovative Engineering and Management Research,Vol 08 Issue08, Aug 2019.
26. Vankdothu, R., Hameed, M.A. "An Effective Congestion and Interference Secure Routing Protocol for Internet of Things Applications in Wireless Sensor Network " Wireless Personal Communication Journal 140, 143–161 (2025)
27. Vankdothu, R., Bhukya, H. & Bhukya, R.R. "Hybrid TDR-MI Based Wireless Sensor Network for

Doi:10.48047/ijiee.2025.15.5.12

Underground Water Pipeline Leakage Detection and Localization Using Pressure Residuals and Classifiers Wireless Personal Communications 139, 803–823 (2024).

28. Vankdothu, R., Cheng, X. “Energy Efficient TDMA and Secure Based MAC Protocol for WSN Using AQL Coding and ASGWI Clustering”. Wireless Personal Communications 136, 2125–2143 (2024)
29. Vankdothu, R., Hameed, M.A., Fatima, H. *et al.* Multicast Scaling in Heterogeneous Wireless Sensor Networks for Security and Time Efficiency. Wireless Personal Communications (2025).
30. Vankdothu, R., Hameed, M.A., Fatima, H. *et al.* Multicast Scaling in Heterogeneous Wireless Sensor Networks for Security and Time Efficiency. Wireless Personal Communications (2025)
31. Ramdas Vankdothu, Mohd Abdul Hameed” Brain MRI Images for Tumor Detection using Storage Optimization Technique”,Mobile Radio Communications and 5G Networks,Lecture Notes in Networks and Systems,425-437, Springer .
32. Bandi Krishna , Ramdas Vankdothu , Varun Revuri and B. Prashanth” A brain tumor identification using convolution neural network in the deep learning” MATEC Web of Conferences 392, 01131 (2024) ,https://doi.org/10.1051/matecconf/202439201131 ICMED 2024

Doi:10.48047/ijiee.2025.15.5.12

BIBILOGRAPHY

I'm Namitha. I am currently in my 8th semester of Computer Science in the Bachelor's Degree at Balaji Institute of Technology and Science. My research interest is done based on **"HOSPITAL MANAGEMENT SYSTEM"**

I'm Saishivani. I am currently in my 8th semester of Computer Science in the Bachelor's Degree at Balaji Institute of Technology and Science. My research interest is done based on **"HOSPITAL MANAGEMENT SYSTEM"**

Doi:10.48047/ijiee.2025.15.5.12

I'm Rahul. I am currently in my 8th semester of Computer Science in the Bachelor's Degree at Balaji Institute of Technology and Science. My research interest is done based on **"HOSPITAL MANAGEMENT SYSTEM"**

I'm Afnaan. I am currently in my 8th semester of Computer Science in the Bachelor's Degree at Balaji Institute of Technology and Science. My research interest is done based on **"HOSPITAL MANAGEMENT SYSTEM"**

I'm Suresh. I am currently in my 8th semester of Computer Science in the Bachelor's Degree at Balaji Institute of Technology and Science. My research interest is done based on **"HOSPITAL MANAGEMENT SYSTEM"**

Doi:10.48047/ijiee.2025.15.5.12

Doi:10.48047/ijiee.2025.15.5.12