A
Mini-Project Report on

Medical E-Card System

Submitted in complete fulfillment of the requirements
for the degree of
BACHELOR OF ENGINEERING
IN
Computer Science & Engineering
Artificial Intelligence & Machine Learning

by

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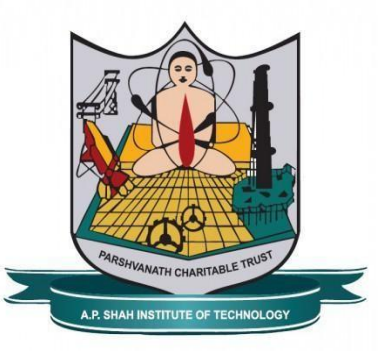

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CERTIFICATE

This is to certify that the project entitled "**Medical E-Card System"** is a bonafide work of Karan Saji Vethody (22106023), Suraj Vishwakarma (22106019), Disha Waghmare (22106033), Shikshita Yadav (22106092) submitted to the University of Mumbai in complete fulfillment of the requirement for the award of **Bachelor of Engineering** in **Computer Science & Engineering (Artificial Intelligence & Machine Learning).**

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Project Report Approval

This Mini project report entitled "**Medical E-Card System"** by **Karan Saji Vethody, Suraj Vishwakarma, Disha Waghmare and Shikshita Yadav** is approved for the degree of ***Bachelor of Engineering*** in ***Computer Science &Engineering***, (AIML) ***2022-23***.

External Examiner: _____

Internal Examiner: _____

Place: APSIT, Thane

Date:

Declaration

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

A medical management system is a software application that helps to manage the daily operations of a medical facility. It can handle tasks such as patient registration, appointment scheduling, billing, inventory, reporting, and more. The system aims to improve the efficiency, quality, and safety of health care delivery. It also provides benefits such as reduced costs, increased revenue, enhanced patient satisfaction, and better compliance with regulations.

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION

A **Hospital Management System (HMS)** is a software system that helps hospitals manage their day-to-day operations. It is designed to streamline the administrative workflow and improve patient care. The system manages all aspects of healthcare, including processes, providers, patients, and more. It ensures that processes are completed swiftly and effectively.

The HMS was introduced in 1960 and has since evolved to integrate with existing facilities, technologies, software, and systems of a hospital. Today, patients can begin the process of healthcare in the palm of their hand – mobile devices and apps make this possible. This process then moves to the healthcare providers and hospitals.

The HMS enables hospitals to manage information and data related to all aspects of healthcare. It handles patient registration & scheduling, electronic medical records, pharmacy records, laboratory tests, etc. The system reduces human intervention for paperwork, less paperwork, reduced staff headcount for jobs that can be easily managed within the HMS, speedier processes, reduction of errors, and data privacy and safety.

The benefits of an HMS are numerous. For the hospitals, HMS translates to being able to track patient history, provide better care, keep track of appointments, save patient insurance and payment data, enable doctors and clinicians to check patient history, maintain patient care continuity, and save time and effort on unnecessary tedious manual tasks.

An HMS is a critical tool for hospitals to manage their operations efficiently. It helps them provide top-line care while ensuring patient and other data confidentiality.

Hospital management systems play a pivotal role in the efficient functioning of healthcare institutions, offering a comprehensive solution to streamline various administrative and clinical processes. As the healthcare landscape continues to evolve, the need for robust and integrated management systems becomes increasingly apparent. In this introduction, we will delve into the key aspects of hospital management systems, exploring their significance, components, and the transformative impact they have on healthcare delivery.

CHAPTER 2

LITERATURE SURVEY

2. LITERATURE SURVEY

2.1-HISTORY

The history of medical patient record management can be traced back to ancient times when physicians recorded their observations and treatments of patients in narratives or case studies. However, the modern era of medical patient record management began in the 1920s, when the American College of Surgeons (ACOS) established the American Association of Record Librarians (AARL), which later became the American Health Information Management Association (AHIMA). The AARL aimed to standardize and improve the quality of medical records in clinical settings1.

The development of computers and information technology in the 1960s and 1970s enabled the creation and storage of electronic medical records (EMRs), which were initially used by large healthcare facilities and universities. EMRs allowed for faster and easier access to patient information, but they were limited to a single location and often incompatible with other systems2. In the 1990s, the Health Insurance Portability and Accountability Act (HIPAA) was enacted to protect the privacy and security of patient information and to promote the adoption of electronic health records (EHRs), which are more comprehensive and interoperable than EMRs. EHRs can integrate data from multiple sources, such as laboratories, pharmacies, and imaging centers, and can be shared across different healthcare providers and organizations.

The history of medical patient record management shows how the field has evolved from simple documentation to complex data analysis and exchange. Today, health information management (HIM) professionals are responsible for managing, organizing, and protecting the health information of patients, as well as ensuring its accuracy, completeness, and accessibility. HIM professionals also use various tools and techniques to analyze and interpret health data for improving patient care, quality, safety, and outcomes. The future of medical patient record management will likely involve more advanced technologies, such as artificial intelligence, cloud computing, blockchain, and big data analytics, that will enable more efficient and effective use of health information.

2.2-LITERATURE REVIEW

It is designed to streamline the administrative workflow and improve patient care. The system manages all aspects of healthcare, including processes, providers, patients, and more. It ensures that processes completed swiftly and effectively.

Title: "Challenges and Solutions in Hospital Management System: A Case Study of Tallinn Children's Hospital," Authors: P. Rajak, P. Krus, A. Haldre

The HMS enables hospitals to manage information and data related to all aspects of healthcare. It oversees patient registration & scheduling, electronic medical records, pharmacy records, laboratory tests, etc. The system reduces human intervention for paperwork, less paperwork, reduced staff headcount for jobs that can be easily managed within the HMS, speedier processes, reduction of errors, and data privacy and safety.

A literature review on hospital management systems reveals that these systems have been widely researched in recent years. reviewed research papers on healthcare operations management from reputed operations management and service management journals from two thousand. presents a review of the research published in M&SOM on healthcare management since its inception 20 years ago and reflects on opportunities for further research.

Hospital Management System in health care: where are we? A scoping review:

If you're looking for a literature review on hospital management systems, I can help with that. A **Hospital Management System (HMS)** is a software system that helps hospitals manage their day-to-day operations. It is designed to streamline the administrative workflow and improve patient care. The system manages all aspects of healthcare, including processes, providers, patients, and more. It ensures that processes are completed swiftly and effectively.

The scope of a Hospital Management System (HMS) extends across various dimensions, encompassing both the administrative and clinical aspects of healthcare delivery. As technology continues to advance, the scope of HMS is evolving, and its impact on the healthcare industry is becoming more profound. Let's explore the diverse scope of a Hospital Management System:

1. Administrative Management:

- Patient Registration and Management: HMS streamlines the process of patient registration, creating a centralized database with accurate and up-to-date patient information.

- Appointment Scheduling: Efficient appointment scheduling ensures optimal utilization of resources, reduces waiting times, and enhances the overall patient experience.

- Billing and Finance: The billing module automates invoicing, tracks payments, and manages insurance claims, contributing to improved financial management and revenue cycle.

- Inventory Management: HMS helps in managing and tracking medical supplies, equipment, and pharmaceuticals, ensuring efficient inventory control, and minimizing wastage.

- Human Resource Management: The system assists in managing staff-related processes, including attendance tracking, payroll processing, and performance evaluations.

2. Clinical Management:

- Electronic Health Records (EHR): The core of clinical management, EHRs centralize patient information, promoting comprehensive and integrated healthcare delivery. This includes medical history, diagnoses, medications, treatment plans, and more.

- Laboratory Information System (LIS): The system manages laboratory operations, from sample tracking to result recording, contributing to accurate and timely diagnostics.

- Radiology Information System (RIS): RIS facilitates the management of radiological procedures and images, ensuring efficient workflow in radiology departments.

- Pharmacy Management: HMS includes features for managing pharmacy operations, including drug inventory, prescription management, and dispensing.

3. Reporting and Analytics:

- Data Analysis: HMS provides tools for analyzing data generated within the healthcare system, offering insights into key performance indicators, patient outcomes, and operational efficiency.

- Decision Support: The reporting and analytics capabilities aid administrators in making informed decisions, optimizing resource allocation, and implementing strategic initiatives for continuous improvement.

4. Patient Engagement:

- Patient Portals: Many HMS include patient portals that enable individuals to access their health records, schedule appointments, and communicate with healthcare providers, fostering a more engaged and informed patient community.

- Mobile Applications: Mobile apps linked to HMS enhance patient engagement by providing on-the-go access to health information, appointment reminders, and medication alerts.

5. Emerging Technologies:

- Artificial Intelligence (AI): The integration of AI in HMS is opening new avenues for predictive analytics, personalized medicine, and automation of routine tasks, further enhancing the efficiency and effectiveness of healthcare delivery.

- Telehealth Integration: The scope of HMS is expanding to accommodate the growing trend of telehealth, allowing for remote consultations, virtual monitoring, and the seamless integration of telehealth data into patient records.

6. Interoperability:

- Integration with External Systems: *HMS is increasingly designed to be interoperable, allowing for the exchange of information with external systems, laboratories, and other healthcare providers. This ensures a more comprehensive and connected healthcare ecosystem.

Scope of a Hospital Management System is vast and multifaceted, covering everything from patient registration to clinical management, financial operations, analytics, and patient engagement. As technology advances and healthcare delivery models evolve, the scope of HMS continues to expand, playing a crucial role in shaping the future of healthcare administration and patient care.

The Adoption and Implementation of Hospital Management System in Healthcare: A Literature Review:

The adoption of information management systems by the health-care industry has been widely researched in recent years. Crisan and Mihaila 1 suggest that small or large health-care organizations should no longer focus on information systems' adoption but should adopt a digital transformation paradigm. By considering this paradigm, management practices related to information technologies' adoption projects should be complemented by practices related to the continuous organizational changes and readaptation of the organizational strategy, to benefit the advantages information systems can offer

CHAPTER 3

Problem Statement

3.PROBLEM STATEMENT

Designing an efficient Hospital Management System (HMS) poses the challenge of seamlessly integrating diverse functions within a healthcare facility. The system must address patient registration, appointment scheduling, medical record maintenance, billing, and inventory management. Ensuring data accuracy, security, and accessibility are paramount to facilitate smooth workflow among different departments. The system should also prioritize user-friendly interfaces for both healthcare professionals and administrative staff. Additionally, it must adapt to evolving medical practices and technological advancements, providing scalability and futureproofing. Striking a balance between customization and standardization is crucial to meet the unique needs of various healthcare institutions. Ultimately, the challenge lies in creating a robust HMS that enhances operational efficiency, improves patient care, and complies with regulatory standards in the dynamic landscape of healthcare management.

- Interoperability: Integrating diverse hospital functions and ensuring seamless communication between different software modules.
- Data Security and Privacy: Safeguarding sensitive patient information and complying with data protection regulations.
- User Training and Adoption: Overcoming resistance to change and ensuring that healthcare professionals can effectively use the new system.
- Scalability: Designing a system that can grow and adapt to the evolving needs and size of the healthcare facility.
- Customization vs. Standardization: Balancing the need for tailored solutions for specific departments with the advantages of standardized processes.
- Technological Obsolescence: Mitigating the risk of the system becoming outdated by incorporating flexible, upgradable technologies.
- Workflow Optimization: Streamlining hospital processes to enhance efficiency and reduce bottlenecks in patient care.
- Regulatory Compliance: Ensuring the system adheres to healthcare regulations and standards to avoid legal issues and penalties.
- Cost Management: Developing a system that is cost-effective both in terms of initial implementation and ongoing maintenance.

The aim of the research on hospital management systems is to enhance the efficiency, effectiveness, and overall quality of healthcare services through the development and implementation of advanced technological solutions. The key objectives include:

1. Optimizing Workflow: Investigate ways to streamline and optimize hospital processes, from patient registration to discharge, to improve overall workflow efficiency.
2. Data Security and Privacy: Explore robust measures to ensure the confidentiality, integrity, and availability of patient information, aligning with stringent data protection regulations.
3. Interoperability: Research methods to achieve seamless integration and communication between various modules and systems within the hospital, promoting information exchange among different departments.
4. User Adoption and Training: Examine strategies to facilitate smooth user adoption, offering comprehensive training programs for healthcare professionals to maximize the system's benefits.
5. Scalability and Flexibility: Investigate technologies and frameworks that allow the hospital management system to scale with the growing needs of the healthcare facility and adapt to evolving medical practices.

CHAPTER 4

Experimental Setup

4.EXPERIMENTAL SETUP

Python:

Python is a popular programming language that has many features and applications. Some of the main aspects of Python are:

It is an interpreted, object-oriented, high-level language with dynamic semantics1.

It has a simple and easy to learn syntax that emphasizes readability and reduces the cost of maintenance.

It supports multiple programming paradigms, such as imperative, functional, procedural, and object-oriented.

Flask:

Flask is a micro web framework written in Python that allows developers to build lightweight web applications quickly and easily with Flask Libraries 12. It was developed by Armin Ronacher. Flask is based on the WSGI (Web Server Gateway Interface) toolkit and Jinja templating engine. It is classified as a microframework because it does not require tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions.

MySQL:

MySQL is a popular open-source relational database management system (RDBMS) that allows users to store, manage, and retrieve structured data efficiently 1. It was developed by MySQL AB and is now owned by Oracle Corporation. MySQL is written in C and C++ and works on many system platforms, including Linux, macOS, Microsoft Windows, and others. It has a multithreaded SQL server that supports different back ends, several different client programs and libraries, administrative tools, and a wide range of application-programming interfaces (APIs).

CSS:

Cascading Style Sheets (CSS) is a style sheet language used to describe the presentation of a document written in HTML or XML 12. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript 1. CSS allows you to apply styles to web pages. More importantly, CSS enables you to do this independently of the HTML that makes up each web page 3. It describes how a webpage should look: it prescribes colors, fonts, spacing, and much more. In short, you can make your website look however you want 3. CSS lets developers and designers define how it behaves, including how elements are positioned in the browser. While HTML uses tags, CSS uses rulesets 3. CSS is easy to learn and understand, but it provides powerful control over the presentation of an HTML document 3.

JavaScript:

JavaScript is a popular programming language that is widely used for web development. It is an interpreted, object-oriented, high-level language with dynamic semantics. JavaScript is the programming language of the Web and is easy to learn. It supports multiple programming paradigms, such as imperative, functional, procedural, and object-oriented. JavaScript has a large and comprehensive standard library that provides built-in functions and modules for various tasks.

CHAPTER 5

Proposed System & Implementation

5.PROPOSED SYSTEM & IMPLEMENTATION

5.1 Block diagram of proposed system

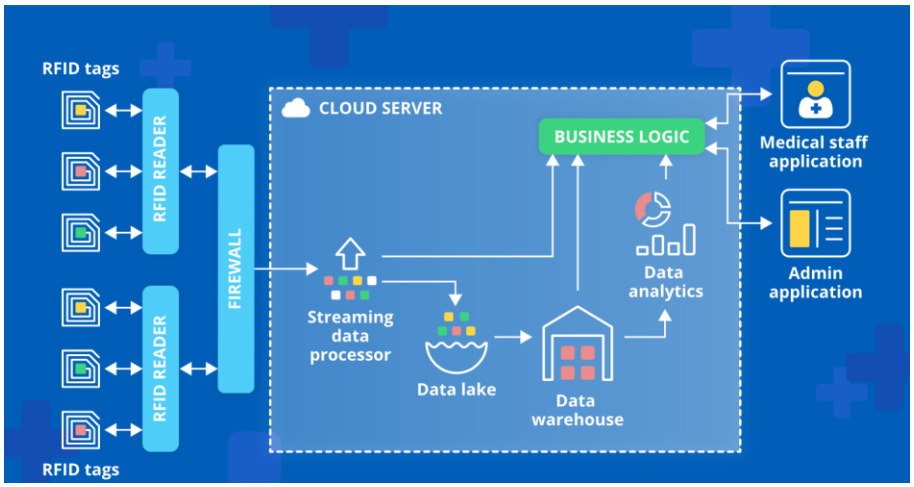


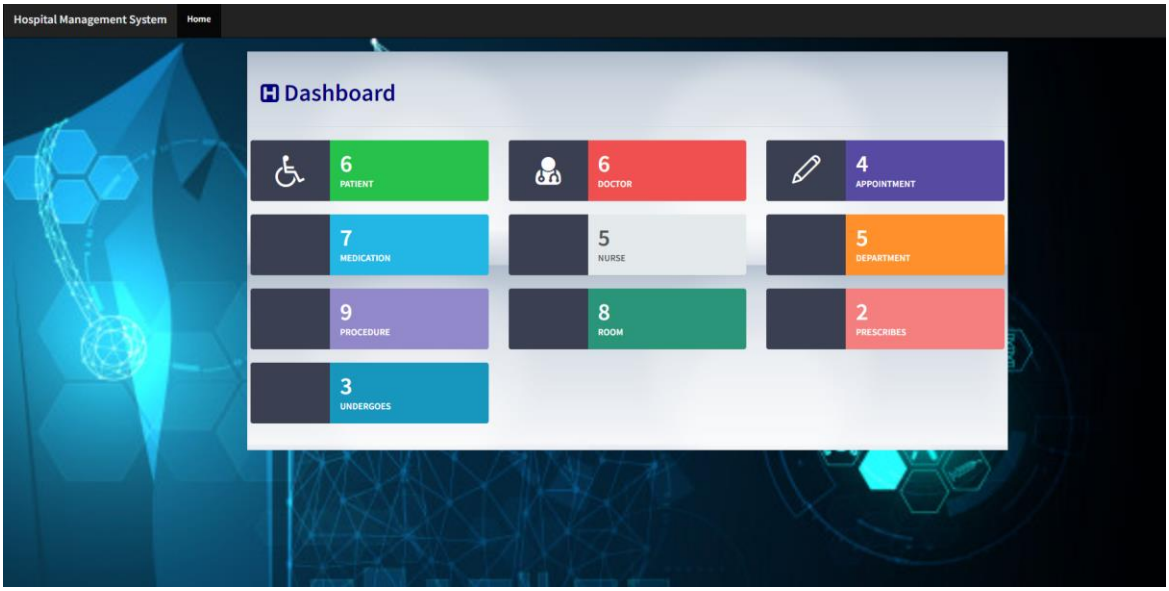
Fig 5.1: Block diagram of proposed

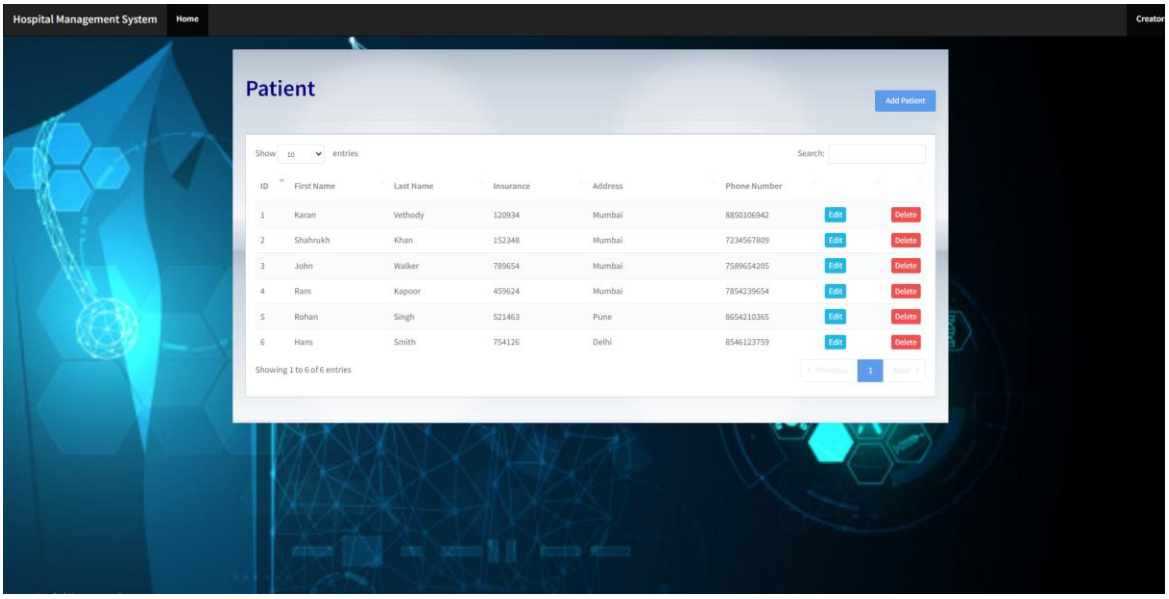
5.2 Description of block diagram

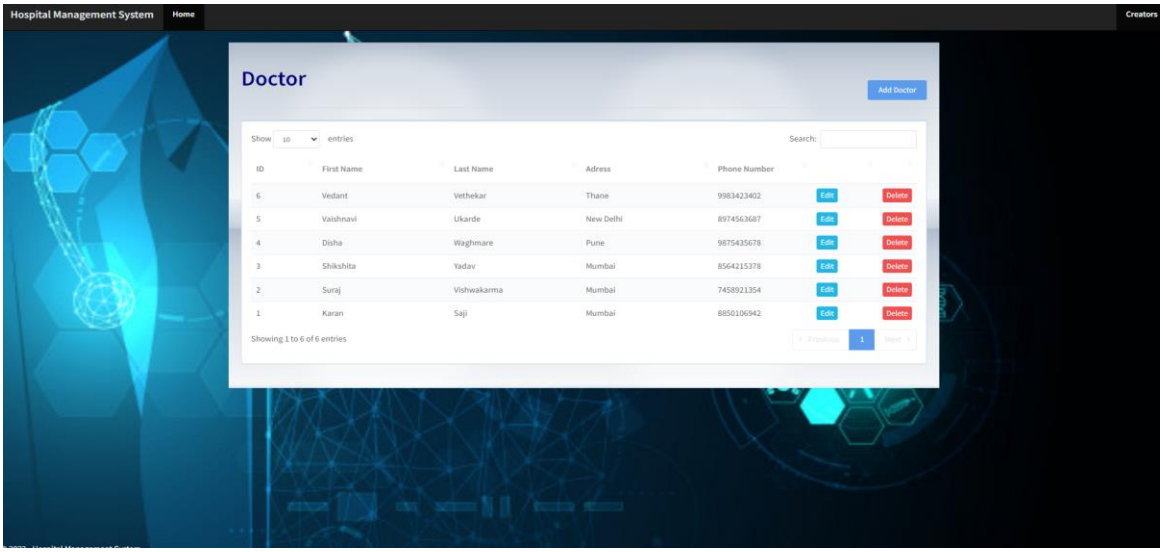
- **RFID tags (active or passive) –** attached to or embedded into hospital assets or tracking bracelets/badges for patients, visitors, staff and transmit information on their location to RFID readers.
- **RFID readers –** located in hospital corridors, wards, etc., they identify the location of RFID tags and send this data to the cloud gateway.
- **Firewall –** to securely transmit collected data to the cloud server.
- **Streaming data processor –** to transfer the input data about hospital assets, patients, staff, etc., to a data lake.
- **Data lake –** to store the data about tracked patients, staff, and hospital assets sent by RFID tags in its original format.
- **Big data warehouse –** to store filtered and preprocessed data for further analysis of hospital staff workflow efficiency, movements of patients, medical asset utilization, etc.
- **Data analytics –** to identify patterns and tendencies in hospital asset use and movements of tracked people and provide insights aimed at improving asset availability, medical staff schedules, patient safety, etc.
- **RFID tracking software business logic –** to process hospital asset requests and high-priority events (e.g., the patient leaves the hospital premises without being discharged), provide information on the location of patients, visitors, and staff members, etc.

- **Staff application** – to enable the medical staff, equipment technicians, etc., to view locations of hospital assets and request them for use, get information on patient location, get alerts on the unusual patient or visitor behavior. The application also helps supervisors view locations of each hospital unit employee, get insights on workflow optimization, etc.
- **Admin application –** to view the list of monitored assets, tracked patients, visitors, medical specialists, and information about them, add new assets, staff members, edit key data about tracked items and people, grant access to the asset tracking system for the medical and administrative staff, etc.

5.3 Implementation



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Add Doctor
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5 Vaishnavi Ukarde New Delhi 8974563687 Edit Delete
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CHAPTER 6

Conclusion

6. CONCLUSION

6.1 Conclusion

A hospital management system is a web-based application that allows patients and health care providers to access and share medical information electronically. A hospital management system can have various benefits, such as:

Therefore, a hospital management system should be designed and implemented with careful consideration of the human factors involved in health care in the home. A human factors approach can help identify the needs, preferences, capabilities, and limitations of the users and the environment, and provide solutions that support maximizing the safety and quality of health care delivered in the home. Some examples of applying human factors principles to a medical e-card system are:

Regulating technologies for health care consumers to ensure that they meet the standards of safety, effectiveness, and usability, developing guidance on the structure and usability of health information technologies to ensure that they are compatible with the users' cognitive abilities, tasks, goals, and expectations. Developing guidance and standards for medical device labeling to ensure that they provide clear, accurate, and consistent information for both patients and health care providers. Improving adverse event reporting systems for medical devices to ensure that they capture and analyze relevant data for improving the safety and quality of health care in the home.

In conclusion, a hospital management system is a promising technology that can improve health care in the home. However, it also poses some challenges that require careful attention. A human factors approach can help address these challenges by providing user-centered solutions that enhance the safety, quality, and efficiency of health care in the home.

6.2 Future Scope

The scope of a hospital management system (HMS) is extensive, covering various aspects of hospital operations. An HMS typically includes functionalities like patient registration, appointment scheduling, electronic medical records (EMR), billing, inventory management, pharmacy management, and laboratory management. It may also incorporate features for medical imaging, telemedicine, reporting and analytics, and integration with external systems like insurance providers and laboratories. The scope of an HMS is to automate and streamline administrative and clinical processes, improve patient care coordination, enhance data security and accuracy, optimize resource utilization, and provide valuable insights for decision-making. The future scope of an HMS is to incorporate more advanced technologies like artificial intelligence (AI) and machine learning (ML) to enable predictive analytics, personalized medicine, and precision healthcare.

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