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Hospital Management System

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Table of Contents

Project Proposal Document	1
Introduction	4
PURPOSE	4
SCOPE	4
Problems and Motivation	5
Problem	5
Solution	5
Benefits	5
Aim and Objectives	6
Aim	6
Objectives	6
System Overview	7
System Functions	7
1. Patient Management	7
2. Help & Support Management	8
3. Doctor Management	9
4. Staff/Employee Management	10
5. Account/Payment Management	11
6. Inventory & Pharmacy Management	12
7. Laboratory And Tests Management	13
8. Transport Management	14
Literature review	15
System Requirements	15
similar solutions	15
Methodology	16
Tools and Technologies	16
MERN Stack	16
Backend Checking Tools	16

IT2080 – Information Technology Project

Year2, Semester2, 2023

Styling.....	17
Coding Platforms	17
Developer Tool	17
Version Control System.....	17
Gant chart/Monthly plan	18
Evaluation Method	18
Bibliography	19
Appendix	20
System Overview	20



Introduction

PURPOSE

The MediHelp hospital management system is designed to cover a wide range of hospital administration and management processes such as appointment management, payment management, pharmaceutical inventory and laboratory management, transport, etc. In this system the Receptionist, Administrator, Doctor and Patient can access in different perspectives for their relevant tasks. They alone can add data to the database. Data processing is quick because the data are well protected for personal use. system will make sure that our patients do not need to que in line for hours to visit consultants. Our patients will be able to determine the time that they must arrive at the hospital to visit their preferred consultant by enabling system with a seamless interconnection with our precious customers. In line with regional and global healthcare environments, patients have direct access to the system's range of services, including complaint management. It is exciting to see MediHelp online hospital management system live as it will provide easy and affordable access to healthcare through a powerful digital platform.

SCOPE

This system will be utilized as a hospital-serving application. The system's goal is to improve the number of people who can receive effective care. The management of the hospital must make significant efforts to secure the files which is file-based. because Fire, insects, and natural disasters can all readily damage them. also be lost if data and information are lost. So that, automation of some functionalities is required.

Based on the functions they are develop for the scope of the tasks that each primary users can have and make some of them accessible for the administrators of the system. In this system it prioritized the administrator for the system management and give batter care for the Patient and Doctors.

Problems and Motivation

Problem

- Cannot interconnect/communicate with hospitals. So that, they cannot transport patient's hospitals to hospitals.
- Inventory Management not automated. So that, they do not have idea about the lack of medicine.
- There is not having any system to get any support about system or any other things in online.
- Patient and Receptionist must make appointments very efficient and healthy way.
- Payment wants to be done by an automated way.

Solution

- Develop Transport Management inside the system as a solution for the inside and outside transportation.
- Make an Inventory Management function for solve the tracking about Inventory and get in touch with medicine.
- Develop an Online Support System so that all users communicate with the system can get help in an automated way by raising tickets from the system.
- Develop Patient Management function inside the system for automating the process between the system and Patient and make the patient appointment secure and healthy.
- Make the Payment Management automated and add different features to it for secure it.

Benefits

- Boot up the performance than the available system.
- All users can get help and support without calling call center and it will reduce the time and can give a better solution for problems that users can have.
- If the Inventory is facing the problem such as lack of resources that can leads to bigger problems can be managed by the system.
- Patient do not need to come always to the Hospital for make their appointment. It is lead to manage the interaction between Patient and the secondary actors in the Hospital and will help to manage the influence spread control.
- Users of the system can make necessary payments in a secured and efficient way with different experience than the existing system.

Aim and Objectives

Aim

The aim of this project is to develop a better Hospital management system for MediHelp Health Care Center with solutions for their system problems that they are facing right now. So that we are focusing to automate some of the main functions for their system such as Inventory control, Support management, staff management, transport management, payment management and build the other main functions with them. In this system we also focus to manage payments in a secured way and make this application very familiar to its' users by using different perspectives for Admin, Patient, Doctors, and Employees. Other than that the Patients, Doctors and Employees can manage their tasks and their details properly, get the relevant reports, view the details of the system, and get support as soon as possible without making calls are also the aspects of this Hospital Management System as well.

Objectives

- Consider getting the idea about how each user interacts with the system and what they are required to do within it.
- Use online resources and use the 60-30-10 rule when coloring of the content for the front-end development and get better UI/UX design.
- Identify the Emotional Needs that each user can have.
- Develop better management system for the employees and the patients.
- Get in touch with the policies and standards for the lab reports.
- Use technical techniques which requires to manage server overload problems.
- Identify all the requirements that help to develop a satisfied system for all users.
- Identify the problems that users can occur when using the system.

System Overview

System Functions

1. Patient Management

In this function It covers a wide area of the system and became more powerful and very effective side of the system. Patient Management has the responsibility to give more friendly and more familiar Interface to the patient because sometimes it can become a problem with the patient's life if any mistake happens. So that this must be more reliable efficient and working as a real time function. Those things are getting as non-functional requirements.

When patient using this web application first, one visits some of the pages of the application or immediately decide to make an appointment for an emergency purpose. If a patient has lack of knowledge of the system, one can schedule an appointment through the reception section of the system by contact them. Patient can also Register with the system and get more facilities from it.

When Patient decide to schedule an appointment whether one is register or not one has to register with the system because of the system requirement. Employee also can schedule an appointment for a patients request. First patient fills the appointment with the details, make the payment and submit it. then he received an email with his appointment details as a notification.

If Patient want to update/delete the appointment one can delete it. But there are no options for updating an appointment. Patient can also view doctors' details for the purpose of get an idea about the doctor and his/her specialization before making the appointment. However, if patient's appointment deleted by the system Admin, then one can notify about it and if Patient didn't attend for the reserved appointment, it will delete automatically from the system.

According to the registration of a Patient, Patient can register to the system himself/herself or with the help of a receptionist. However, Patient must submit the form that requires to registration. One's Patient registered to the system He can manage it by updating or deleting the profile. Patient can also view his/her report details, Appointment details and prescription details. Also, Patient can get PDF documents for those reports if requires.

2. Help & Support Management

A helpdesk management system is an important component of a hospital management system. It allows for requesting inquiries and issues regarding patient care, facility maintenance, and IT support. The helpdesk management system was developed for including patients, hospital staff, and doctors to request issues on time. The helpdesk system included following functions,

- Ticket management
- Communication
- Reporting and analytics
- Integration with other systems

The system can help to provide accurate responses to patients and others. They can submit an issue briefly using a description and selecting a category of issue. After successfully submitting, the system will generate a ticket for the issue. The system can also provide updates on the status of requests. So, they can view the ticket and the status of the ticket whether it's resolved or not. The support agent can manage the ticket and they will solve the issue as soon as possible. If there isn't any suitable category for selecting, they can inform about that support agent. They will handle it with relevant management. So, the helpdesk management system is always integrated with other systems.

As a summary of the helpdesk management system, it is the best tool for managing requests and improving the quality of hospital management.

3. Doctor Management

The main task of the doctor management system is to manage appointment, add prescription and store the doctor and patient details and retrieve them as needed. Designation appointment details and patient details are included in the system's data input, and the system's output is to cause these details to appear on the display. Here is the main flow of events is first is doctor logs in to the system, doctor may select view patient, patient record is displayed with treatment history. Doctors add description of patient treatment. doctor may select appointment details, appointment requests is displayed with schedule, doctor confirm or cancel appointment.

The doctor enters patient Id and after this all the treatment details and medicine, remark and advice for the patient after this system shall show a message screen while adding the prescription. physicians have access to the patient appointment list and can confirm appointments or modify them as needed. Only the patient records that they are currently treating are available to doctors. Doctor management system main flow of event is first logs in to system, view patient record and accept appointment or cancel the appointment. Appointment dates and enables doctor to select the most suitable appointment date and patients. The doctor may also the cancel the appointment. As a summary of doctor management system, it is the best tool for appointment management and quality improvement.

4. Staff/Employee Management

Staff/Employee Management is one of the major roles of hospital management system. Employees play a major role in this system and there should be an organized way to manage the Staff/Employee details into this hospital management web application that we create. Staff/Employee Management is needed to keep that information systematically. First, the Staff/Employee should register to the system. When registering, the staff/employee should provide details such as,

- Employee Name
- Department Name
- Employee Email
- Employee Phone Number
- Password
- Date Of Birth
- NIC
- Designation Description
- Gender
- Address

By submitting the registration form a new staff/employee can be added to this web application. All the validations will be checked upon submission.

After the registration is successfully done, a staff member/employee can mark the attendance, view the attendance sheet, check the staff/employee profile details, or update their profile details, delete employee/staff member details etc. To do this, the relevant staff/employee should log in to the website by providing the registered email & password.

Now the employee can update employee profile details on the site mark the attendance etc...

Here the staff member/employee can generate a report of the attendance report details through this functionality. Not only that a staff member/employee can display the staff member/employee's profile details also.

Mainly the staff member/employee will be able to Create/Insert, Read, Update and Delete the data.

- Create staff member/employee Registration and Login Screen
- View staff member/employee details.
- Update staff member/employee details.
- Mark the attendance.
- Generate a report of the attendance sheet.

5. Account/Payment Management

- ❖ Patient management function is very important to hospital management system. It always process and handling payments for medical services provided to patients. In the below are some key points of payment management in hospital system.
- Payment methods – in payments methods allows to patients to make payments using different payment methods. Like credit cards, debit cards or online banking.
- Payment tracking - tracking payment history and provide payment report for customers.
- Automated payment reminders – the system automatically sends payments reminders to patients. This option helps to develop the hospital's cash flow.
- Payment security – handle the payment information securely.
- Refunding process – the system should be able refund the money to unsuccessful payments of customers.
- Payment notification / billing and invoicing – the system send invoice to customers after their payments and it's shows the chargers for each services.

Non-functional requirements

- ❖ Performance
- ❖ Usability
- ❖ Security
- ❖ Compatibility
- ❖ Security

Hospital can increase revenue gathering, lower errors, and offer patients a smooth payment process by integrating a complete payment management system. This can assist the hospital's financial situation and allow it to give patients greater treatment.

6. Inventory & Pharmacy Management

The inventory and pharmaceutical management module strives to limit purchases to a minimum while maintaining sufficient product inventory to meet customer and prescriber expectations. This will also be used to monitor the effectiveness of the pharmacy and identify the most urgently needed pharmaceuticals. You can keep an eye on your drug supply by utilizing a pharmacy management system. Prescriptions are properly filled and delivered in precise quantities courtesy to pharmacy management software. In order to ensure efficient collaboration and productive outcomes, it oversees and manages the pharmaceutical team. Also, this can improve customer satisfaction ratings, quality standards and prevent the expiration of pharmaceuticals in the inventory.

The pharmacist logs into the system when products are delivered by the supplier and inputs all the information regarding those recently delivered products. The system database will be used to record information such as the product name, description, and supplier name. When a product is successfully added to the system, a product id is generated. Seeing every item now available in the system is a feature of this inventory management system.

The system allows manager to check what products have got out of stocks and what products have expired. System automatically shows out of stocks products, low stock products and notify the pharmacist. Any product that is currently in the system is searchable by users. Using the Product ID or Name, systems assist users in finding products quickly. System automatically generate Reports which aid the user organize, manage the inventory and secure drug information efficiently.

Non-Functional Requirements

- ❖ Usability - The web site is designed for user friendly environment and ease of use.
- ❖ Security - The system and database are not accessible to unauthorized users.
- ❖ Reliability - Both clients and admin should have access to a dependable environment through the system. All orders ought to be delivered to the administrator without any problems.
- ❖ Availability - This website will be available 24/7.
- ❖ Scalability - The inventory records are able to be increased by users accordingly.
- ❖ Performance - System performance is made to quickly load the pages.

7. Laboratory And Tests Management

A laboratory management system is a software system designed to support and manage the operations of a laboratory. The system is typically used in research labs, clinical labs, and testing labs to streamline processes, improve accuracy, and reduce administrative overhead.

The primary features of a laboratory management system include:

- **Sample management:** LMS allows users to track and manage samples, including their storage location, test history, and other pertinent data.
- **Test management:** The system enables users to manage tests and associated workflows, including scheduling, sample preparation, data collection, and reporting.
- **Instrument integration:** LMS can integrate with laboratory instruments to automate data collection, analysis, and reporting.
- **Quality control:** The system can provide tools to ensure that lab procedures meet established standards and guidelines.
- **Inventory management:** LMS can help manage lab inventory, including reagents, consumables, and equipment.
- **Reporting:** The system can generate reports to provide insight into lab performance, test results, and quality control measures.

The benefits of implementing a laboratory management system include improved efficiency, reduced errors, increased accuracy, and better compliance. LMS can also improve communication and collaboration among lab staff and enhance the overall quality of lab operations.

8. Transport Management

The transport function in a hospital management system is responsible for the safe and efficient movement of patients, medical equipment, and supplies within the hospital. This function involves coordinating transportation requests, managing transportation schedules, and ensuring that the appropriate mode of transportation is used for each patient.

In a hospital, patients may require transportation for various reasons, such as to attend medical appointments, to move between hospital units, or to be discharged from the hospital. The transport function helps to ensure that patients are transported safely and efficiently, minimizing the risk of adverse events and delays.

Transportation of medical equipment and supplies is also an essential part of hospital management. The transport function ensures that medical equipment and supplies are moved to the appropriate location in the hospital, such as operating rooms, emergency departments, and patient rooms, in a timely and efficient manner.

A well-functioning transport system in a hospital can improve patient outcomes, reduce wait times, and increase the efficiency of the hospital's operations.

Literature review

System Requirements

- Communication between Employees with using an application such as EMOJOT.
- Generate Reports Directly using relevant Machines.
- Get Patient Report Details using automated method.
- Hospital to hospital Transportation when emergency state of a Patient.
- Automate the Inventory Management

similar solutions

Pros	Cons(against)
Using an application like EMOJOT it will make batter communication between Employees.	Time Consuming and Out of Scope
Direct use of machines for generating reports will create accurate and more clear results.	It gets more time to search and get details about how those machines are working and how to achieve the target with using them.
QR code for a particular Patient Report.	The process is larger sometimes it needs to be real time so that QR code generation for Reports are not usable.
Use an online communication method for hospital-to-hospital transportation.	its process was difficult to solve and out of scope of the project.
Get a pharmacist for handle the Inventory side.	This can create too many logins and too many privileges to the system so that security problem may occur.

Methodology

Tools and Technologies

MERN Stack

➤ MongoDB

- This is document-oriented NoSQL Data Base program, and this uses JSON format when storing data. This is use for building highly available and scalable internet applications.

➤ Express

- This is a framework of the NodeJS web applications, and it is used to build a single page, multipage, and hybrid web application.

➤ ReactJS

- React is a free and open-source frontend JavaScript library for building user interfaces based on components. This is use for front-end Development.

➤ NodeJS

- Node.js is a cross-platform, open-source server environment This is use for frontend and backend developments.

Backend Checking Tools

➤ Postmen

- Postman is an API platform for developers to design, build, test and iterate their APIs.

Styling

➤ Font Awesome

- Font Awesome is a font and icon toolkit and this is used for frontend styling.

➤ Google Fonts

- Google Fonts is a computer font and web font service owned by Google. this is also used for frontend styling.

Coding Platforms

➤ VS Code

- This is a source-code editor made by Microsoft with the Electron Framework and used when coding our project.

➤ Sublime Text

- Sublime Text is a shareware text and source code editor. This is also used when coding our project.

Developer Tool

➤ Chrome DevTools

- Chrome DevTools is a set of web developer tools built directly into the Google Chrome browser. Most of the time this is useful for finding and fixing errors in your code.

Version Control System

- GIT – GIT is distributed version control system Used for coordinating work among programmers collaboratively.



Gant chart/Monthly plan

TASK	February				March				April				May			
	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4
Requirement Gathering	■															
Project Charter		■														
Project Presentation			■	■												
Interface Design				■	■											
ER Diagram and Database Design					■	■										
Coding and Developing page							■	■	■							
Testing the page										■	■					
Integration												■				
Accepting and Testing													■	■		
Final Report Writing														■	■	
Final Presentation and Viva															■	

Evaluation Method

In our Project Evolution we use **Interview** method for getting the client and the Employees requirements by their actions. After getting those requirements we create batter functions for their system and discuss what will be done by those functions for the useful things which are not existing on the available system. However, when getting requirement, we use some **Observation** and **Case study** Techniques as well.

According to our gathered requirements we **create templates of UIs** in our system and using them we try to gather more comments for those UIs' and analyze how the system is to be developed and behave for a particular situation according to the thoughts of its' users and also, we are using **Prototype** and get UX of our system for that purpose as well.

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Appendix

System Overview

