PROJECT TITLE

HOSPITAL MANAGEMENT SYSTEM

Submitted in partial fulfillment of the requirements of

PG Diploma in Advanced Computing

By

Vipul Zope	**200240320134**
Ashwini Jadhav	**200240320025**
Shashank Agam	**200240320106**
Bhagyashri Deore	**200240320027**
Harshit Jain	**200240320040**
Shantanu Upase	**200240320105**
Amol Shinde	**200240320017**
Dipesh Patil	**200240320036**
Amrita Tiwari	**200240320018**

Guide(s):

Mr. Samadhan Manore

Abhijeet Wagh
Project Engineer at CDAC Mumbai

Centre for Development of Advanced Computing

Kharghar/Juhu

February 2020

CERTIFICATE

2

This is to certify that the project entitled "**Hospital Management System**" is a bonafide work of "**Vipul Zope(200240320134), Shashank Agam(200240320106), Bhagyashri Deore(200240320027), Ashwini Jadhav(200240320025), Harshit Jain(200240320040), Shantanu Upase (200240320105), Amol Shinde(200240320017), Dipesh Patil(200240320036**), **Amrita Tiwari(200240320018)."** submitted to C-DAC Mumbai in partial fulfillment of the requirement for the award of the Post Graduate Diploma in Advanced Computing.

(Name)   **(Name)**

Supervisor/Guide   **Faculty Supervisor/Guide**

Declaration

I declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we 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. We 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.

(Vipul Zope   200240320134)

(Shashank Agam   200240320106)

(Bhagyashri Deore 200240320027)

(Ashwini Jadhav   200240320025)

(Harshit Jain   200240320040)

(Shantanu Upase   200240320105)

(Amol Shinde   200240320017)

(Dipesh Patil   200240320036)

(Amrita Tiwari   200240320018)

Date: 24/01/2021

Abstract

The hospital is aspiring to accelerate services to patients and to reduce the burden of doctors and nurses by reducing the number of mistakes. The main purpose of this project is to develop an intermediary Robot system and an online platform that acts as a device that is designed to help the doctors manage patient diagnostic report, which will help in accurate diagnosis of the patient which will in turn help in proper recovering of the patient. The main contribution behind this project is to deliver a multi-functional robotic system that will help in accurate administering of medicines and to provide a platform to register and store patient details and retrieve these details as and when required, and also to manipulate these details meaningfully.

Contents

Chapter	Contents	Page No.
1	**INTRODUCTION:** Give at least two to three sentences about your project.	
	1.1 Description *(Brief description of project)* The main functionality of the project should be explained in brief	
	1.2 Problem Formulation *(Explain the problem)*	
	1.3 Motivation *(need of the project)*: List the various approaches along with its drawbacks for solving the problem and briefly explain the approach used for your project.	
	1.3 Proposed Solution: Explain the method/technique used for solving the problem and how it overcomes the drawbacks mentioned under heading 1.3. Also explain how the project is going to help end users.	
	1.4 Scope of the project *(scale/range of your project)***:** Extent of how far your project can be completed. This can be in terms of domain or application related constraints/limitations.	
2	**REVIEW OF LITERATURE** *(include at least 3IEEE or similar reputed technical papers as reference or give reference sites and details of algorithms used*) Should be atleast 2 pages which gives the ideas referenced by the reference papers. Mark the references wherever appropriate. (Note: - Please don't write the paper titles and the abstract of papers.)	
3	**SYSTEM ANALYSIS**	

	3.1 Functional Requirements (*write requirements of the project)* Should follow the IEEE SRS format	
	3.2 Non Functional Requirements Should follow the IEEE SRS format	
	3.3 Specific Requirements *(Hardware and software requirements)*	
4	**ANALYSIS MODELING**	
	4.1 Use-Case Diagrams and description **4.2 Activity Diagrams** **4.3 Class Diagram** **4.4 Sequence Diagram**	
	4.5 Timeline Chart *(For the project duration) [Gantt]*	
5	**DESIGN**	
	5.1 Data Modeling *(E-R Model, Relational tables with its associated Data dictionary)* ER Diagram normalized till the third normal form accompanied by the respective data dictionary table should be included	
	5.2 Architectural Design *(Project Flow /architecture with description)*	
	5.2 User Interface Design GUI for your project	
6	**IMPLEMENTATION**	
	6.1 Algorithms / Methods Used Mention your algorithms if any or any methodology used.	

	6.2 Working of the project *(code for mentioned algorithms) [do not copy paste entire code. Only main snippets]*	
7	**TESTING** *(white box /black-box / any testing algorithm used)*	
	7.1 Test cases *(conditions on which testing is done)*	
	7.2 Type of Testing used *(explanation and reason of testing method used)*	
8	**RESULTS AND DISCUSSIONS** *(final results or outputs)*	
9	**CONCLUSIONS & FUTURE SCOPE**	

Appendix

- Appendix I

Literature Cited

Acknowledgments

List of Figures

1.4.3	Nurse Sequence diagram	
1.4.4	Patient Sequence diagram	
1.5.1	E-R diagram	
1.5.2.1	Management Flow diagram	
1.5.2.2	Doctor Flow diagram	
1.5.2.3	Nurse Flow diagram	
1.5.2.4	Patient Flow diagram	

List of Tables

Table No.	Table Title	Page No.
I	Table 1.1 Test Cases	

List of Abbreviations

Sr. No.	Abbreviation	Expanded form
I	DSS	Decision Support System
II	E-R	Entity Relationship

Chapter 1

Introduction

The project Hospital Management system includes registration of patients, storing their details into the system, storing patient's diagnosis report and also providing framework for the patient to view their report. The software has the facility to store and provide a digitalised report about the patient diagnosis. It includes a search facility to know the current status of each patient. User can search details of a patient using the Patient id. The Hospital Management System can be entered using a username and password. The entry of data is accessible either by a doctor or a nurse, only they can add data into the database. The data can be retrieved easily. The interface is very user-friendly. The data are well protected for personal use and makes the data processing very fast. Hospital Management System is efficient, flexible, and easy to use and is designed and developed to deliver real conceivable benefits to hospitals. Hospital Management System is designed for MGM hospital Mumbai, to cover a wide range of administration and management processes. It is an integrated end-to-end Hospital Management System that provides relevant information across the hospital to support effective decision making for patient care, hospital administration, in a seamless flow. The Hospital Management System is a software product suite designed to improve the quality and management of hospital management in the areas of clinical process analysis and diagnosis. Hospital Management System enables to develop the organization and improve its effectiveness and quality of work. Managing the key processes efficiently is critical to the success of the hospital.

1.1 Description

This project is a web application in which Doctor, Nurse can register patient who will be getting diagnosed in accordance with heath standards, the Doctors will write the report which can be viewed by the Nurse and the Patient. The Nurse will able to log in and check the report and administer the required medicines so prescribed by the doctor under her guidance. The portal will provide information about the patient diagnosis report after every diagnosis with prescribed medicines or suggestions specified by the doctor. This diagnostic report will be maintained by the Doctor and Nurse. For selected Patient, Nurses and Doctor will be verified by the respective database. If entered data is correct then it will give information about Patient details, selection of tests and assigned diagnostic report that are available in the database.

The project 'Hospital Management System' is based on the database, object-oriented programming and networking techniques. As there are many areas where we keep the records in database for which we are using MY SQL software which is one of the best and the easiest software to keep our information. This project uses Angular with Bootstrap as the front-end software and has connectivity with MY SQL.

1.2 Problem Formulation

Since Hospitals are associated with the lives of common people and their day-to-day routines so we decided to work on this project.

The manual handling of the record is time consuming and highly prone to error. The purpose of this project is to automate or make online, the process of day-to-day activities like Patient diagnosis, medication report, admission of New Patient, assign a Nurse, etc. We have tried our best to make the complicated process of Hospital Management System as simple as possible using Structured & Modular technique & Menu oriented interface. We have tried to design the software in such a way that the user may not have any difficulty in using this package & further expansion is possible without much effort. Even though we cannot claim that this work to be entirely exhaustive, the main purpose of our exercise is to perform each activity in computerized way rather than manually which is time consuming.

1.3 Motivation

1. Easy Access to Patient Data

One of the main advantages of hospital management software is easily available patient data to the care providers. It is only a matter of few clicks and all the required information about a patient, from various departments in the hospital, can be available on the screen.

2. Cost Effective

Well-Implemented clinic management system reduces a lot of manual work that is essentially performed in hospitals, especially the ones where documentation and record keeping is required. It also saves much on storage and the related operational costs.

3. Improved Efficiency

Using software enables the processes automated to mean that the processes will be taken care of mechanically without any human intervention and this will instantly ensure improved efficiency.

4. Reduces Scope of Error

Because processes on hospital software are automated and a lot of tasks are assigned to the software to perform with utmost accuracy with minimum human intervention, the scope of error is reduced dramatically.

5. Data Security & Retrieve-ability

All the important data is stored on the server or cloud, keeping it safe. Since hospital software works on logins, data security is becoming a non-issue offering data access based on the role of the person – Receptionist, doctor, nurse, radiologist etc.

6. Improved Patient Care

Improved access to patient data and it improves work efficiency means better and quick clinical decisions. In this era of evidence-based medicine, the faster the clinician gets the diagnostic reports and the quicker her orders are implemented the faster is the patient recovery and the better it is on the patient care index.

1.4 Scope

The modules of hospital management software are user-friendly and easy to access. It has a common user-friendly interface having several modules. The officials can utilize these modules in their processes without any hassle and make the best possible use of hospital management system. Since, every hospital has some or the other points of worth those vary in comparison with to its competitors. Hence, most of the IT companies give on-demand solutions or feature of customization. It further implicates that hospital information management software can be customized by specifying personal requirements of the campus.

Information about Patients is done by just writing the Patient's name, age, gender, address and email. Whenever the Patient comes up his information is stored freshly. Diagnosis information to patients is generally recorded on the document, which contains Patient information. It is destroyed after some time period to decrease the paper load in the office. Immunization records of children are maintained in pre-formatted sheets, which are kept in a file. Information about various diseases is not kept as any document. Doctors themselves do this job by remembering various medicines

Chapter 2

Review of Literature

Automated Hospital Ward Management System Interacting with Mobile Robot Platform WDBOT

 - This paper presents a novel intelligent Automated

Hospital Ward Management System (AHWMS) based on a mobile robotic platform named WDBOT for a hospital ward. The need of an automated system including an assisting robot for performing activities in the hospital system is great importance for doctors, nurses, patients and other healthcare assistants due to demanding work load and limited number of personnel. The aim of this research is to provide an automated mobile robot-based solution to improve the effectiveness of ward management and medicine management and distribution processes. AHWMS interacts with WDBOT via wireless network to achieve the abovementioned tasks with the help of controlling, image analysis, processing and communication. Verification of the system was done with the help of simulation and physical modeling of some units. This system shows it's use can improve the effectiveness of the present hospital ward management system.

Chapter 3

System Analysis

3.1 Functional Requirements

3.1.1 Login of Doctor

o   The system will allow the Doctor to check patient details and patient diagnostic report.

o   The system will allow the Doctor to give prescription to patient and write diagnostic report.

o   The system will allow the Doctor to assign nurse to the Patient.

3.1.2 Login of Nurse

o   The system will allow the Nurse to register a Patient.

o   The system will allow the Nurse to give treatment to a Patient according to Doctor's prescription.

o   The system will allow the Nurse to send a robot to a Patient to administer medicines.

3.1.3 Login of Patient

o   The system will allow the Patient to register Themselves.

o   The system will allow the Patient to view treatment.

o   The system will allow the Patient to view Prescription.

o   The system will allow the Patient to view diagnostic report of Doctor and Nurse.

o   The system will allow the Patient to view daily readings.

3.2 Non-functional Requirements

3.2.1 Performance Requirements

The system should store all the database records of each student, mentor and admin staff properly and the application should be available for use 24*7 through the server. Also, the application should be user friendly with a proper user interface which makes it easy for the user to understand. All the options should be present in properly accessible places for user convenience.

Admin staff personnel should be properly trained to operate the application so provided. Patient prescriptions, test details, administered food details, feedback details, allocation of nurse details, records are to be backed up securely across database servers. In case database is hacked by someone and data is deleted a backup server should be present for such purpose.

All login ids and passwords of the Admin, Police Admin and FIR Entry Operator should be protected for privacy using whatever constraints required in the database or the application.

3.2.1 Safety Requirements

All login ids and passwords of the Admin, Doctor, Nurse, and Patient should be protected for privacy using whatever constraints required in the database or the application. The system requires the individual to acknowledge the person making use of the phone. Any adjustments like insert, erase, update, etc. for the data source can be integrated promptly as well as executed only by the Nurse and Doctor. The Admin can consider as well as alter any kind of information in the Hospital Management System.

3.2.3 Security Requirements

Passwords of the Admin, Doctor, Nurse, and Patient should be protected for privacy using whatever constraints required in the database or the application. Transactions regarding Patients and Nurse records should be carried out properly. Only admin and doctors will have access rights to the all the data according to the need for E.g.: -Patient details, passwords etc. The system shall protect the data and service from unauthorized access. The system shall also provide authentication and secure transaction.

3.2.4.1 Availability

The system should run on a variety of operating systems that support the JavaScript language. The system should run on a variety of hardware.

3.2.4.2 Accessibility

The software will be accessible to Admin, Management, Doctor, Nurse and Patient.

3.2.4.3 Compatibility

The software will be compatible with multiple platforms.

3.2.4.4 Durability

The software will be tested for working with multiple users and records as system has to manage multiple users (Admin, Doctor, Patient and Nurse) and records (Patient details, Medicines, Treatment).

3.2.4.5 Effectiveness

The software will be made to handle operations effectively. The system should provide good quality and be error free.

3.2.4.6 Maintainability

The system should be easy to maintain. There should be a clear separation between the interface and the business logic code. There should be a clear separation between the data access objects that map the database and the business logic code.

Chapter 4

Analysis Modeling
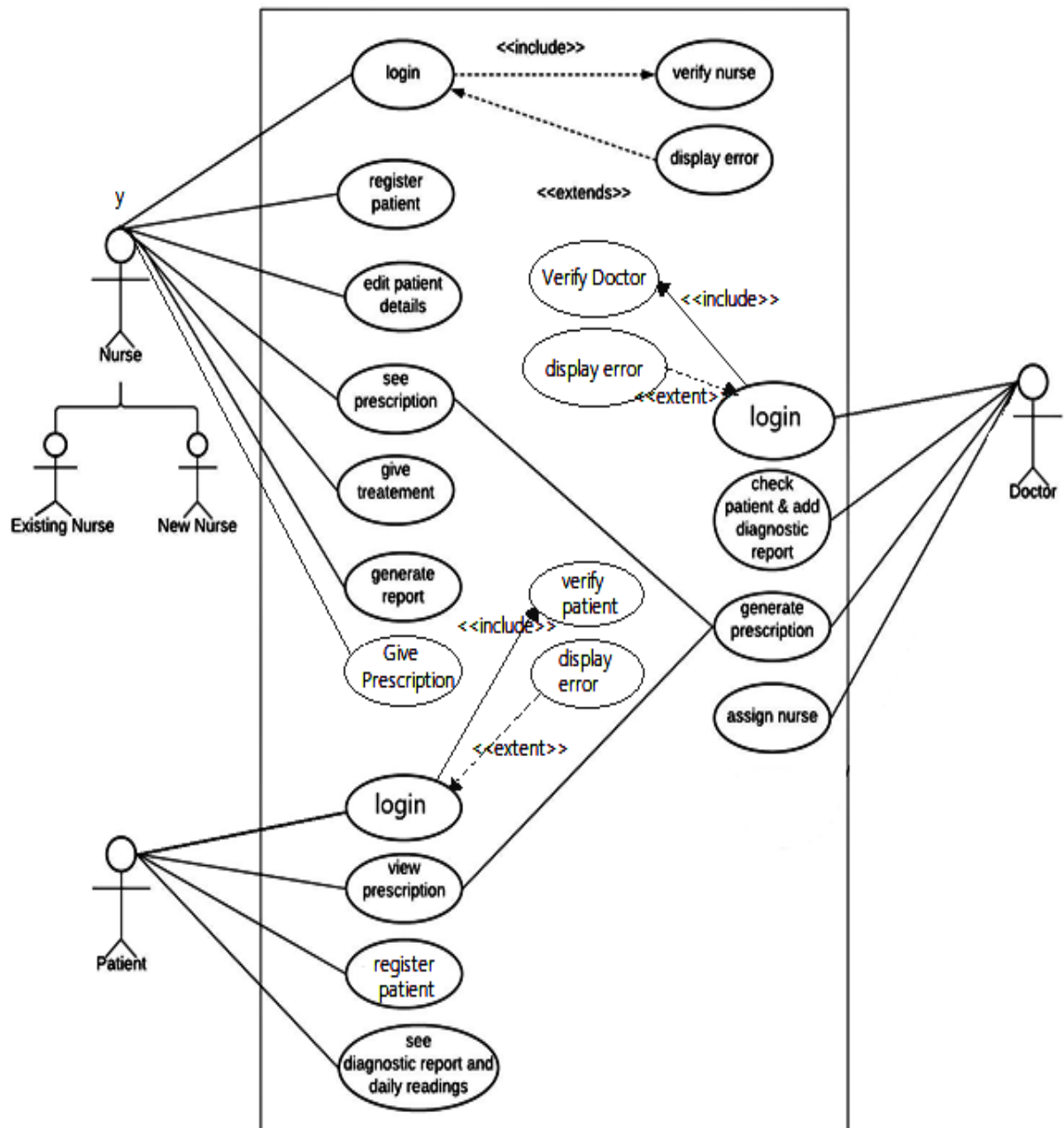
4.1 Use Case Diagram: -

Figure 1.1 Use Case diagram

4.2 Class Diagram: -
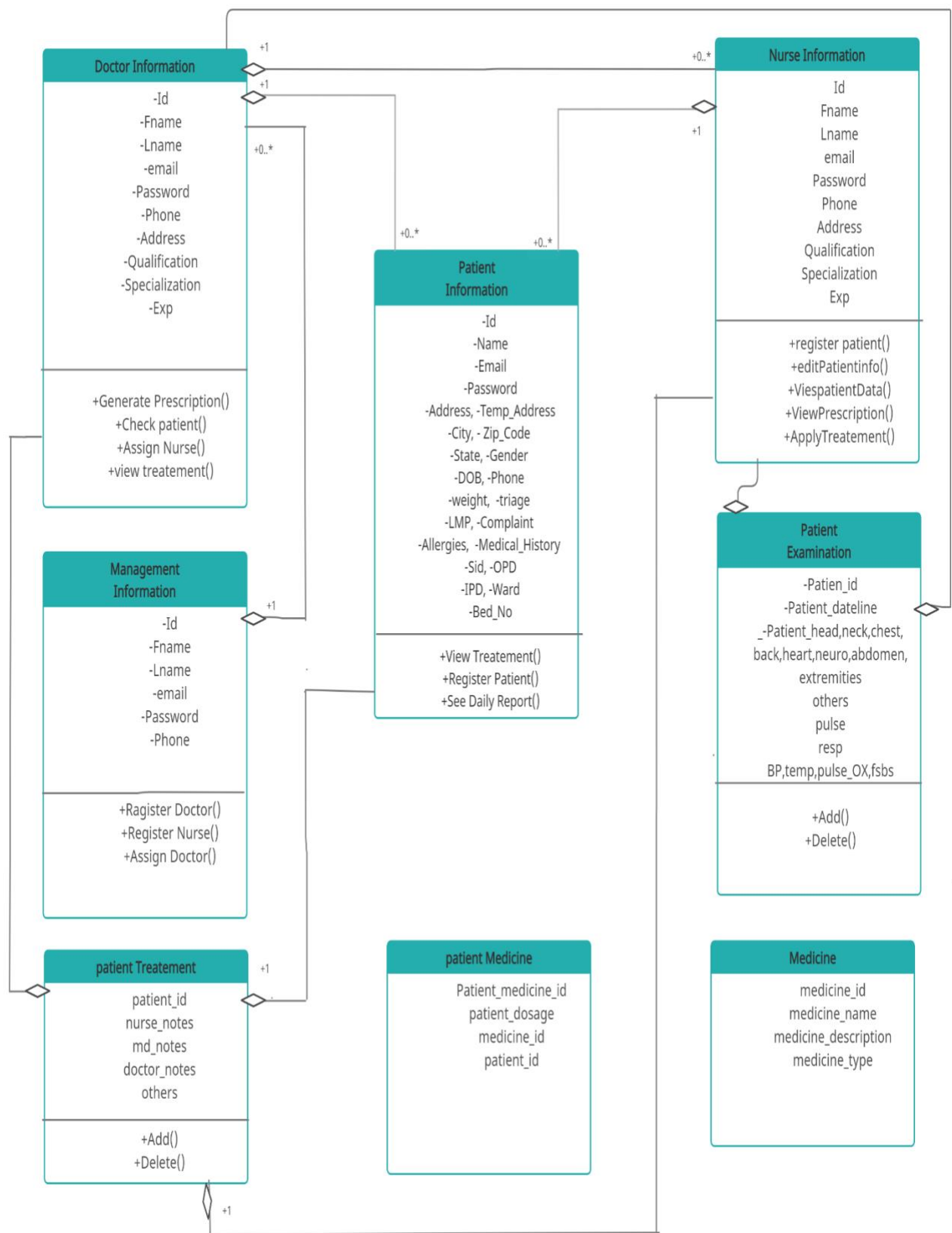
Figure 1.2 Class diagram

4.3 Activity Diagram: -

- Management
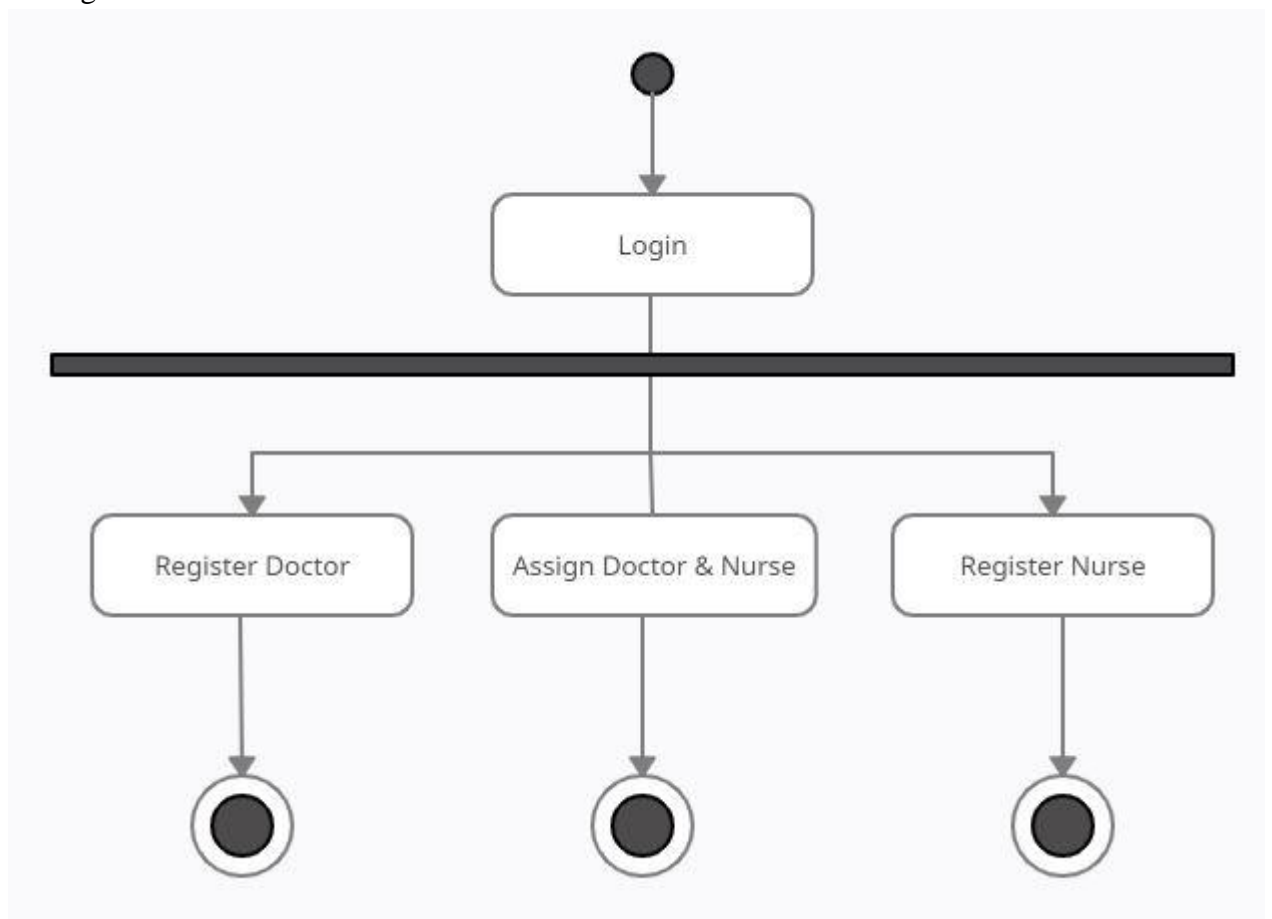
Figure 1.3.1 Management Activity diagram

- Doctor
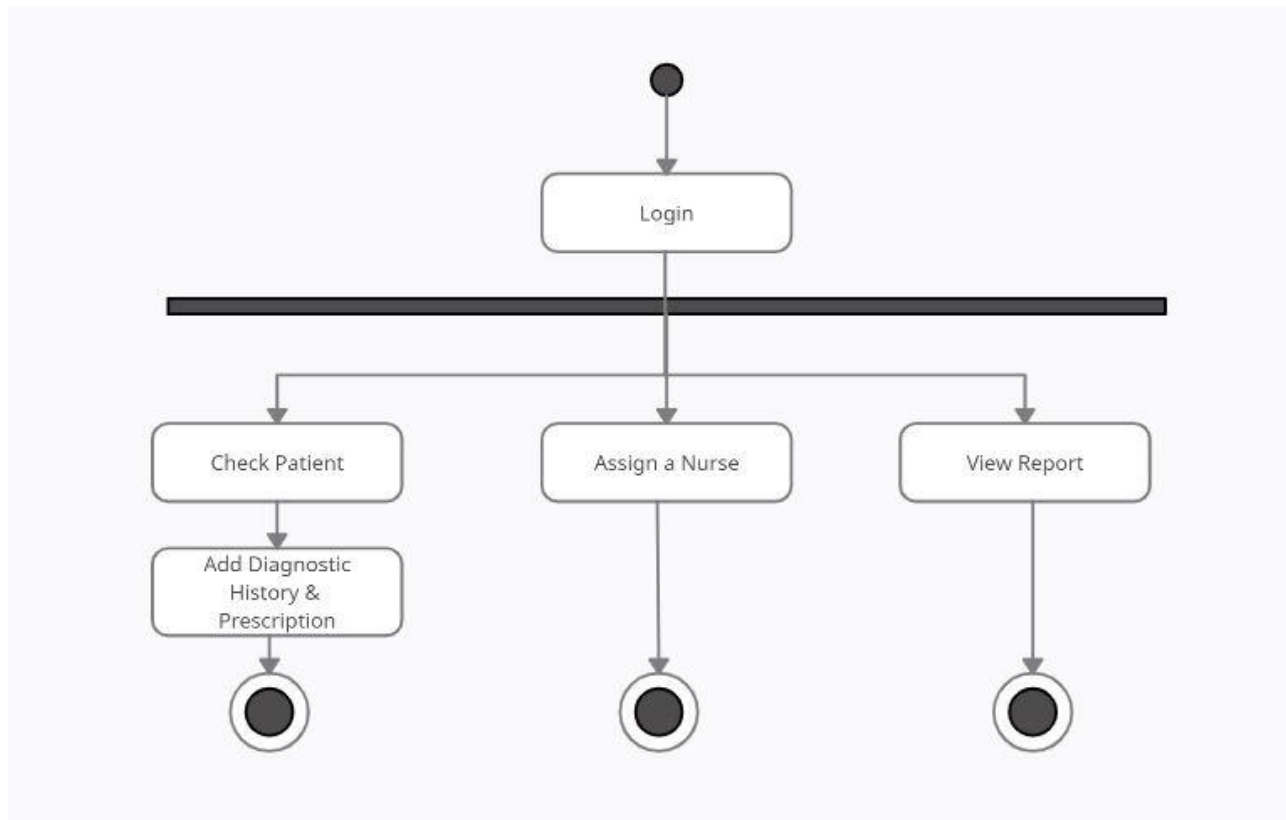
Figure 1.3.2 Doctor Activity diagram

- Nurse
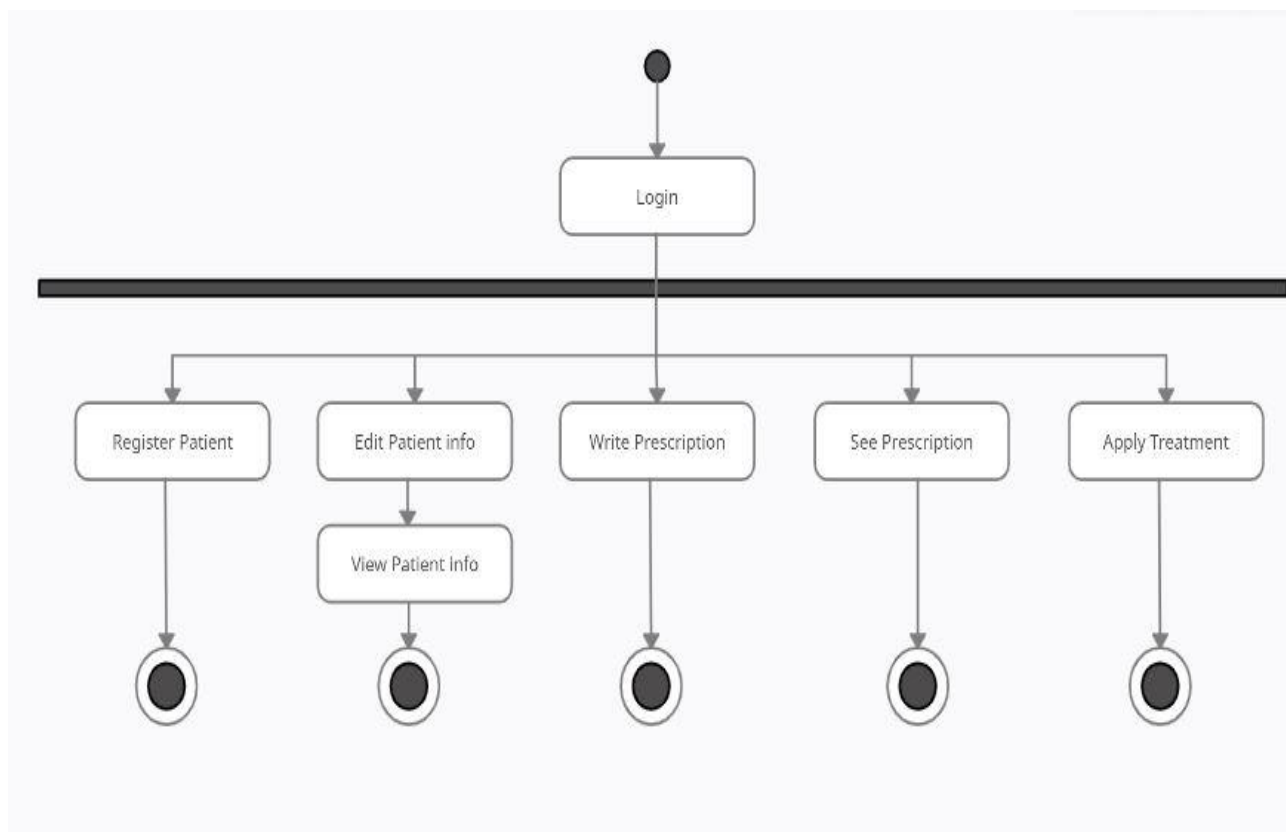
Figure 1.3.3 Nurse Activity diagram

- Patient
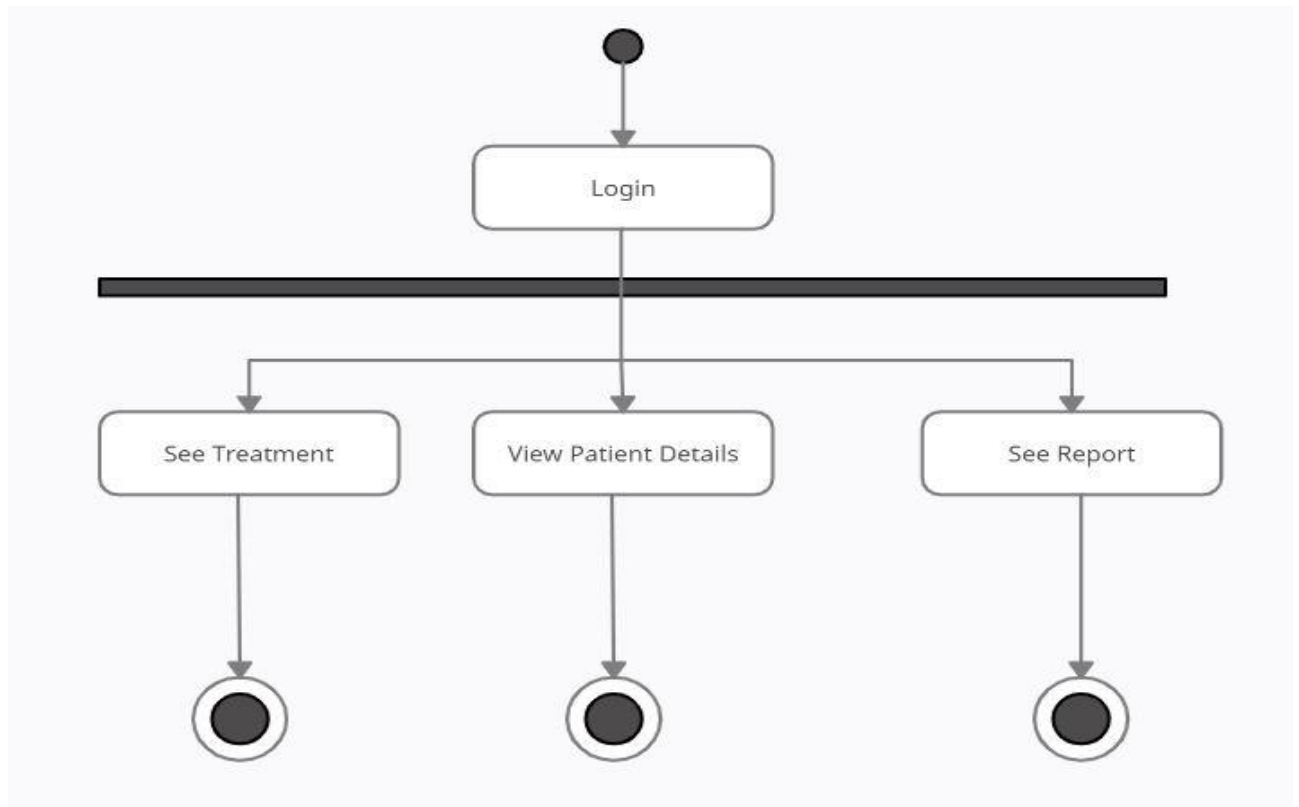
Figure 1.3.4 Patient Activity diagram

4.2 Sequence Diagram: -

- Management
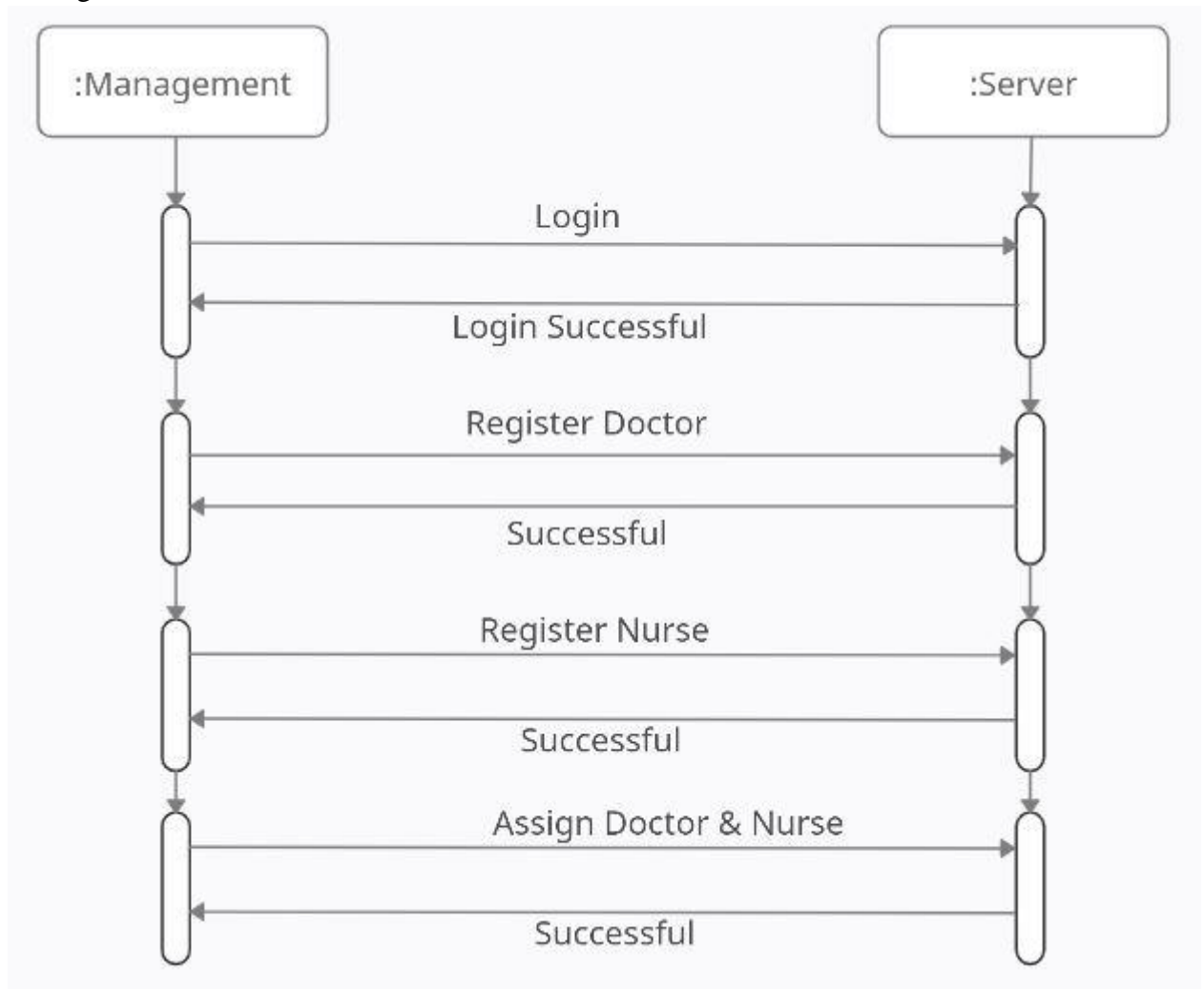
Figure 1.4.1 Management Sequence diagram

- Doctor
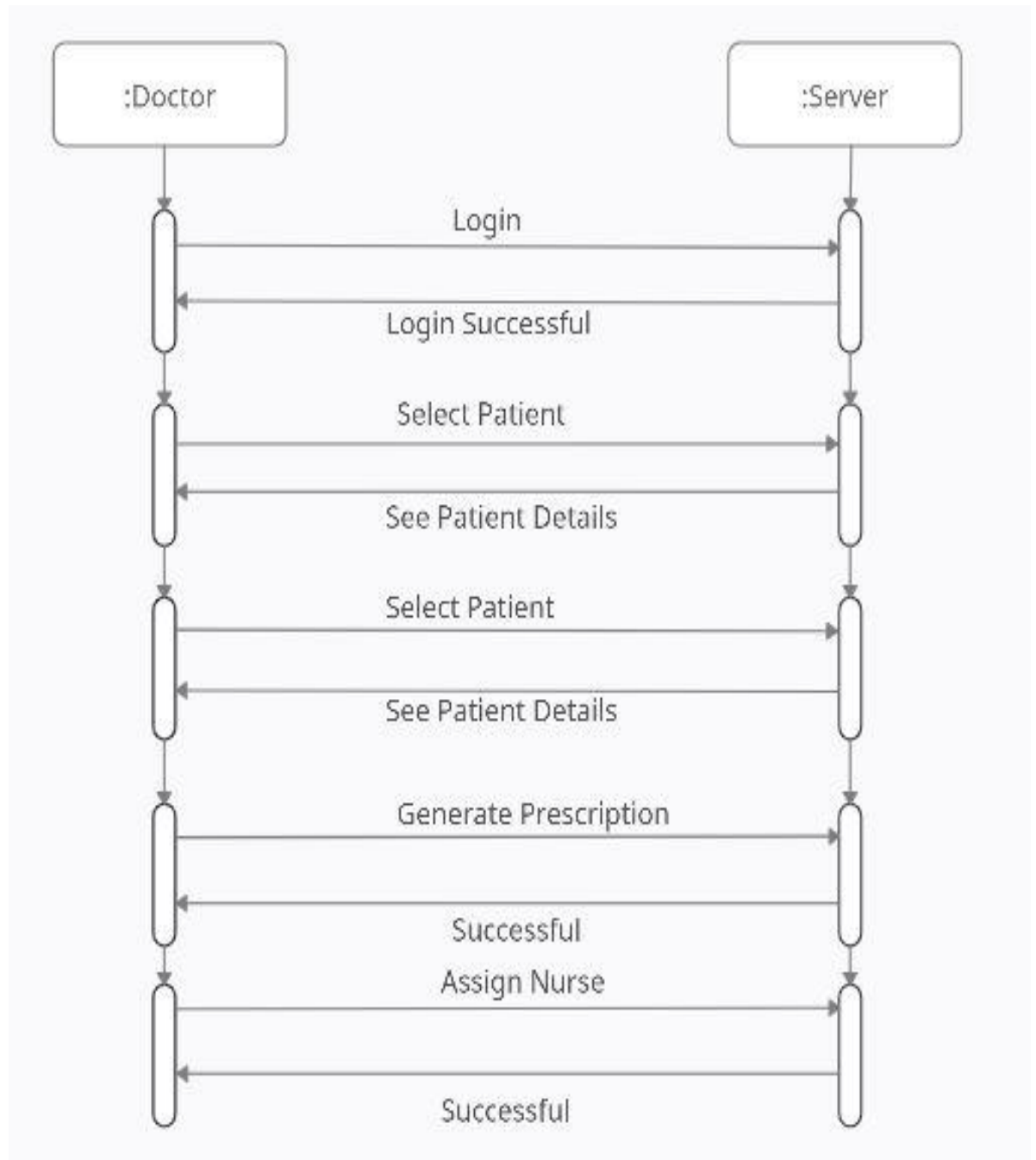
Figure 1.4.2 Doctor Sequence diagram

- Nurse
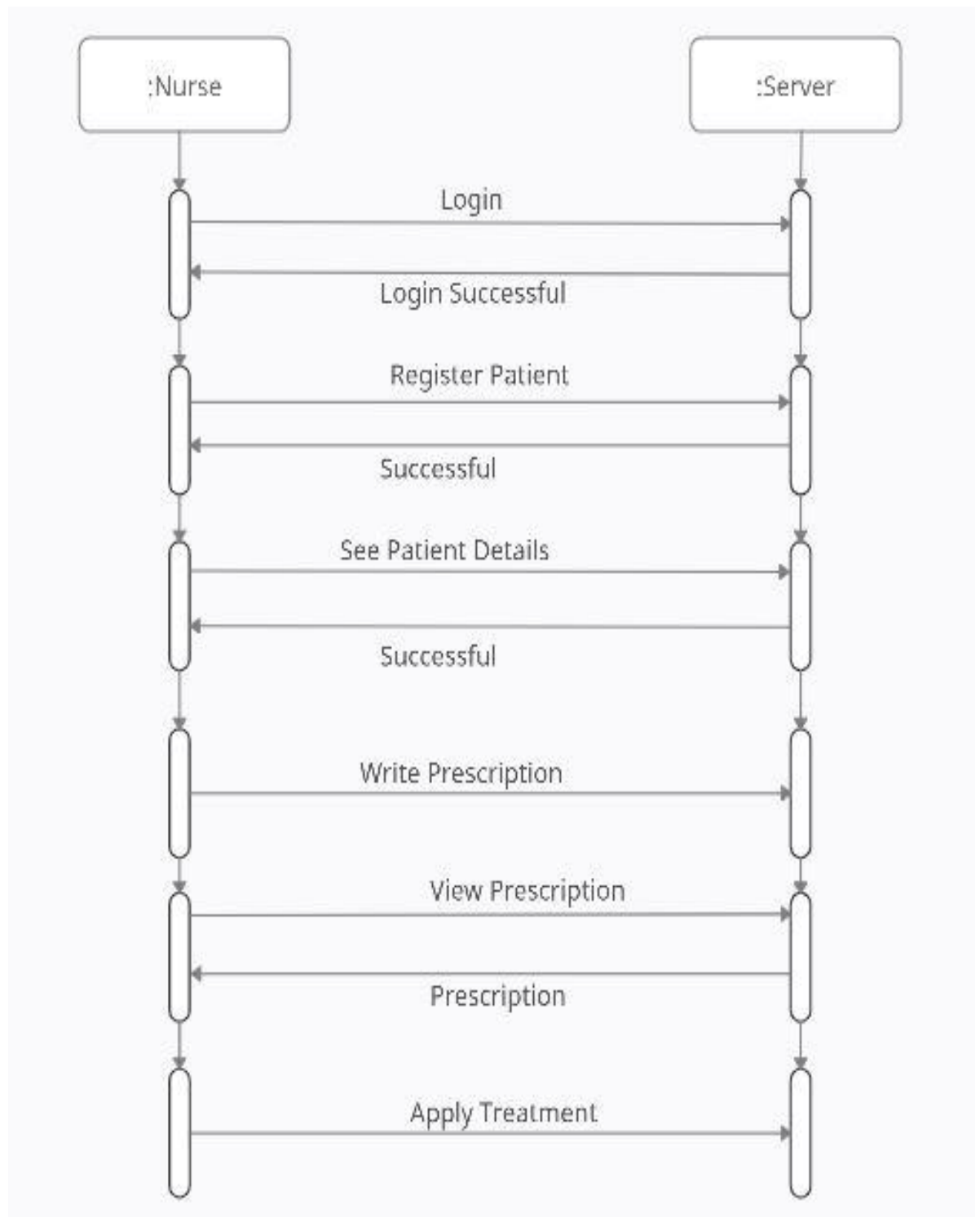
Figure 1.4.3 Nurse Sequence diagram

- Patient
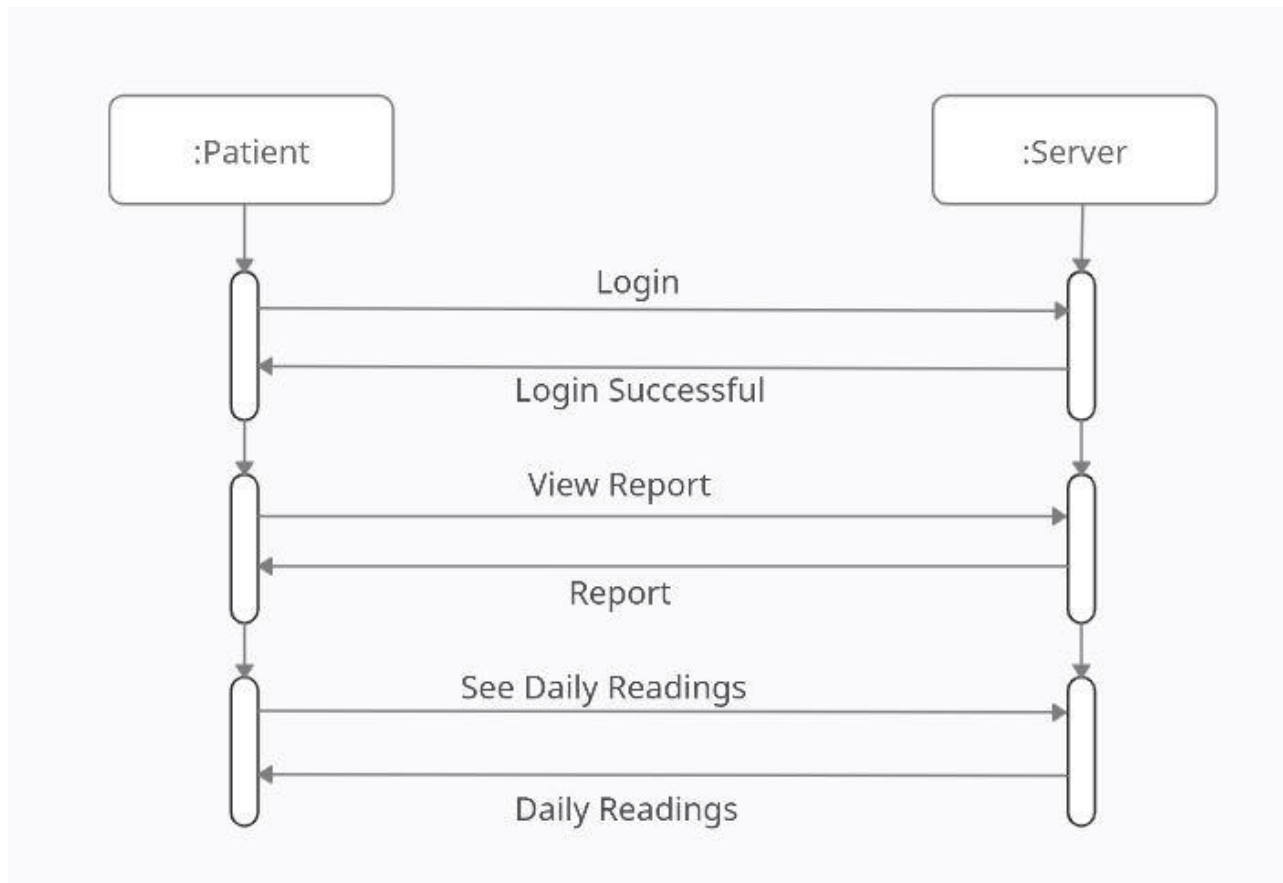
Figure 1.4.4 Patient Sequence diagram

Chapter 5

DESIGN

5.1 Data Modeling
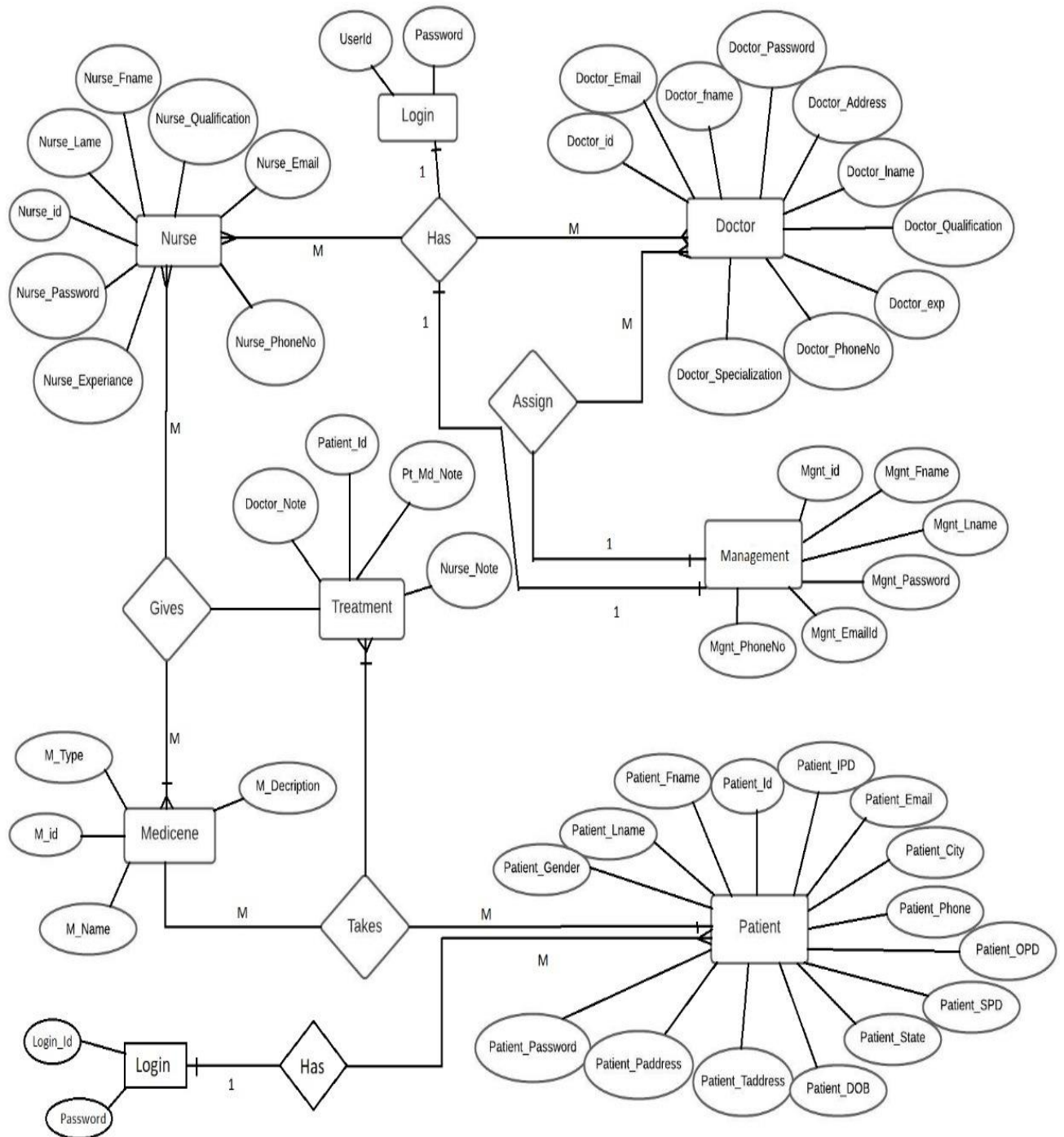
Figure 1.5.1 E-R diagram

5.2 Architectural Design

- Management
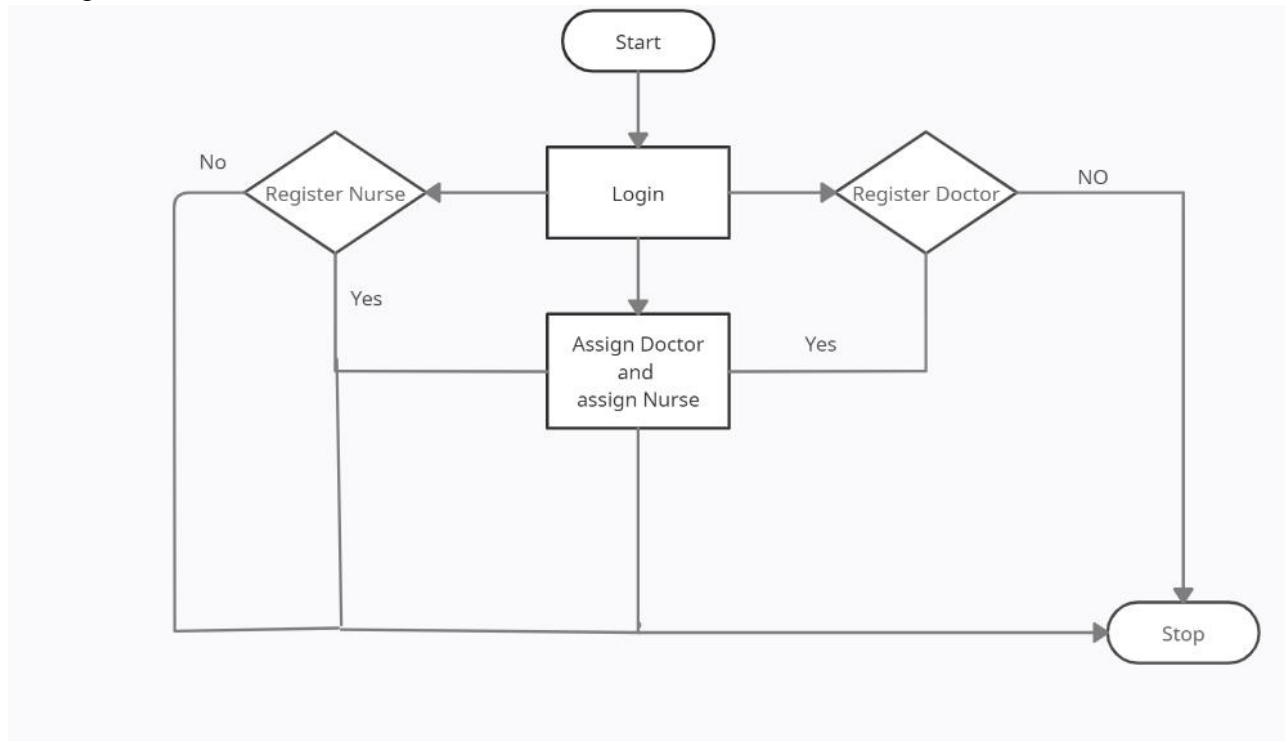
Figure 1.5.2.1 Management flow diagram

- Doctor
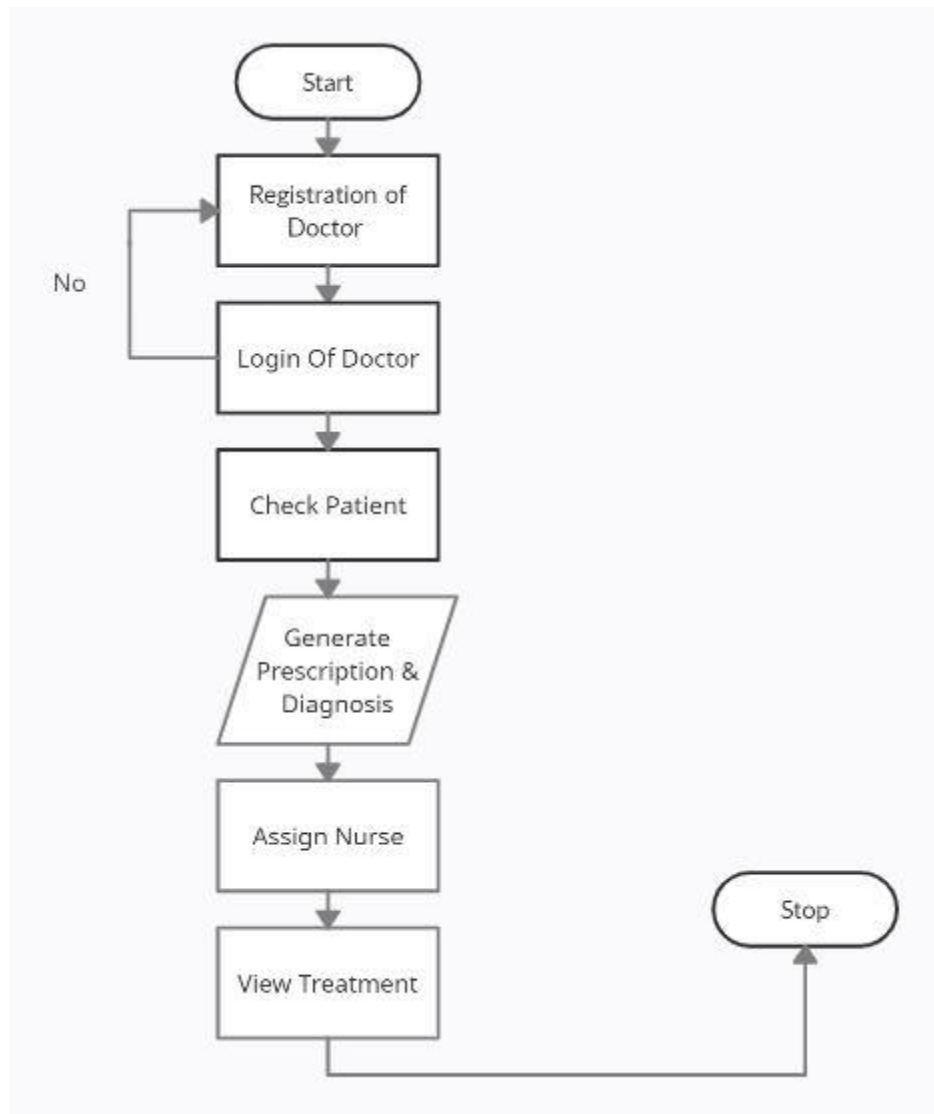
Figure 1.5.2.2 Doctor flow diagram

- Nurse
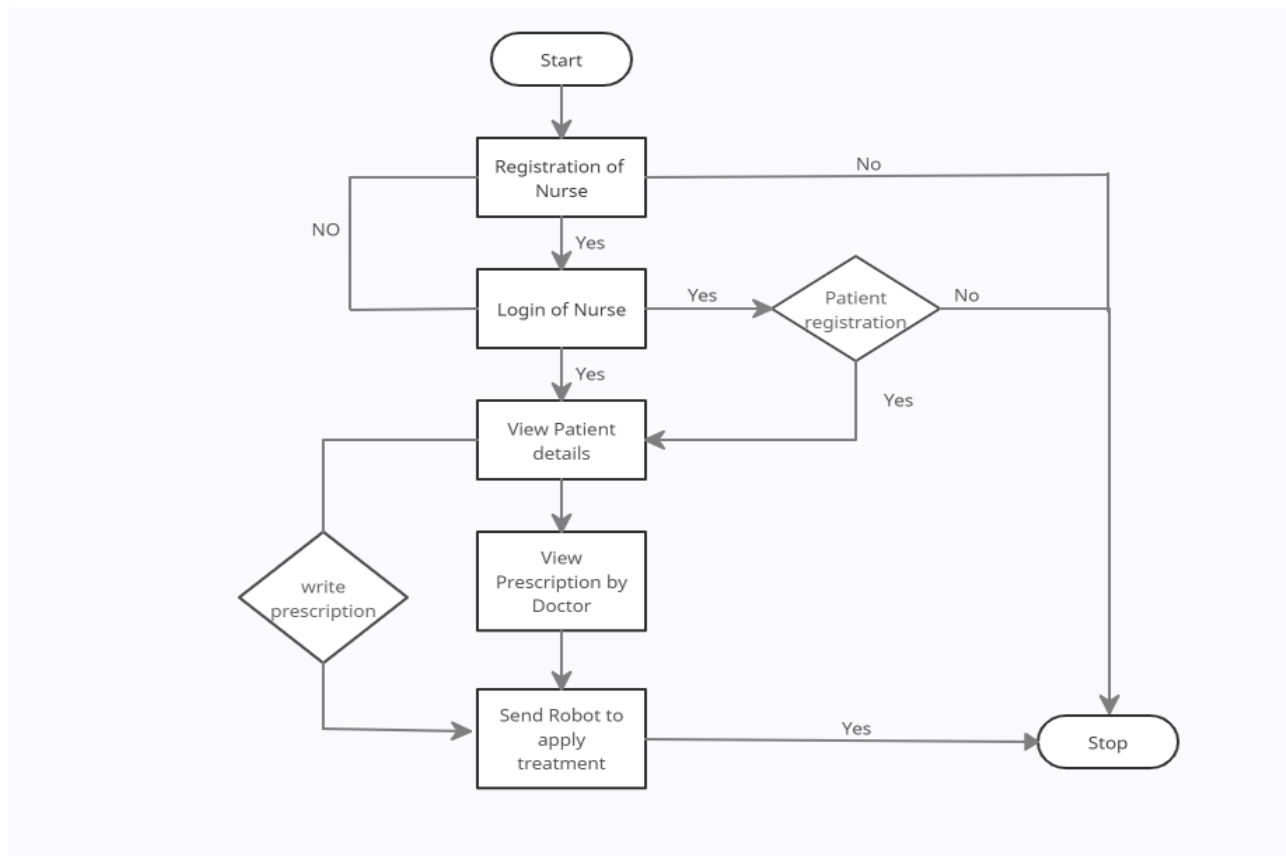


Figure 1.5.2.3 Nurse flow diagram

- Patient
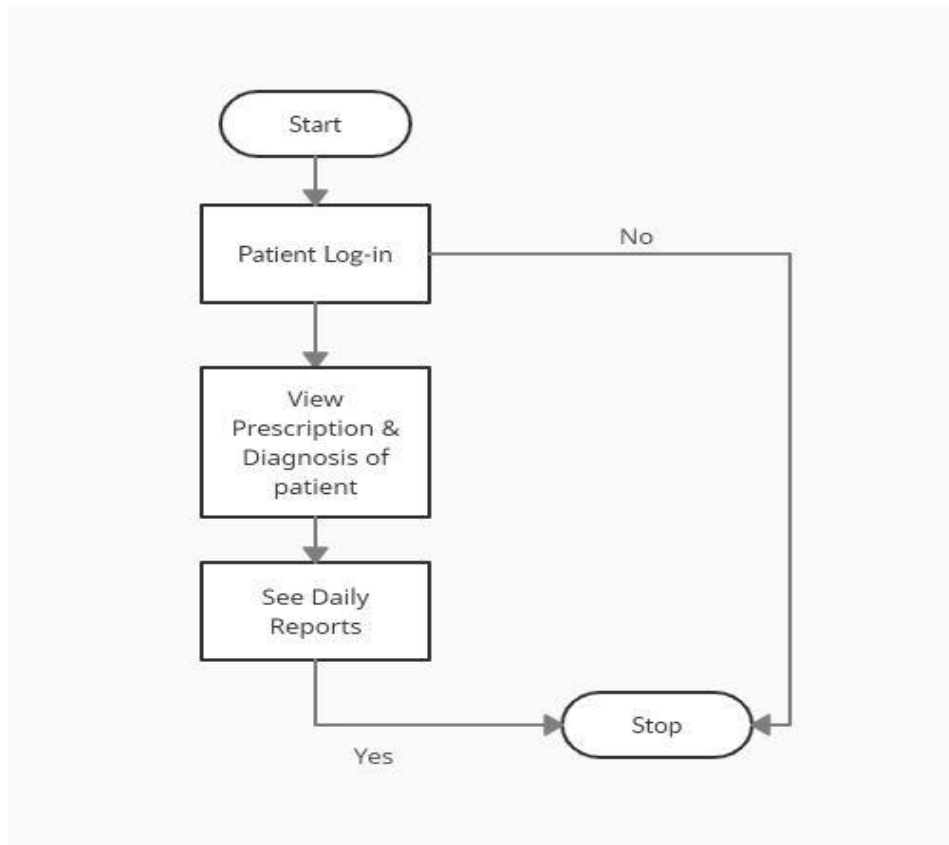
**Figure 1.5.2.4 Patient flow diagram**

5.2 User Interface Design

- Homepage
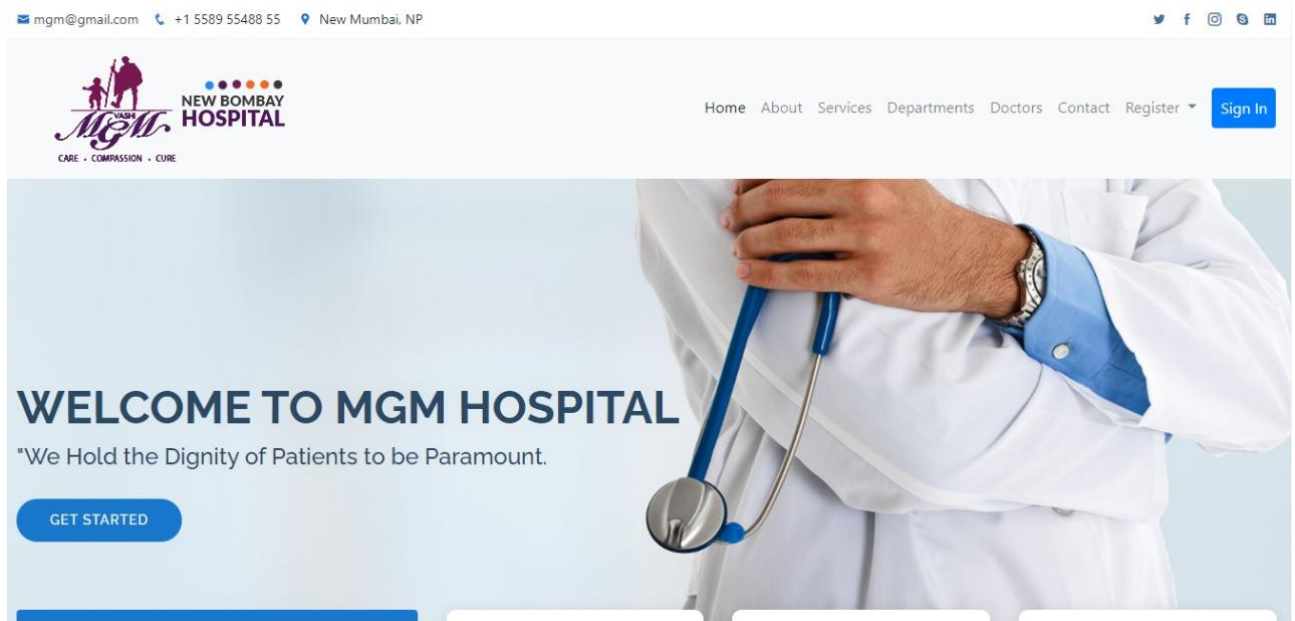
1.1 Home Page snapshot
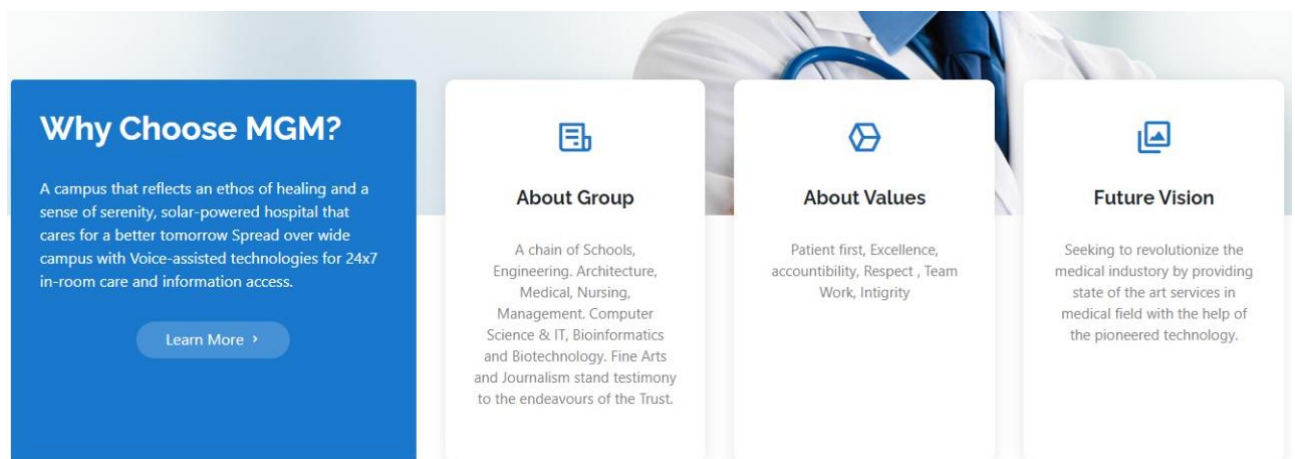
**1.2 Home Page snapshot**

Gallery

below you will find the pictorial views which will present our MGM facility as a whole.

1.3 Home Page Gallery snapshot
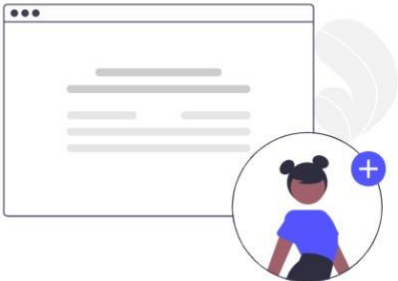
- Management Registration

2.1 Management Registration snapshot

- Doctor Registration

2.2 Doctor Registration snapshot

- Nurse Registration

2.3 Nurse Registration snapshot

- Patient Registration

2.4 Patient Registration snapshot

- Login
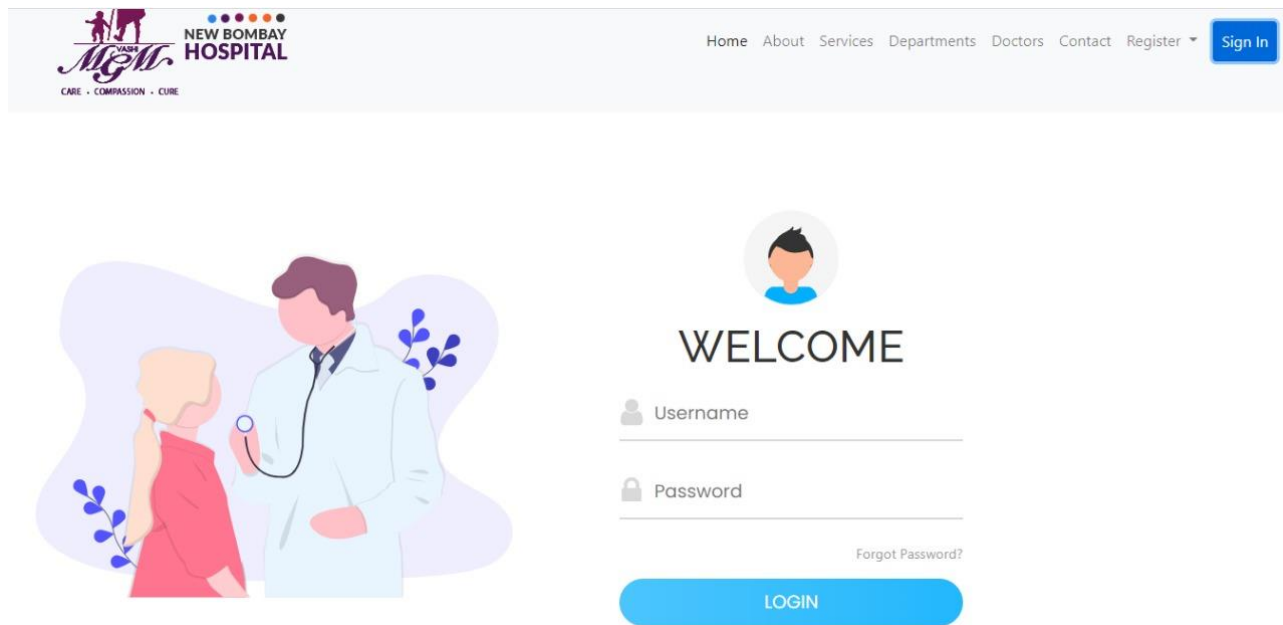

3.1 Login snapshot

- Doctor homepage
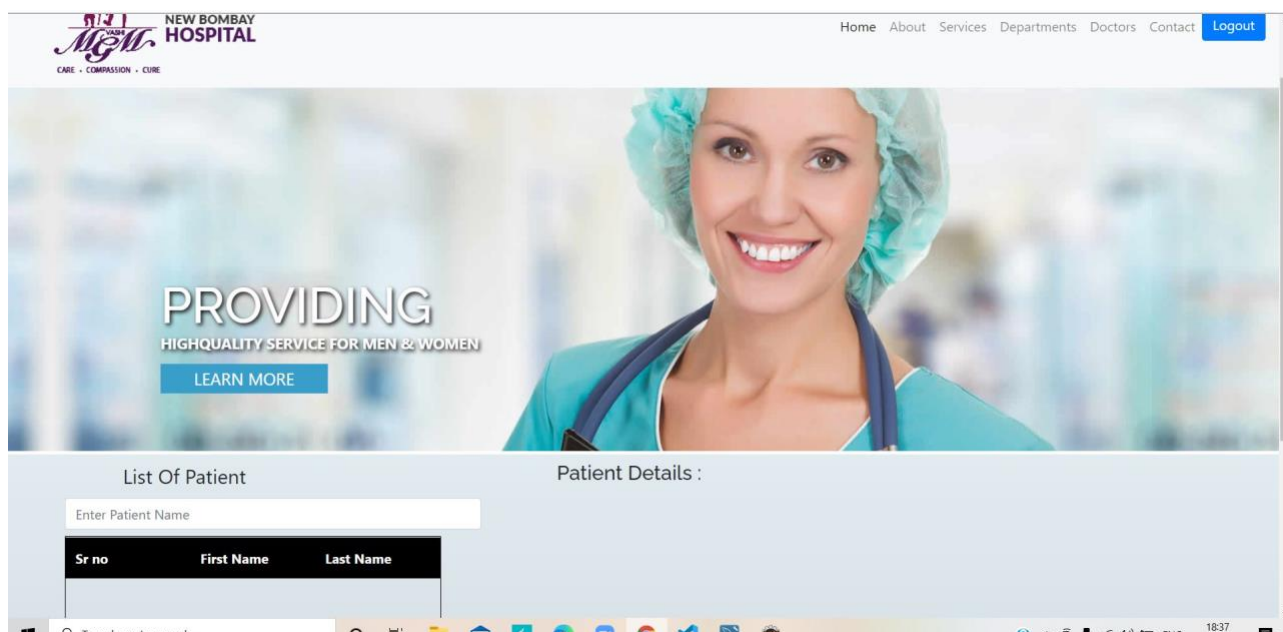
4.1 Doctor Homepage snapshot

- Nurse Homepage
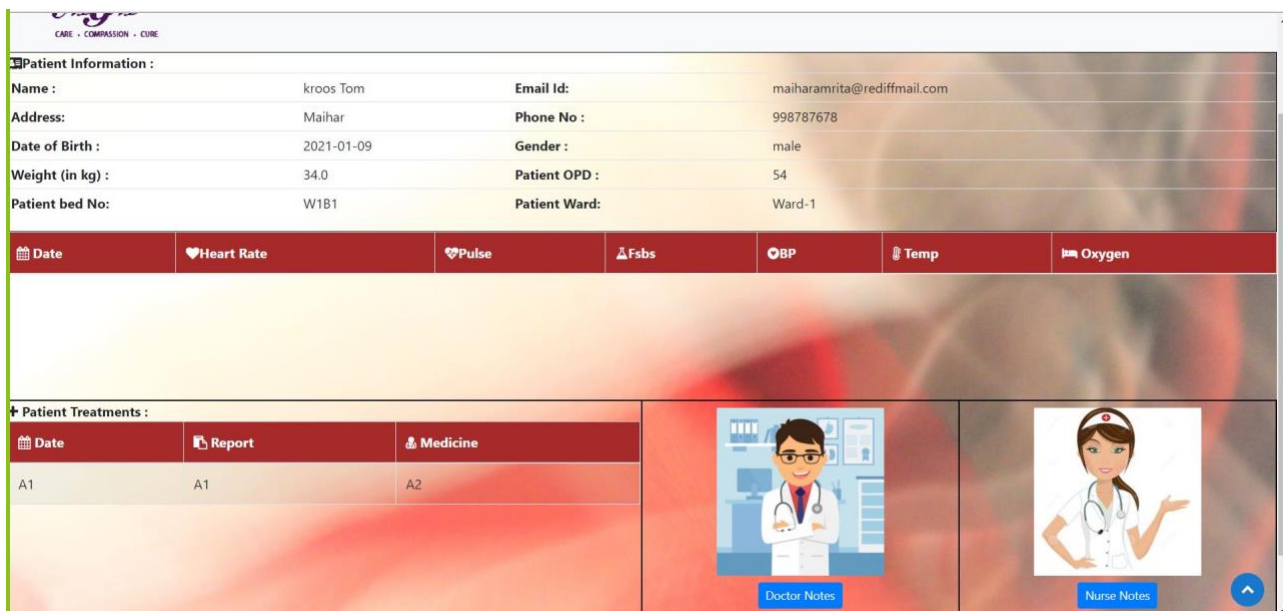
4.2 Nurse Homepage snapshot

- Patient Homepage

4.3 Patient Homepage snapshot

- Robot Homepage
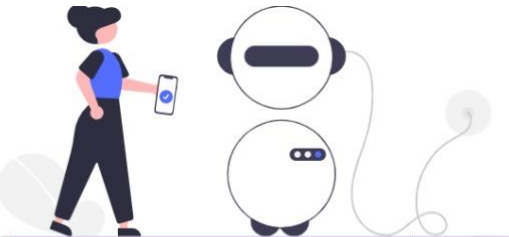
4.4 Robot Homepage snapshot

Chapter 6

IMPLEMENTATION

6.1 Algorithm of the project

STEP 1: START

STEP 2: OPEN HOME PAGE

STEP 3: DO REGISTRATION

STEP 4: LOGIN INTO SYSTEM

STEP 5: IF MANAGEMENT

        THEN DO REGISTRATION FOR NURSE AND DOCTOR

STEP 6: IF DOCTOR

        THEN GIVE TREATMENT TO THE PATIENT,

        ASSIGN NURSE TO THE PATIENT,

        GENERATE PRESCRIPTION

STEP 7: IF NURSE

        THEN GIVE TREATMENT TO THE PATIENT,

        MAINTAIN PATIENT REPORT,

        SEND ROBOT TO THE PATIENT

STEP 8: IF PATIENT

        VIEW TREATMENT

STEP 9: END

Chapter 7

TESTING

7.1 Test Cases

Table 1.1 Test Cases

Test Id	Item to be Tested	Steps	Input	Actual Output	Expected Output	Pass/Fail
1	User Id	User enters user Id	User Id	Display Success	Display Message successful	Pass
2	System check for proper username and password entered by users	System compares the data entered by user and the entered data in database	User Id and Password	View Page	Display page	Pass

		If username and password is valid		Make Connection	Makes connect-ion	Pass
		If username & password is invalid		Report invalid user id	Report error	Pass
3	System checks whether details of user are entered as per the format	System checks the data entered by user is in valid form or not.				
		If valid	User entered data	Entered in database	Entered in database	Pass
		If invalid	User entered data	"Invalid Data" message will be printed	"Invalid Data" message will be printed	Pass

4	Session Management	System checks the URL entered by user is in valid form or not.				
		If valid	Page URL	View Page	View Page	Pass
		If invalid	Page URL	Error Page	Error Page	Pass

Chapter 8

Results and Discussions

HMS came into the picture of hospital management as early as 1960 and have ever since been evolving and synchronizing with the technologies while modernizing healthcare facilities. In today's world, the management of healthcare starts from the hands of the patients through their mobile phones and facilitates the needs of the patient.

Why is HMS important for a hospital?

HMS was introduced to solve the complications coming from managing all the paper works of every patient associated with the various departments of hospitalization with confidentiality. HMS provides the ability to manage all the paperwork in one place, reducing the work of staff in arranging and analysing the paperwork of the patients. HMS does many works like:

- Maintain the medical records of the patient

- Maintain the contact details of the patient

- Keep track of the appointment dates

- Save the insurance information for later reference

- Tracking the bill payments.

The advantages of HMS can be pinpointed to the following:

- Time-saving Technology

- Improved Efficiency by avoiding human errors

- Reduces scope for Error

- Data security and correct data retrieval made possible

- Cost effective and easily manageable

- Easy access to patient data with correct patient history

- Improved patient care made possible

- Easy monitoring of supplies in inventory

- Reduces the work of documentation

- Better Audit controls and policy compliance.

Chapter 9

Conclusions

Taking into account all the mentioned details, we can make the conclusion that the hospital management system is the inevitable part of the lifecycle of the modern medical institution. It automates numerous daily operations and enables smooth interactions of the users. Developing the hospital system software is a great opportunity to create the distinct, efficient and fast delivering healthcare model. Implementation of hospital management system project helps to store all the kinds of records, provide coordination and user communication, implement policies, improve day-to-day operations, arrange the supply chain, manage financial and human resources, and market hospital services. This beneficial decision covers the needs of the patients, staff and hospital authorities and simplifies their interactions. It has become the usual approach to manage the hospital. Many clinics have already experienced its advantages and continue developing new hospital management system project modules.

Appendix

47

Appendix I

- GUI: Graphical User Interface
- Platform dependent operating system which should be compatible with our software.
- SQL: Structured Query Language
- HTML: Hyper Text Markup Language
- CSS: Cascading Style Sheet

Literature Cited

IEEE standard

Proceeding paper

[1] A.L. Kulasekera, "Automated Hospital Ward Management System Interacting with Mobile Robot Platform WDBOT" Proceedings of 2018 IEEE International Conference on Mechatronics and Automation

August 5 - 8, Changchun, China, pp. 763–766.

Acknowledgements

Presentation inspiration and motivation have always played a key role in the success of any venture.

We express our sincere thanks to Dr. C. P. Johnson, Senior Director, Center for Development of Advance Computing (C-DAC), Mumbai.

We pay our deep sense of gratitude to Mrs. Elizabeth George, Course Co-ordinator, C-DAC Mumbai to encourage us to the highest peak and to provide us the opportunity to prepare the project. We are immensely obliged to our colleague for their elevating inspiration, encouraging guidance and kind supervision in the completion of our project.

We feel to acknowledge our indebtedness and deep sense of gratitude to our guide Mr. Samadhan Manore whose valuable guidance and kind supervision given to us.