North South University

Project Title

“Smart MediCare”

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Abstract

Streamlined operations, greater administration and management, superior patient care, strict cost control, and increased profitability are all advantages of the smart Medicare. Smart Medicare is a powerful, adaptable, and simple-to-use system that was created and developed to provide real-world benefits to the hospitals What's more, it's backed up with solid and dependable assistance.

The project ‘Smart Medicare System’ is based on the database, object oriented 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 Bootstrap and JAVA-Script as the front-end software which is an Object Oriented Programming and has connectivity with MY SQL.

Smart Medicare System is custom built to meet the specific requirement of the people who is in emergency situation across the globe. All the required modules and features have been particularly built to just fit in to your requirement. The database of the application makes it more users friendly and expandable. The package is highly customizable and can be modified as per the needs and requirements of our clients. Prolonged study of the functionality of the Smart Medicare and its specific requirement has given it a wonderful shape both technically and usability wise. It covers all the required modules right from Patient Registration, Doctor, Wards, Admin, Store, Patient appointment, bill payment, record modification, discharge details etc.

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Chapter One

Introduction

Human Body is a very complex and sophisticated structure and comprises of millions of functions. All these complicated functions have been understood by man him, part-by-part their research and experiments. As science and technology progressed, medicine became an integral part of the research. Gradually, medical science became an entirely new branch of science. As of today, the Health Sector comprises of Medical institutions i.e. Hospitals etc. research and development institutions and medical colleges. Thus the Health sector aims at providing the best medical facilities to the common man.

1.1 Problem Statement

Recently, the increasing number of hospitals has been an obvious trend in many countries. This is mainly because of the need to provide medical services to increasing patients due to various forms of the disease. One has to run from one place to another for booking because they don't know where there are available seats. And during this time many of them lose their lives. Such a scenario needs careful attention from the hospital management system to provide appropriate service to patients. One of the tasks is to show vacant seats in the hospital and another important task is to ensure efficient health care service by booking hospital beds. With the increasing number of patients, systematic booking is crucial to provide accurate and fast medical treatment to patients. The conventional way of booking an appointment is time-consuming since it requires patients to go to the hospital, which eventually increasing cost and effort .

1.2 Objective

This Study provides the benefits as listed below:

- Provides the support to see the vacancy of the hospitals.
- Provide safe and secure online reservations.
- Reduce effort and time.
- Minimize the waiting time for patients during an emergency.
- Increased coordination resulting in better patient transfer and better pre-planning.

1.3 Scope

We will develop an online reservation system of hospitals in Bangladesh by the vacancy data provided by the hospitals. This system can be remotely accessed by users from anywhere, anytime, using internet applications from mobile devices for booking seats. The development made use of SQL server database and visual studio code 2020. Mobile devices include laptops, computers, and mobile phones. A web application is a computer program that utilizes web browsers and web technology to perform tasks over the internet. The web application uses a combination of server-side scripts to handle the storage and retrieval of the information, and client-side scripts demonstrate those data to the user. Visual Studio Code is an Integrated Development Environment (IDE) that can be used to develop graphical user interface applications along with Windows Forms Applications and web applications for all platforms supported by Microsoft Windows, Windows mobile, Windows. NET, is used here to build the React-Framework, Next.js web application.

Chapter Two

Project Management

2.1 Project planning and scheduling

Project planning is part of project management, which relates to the use of schedules such as Gantt charts to plan and subsequently report progress within the project environment. Initially, the project scope is defined and the appropriate methods for completing the project are determined. Following this step, the durations for the various tasks necessary to complete the work are listed and grouped into a work breakdown structure. The logical dependencies between tasks are defined using an activity network diagram that enables identification of the critical path.

2.1.1 Methods and Methodology

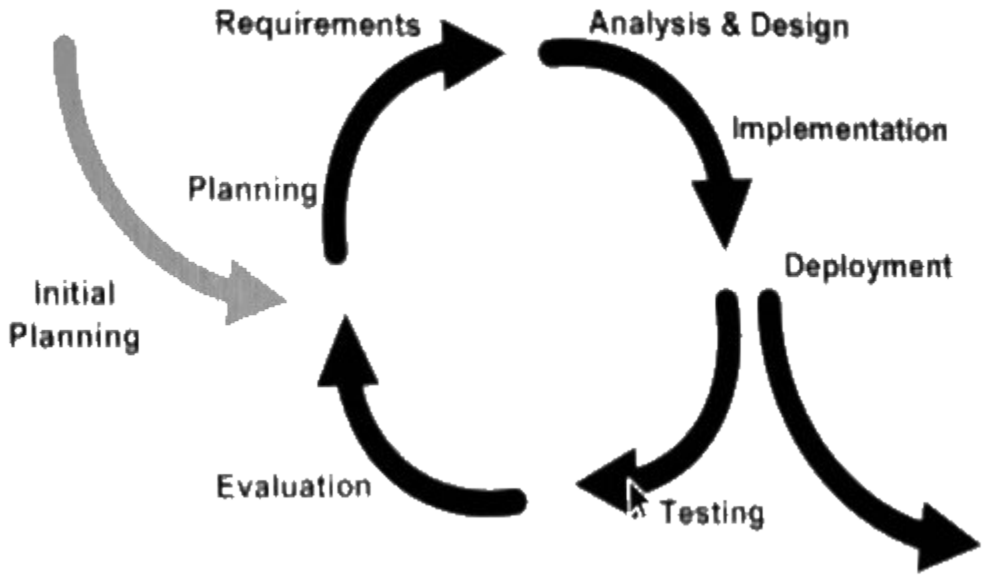
The Smart Medicare application programming interface is used to develop the vacancy of the hospitals in Bangladesh. It will take the information of the hospital name, vacancy of the seats. And patients will log in as a user to see the vacancy in need for their emergency and book the seats via an internet server sitting at home. Here JavaScript is used for real-time data fetching. Structured Query Language (SQL) and Prisma CLI have been used for database and connection communication. Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), JavaScript, and Bootstrap have been used for the front-end design.

2.1.2 Project Management Life Cycle

The Project Management Life Cycle has four phases. Each project life cycle phase is described along with the tasks need to complete it.

The four phases is :

1. Initiation
2. Planning
3. Execution
4. Closure



2.1.3 Project Plan:

Once we examine that the project is feasible, I undertake project planning. The table below describes how we planned my project.

Project Plan

	Task Name	Duration	Start	Finish
1.	Planning	20 days	25/06/2021	14/07/2021
2.	Design	20 days	15/07/2021	04/08/2021
3.	Coding	37 days	05/08/2021	11/09/2021
4.	Delivery	7 days	12/09/2021	19/09/2021

2.1.4 Schedule Representation

Scheduling the project tasks is an important project planning activity. It involves deciding which tasks would be taken up when. In order to schedule the project activities, a web application project manager needs to do the following this rules.

week	1	2	3	4	5	6	7	8	9	10	11	12
planning												
Design												
Coding												
Delivery												

Chapter Three

System Analysis

3.1 Background Study

System Analysis is a separation of a substance into parts for study and their implementation and detailed examination. Before designing any system it is important that the nature of the business and the way it currently operates are clearly understood. The detailed examination provides the specific data required during designing in order to ensure that all the client's requirements are fulfilled. The investigation or the study conducted during the analysis phase is largely based on the feasibility study. Rather it would not be wrong to say that the analysis and feasibility phases overlap. High-level analysis begins during the feasibility study. Though analysis is represented as one phase of the system development life cycle (SDLC), this is not true. Analysis begins with system initialization and continues until its maintenance. Even after successful implementation of the system, analysis may play its role for periodic maintenance and up gradation of the system. One of the main causes of project failures is inadequate understanding, and one of the main causes of inadequate understanding of the requirements is the poor planning of system analysis.

3.2 Application system attributes

3.2.1 Reliability: This application is a reliable product that produces fast & verified output of all its

process.

3.2.2 Availability: This application will be available to use and help them to carry their operations

conveniently.

3.2.3 Security: This application will be designed in a maintainable manner. It will be easy to

incorporate new requirements in the individual modules.

3.3 Scope of working

We will develop an online reservation system of hospitals in Bangladesh by the vacancy data provided by the hospitals. This system can be remotely accessed by users from anywhere, anytime, using internet applications from mobile devices for booking seats. The development made use of SQL server database and visual studio code 2020. Mobile devices include laptops, computers, and mobile phones. A web application is a computer program that utilizes web browsers and web technology to perform tasks over the internet. The web application uses a combination of server-side scripts to handle the storage and retrieval of the information, and client-side scripts demonstrate those data to the user. Visual Studio Code is an Integrated Development Environment (IDE) that can be used to develop graphical user interface applications along with Windows Forms Applications and web applications for all platforms supported by Microsoft Windows, Windows mobile, Windows. NET, is used here to build the React-Framework, Next.js web application.

3.4 Feasibility study

3.4.1 Technical Feasibility: This is concerned with specifying equipment and application that will successfully satisfy the user requirement. The technical needs of the system may vary considerably, but might include:

The facility to produce outputs in a given time:

1. Response time under conditions.
2. Ability to process a certain volume of transaction at a particular seep.
3. Facility to communicate data to distant location.

3.4.2 Operational Feasibility: It is mainly related to human organization and political aspects. The points to be considered are:

1. What changes will be brought with the system?
2. What organizational structures are distributed?

3.4.3 Economic Feasibility: Economic analysis is the most frequently used technique for evaluating the effectiveness of a proposed system. More frequently known as cost/benefit system and compare them with costs. If benefits outweigh costs, a decision is taken to design and implement the system.

3.4.4 Management Feasibility: It is a determination of whether a proposed project will be acceptable to management. If does not accept a project of gives a negligible support to it. The analyst will tend to view the project as a no feasible one.

3.4.5 Social Feasibility: Social feasibility is a determination of whether the project will be acceptable to the people or not. This determination typically examines the probability of the project accepted by the group directly affected by the proposed system change.

Chapter Four

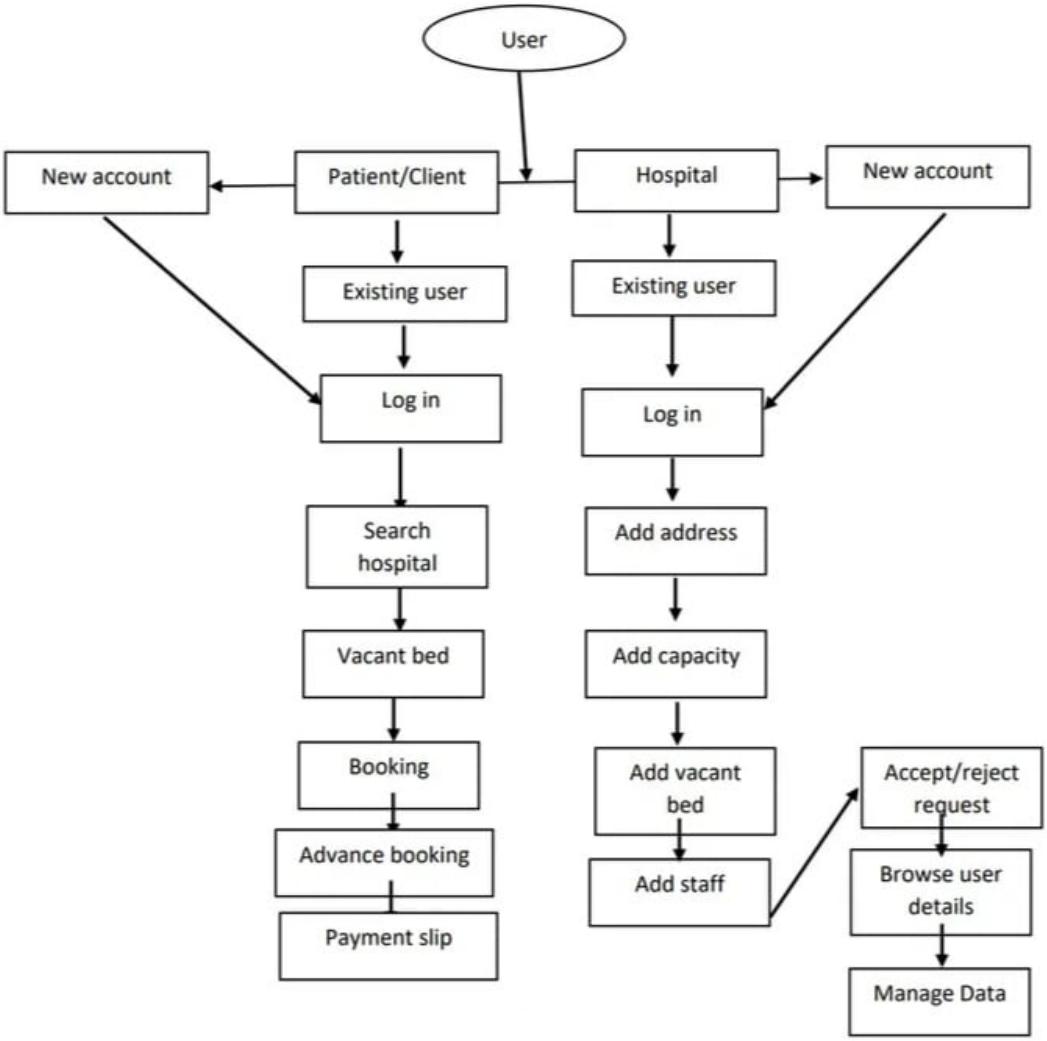
System Design

4.1 Database Design

Database design is the process of producing a detailed data model of database. This data model contains all the need logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be used to create a database. A fully attributed data model contains detailed attributes for each entity. The term database design can be used to describe many different part of the design of an overall database system. Principally, and most correctly, it can be thought of as the logical design of the base data structure used to store the data. In the relational model these are the tables and views. In an object database the entities and relationships map directly to object classes and named relationships. However, the term database design could also be used to apply to the overall process of designing, not just the base data structure, but also the forms and queries used as part of the overall database application within the database management system.

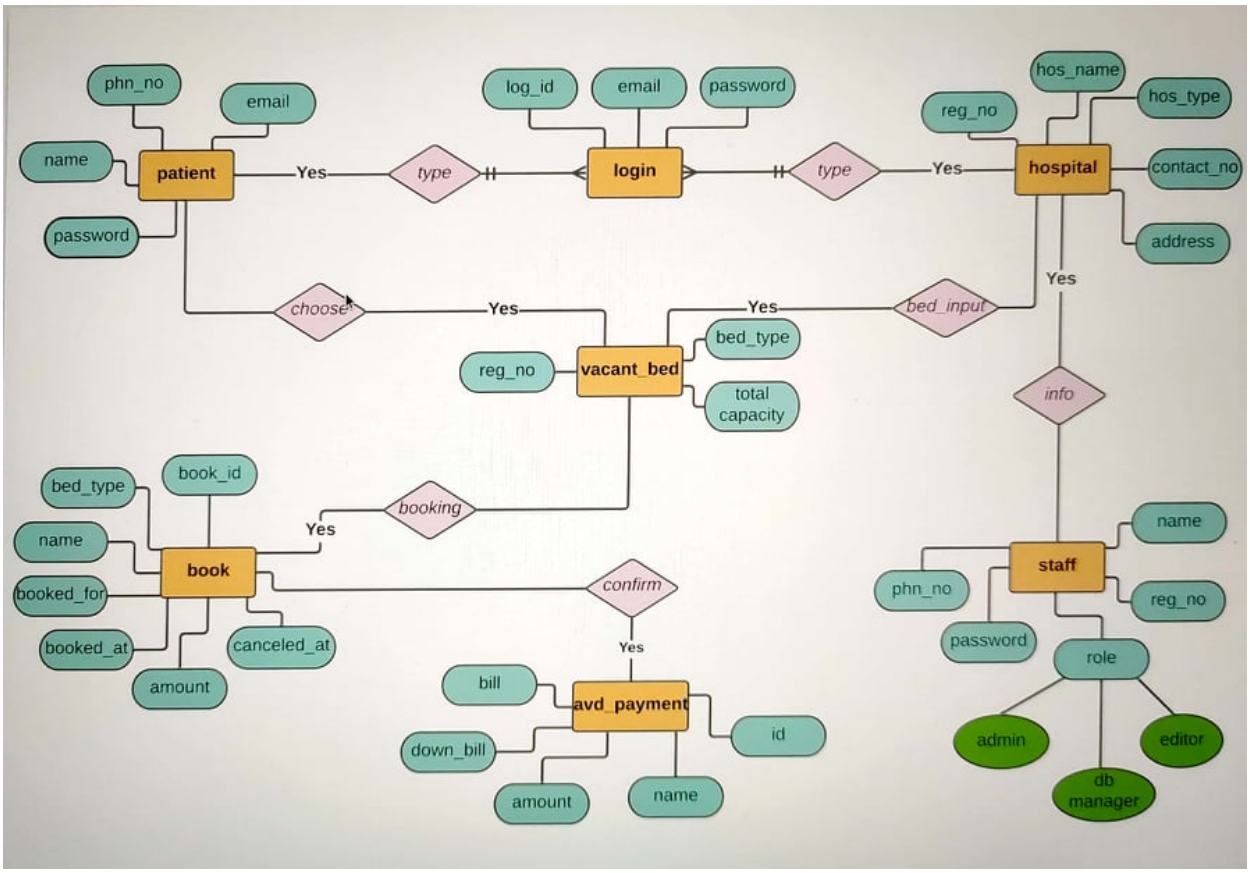
4.2 Block Diagram of Smart Medicare

The entire block diagram of the proposed web application is shown in the below figure. The web application helps feast one's eyes on the vacancy of the hospitals and book the seats online. The Smart Medicare system consists of 2 panels, users, and administrations. A user can sign in as a patient. The patient can access the hospital lists, search for the vacancy after registration, and make a reservation for the hospital space through the internet**.**



4.3 E-R Diagram of Smart Medicare

An entity-relationship diagram (ERD) is an abstract and conceptual representation of data. Entity relationship modeling is a database modeling method, used to produce a type of conceptual schema or semantic data model of a system, often a relational database, and its requirements in a top-down fashion. The entity-relationship diagram, which portrays the structure of the existing system database, is shown below. It shows how entities, like a patient, hospital, or administration, are connected.



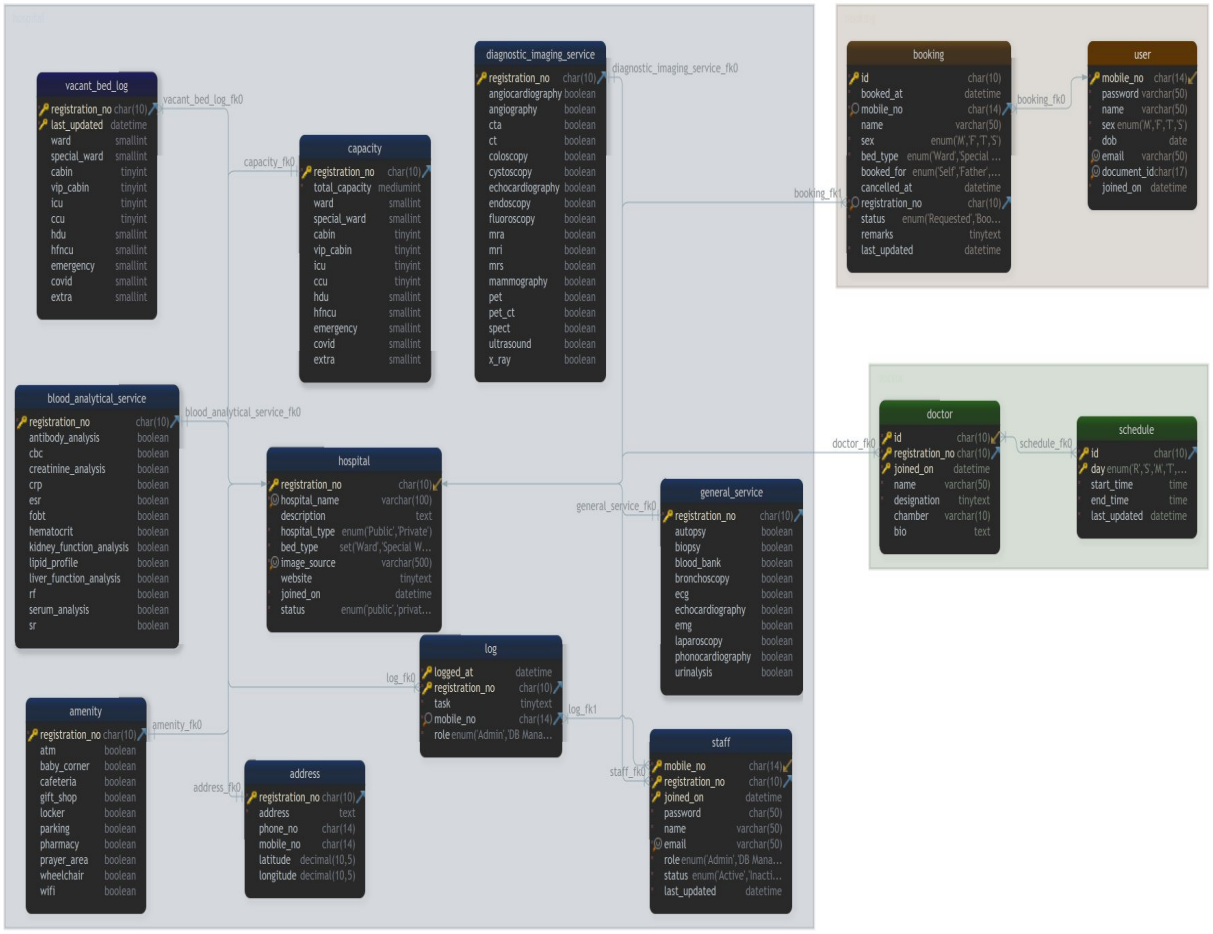
4.4 Database schema of Smart Medicare

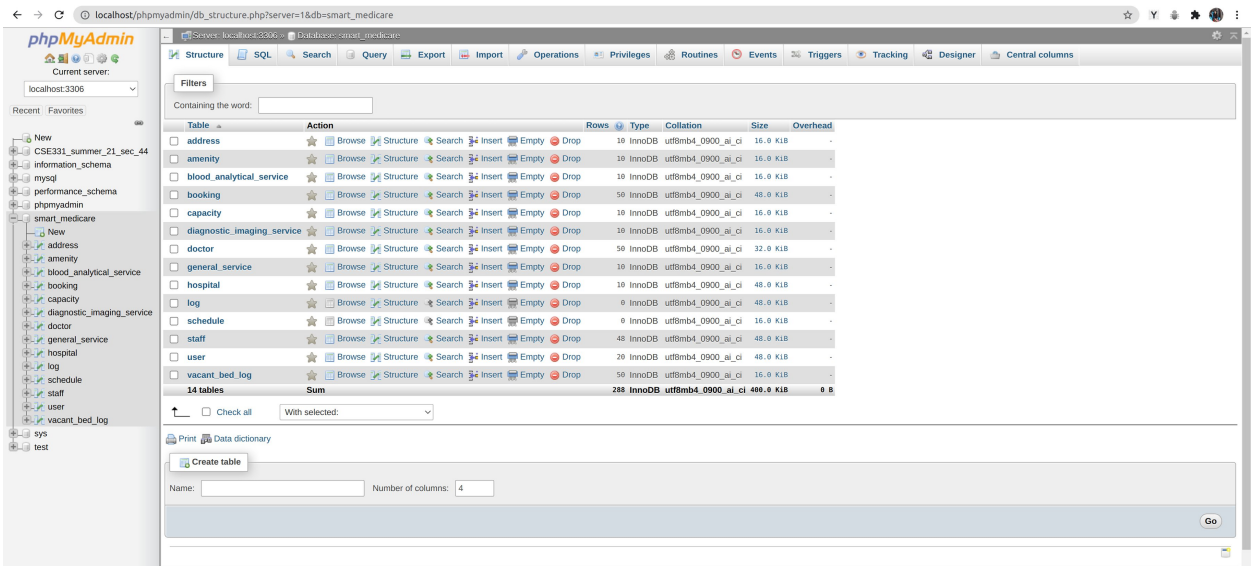
A database schema is the skeleton structure that represents the logical view of the entire database. It defines how the data is organized and how the relations among them are associated. It formulates all the constraints that are to be applied on the data.

A database schema can be divided broadly into two categories –

Physical Database Schema: This schema pertains to the actual storage of data and its form of storage like files, indies, etc. It defines how the data will be stored in a secondary storage.

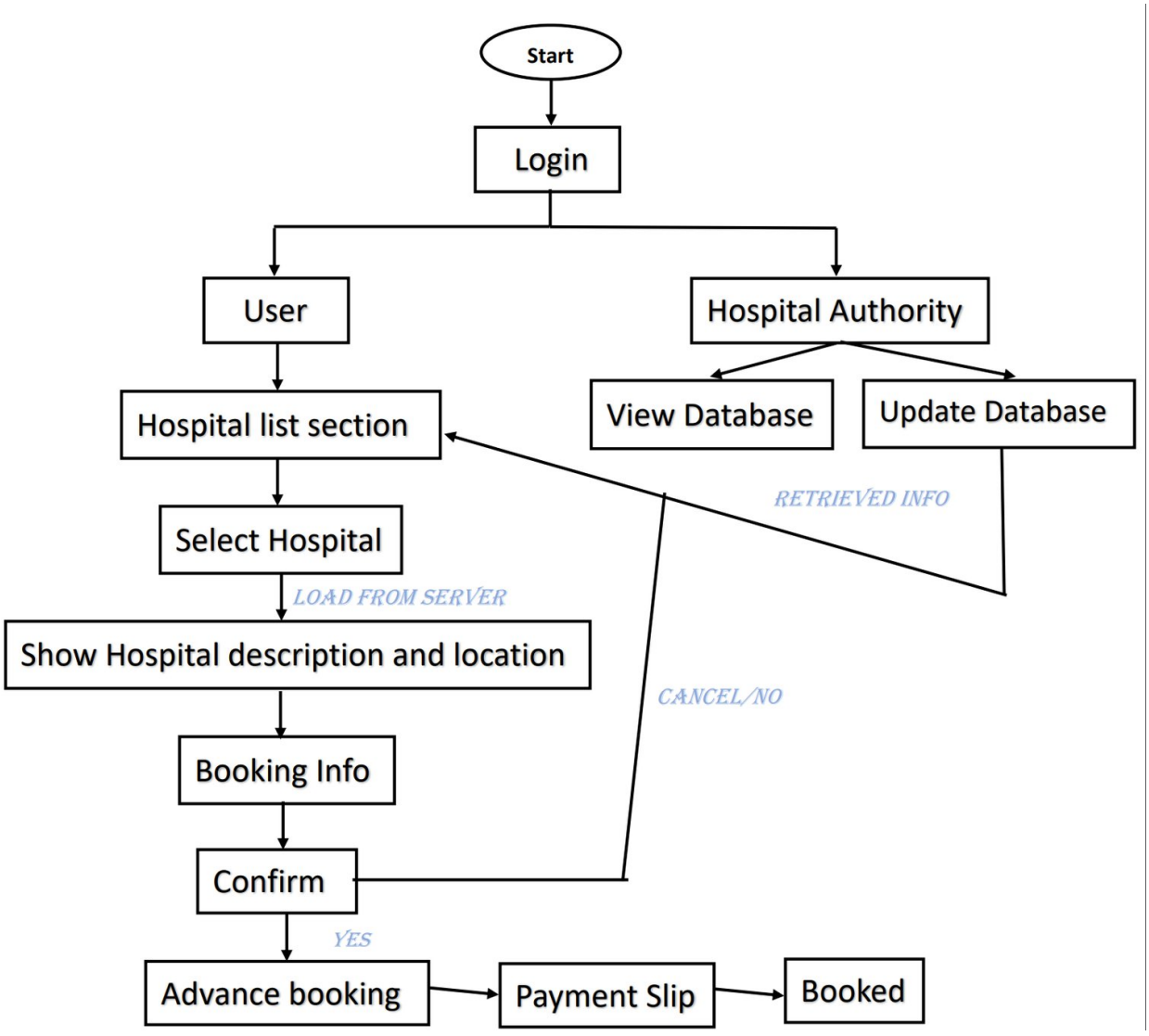
Logical Database Schema: This schema defines all the logical constraints that need to be applied on the data stored. It defines tables, views, and integrity constraints.

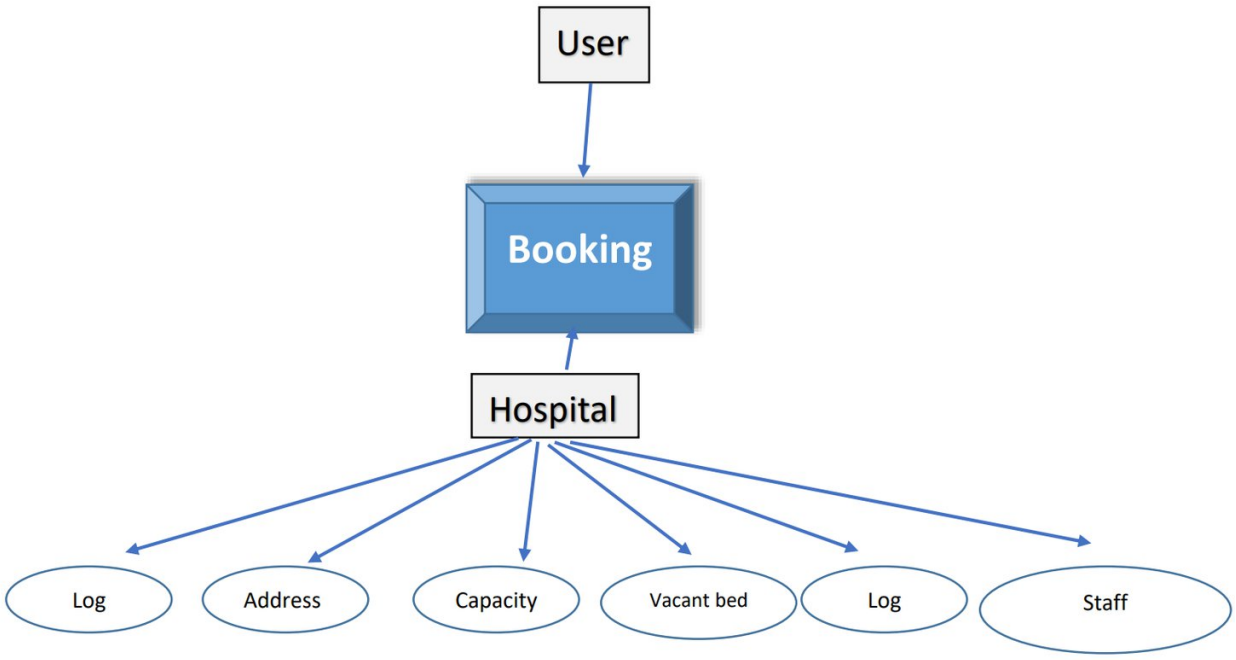

vacant_bed_log
registration_no char(10)
last_updated datetime
ward smallint
special_ward smallint
cabin tinyint
vip_cabin tinyint
icu tinyint
ccu tinyint
hdu smallint
hfncu smallint
emergency smallint
covid smallint
extra smallint
vacant_bed_log_fk0
capacity
registration_no char(10)
total_capacity mediumint
ward smallint
special_ward smallint
cabin tinyint
vip_cabin tinyint
icu tinyint
ccu tinyint
hdu smallint
hfncu smallint
emergency smallint
covid smallint
extra smallint
capacity_fk0
diagnostic_imaging_service
registration_no char(10)
angiocardiography boolean
angiography boolean
cta boolean
ct boolean
coloscopy boolean
cystoscopy boolean
echocardiography boolean
endoscopy boolean
fluoroscopy boolean
mra boolean
mri boolean
mrs boolean
mammography boolean
pet boolean
pet_ct boolean
spect boolean
ultrasound boolean
x_ray boolean
diagnostic_imaging_service_fk0
booking
id char(10)
booked_at datetime
mobile_no char(14)
name varchar(50)
sex enum('M','F','T','S')
bed_type enum('Ward','Special ...
booked_for enum('Self','Father',...
cancelled_at datetime
registration_no char(10)
status enum('Requested','Boo...
remarks tinytext
last_updated datetime
booking_fk0
booking_fk1
user
mobile_no char(14)
password varchar(50)
name varchar(50)
sex enum('M','F','T','S')
dob date
email varchar(50)
document_id char(17)
joined_on datetime
blood_analytical_service
registration_no char(10)
antibody_analysis boolean
cbc boolean
creatinine_analysis boolean
crp boolean
esr boolean
fobt boolean
hematocrit boolean
kidney_function_analysis boolean
lipid_profile boolean
liver_function_analysis boolean
rf boolean
serum_analysis boolean
sr boolean
blood_analytical_service_fk0
hospital
registration_no char(10)
hospital_name varchar(100)
description text
hospital_type enum('Public','Private')
bed_type set('Ward','Special W...
image_source varchar(500)
website tinytext
joined_on datetime
status enum('public','privat...
doctor
id char(10)
registration_no char(10)
joined_on datetime
name varchar(50)
designation tinytext
chamber varchar(10)
bio text
doctor_fk0
schedule
id char(10)
day enum('R','S','M','T',...
start_time time
end_time time
last_updated datetime
schedule_fk0
general_service
registration_no char(10)
autopsy boolean
biopsy boolean
blood_bank boolean
bronchoscopy boolean
ecg boolean
echocardiography boolean
emg boolean
laparoscopy boolean
phonocardiography boolean
urinalysis boolean
general_service_fk0
log
logged_at datetime
registration_no char(10)
task tinytext
mobile_no char(14)
role enum('Admin','DB Mana...
log_fk0
log_fk1
amenity
registration_no char(10)
atm boolean
baby_corner boolean
cafeteria boolean
gift_shop boolean
locker boolean
parking boolean
pharmacy boolean
prayer_area boolean
wheelchair boolean
wifi boolean
amenity_fk0
address
registration_no char(10)
address text
phone_no char(14)
mobile_no char(14)
latitude decimal(10,5)
longitude decimal(10,5)
address_fk0
staff
mobile_no char(14)
registration_no char(10)
joined_on datetime
password char(50)
name varchar(50)
email varchar(50)
role enum('Admin','DB Mana...
status enum('Active','Inacti...
last_updated datetime
staff_fk0


localhost/phpmyadmin/db_structure.php?server=1&db=smart_medicare
phpMyAdmin
Current server:
localhost:3306
Recent Favorites
New
CSE331_summer_21_sec_44
information_schema
mysql
performance_schema
phpmyadmin
smart_medicare
New
address
amenity
blood_analytical_service
booking
capacity
diagnostic_imaging_service
doctor
general_service
hospital
log
schedule
staff
user
vacant_bed_log
sys
test
Server: localhost:3306 » Database: smart_medicare
Structure SQL Search Query Export Import Operations Privileges Routines Events Triggers Tracking Designer Central columns
Filters
Containing the word:
Table Action Rows Type Collation Size Overhead
address Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
amenity Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
blood_analytical_service Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
booking Browse Structure Search Insert Empty Drop 50 InnoDB utf8mb4_0900_ai_ci 48.0 KiB -
capacity Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
diagnostic_imaging_service Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
doctor Browse Structure Search Insert Empty Drop 50 InnoDB utf8mb4_0900_ai_ci 32.0 KiB -
general_service Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
hospital Browse Structure Search Insert Empty Drop 10 InnoDB utf8mb4_0900_ai_ci 48.0 KiB -
log Browse Structure Search Insert Empty Drop 0 InnoDB utf8mb4_0900_ai_ci 48.0 KiB -
schedule Browse Structure Search Insert Empty Drop 0 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
staff Browse Structure Search Insert Empty Drop 48 InnoDB utf8mb4_0900_ai_ci 48.0 KiB -
user Browse Structure Search Insert Empty Drop 20 InnoDB utf8mb4_0900_ai_ci 48.0 KiB -
vacant_bed_log Browse Structure Search Insert Empty Drop 50 InnoDB utf8mb4_0900_ai_ci 16.0 KiB -
14 tables Sum 288 InnoDB utf8mb4_0900_ai_ci 400.0 KiB 0 B
Check all With selected:
Print Data dictionary
Create table
Name: Number of columns: 4
Go

4.5 Data Flow Diagram of Smart Medicare

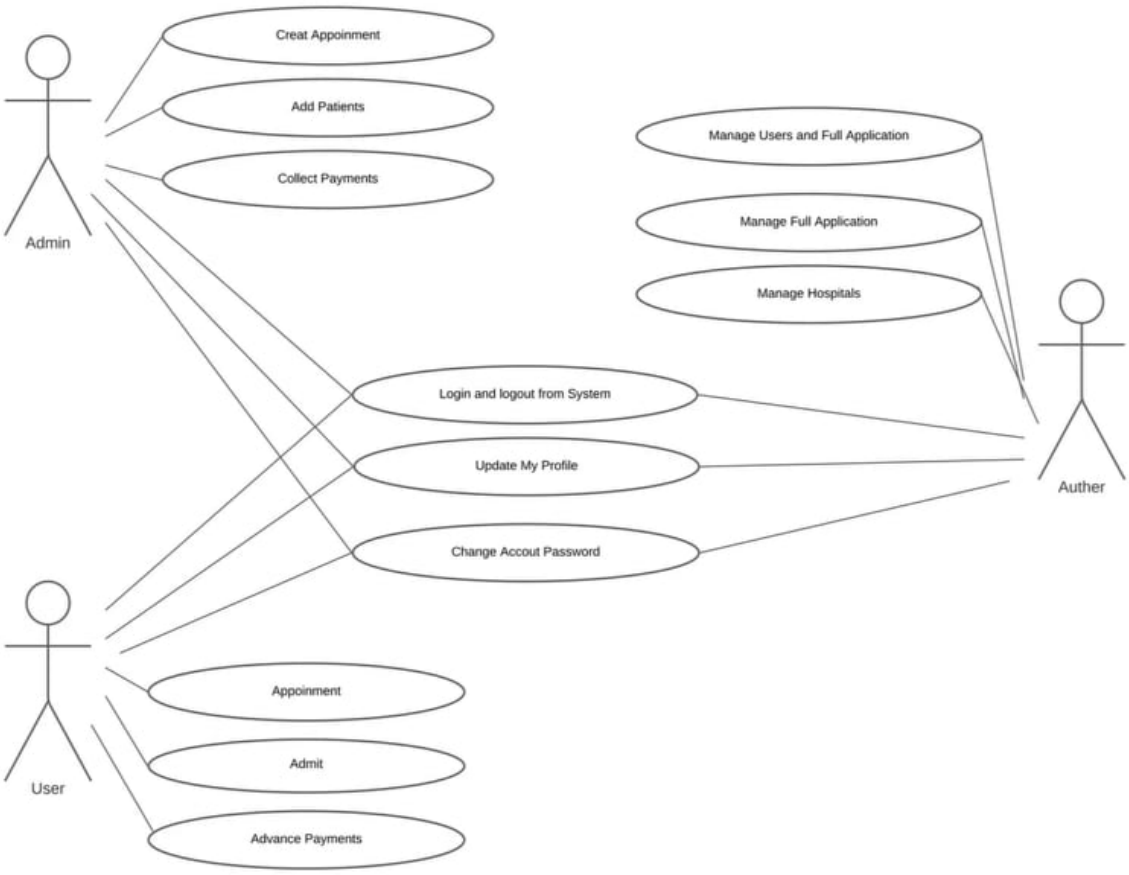
The context diagram is the most abstract data flow representation of a system. It represents the entire system as a single bubble and. The various external entities with which the system interacts and the data flows occurring between the system and the external entities are also represented. The name context diagram is well justified because it represents the context in which the system is to exist i.e. the external entities (users) that would interact with the system and specific data items they would be receiving from the system.





4.6 Use Case Diagram of Smart Medicare

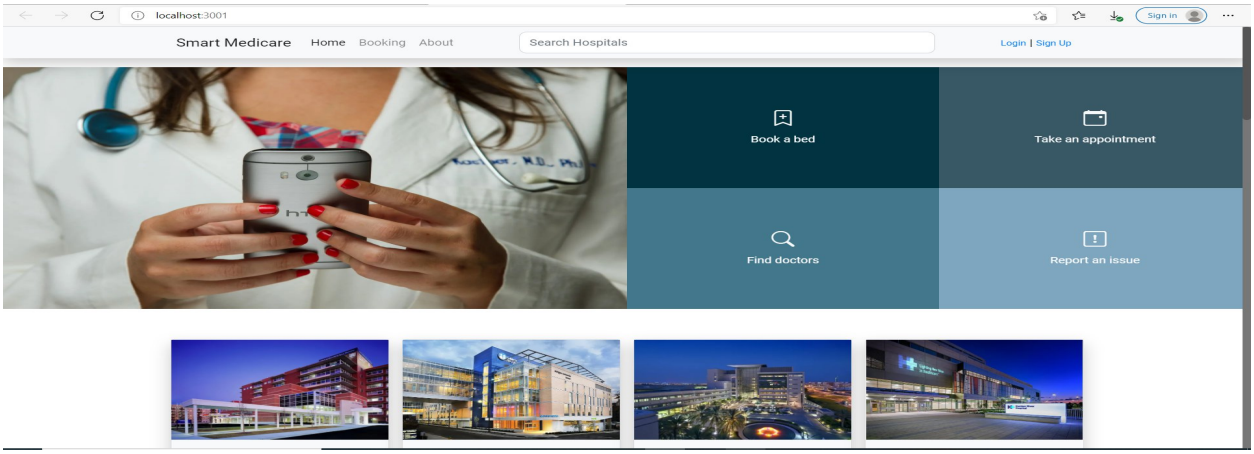
A use case diagram is used to represent the dynamic behavior of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application.



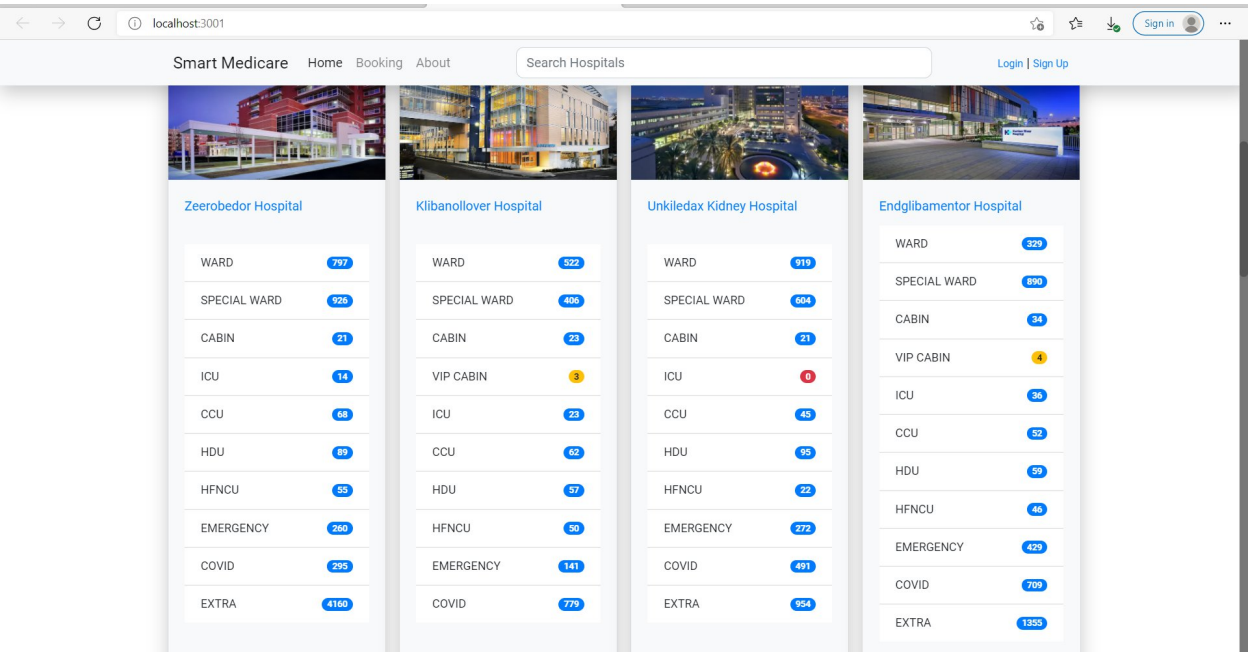
4.7 User Interface

4.7.1 Home Page

Actor: Any users



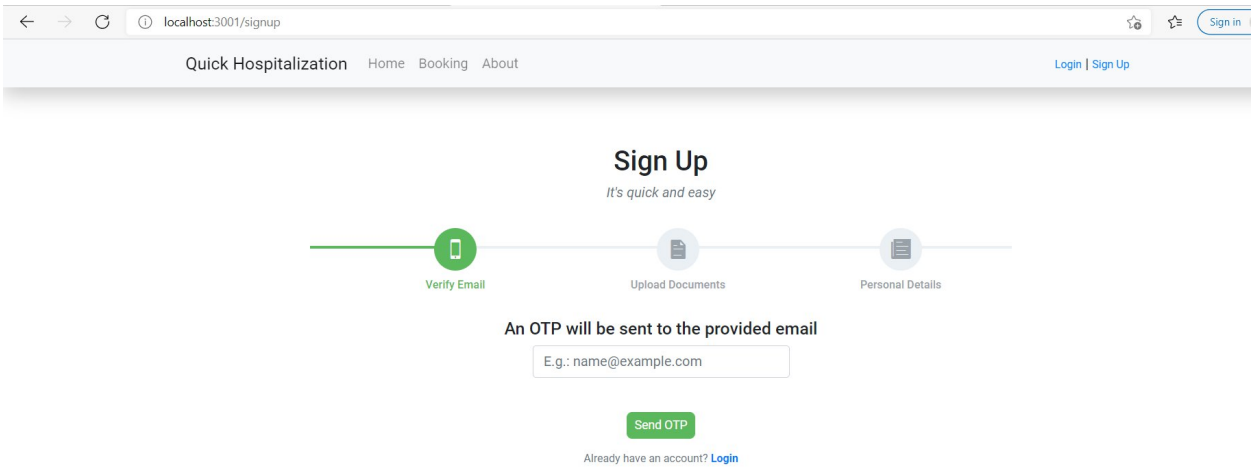
On this page, there will be a list of hospitals with their name and vacancies. User patients see the vacancies and book thereby.



4.7.2 User account create page

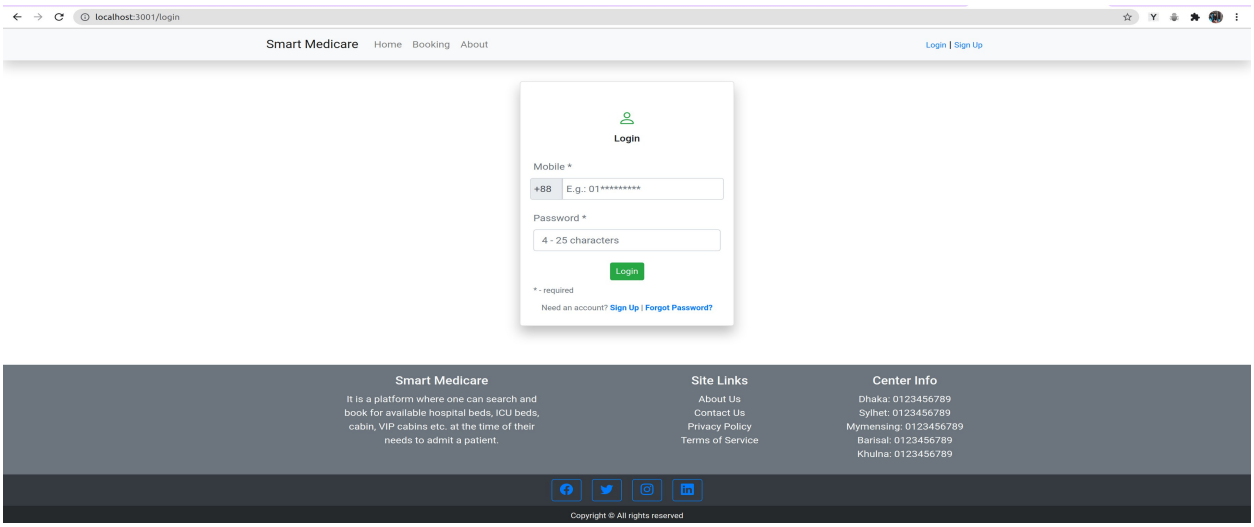
Actor: User.

This is the sign-up page for the user. The user gives their valid email address and an OTP will be sent to the user's email. Then the user can scan their digital document and the personal information will be automatically filled up through Optical Character Recognition (OCR) or they may choose to manually input the data.



4.7.3 User login page

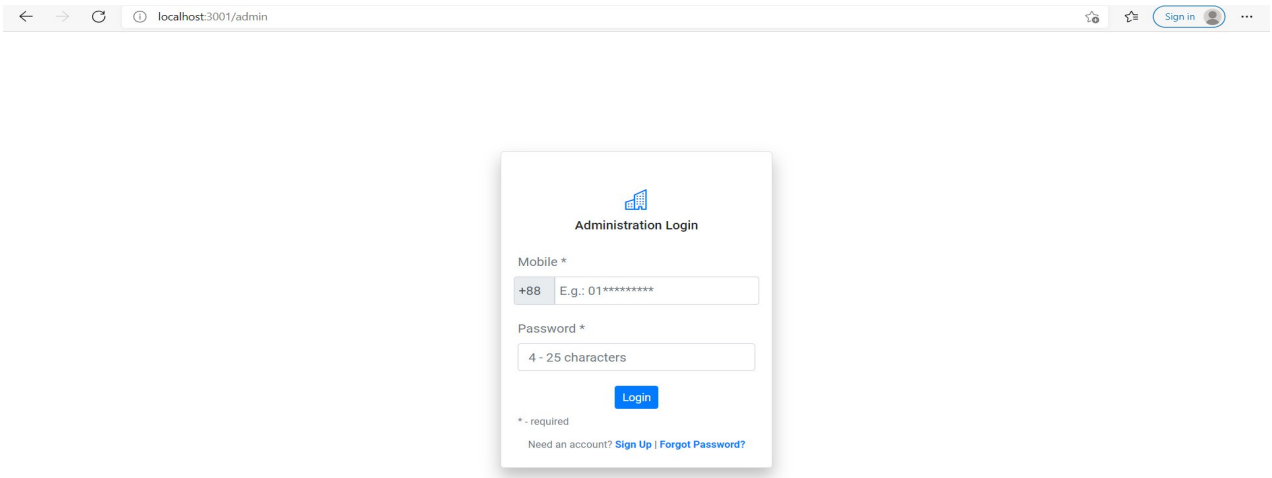
Actor: Users



4.8 Admin Interface

4.8.1 Admin login page

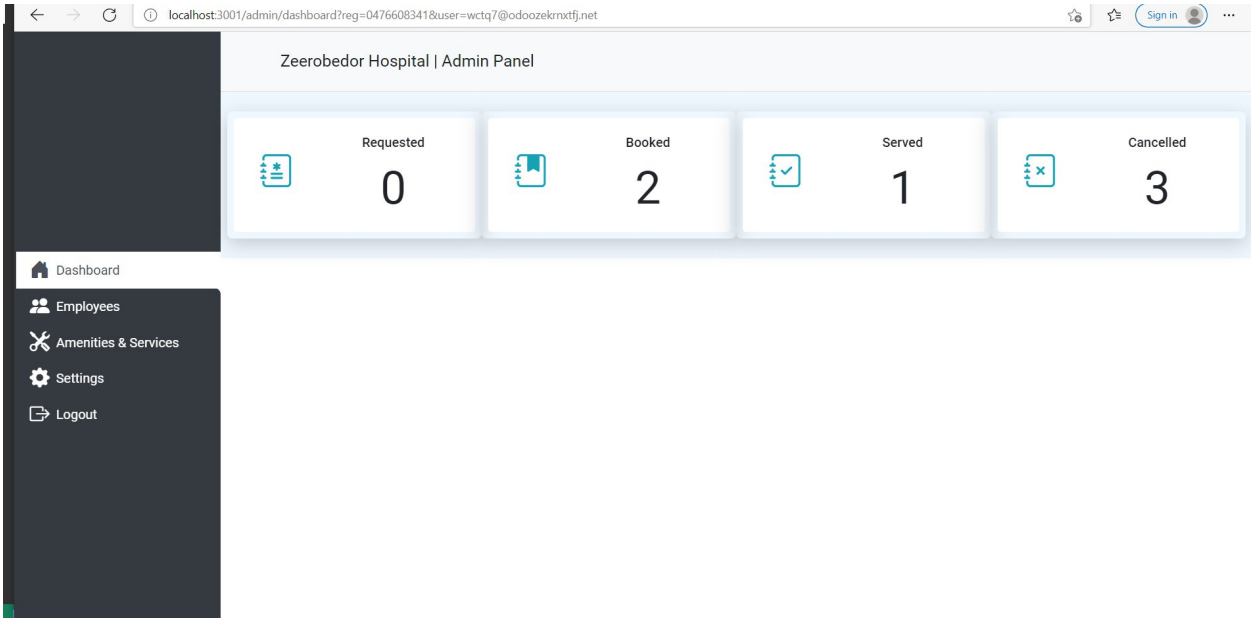
Actor: Admin users



4.8.2 Admin user details page

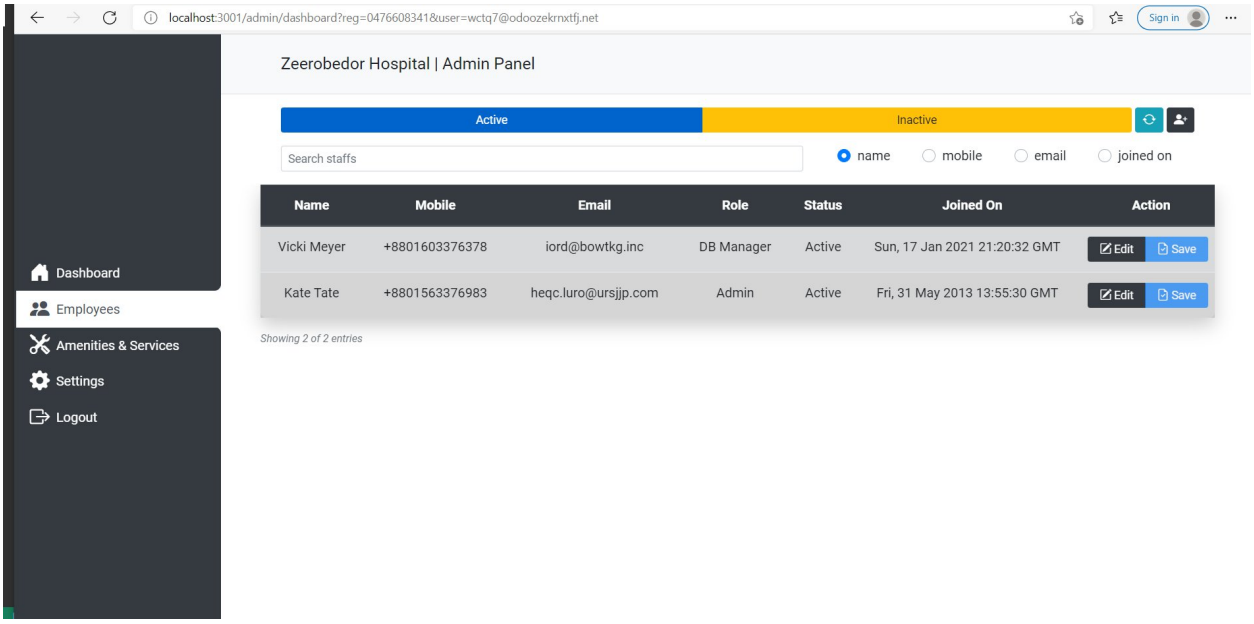
Actor: Admin users

The dashboard is the hub of all hospital administration functions. Here the authority can create, update and delete bed info and staff that has respective rights. Managing employees, user records, hospital records, etc. is controlled from here.



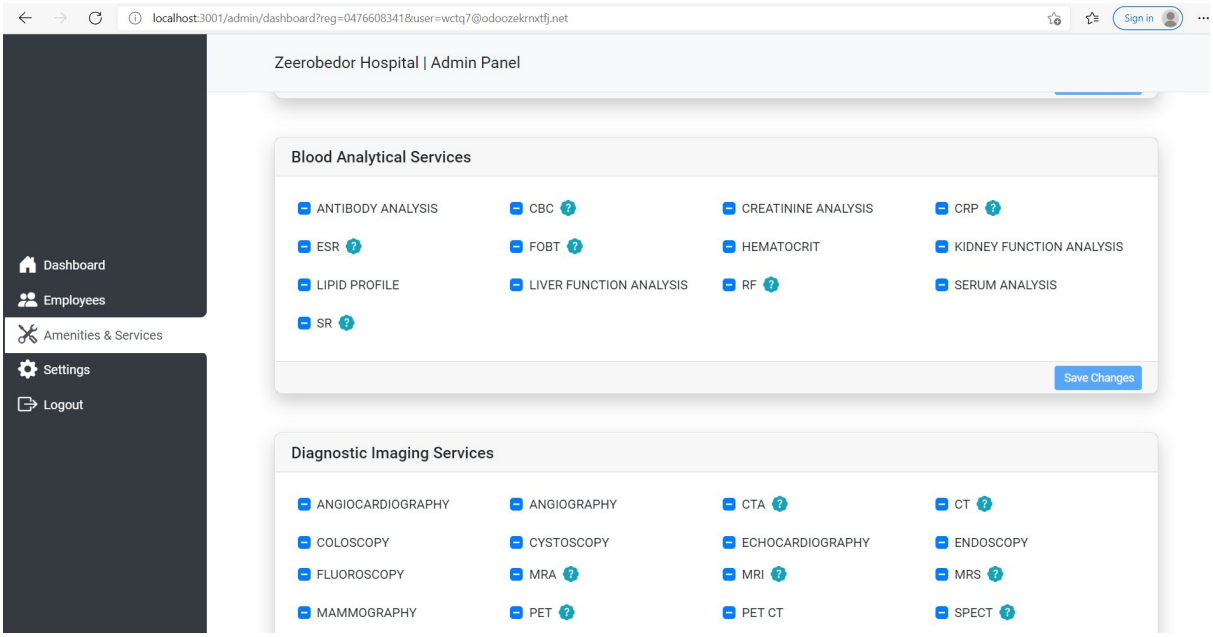
4.8.3 Appointment Panel page

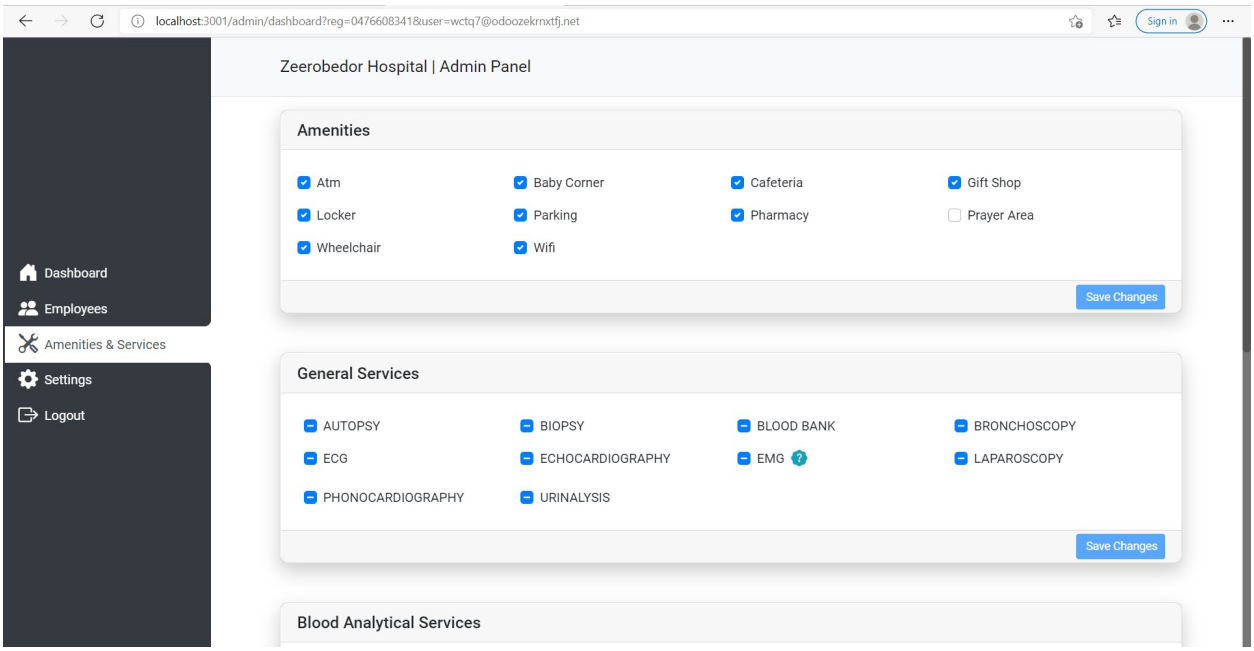
Actor: Admin users



4.8.4 Services Page

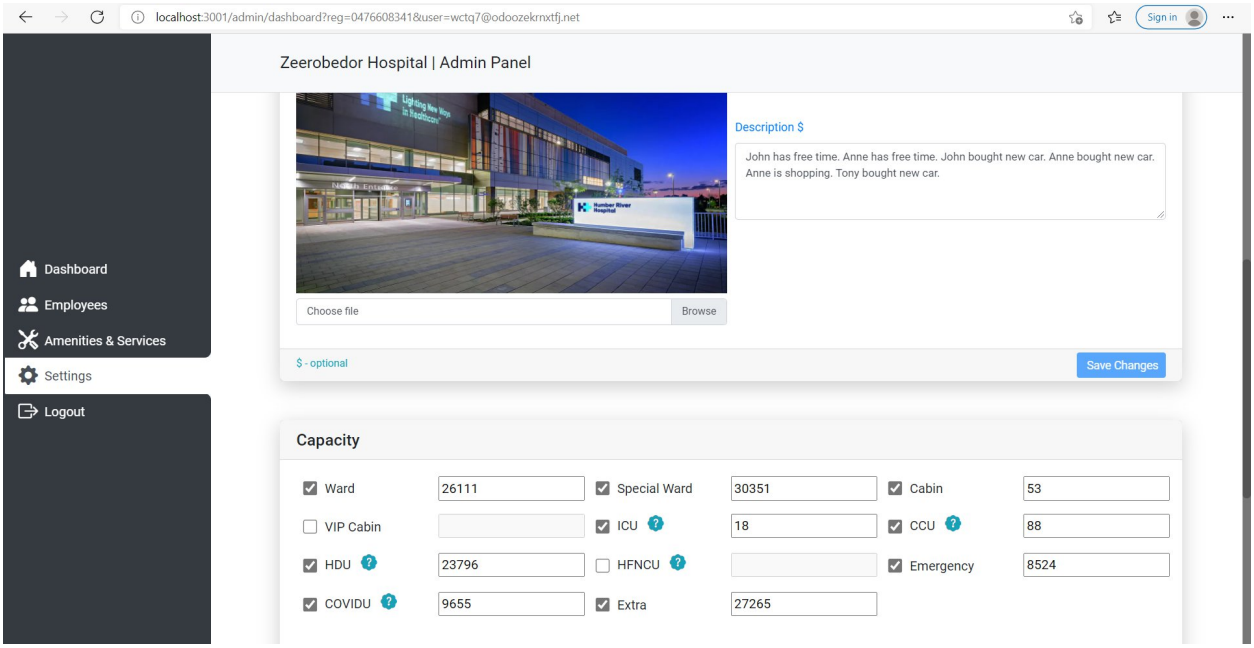
Actor : Admin users

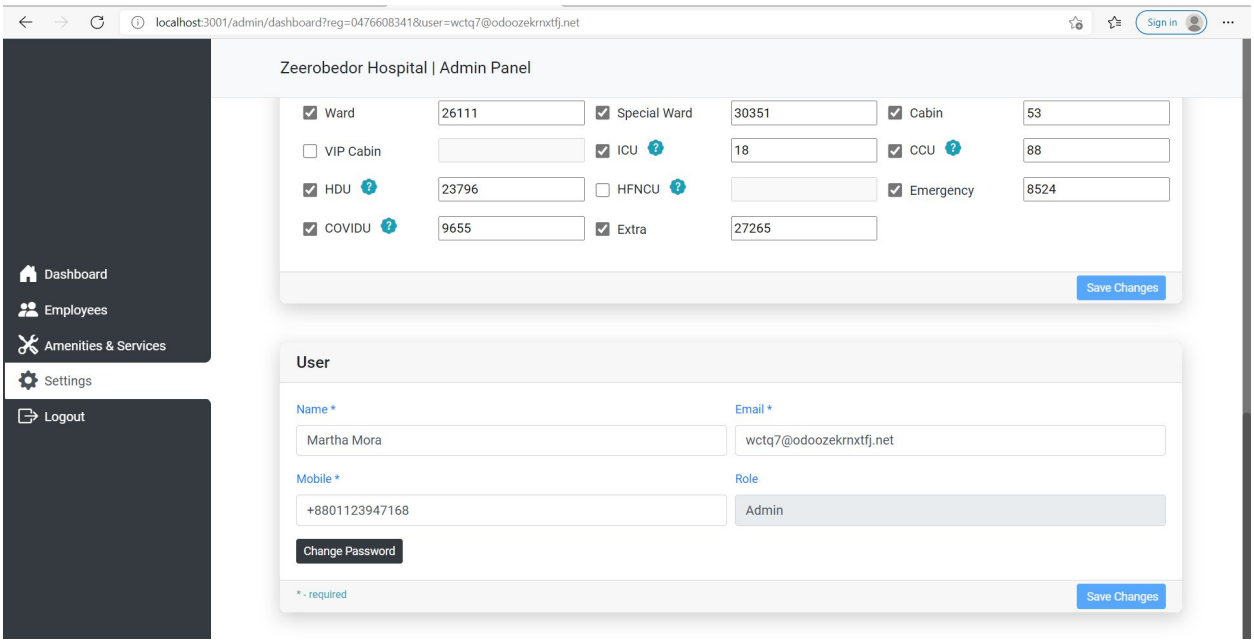




4.8.5 Setting Page

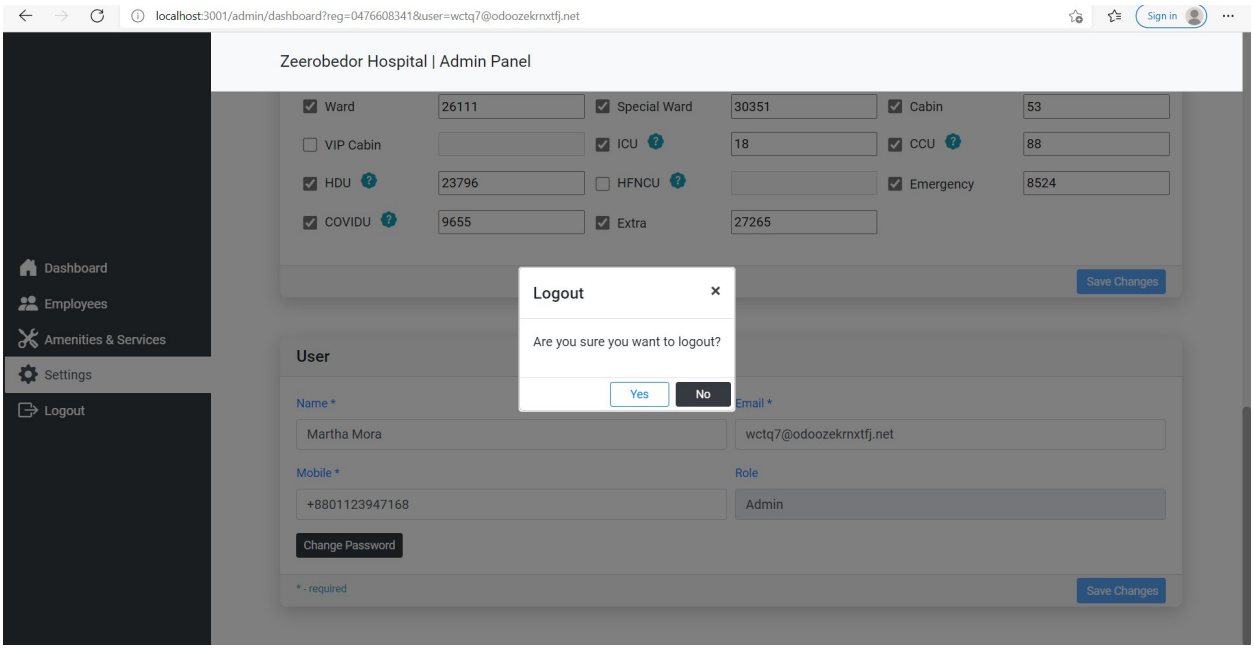
Actor : Admin users





4.8.6 Logout Page

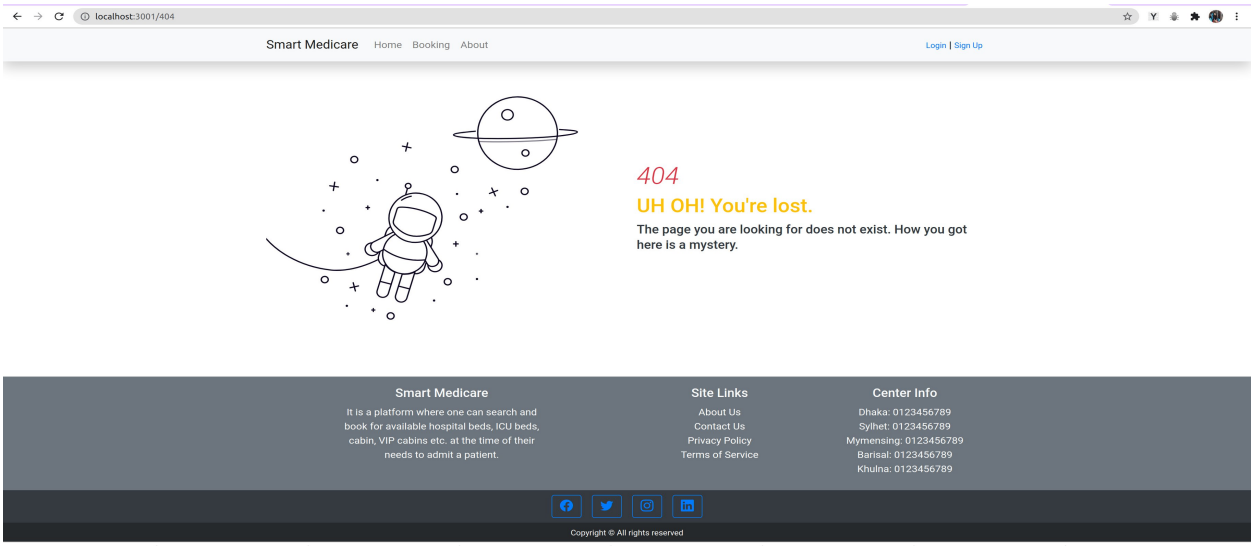
Actor : Admin users



4.9 Error Interface

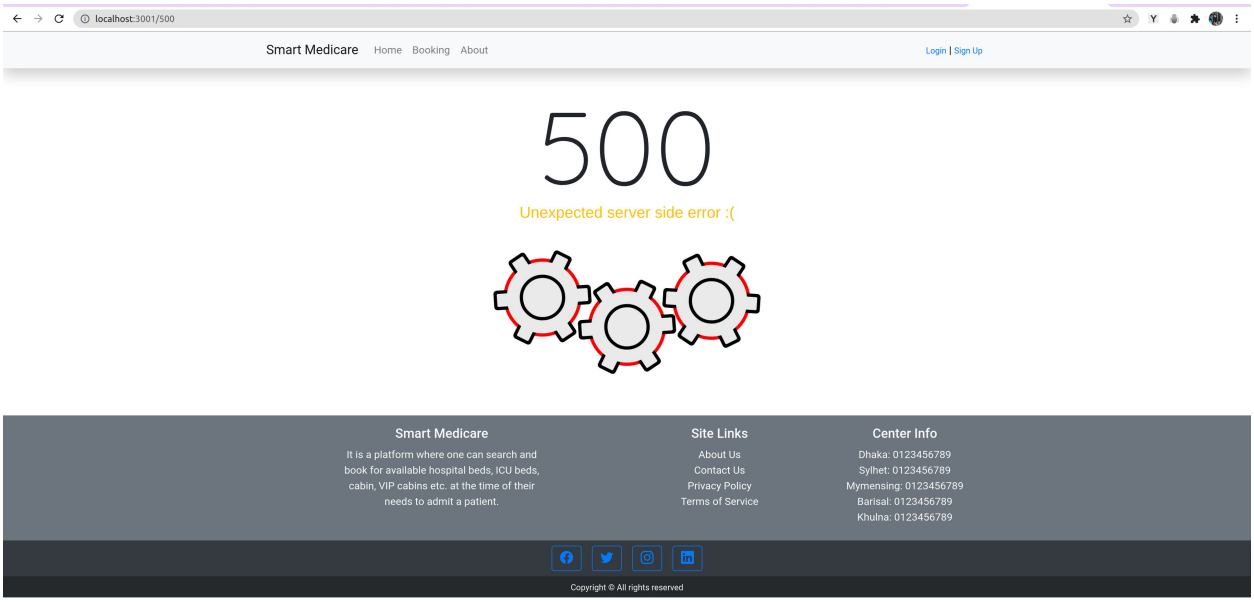
4.9.1 404 Error

The requested resource could not be found but may be available in the future. Subsequent requests by the client are permissible.



4.9.2 500 Error

Perhaps the most common message encountered indicates a generic server error that's displayed when the server cannot determine the exact problem.



Chapter Five

Project Equipment

5.1 User Type

The application is for the booking system for the hospital beds during an emergency. It maintains two levels of user: -

- Administration Level
- User Level

5.2 Supported Operating Systems

- Windows
- Mac
- Linux

5.3 Used Languages

- HTML: page layout
- CSS: design
- JS: front-end & back-end functionality
- MySQL: database schema [12]
- Prisma: back-end (database accessing tool)

5.4 Used Frameworks

- Next.js v11 — React-Framework: back-end
- Bootstrap v4.6: front-end – design & outlook
- SASS: CSS compiler
- Typescript: front-end & back-end for type-safe code

Chapter Six

Conclusion

6.1 Conclusions

The project Smart Medicare is for computerizing the working in a hospital. The application takes care of all the requirements for booking the beds of a hospital and is capable to provide easy and effective storage of information related to the list of hospitals. It generates a booking system, hospital information including staff, beds, etc.

6.2 Future plan

- Diagnostics billing system.
- Doctor's appointment
- Patient's record
- advance payment
- download record file