DESIGN AND IMPLEMENTATION OF A SMART HOSPITAL MANAGEMENT SYSTEM

BY

Md. Zahid Hasan
ID: 181-15-11280
AND

Md. Mobarok Hossain
ID: 172-15-1554

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

Supervised By

Shayla Sharmin
Senior Lecturer
Department of CSE
Daffodil International University

Co-Supervised By

Tajim Md. Niyamat Ullah Akhund
Senior Lecturer
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

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APPROVAL

This Project titled "Design and implementation of a Smart Hospital Management System", submitted by Md. Zahid Hasan and Md. Mobarok Hossain to the **Shayla Sharmin**, Senior Lecturer Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 6 February 2023.

BOARD OF EXAMINERS

8/2/23

Md. Tauhid Bhuiyan — **Chairman**
Professor and Head
Department of CSE
Faculty of Science & Information Technology
Daffodil International University

Arif Mahmud — **Internal Examiner**
Assistant Professor
Department of CSE
Faculty of Science & Information Technology
Daffodil International University

Mr.Mushfiqur Rahman — **Internal Examiner**
Senior Lecturer
Department of CSE
Faculty of Science & Information Technology
Daffodil International University

Dr. Mohammad Shorif Uddin — **External Examiner**
Professor
Department ofvCSE
Jahangirnagar University

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of Shayla Sharmin, Senior Lecturer**, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted

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Supervised by:

Shayla Sharmin 8.2.23

Shayla Sharmin
Senior Lecturer
Department of CSE
Daffodil International University

Co-Supervised by:

For Shayla Sharmin 8.2.23

Tajim Md. Niyamat Ullah Akhund
Senior Lecturer
Department of CSE
Daffodil International University

Submitted by:

Zahid

Md. Zahid Hasan
ID: 181-15-11280
Department of CSE
Daffodil International University

Mobarok

Md. Mobarok Hossain
ID: 172-15-1554
Department of CSE
Daffodil International University

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ABSTRACT

This project Smart Hospital Management Application includes registration of patients, storing their details into the system, and also computerized billing in the pharmacy, and labs. The software has the facility to give a unique id for every patient and stores the clinical details of every patient and hospital tests done automatically. It includes a search facility to know the current status of each patient. User can search details of a patient using the id. The Hospital Management System can be entered using a username and password. It is accessible either by an administrator or receptionist. 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.

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CHAPTER 1
INTRODUCTION

1.1 What is Smart Hospital Management Application?

The key elements of Smart Hospital Management Application are modern technology, smart mobile apps, intelligence of healthcare for the implementation. Patients and Doctors are used our website easily because we are trying to make our application much easier.

1.2 Motivation

Currently, there are many problems in showing or admitting patients to the maximum hospital. It takes a lot of serials to see a doctor. There are many more problems in government hospitals such as holding a doctor's serial for 3-4 hours and holding a patient's serial for 2-3 hours. This makes the patient more vulnerable. To solve this problem, we have arranged online application. This will allow any patient to make an appointment while sitting at home. If the patient wants, he can select the doctor according to his choice. And our admin will maintain everything. Our goal is to get a patient to the doctor very quickly.

1.3 Objects

The main goals of this project are:

- Patients are easily allocated to the doctors.
- Patients' information will be kept up to date and their record will be kept in the system for this purpose.
- Patients list help doctors to search their patients.
- To make scheduling the appointment of patient with doctors convenient for both.
- To computerize all details regarding hospital details and patient details.

1.4 Expected Outcomes

We all know that every management application can deal to depend on its software features with a lot of tasks. Our hospital management application also follows this. It helps to outline and guarantee communication, implement policies, manage human and financial resources and provide the uninterrupted supply chain, design the patient-oriented workflows. All patients and doctors can easily use our application because its very user friendly.

CHAPTER 2
BACKGROUND

2.1 Terminologies

Hospital Information Management Systems (HMIS) have played a crucial role in transformation and digitization of healthcare services in developing nations. One of the key components of a HMIS is the terminology adopted for standardizing entry and referencing of drugs so as to enable the system to generate alerts for drug interactions and contraindications. Generic drugs are prescribed by clinicians, indented at nursing or billing desks, and issued by the stores based on the stock availability.

2.2 Related Work

There are some related works in our country. Many of website or many applications provide this service but we are trying to make easy to our user. Some of them mentioned here:

➤ Bumrungrad International Hospital has been a global pioneer in healthcare services support and providing world-class international patient for nearly four decades (Founded in 1980). It is an internationally multi-specialty hospital listed, accredited on the Stock Exchange of Thailand since 1989 located in the heart of Bangkok. Link - https://www.bumrungrad.com/en

➤ They are a software platform which assists higher study aspirants with their application process, targeted mainly towards international students. The platform provides machine learning based university recommendations to students based on their profiles and also matches students with personalized mentors according to

their admission goals. Link - https://www.smartsoftware.com.bd/hospital-management

➤ HarmoniMD Health Informatics System is designed to effectively manage staff, patients, departments, billing and inventory. The system allows administrative staff to give privileges to department managers and users and define the setup of departments. Link - https://www.harmonimd.com/en/hospital-management-system/

➤ We provide the first free dataset of all professors in 50 top US Computer Science Graduate Programs. We believe that we offer a valuable resource to anyone who is interested and to the academic community in the shape of the Computer Science in the most competitive institutes of the US. Link - https://www.bdtask.com/hospital-management-system.php

2.3 Scope of the problem

This application will be used in any clinic, hospital and Pathology lab in any hospital. Paper-based system is been by the current system in use. Within a reasonable time, frame, it is slow and cannot provide updated lists of patients. The intentions of the application are to increase the number of patients and reduce over-time pay that can be accurately.

2.4 Challenge

Our big challenge is to get our application to the people. So that people can use our application very easily. In the current age of information technology, people do not like any complexity. They want the easy thing in everything.

We are trying to build our applications according to the needs of the people so that they can get rid of all their clutter by using our application once. Now there is no longer a day to go to the hospital and give a long line of doctors or doctor's serials.

In the age of information technology, everything is now being done at home. Which is why our application can be easily used by people sitting at home and our application will reach more and more people. This is our big challenge.

CHAPTER 3
TOOLS AND TECHNOLOGY

In this project, we use different type of tools and technology. They are:

• Front-End

➤ HTML

➤ CSS

➤ JavaScript

➤ Bootstrap

➤ Material UI

• Back-End

➤ PHP

➤ XAMPP

• Database

➤ MySQL

3.1 HTML

The full meaning of HTML is Hyper Text Markup Language. It is a structure of HTML in a web page. It saves a lot of work. External stylesheets are stored in HTML files. It consists of a series of elements and elements tell the browser how to display the content.

3.2 CSS

CSS is the language for describing the presentation of Web pages, including colors, layout, and fonts. It allows one to adapt the presentation to different types of devices, such as large screens, small screens, or printers. CSS is independent of

HTML and can be used with any XML-based markup language. CSS (Cascading Style Sheets) describes how HTML elements are to be displayed in other media, on screen or paper. HTML format are designed by CSS. External stylesheets are stored in CSS files. CSS is used to define styles for layout, including the design and variations, web pages in display for different devices and screen sizes.

3.3 JavaScript

JavaScript (JS) is a lightweight, interpreted, or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments also use it, such as Node.js, Apache CouchDB and Adobe Acrobat. JavaScript is the world's most familiar programming language. It is the programming language of the Web. It is one of the top languages all web developers must learn. Below the picture, we can see the JS popularity.

3.4 Bootstrap

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

3.5 Jekyll Theme

Jekyll Theme is a pre-built website template designed to be used with the Jekyll static site generator. Themes are typically built with HTML, CSS, and JavaScript, and they often include a configuration file that lets you customize the theme with your own content, styles, and layout.

3.6 PHP

PHP stands for Hypertext Preprocessor and is a widely-used, open-source scripting language. Primarily used for web development, PHP is used to create dynamic web pages, which are capable of interacting with the user, collecting and storing data, and much more. Using of PHP:

- PHP is used to create dynamic website content.
- PHP can be used to create login and registration forms.
- PHP is used to process form data, such as submitting a form or uploading a file.
- PHP is used to create and modify databases.
- PHP is used to create and manipulate images.
- PHP is used to send and receive cookies.
- PHP is used to send and receive emails.

Installation things:

- Download the latest version of PHP from the official website.
- Install a web server such as Apache or IIS.
- Configure the web server to recognize and handle PHP scripts.
- Install the PHP parser, which is necessary for running PHP scripts.
- Make any necessary changes to the php.ini configuration file.
- Test the PHP installation by creating a test script, such as a “hello world” script.
- Install any necessary extensions or modules, such as the MySQL database extension.
- Restart the web server to apply any changes in the configuration files.

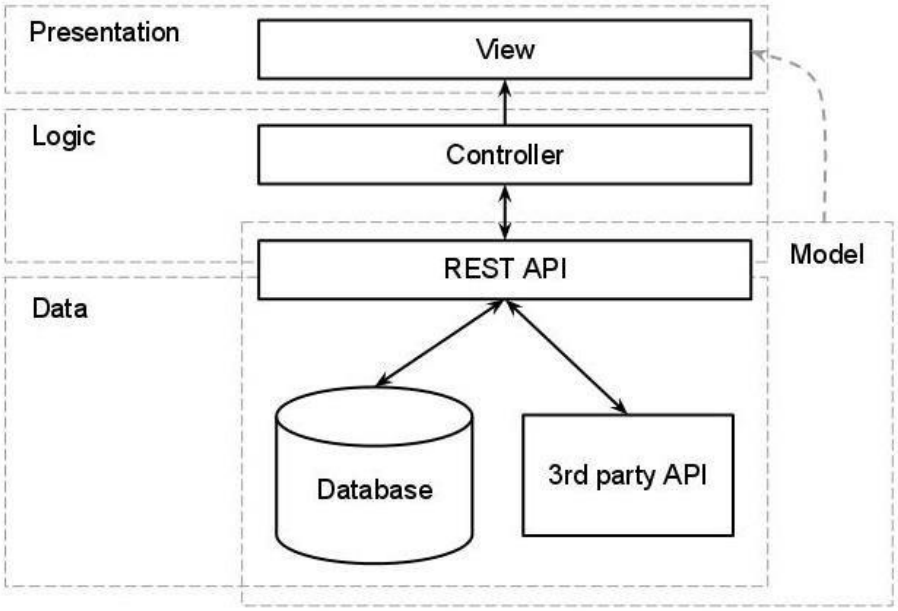


Fig. 1: PHP development

3.7 MySQL

MySQL is an open-source relational database management system (RDBMS). It is the world's most popular database, used by many large and small companies, including Facebook, Google, and Twitter. MySQL is a powerful, robust, and highly customizable database system. It supports a variety of storage engines and provides a wide range of features and tools, making it suitable for a wide range of applications. It is widely used for web-based applications, data warehouses, and e-commerce sites. It is also used to store large amounts of data and can be used to create complex queries. It is highly secure, reliable, and very easy to use. MySQL is an excellent choice for any project requiring a reliable, secure, and efficient database system.

3.8 XAMPP

XAMPP is an open-source, cross-platform web server solution stack package developed by Apache Friends. It stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). It is one of the most popular web server solutions, providing an easy way to build a local web server for testing and

development purposes. XAMPP includes a web server (Apache), database (MySQL or MariaDB), language interpreter (PHP), and other software packages. It is designed to be easy to install and configure and is suitable for both beginner and advanced users. With XAMPP, web developers can quickly create a local web server environment for developing, testing, and debugging websites and web applications. It is a powerful tool for web developers and can be used for a variety of tasks such as testing web applications, hosting websites, and developing dynamic web content.

CHAPTER 4
DESIGN SPECIFICATION

User Interface:

This section describes all the user interfaces of the project. The design specification reflected through the user interfaces of the project. Here below show activity diagram for our project:

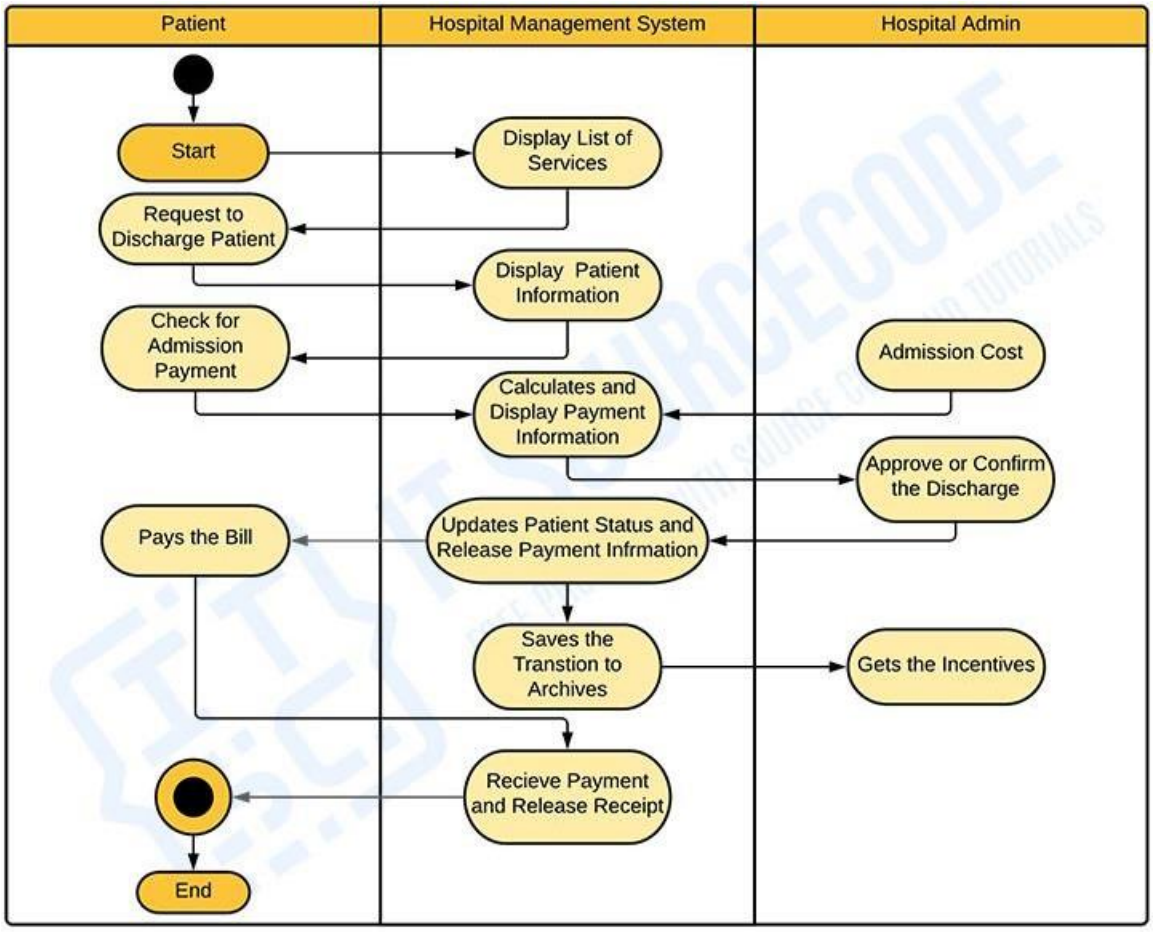


Fig. 2: Activity diagram

Intended User:

All kind of people use this website.

- **Patient in different ages**
- **Doctors**
- **Hospital Management Board**

- **Admin Portal**

Use Case Diagram:

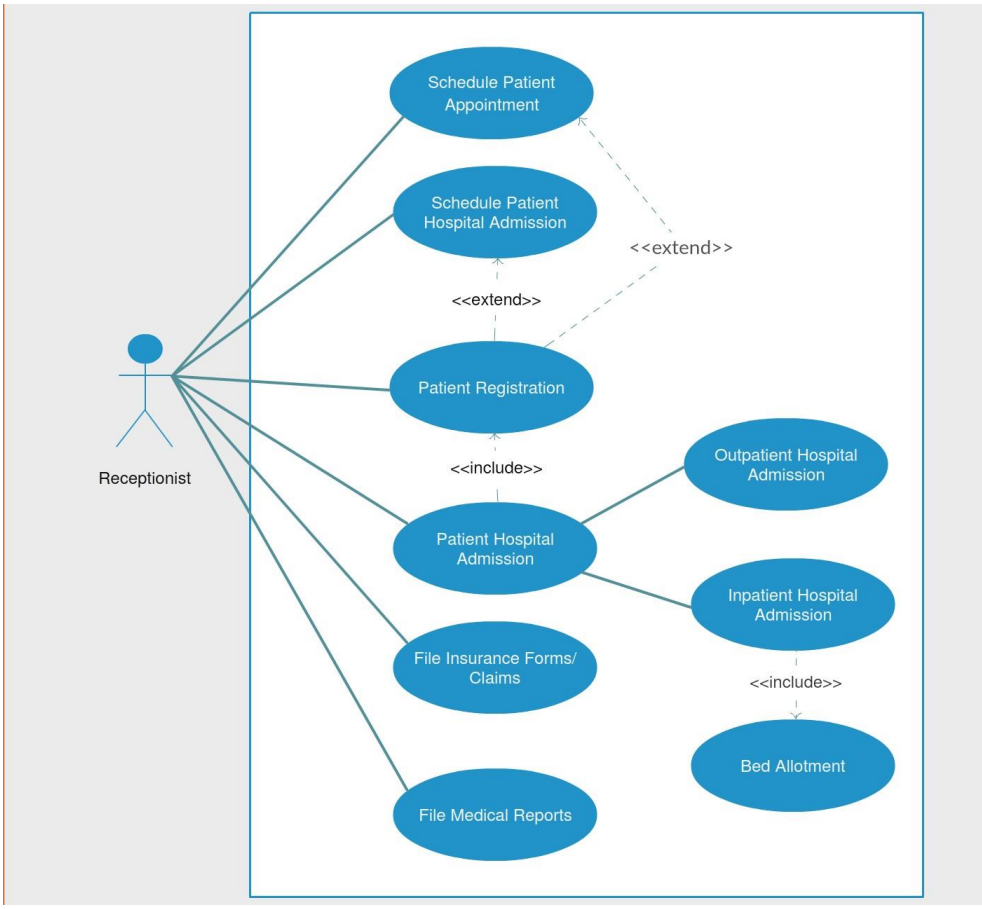


Fig. 3: Use case diagram

In this project, first of all we have to register to login as a doctor or patient or admin. Then the patient can give an appointment to visit doctor different category. He can also check his profile in dashboard. A doctor can give an appointment to join this hospital. Then admin will check his profile and will send a mail him to interview. Admin can check patients and doctor's dashboard and maintain total all details.

4.1 Web Application

Home Page: In homepage, we have used some features. In header, we have added some menu like Home, about us, Contact Us, find a doctor, Get appointment,

Login. In body, we can find a doctor, send an inquiry, book appointment. In header, we can see our service, our address, oral health.

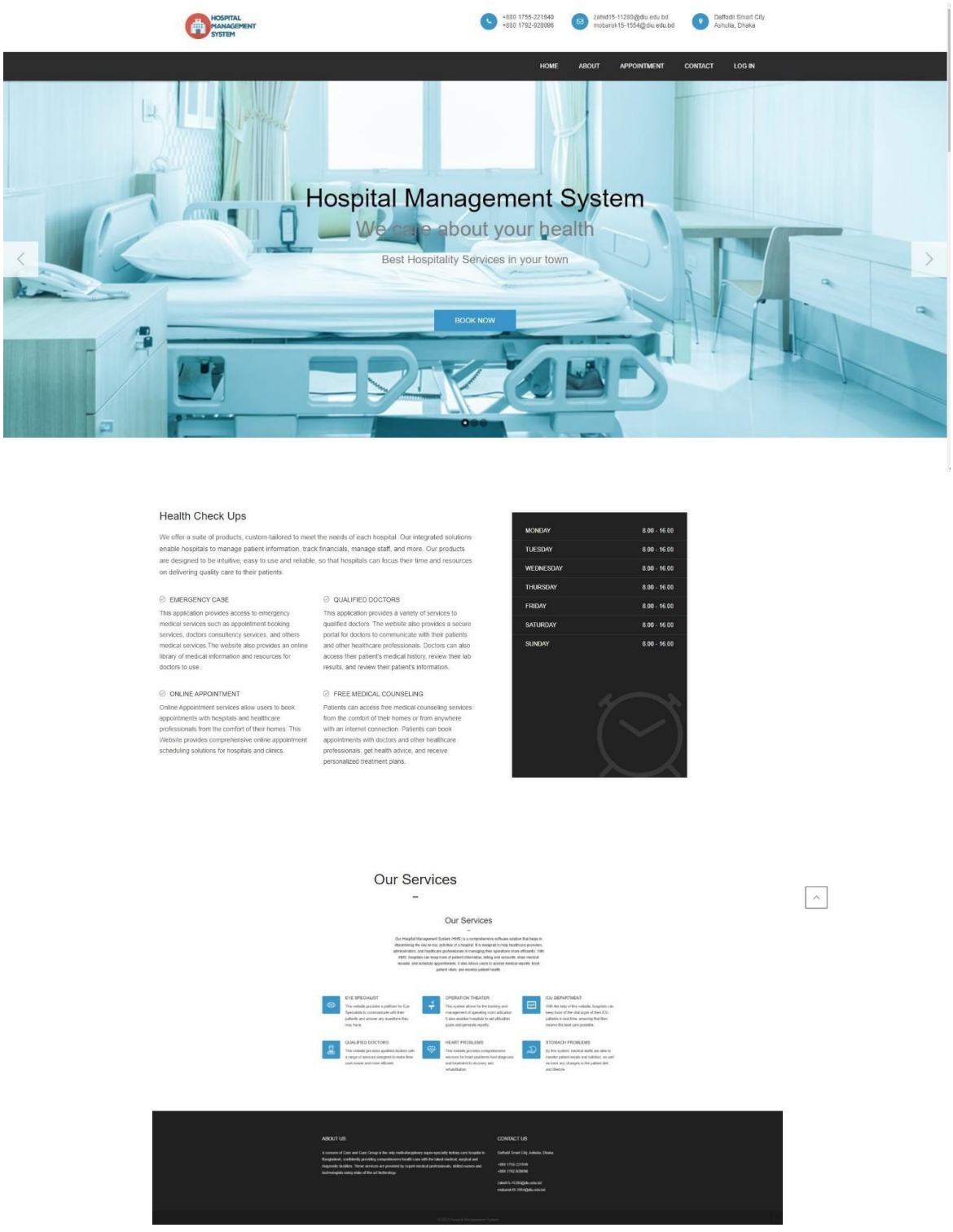


Fig. 4: Homepage

Login and signup page: In this page, we can login and signup three ways like as a doctor, patient, and admin.

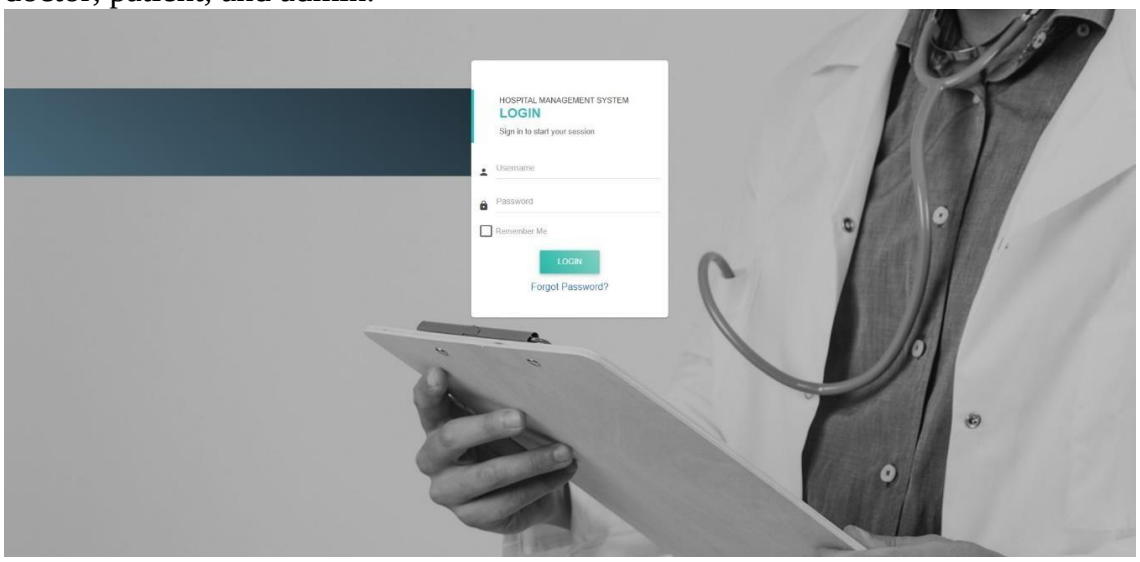


Fig. 5: Login page for admin

In admin dashboard, he/she can do:

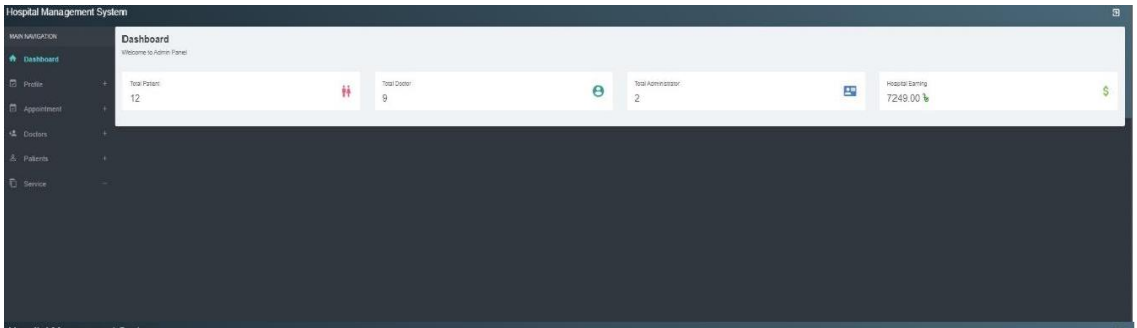
- Signup their account. Then Login (No approval Required).

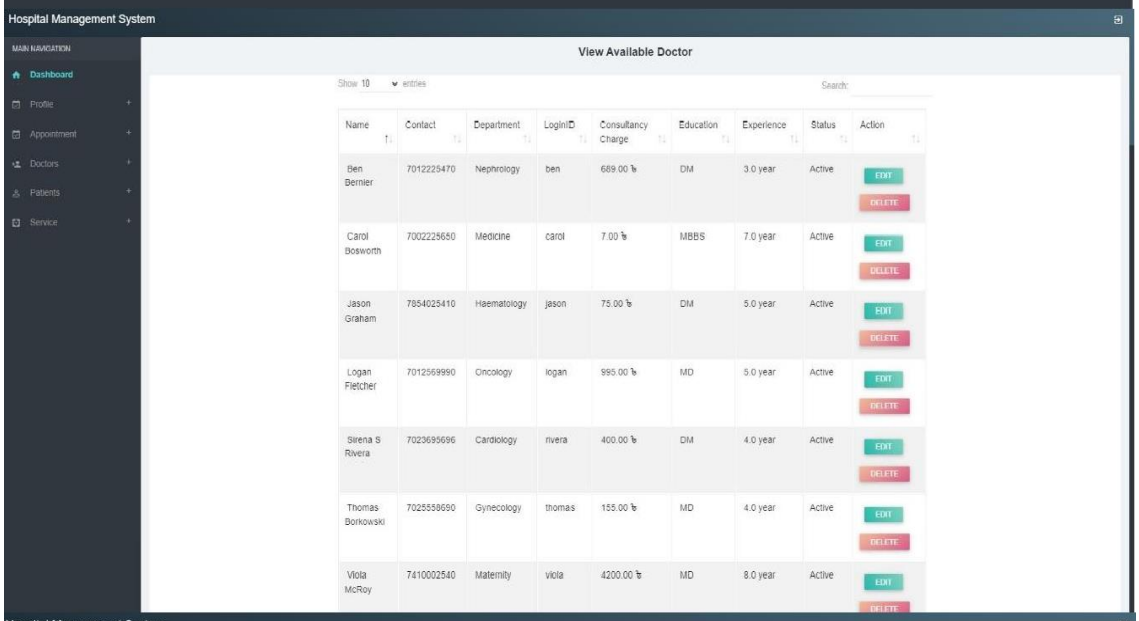
- Can register/view/approve/reject/delete doctor (approve those doctor who applied for job in their hospital).

- Can admit/view/approve/reject/discharge patient (discharge patient when treatment is done).

- Can Generate/Download Invoice pdf (Generate Invoice according to medicine cost, room charge, doctor charge and other charge).

- Can view/book/approve Appointment (approve those appointments which is requested by patient).


Hospital Management System
MAIN NAVIGATION
Dashboard
Profile
Appointment
Doctors
Patients
Service
Dashboard
Welcome to Admin Panel
Total Patient
12
Total Doctor
9
Total Administrator
2
Hospital Earning
7249.00
$


Hospital Management System
MAIN NAVIGATION
Dashboard
Profile
Appointment
Doctors
Patients
Service
View Available Doctor
Show 10 entries
Search:
Name
Contact
Department
LoginID
Consultancy Charge
Education
Experience
Status
Action
Ben Bernier
7012225470
Nephrology
ben
669.00
DM
3.0 year
Active
EDIT
DELETE
Carol Bosworth
7002225650
Medicine
carol
7.00
MBBS
7.0 year
Active
EDIT
DELETE
Jason Graham
7854025410
Haematology
jason
75.00
DM
5.0 year
Active
EDIT
DELETE
Logan Fletcher
7012569990
Oncology
logan
995.00
MD
5.0 year
Active
EDIT
DELETE
Sirena S Rivera
7023695696
Cardiology
rivera
400.00
DM
4.0 year
Active
EDIT
DELETE
Thomas Borkowski
7025558690
Gynecology
thomas
155.00
MD
4.0 year
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Viola McRoy
7410002540
Maternity
viola
4200.00
MD
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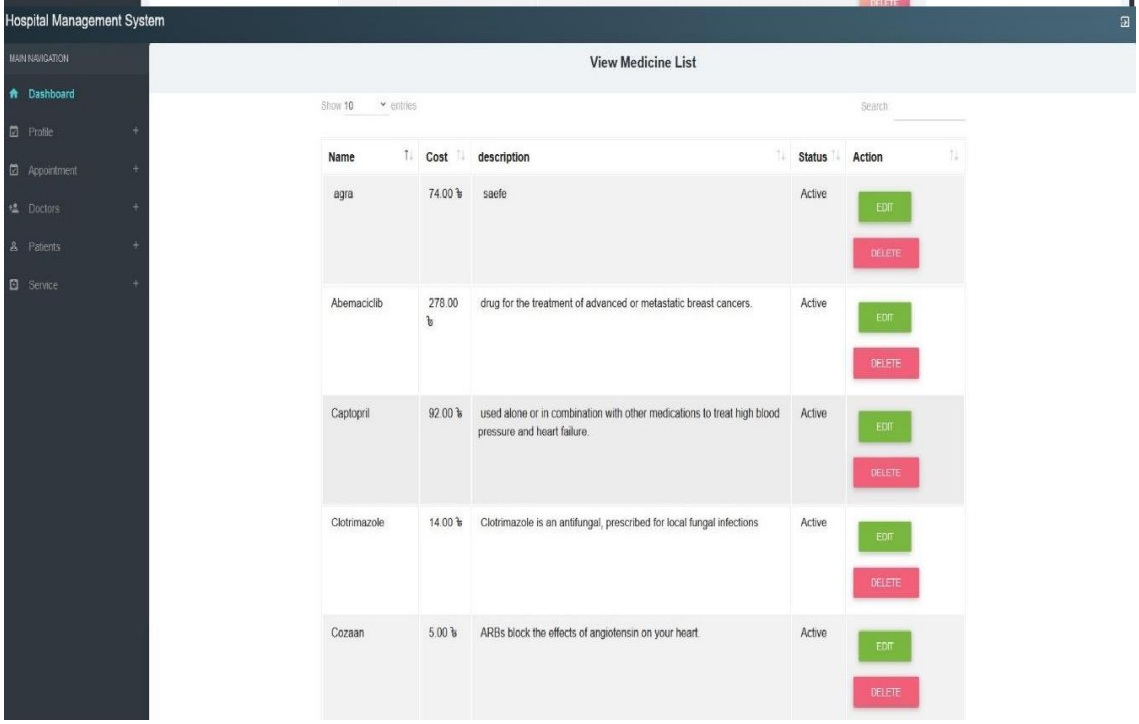
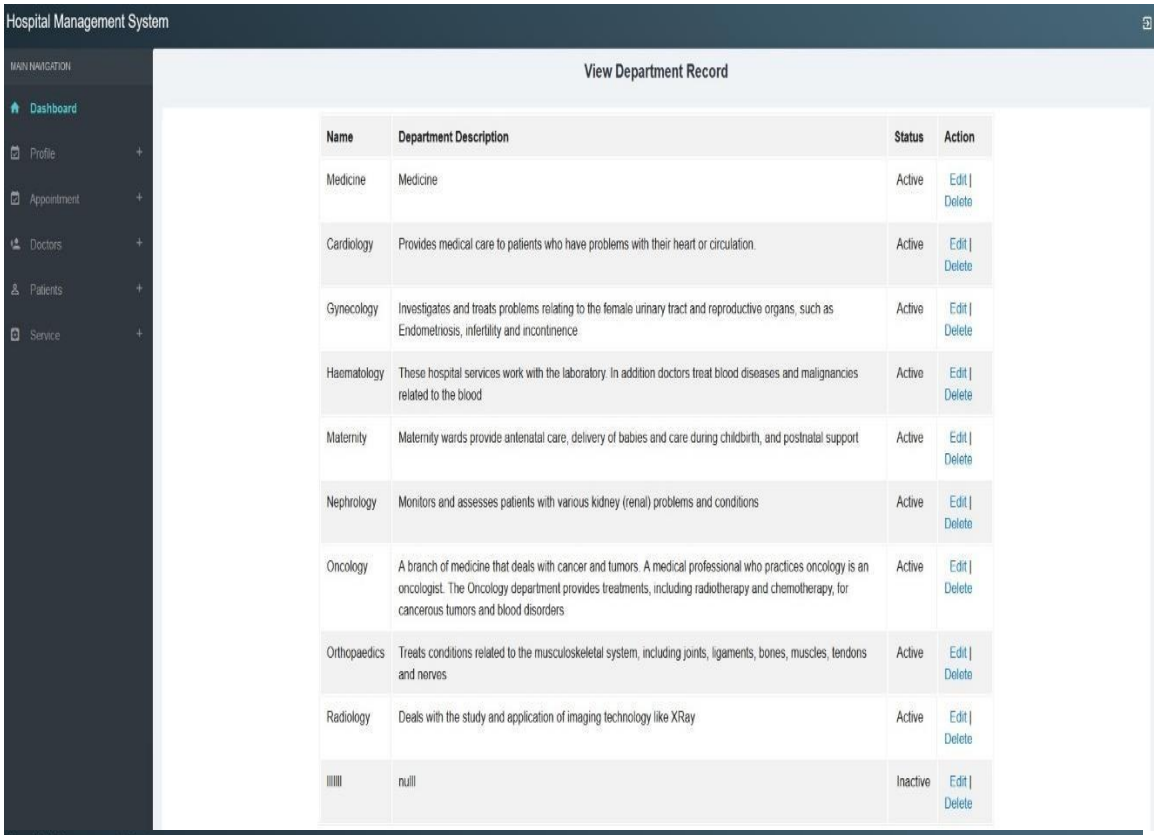

Hospital Management System
MAIN NAVIGATION
Dashboard
Profile
Appointment
Doctors
Patients
Service
View Medicine List
Show 10 entries
Search
Name
Cost
description
Status
Action
agra
74.00
saefe
Active
EDIT
DELETE
Abemaciclib
278.00
drug for the treatment of advanced or metastatic breast cancers.
Active
EDIT
DELETE
Captopril
92.00
used alone or in combination with other medications to treat high blood pressure and heart failure.
Active
EDIT
DELETE
Clotrimazole
14.00
Clotrimazole is an antifungal, prescribed for local fungal infections
Active
EDIT
DELETE
Cozaan
5.00
ARBs block the effects of angiotensin on your heart.
Active
EDIT
DELETE


Hospital Management System
MAIN NAVIGATION
Dashboard
Profile
Appointment
Doctors
Patients
Service
View Department Record
Name
Department Description
Status
Action
Medicine
Medicine
Active
Edit | Delete
Cardiology
Provides medical care to patients who have problems with their heart or circulation.
Active
Edit | Delete
Gynecology
Investigates and treats problems relating to the female urinary tract and reproductive organs, such as Endometriosis, infertility and incontinence
Active
Edit | Delete
Haematology
These hospital services work with the laboratory. In addition doctors treat blood diseases and malignancies related to the blood
Active
Edit | Delete
Maternity
Maternity wards provide antenatal care, delivery of babies and care during childbirth, and postnatal support
Active
Edit | Delete
Nephrology
Monitors and assesses patients with various kidney (renal) problems and conditions
Active
Edit | Delete
Oncology
A branch of medicine that deals with cancer and tumors. A medical professional who practices oncology is an oncologist. The Oncology department provides treatments, including radiotherapy and chemotherapy, for cancerous tumors and blood disorders
Active
Edit | Delete
Orthopaedics
Treats conditions related to the musculoskeletal system, including joints, ligaments, bones, muscles, tendons and nerves
Active
Edit | Delete
Radiology
Deals with the study and application of imaging technology like XRay
Active
Edit | Delete
llllll
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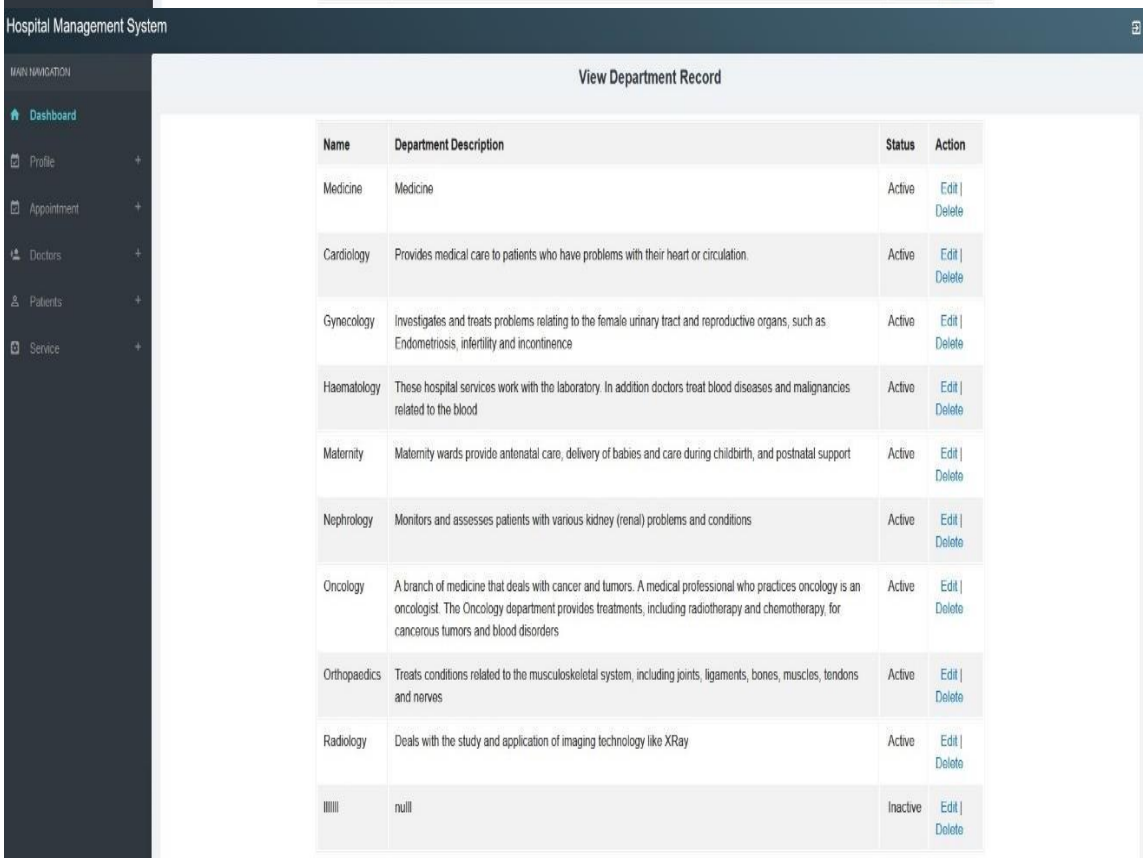
Inactive
Edit | Delete


Hospital Management System
MAIN NAVIGATION
Dashboard
Profile
Appointment
Doctors
Patients
Service
View Department Record
Name
Department Description
Status
Action
Medicine
Medicine
Active
Edit | Delete
Cardiology
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Active
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Inactive
Edit | Delete

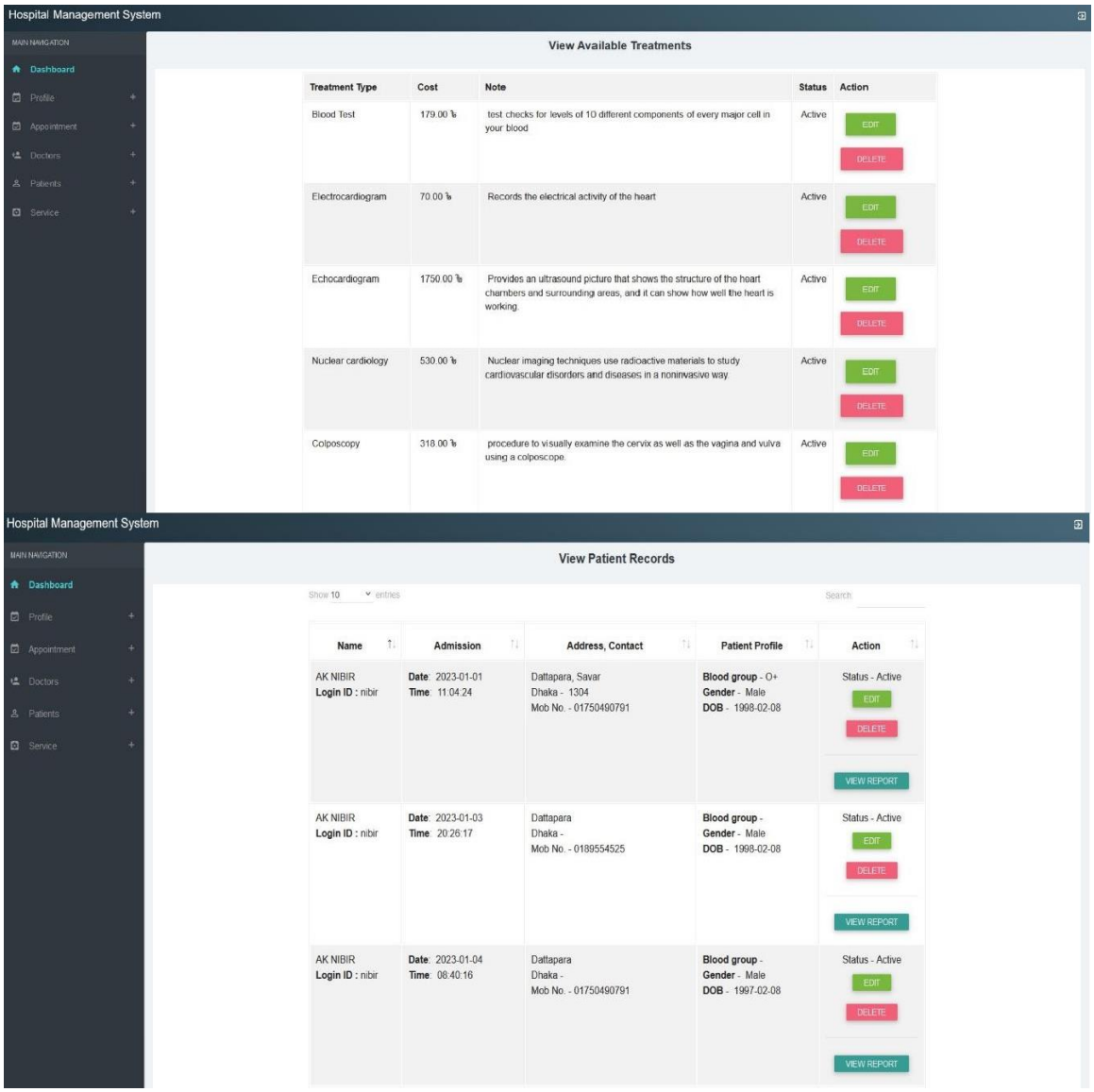

Fig. 6: Full admin dashboard

Doctor section can do:

- Apply for job in hospital. Then Login (Approval required by hospital admin, Then only doctor can login).

- Can only view their patient details (symptoms, name, mobile) assigned to that doctor by admin.

- Can view their discharged(by admin) patient list.

- Can view their Appointments, booked by admin.

- Can delete their Appointment, when doctor attended their appointment.

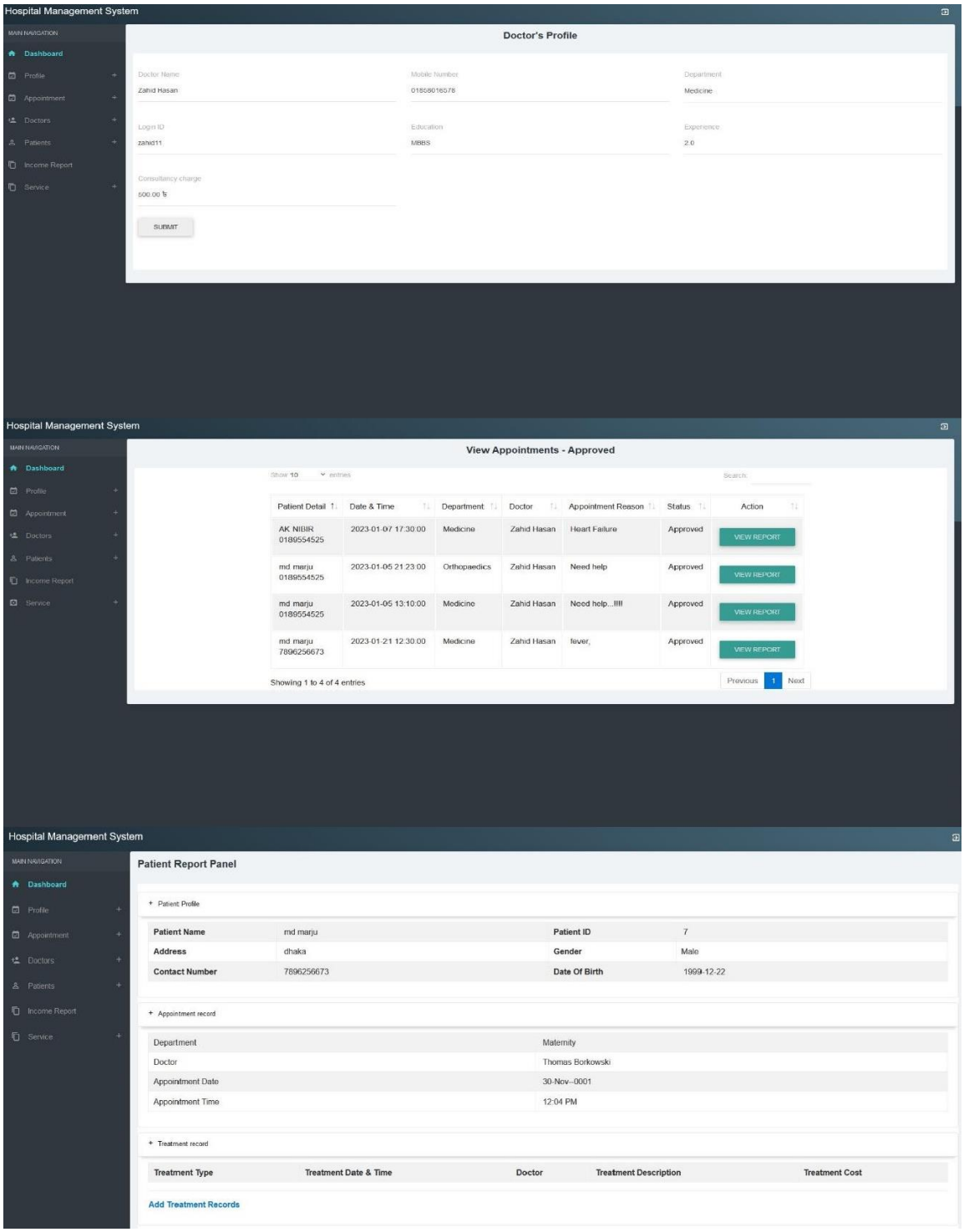

Fig. 7: Doctor dashboard

Patient can do:

- Create account for admit in hospital. Then Login (Approval required by hospital admin, Then only patient can login).

- Can view assigned doctor's details like (specialization, mobile, address).

- Can view their booked appointment status (pending/confirmed by admin).

- Can book appointments.(approval required by admin)

- Can use ambulance service appointments.(approval required by admin)

- Can view/download Invoice pdf (Only when that patient is discharged by admin).

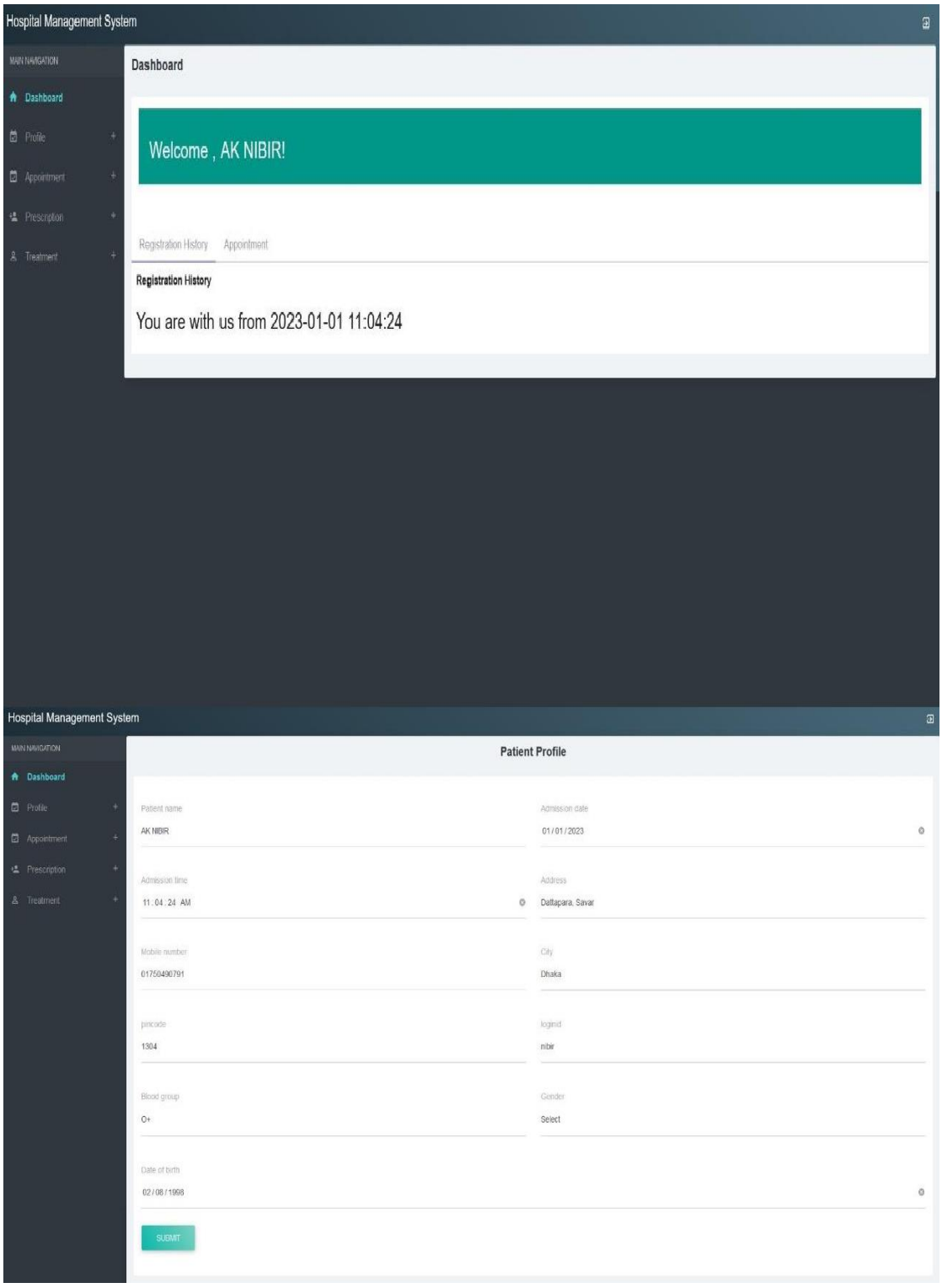

Fig. 8: Patient Dashboard

CHAPTER 5
CONCLUSION

We will bring our web application and mobile application updates so that there are many more benefits for people to use. We want to fast delivering healthcare model and need to improve management in our hospital or plan to innovate healthcare with new software product. Basically, we want to smart hospital management application so that people can use our web application easier.

Future work

There is a lot of opportunity for improvement in this project. Many capabilities, such as :

We can add a voice messaging option in our live chat.

We can add multiple payment gateways to our platform.

We can add multiple languages.

Also, we can use React Native for mobile applications (Cross-Platform

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