A WEB APPLICATION FOR HOSPITAL MANAGEMENT SYSTEM

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

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APPROVAL

This Project titled "**A Web Application For Hospital Management System**", submitted by Jabed Hasan (ID:152-15-5700) and Tamanna Haider (ID:161-15-6751) to the 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 23 September, 2020.

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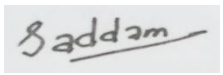

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Md Zahid Hasan, Assistant Professor, Department of CSE,** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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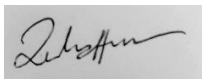

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ABSTRACT

Online hospital management is really necessary tool for current situation. During COVID-19 situation doctors couldn't see the patients face to face because of health risk. So, we are trying to create a web application where we can schedule meetings with doctor and patients. Also, we are trying to create a web-based chat application for more easy and fast communication. At the time of more online collaboration and tremendous use of information technology in all spare of our everyday activities, event like different activities taken time to time, plays very important role in the development of any organization. Each and every hospital or health organization is a functional body of patients, doctors and many other administration participants. For each of these functional bodies especially management of patient and doctor becomes very crucial for healthy and effective management. There are many other Doctor-Patient management sites online, our project is totally focused on the perspective of any hospital in Bangladesh. In this system we attempted to develop an effective, operational and easy to use system for the development of online Doctor booking system. The requirement of such system collected from different hospitals, online sites. The design of the proposed system was done as per the user requirement. The system is implemented using open source technology and content management system. The system was tested for different functions and found satisfactory. In future the system will be integrated for smart phone user also.

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CHAPTER 1
Introduction

1.1 Introduction

A Web Application for Hospital Management System is an online hospital management system web application project that serves the functionality of online hospital management, appointment booking, conversation between patient and doctors using chat application. The system allows admins to register users (patients and doctors) and users are allowed to resister on the application. Patients can request for appointment and admin will approve and book appointments. Discharge right is given to Admin only. This is proposed to be a web application. Mainly the idea came from current COVID-19 situation.

1.2Objectives

The main objective of A Web Application for Hospital Management System is to provide flawless hospital management dashboard not only hospital administrators but also doctors and patients. Everyone registered for a particular user is being managed by admin at any time. This system is basically aimed to provide the administrator a complete control over the doctors and patients. Also, it ensures flexibility between doctors and patients.

The goals of our system are:

- To provide flawless hospital management dashboard.
- Admin will have the total control over the user registration and management

- Admin can approve user registration and manage appointments, discharge and payment system via web application.
- Registration Management
- Online Registration & Payment
- Create invoice

1.3 Motivation

There are many technologies have been developed in this world. The computer is the best among all of these. Long time before, People used pen and paper for writing documents. But, nowadays, automated systems are being developed for solving this issue.

Currently, all the world is facing a pandemic situation for COVID-19. In this time, patient care should be easy enough and maintained through online. Now a days, for COVID situation both patients and doctors feel risky and danger to meet and consult face to face. So, to reduce this risk, a system we are trying to developed which generally, means creating a web system where an admin can control the registration of users online and manage appointment booking and discharge, payment system. The project work is about the designing and hosting the web portal for the management of hospital with doctor and patient. Using HTML, CSS, JS, Ajax, Python, Django, jQuery, SQLite for the database, we developed the project.

1.4 Expected Outcome

In our Project our main focus is to provide a dashboard to a hospital for controlling and managing patient and doctor consultation and treatment though online. But there will be scope for patients and doctors also. Patients will be able to register and request for

appointment as available doctor. They can also add their symptoms and description on the profile section. Doctor can register and provide treatment to their patients. The system also will be able to work on any web browsers platform and can be accessed anywhere via internet. The system also will be secured as it will protect the confidential and privacy of data effectively.

1.5 Report Layout

It's known by everyone that Practical knowledge leads Theoretical knowledge. In our education life we gathered a lot of Theoretical knowledge and got chance to implement those knowledge and skill to This project.

In the First Chapter we've discussed about Introduction, Objectives, Motivation, Expected Outcome and Report layout of the project.

Then Second chapter contains Project Introduction, Related works, Comparative Studies, Scope of the problem and also Challenges of our project.

The Third chapter contains all about Requirement Specification which are Use Case Modeling and Description, Logical Data Model, Design Requirements.

Fourth Chapter describes our full web site description which is related to Design Specification like Front-end Design, Back-end Design, Interaction Design and UX, Implementation Requirements.

The Fifth chapter contains about Implementation and Testing. This contains Implementation of Database, Front-end Design, Interactions, Testing Implementation and Test Results and Reports.

Our last chapter contain conclusion of the full project. This report contains all about our web system, its problem, solution and use of the system.

CHAPTER 2

BACKGROUND

2.1 Introduction

A Web Application for Hospital Management System is the application of hospital management to the development of appointment, treatment and payments.

A Web Application for Hospital Management System involves studying the intricacies of the process, identifying the concurrent problem, devising the online hospital management concept, logistics the planning and coordinating the technical aspects before admitting the patient under doctor. The recent situation of COVID-19 all over the world means that the system of meeting and consulting doctors going out of home has become a risky and dangerous process. In our country, there are some hospitals, who have started online management system but this is very few according to the number of hospitals and patients. This system will make the management process well organized and both parties will be benefitted.

2.2. Organization Events Scenario

A hospital formed with many departments and each department have its own doctors. There is a communication gap or not easily reachable system between doctors, patients and admin. There is a difficult process during appointment of a patients to doctors also consultation of patient to doctor. So, it is not possible all the time to handle the situation offline. So online solution can solve or minimize the problems.

2.3 Event Collaboration

A hospital management is combined of administration, doctors and patients. Most of the time, hospital admin fails to book the appointment due to insufficient real-time information update of doctors available. To book an appointment, admin has to check the availability of a doctor requested by patient. In that case they have to face difficulties to get updates quickly.

2.4 Related Works

Hospital management, attendee management, payment processing, badge printing, hotel room booking, invoice generation, etc.

2.4.1: TONIC

Figure:2.1 is Tonic Website screenshot. Tonic is an online hospital care in Bangladesh. Tonic is basically a gateway of Universal Health Coverage (UHC). It helps the members and their families with health care and financial support. [1]

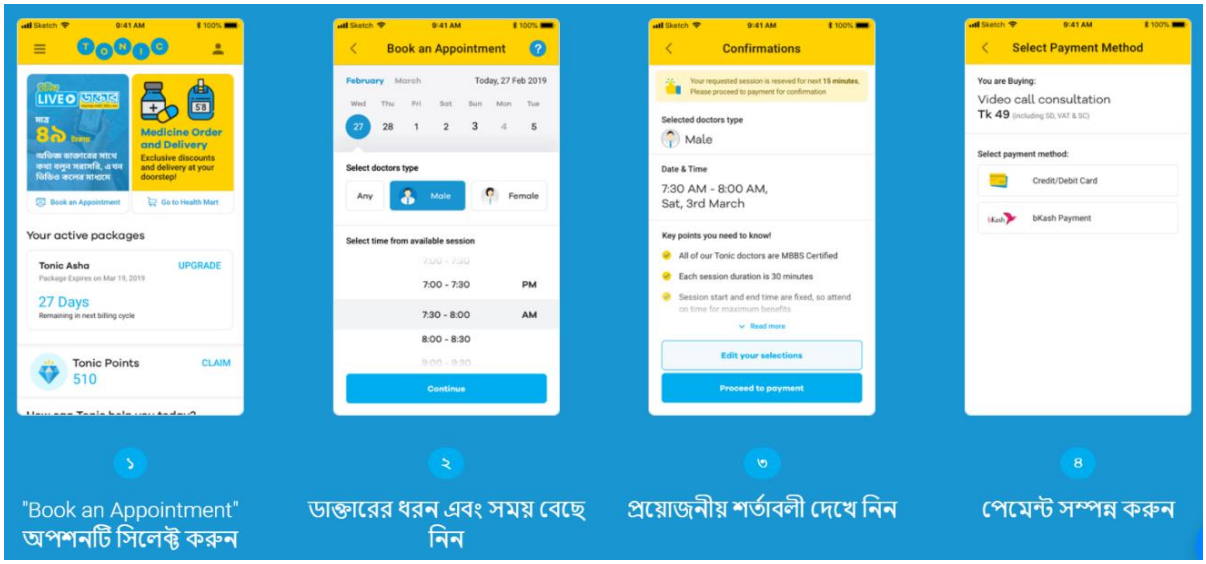

Figure: 2.1 TONIC

Tonic runs with the monthly subscription system. Different monthly subscription has been provided in tonic application and members and their families get benefitted. There is not too much offer given to the basic membership but that's not bad.

2.4.2 Popular Hospital website

Figure:2.2 is Popular Hospital Website screenshot. Popular Diagnostic Centre Ltd. Known as one of the most updated diagnostic and medical services center in Bangladesh. It has been known as a very reputed and equipped diagnostic complexes of Bangladesh and stablished in 1983. It is a large diagnostic services provider organization in private sector of Bangladesh. It is been superior in introducing world most updated medical equipment and digital technology to provide medical researches and treatment services. [2]

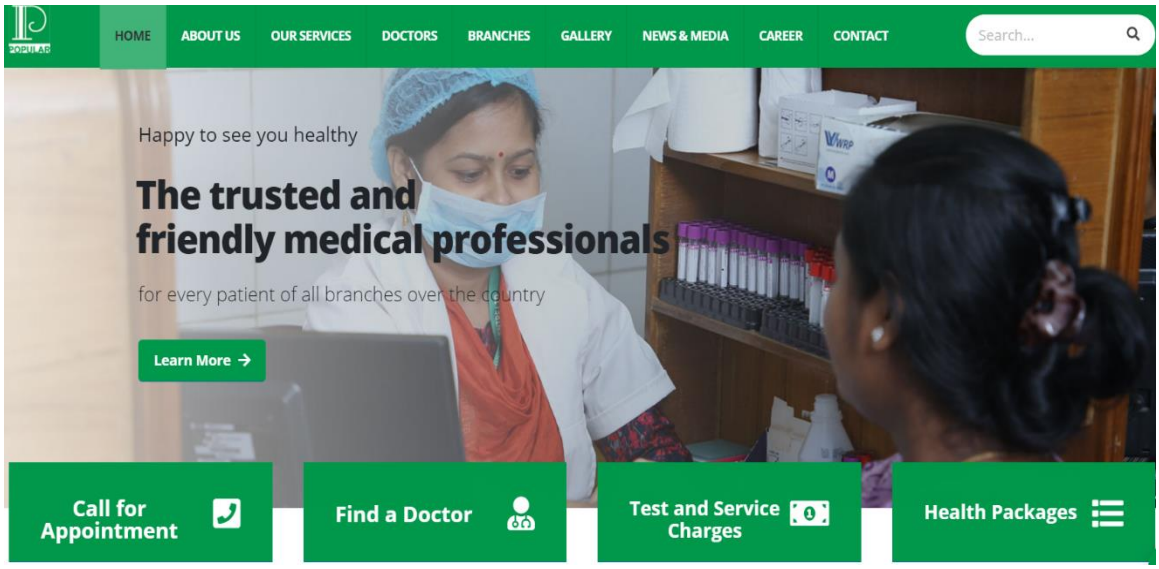

Figure: 2.2 Popular Hospital website

Features [1] [2]

- Doctor appointment
- Discount
- Cash claim
- Automated reminders
- Private doctors
- Ambulance call
- Health package
- Find doctor
- Find nearest branch
- Video calling
- Patient record
- Online payments

2.5 Comparative Studies

First of all, TONIC and Popular Hospital Website is not independent, also they have application module system for installing it in mobile phone, people need to have other specifications and system installed. The A Web Application for Hospital Management System is free from that complications, anybody can access it from a browser from any place. Secondly, our system is really cheap to install and use. In our system, this site will be managed by the hospital itself and the patients and doctor can join by registration. It's a system managed by one for their own management and participated by doctors and patient. And finally, any organization can use our system without cost.

2.6 Scope of the Problems

1) Try Exception handling, we didn’t do this so that our system doesn’t crush when we insert wrong data.

2) Used 2 different server

3) Roll-based permission problem

4) Data insertion problem in Database

2.7 Challenges

- **Try Exception handling:**

Try exception means testing the system with wrong information. If we do try exception handling then although we give wrong data the system will not crush. The simplest method of handling exceptions is try-catch. We have to put the code that we want to run in the try block, and then any exceptions that the code throws will be caught by one or more catch blocks. Any type of exceptions that get thrown will catch by this method. This is the simplest technique for handling exceptions.

- **Used 2 different server:**

Each server allows a specific memory size. From one PC we can run one local server at a time. We had to use 2 different application. One for Chat and another for Hospital Management Web Application. The chat application will run directly from rest API. On front-end we call rest API using JS. If we add front-end with Hospital Management Web Application app, it will work perfectly. The Chat app is not interconnected with front-end. In industrial purpose they also divide the whole system on different servers so that the data flow doesn't get slow also it gives more server speed.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Flow Chart

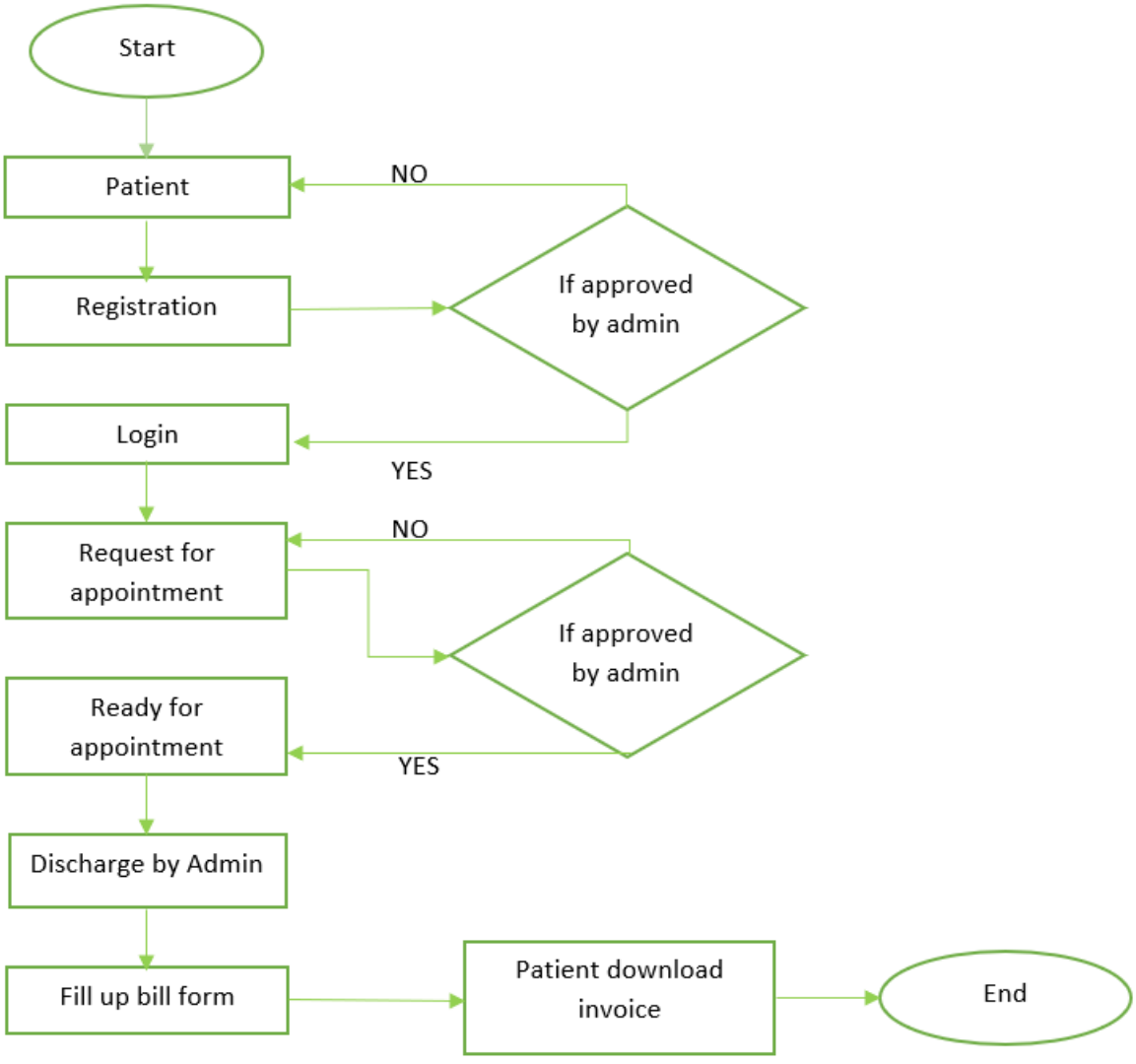

Figure:3.1 Flow-Chart

Figure: 3.1 is Flowchart of our project which shows the separate steps of the process in sequential order. The process will start from patient. Patient can register their account and it needs Admin approval. If the registration request is approved by admin then patient can login to their account. Then patient can request for appointment. But here again the Admin approval is required. Once the appointment request is approved by Admin the patient will be ready for appointment and treatment. After the treatment patient will be discharged by doctor or Admin. While discharging Admin will generate a bill and the invoice will be downloadable from patient dashboard.

3.2 Requirement Collection and Analysis

For requirement collection we first look for proper framework to support our application. For this application we used Django frame work. For OS we use window operating system.

3.3 Use Case Modeling and Description

A use-case model that shows different types of users interact with the system and solve a problem. It describes the goals of the users, shows the interactions between the users and the system, and the required behavior of the system.

A use-case model consists some important elements which are: actors, use cases and the relationships between them. [3]

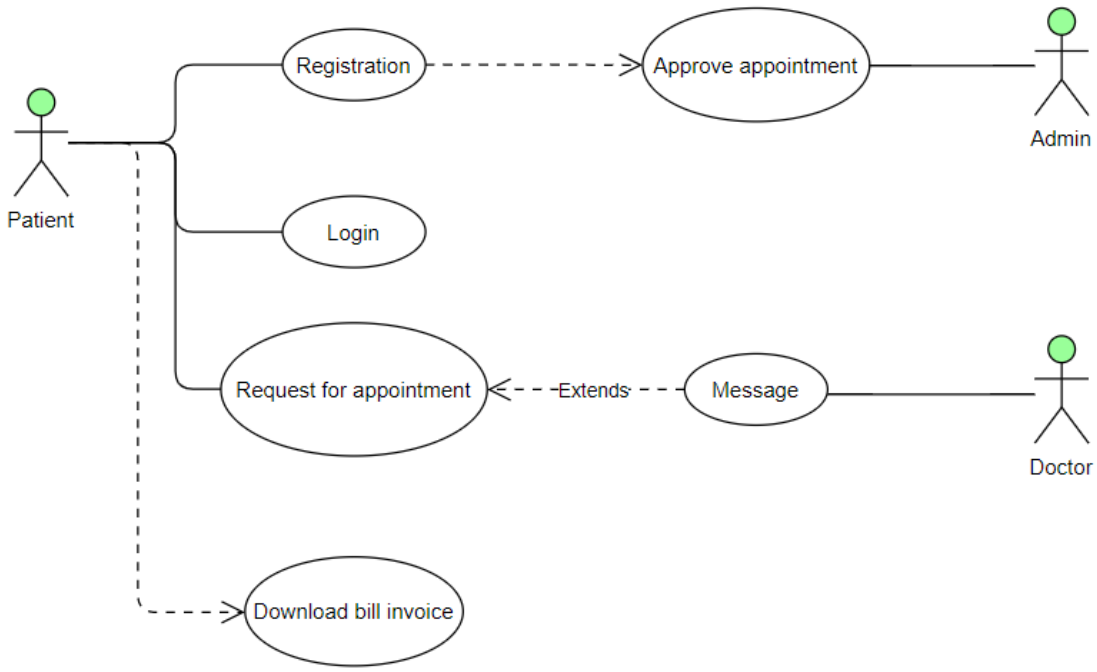

Figure: 3.2 System Use case diagram

The system use case of our project shows the following steps. Patient can register their account and it needs Admin approval. If the registration request is approved by admin then patient can login to their account. Then patient can request for appointment. But here again the Admin approval is required. Once the appointment request is approved by Admin the patient will be ready for appointment and treatment. After the treatment patient will be discharged by doctor or Admin. While discharging Admin will generate a bill and the invoice will be downloadable from patient dashboard.

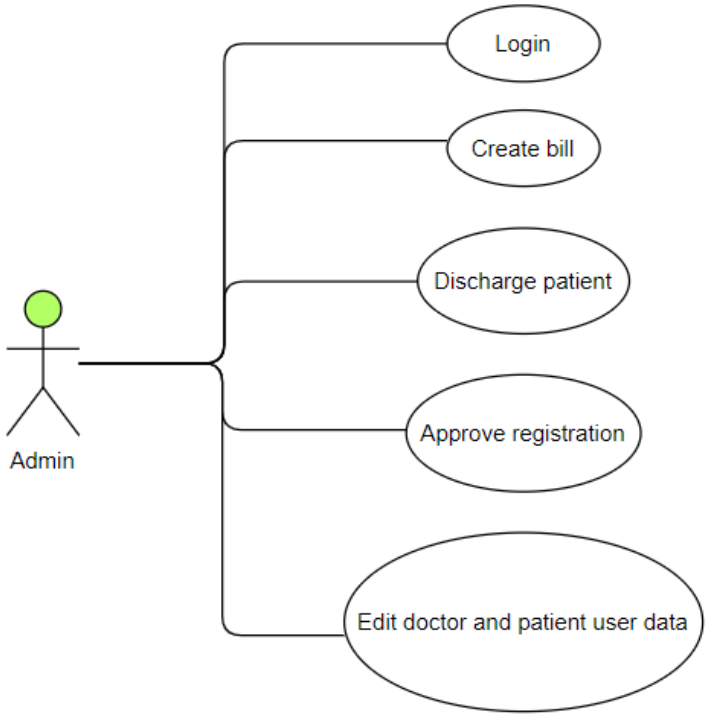

Figure: 3.3 Admin Use case diagram

Use Case Details:

Use case name : Admin Use case

Precondition : None

Actor : Admin

Primary Path : 1. Enter Login ID

2. Enter Password

3. Click “Login” button

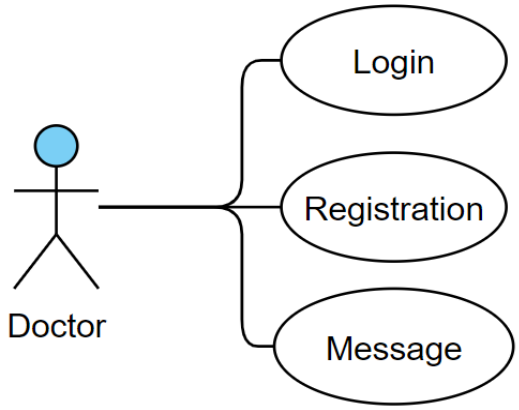

Figure: 3.4 Doctor Use case diagram

Use Case Details:

Use case name : Doctor use case

Precondition : Registration

Actor : Doctor

Primary Path : 1. Enter Login ID

2. Enter Password

3. Click “Login” button

3.4 Database Diagram

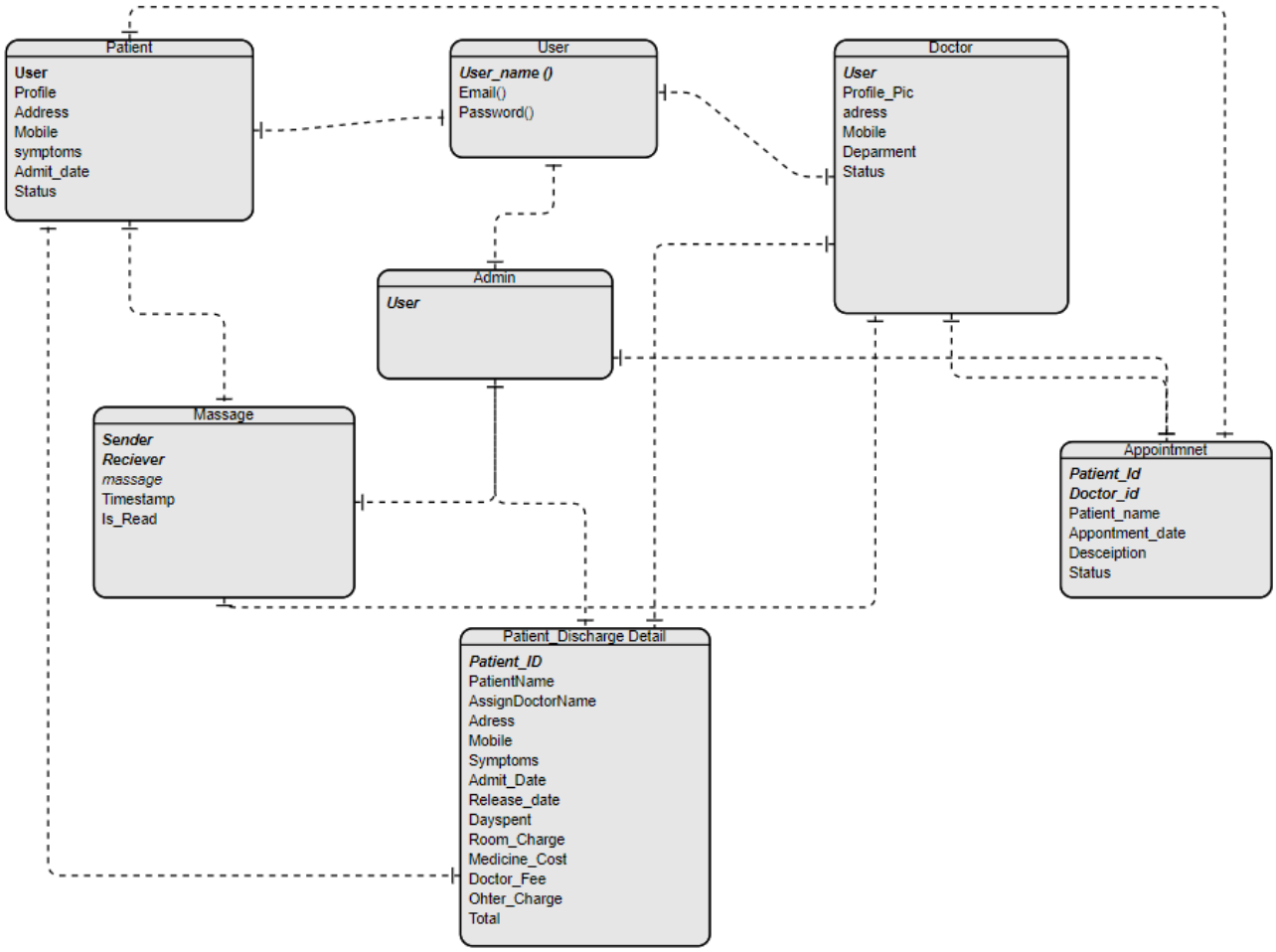

Figure: 3.5 Database Diagram

Chapter 4

Design Specification

4.1 Front-end Design

1. HTML

HTML is the short form of Hypertext Markup Language. HTML is used broadly for creating backbone of web pages and applications. Web server or local storage send HTML document to web browser. Then web browser read the HTML codes and display the correspondent design layout. Then necessary CSS codes can be used for designing the required webpage. [4]

2. CSS

CSS is Cascading Style Sheet. CSS is used for describing the HTML elements on screen. CSS can be called in 3 ways in a HTML code. Like Inline, Internal & External. In CSS file we save External stylesheets. A lot of works can be done easily in CSS as it can control multiple pages all at once. CSS is mainly used to make the better rideability of code. Using CSS, we can design our webpages according to our requirements and desire. [5]

3. jQuery

jQuery is a light weight JavaScript library. jQuery provides an easy process of HTML document manipulation, event handling, animating, and Ajax interactions. Most efficient activity of jQuery is that jQuery supports to implement AJAX applications. [6]

4. JavaScript

JavaScript is a text-based programming language. It is used for client-side as well as server-side. It provides support to make web pages interactive and Dynamic. HTML gives structure, CSS gives Design and JavaScript gives interactive elements to webpages that helps to engage users. [7]

5. Ajax

Full form of AJAX is Asynchronous JavaScript and XML. For creating dynamic web pages, there is an important role of AJAX. Ajax is mainly a group of technologies. A combination of HTML and CSS can be used to mark up and style information. Then the webpage can be modified by JavaScript. [8]

6. Django 3.0

Django is an open source python framework. It's not a language. Django is written in Python language. Django is a collection of Python libraries. It allows to create a quality Web application quickly and efficiently. It is suitable for frontend as well as backend. It is mainly used for rapid development, pragmatic, maintainable, clean design, and secure websites. [9]

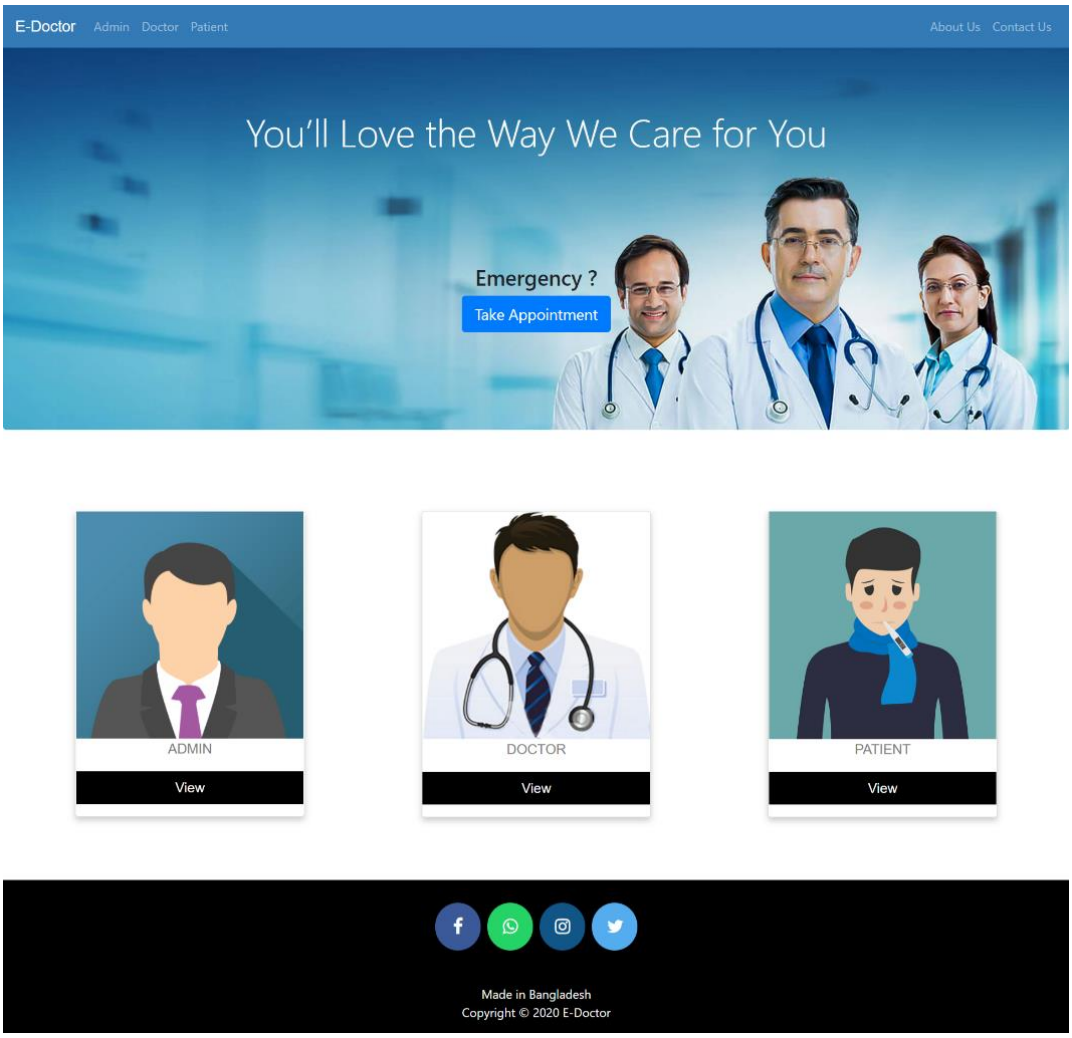

Figure: 4.1 Home Page

This is the Home page of our website. Where we can see we have 3 users and they are Admin, Doctor and Patient. 3 of them can register their account or login for existing account from homepage. Also, patients can book appointment from this page.

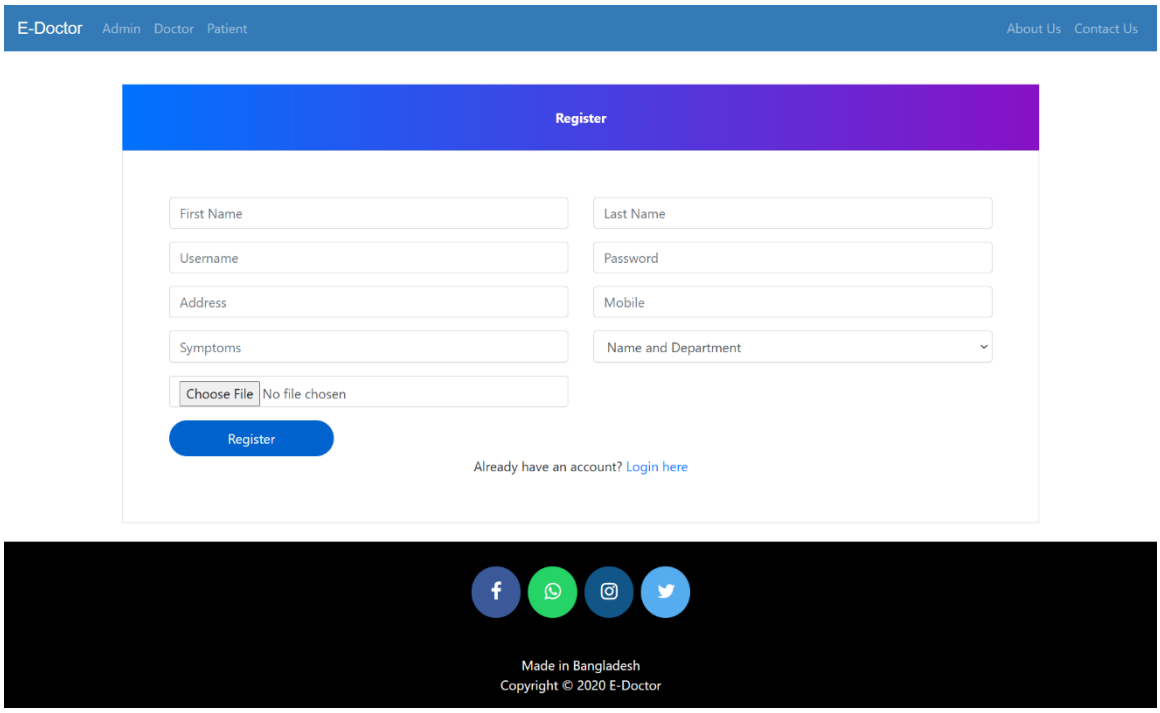

Figure: 4.2 Patient Registration

This is a registration page for Patients. They can register their account as patient and after admin approve, they can login to their account. While registering account they need to provide some information or fill up some fields like First Name, Last Name, Username, Password, Address, Mobile, Symptom, Doctor's name, Profile Picture. After registering account, it will be on hold for admin approval. Once the Admin approve the patient registration the patient will be ready to login and book for appointment.

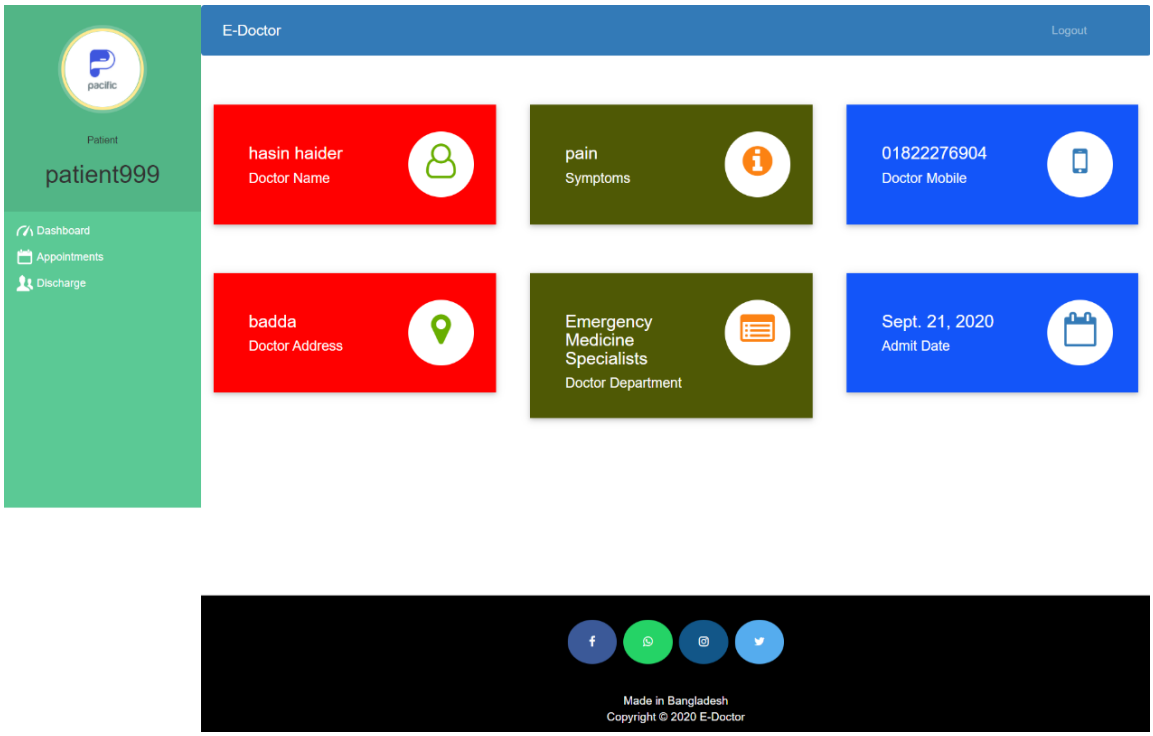

Figure: 4.3 Patient Dashboard

After login patient can see their dashboard. Where doctor's information is displayed. Also, patient can request for booking appointment. While booking an appointment patient needs to give some information like description of problem, Select the doctor name. Then the request for appointment will be on pending again for admin approval. Once the admin approves the appointment request both the doctor and patient will see the appointment on their dashboard. Also, when the patient will be discharged by admin or doctor, they will be able to download the invoice of total bill from discharge option.

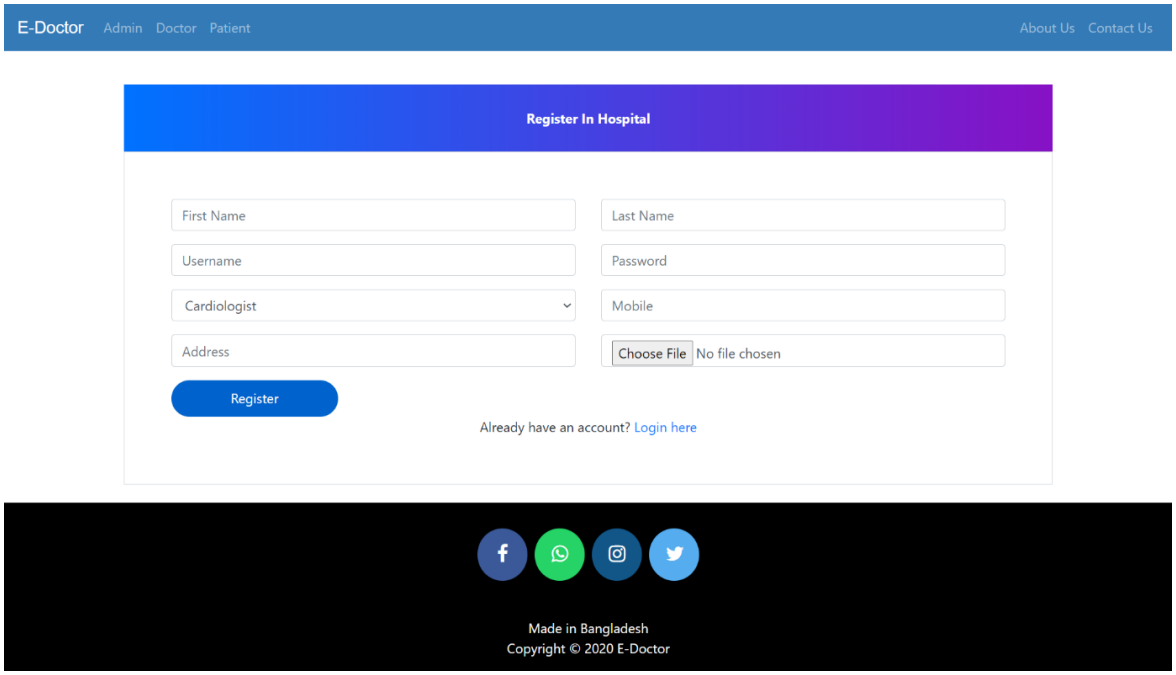

Figure: 4.4 Doctor Registration

This is a registration page for Doctor. They can register their account as Doctor and after admin approve, they can login to their account. While registering account they need to provide some information or fill up some fields like First Name, Last Name, Username, Password, Address, Mobile, Department, Profile Picture. After registering account, it will be on hold for admin approval. Once the Admin approve the doctor registration the doctor will be ready to login do further process.

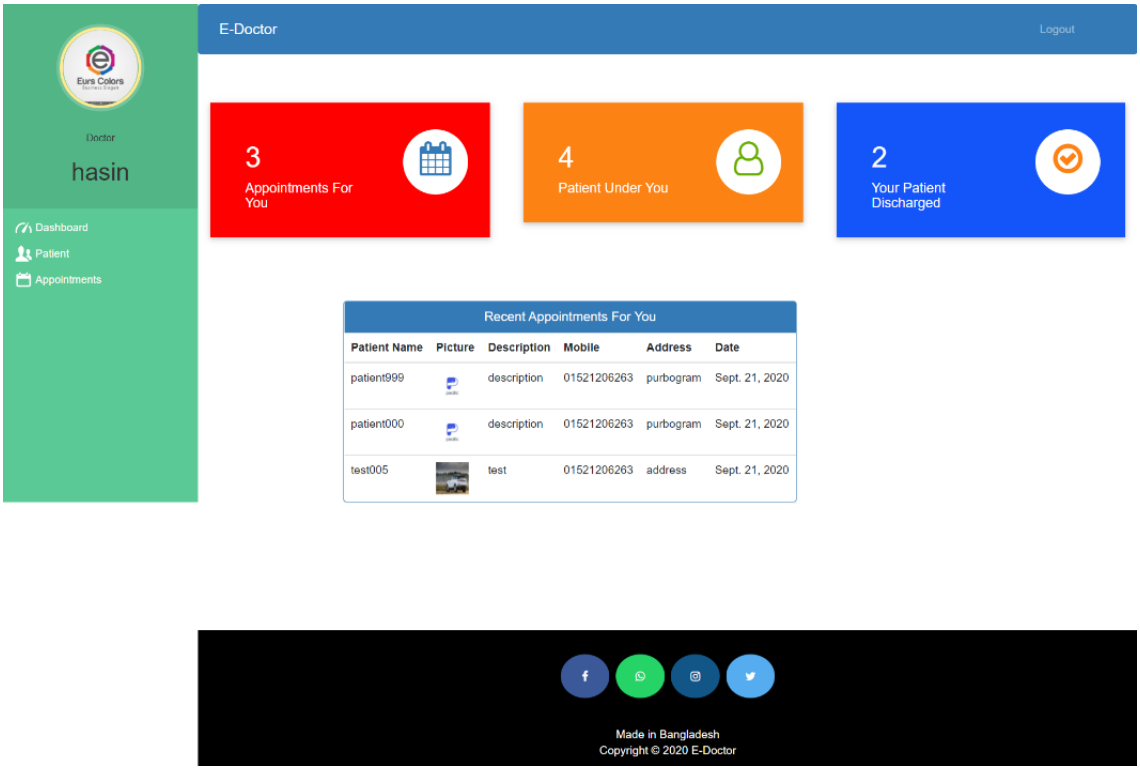

Figure: 4.5 Doctor Dashboard

This is Doctor's dashboard. Where doctor can see their appointments, number of patients under them and number of discharged patients. Also, all the appointments will be displayed on a list.

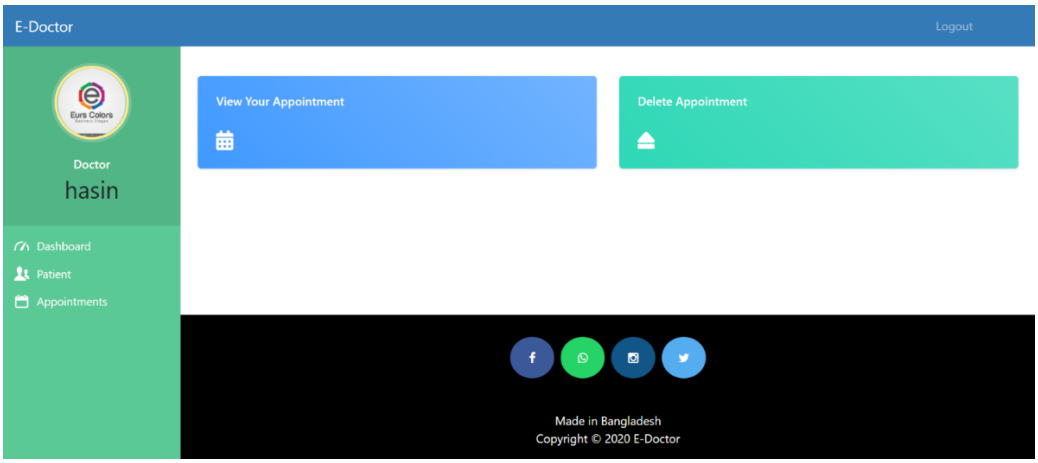

Figure: 4.6 Doctor Appointment View

This is Doctor's Appointment view. Where doctor can see their appointments, delete appointments.

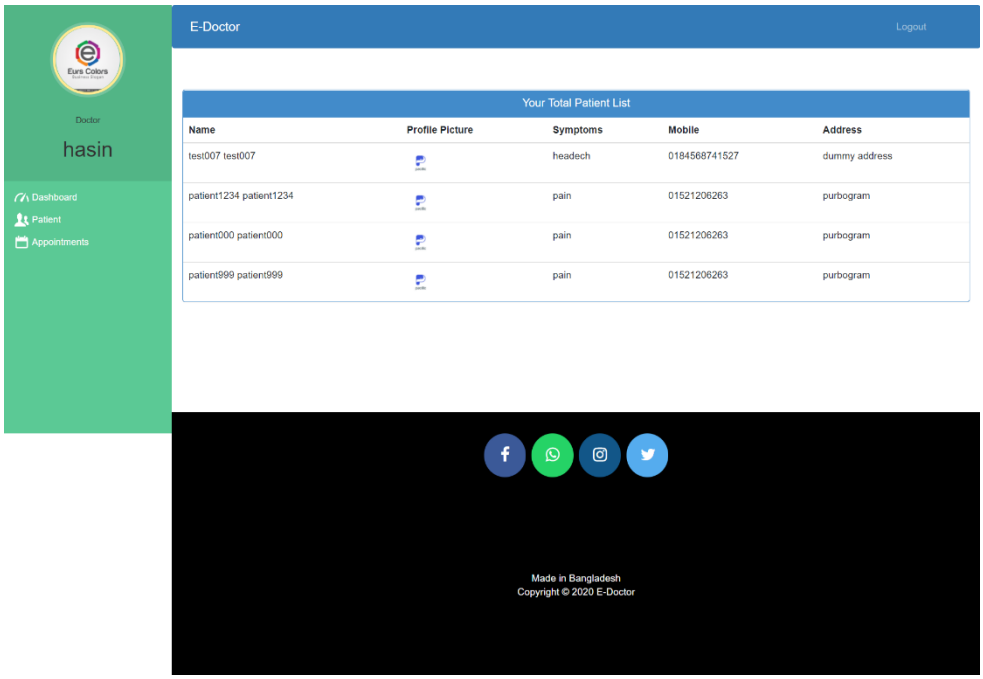

Figure: 4.7 Doctor's Patient record

This is Doctor's patient record doctor can see the list of all patients with symptom, address and mobile number.

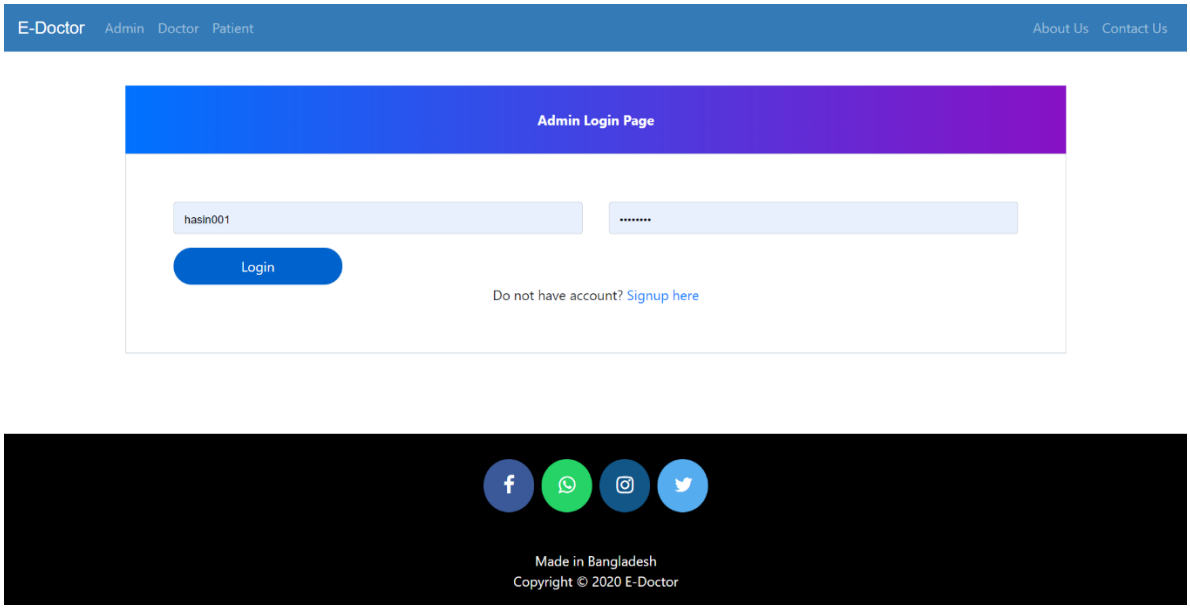

Figure: 4.8 Admin Login

Admin can login with username and password. Admin can register their account and need to be approved by super admin.

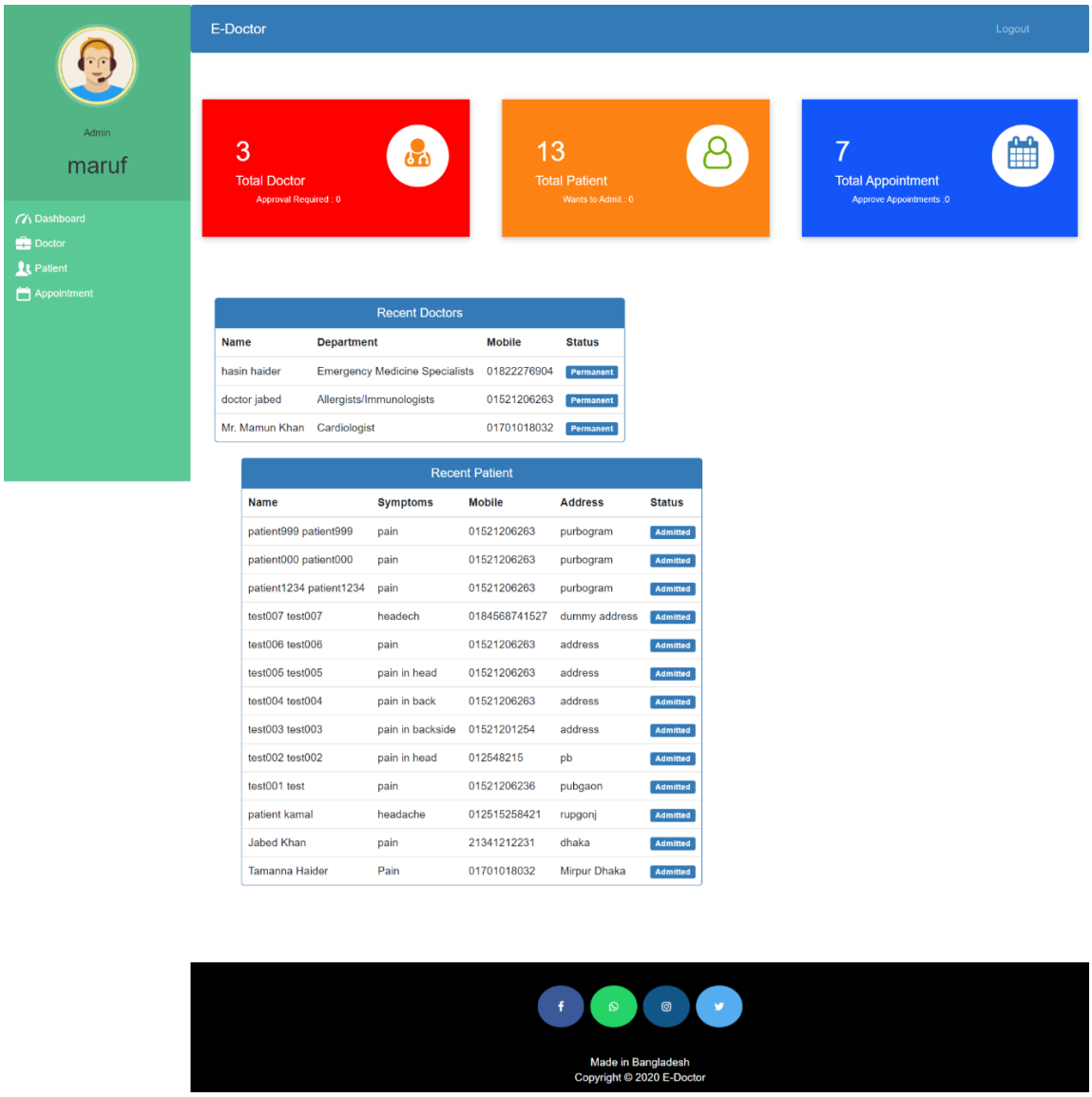

Figure: 4.9 Admin Dashboard

This is admin dashboard. Where admin can see total number of doctors, patients and appointments. From here admin can approve registration request for patient and doctors.

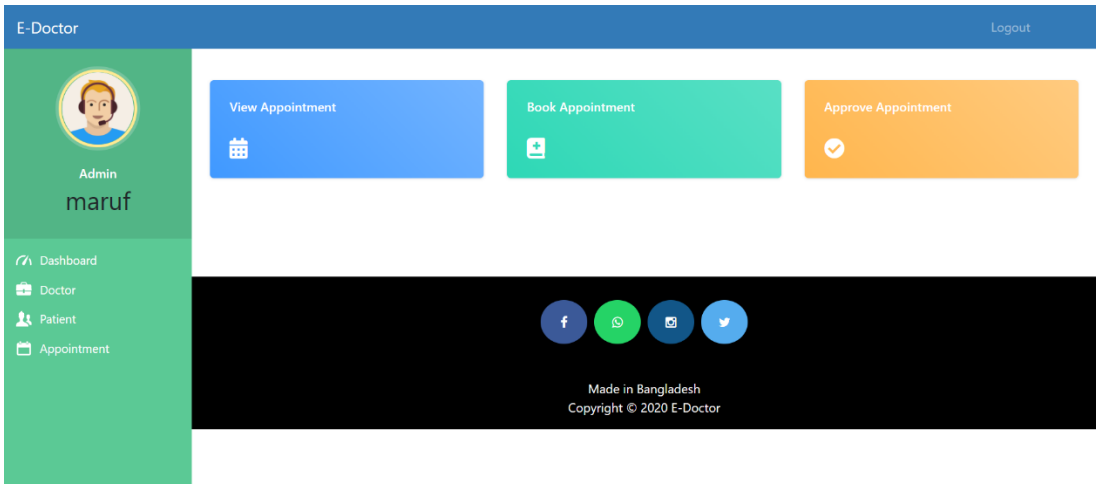

Figure: 4.10 Admin Appointment

From here admin can approve the request of appointment, book an appointment, view all the appointments.

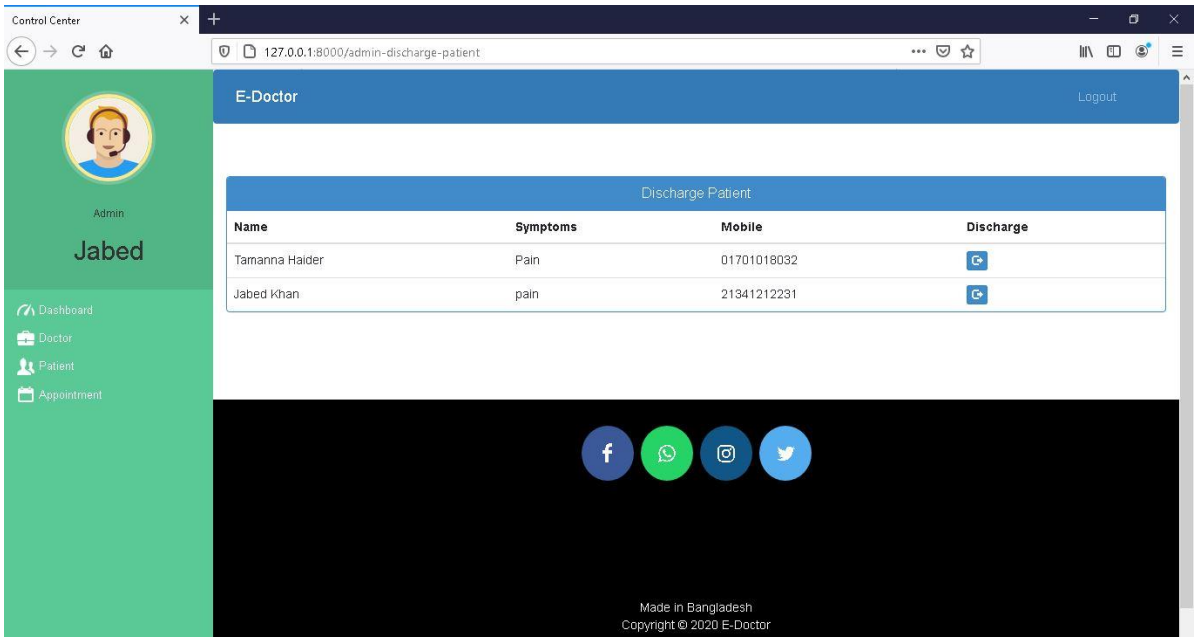

Figure: 4.11 Admin Discharge

Admin can discharge a patient from here. Also, when doctor discharge a patient admin can generate a bill and discharge the patient.

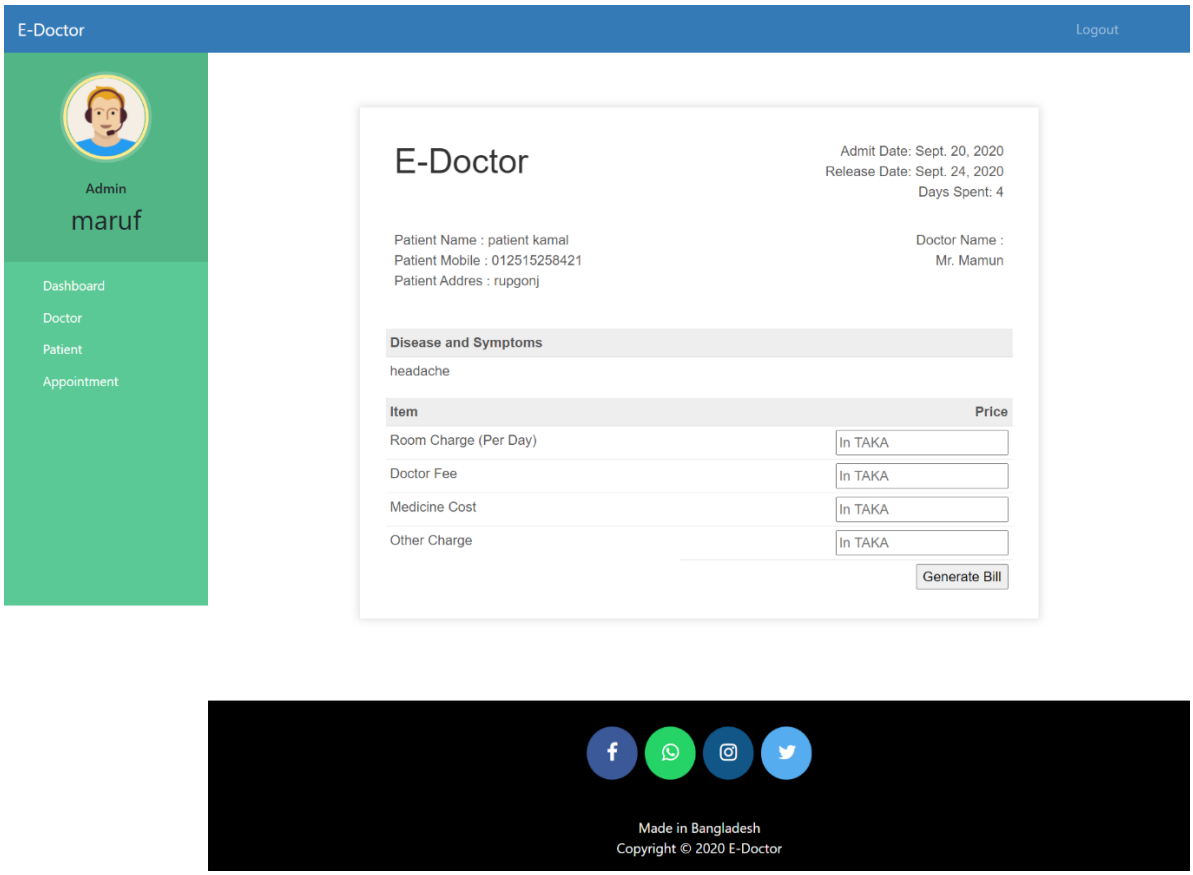

Figure: 4.12 Discharge

While admin will discharge a patient, admin needs to fill a form with bill information and a pdf of total bill will be generated and the copy of the bill will be sent to the patients and they can download the bill or invoice.

4.2 Back-end Design

We used SQLite for database. SQLite is a library of C-language. It helps with implementing fast, self-contained, high-reliability, full-featured, SQL database engine. SQLite is the most used database engine in the world. SQLite source code is in the public-domain and is free to everyone to use for any purpose. [10]

4.3 Interaction Design and User Experience (UX)

For Frontend development it is very important to give a user-friendly environment while a user operate the system. We tried to make it more responsive for every types of devices.

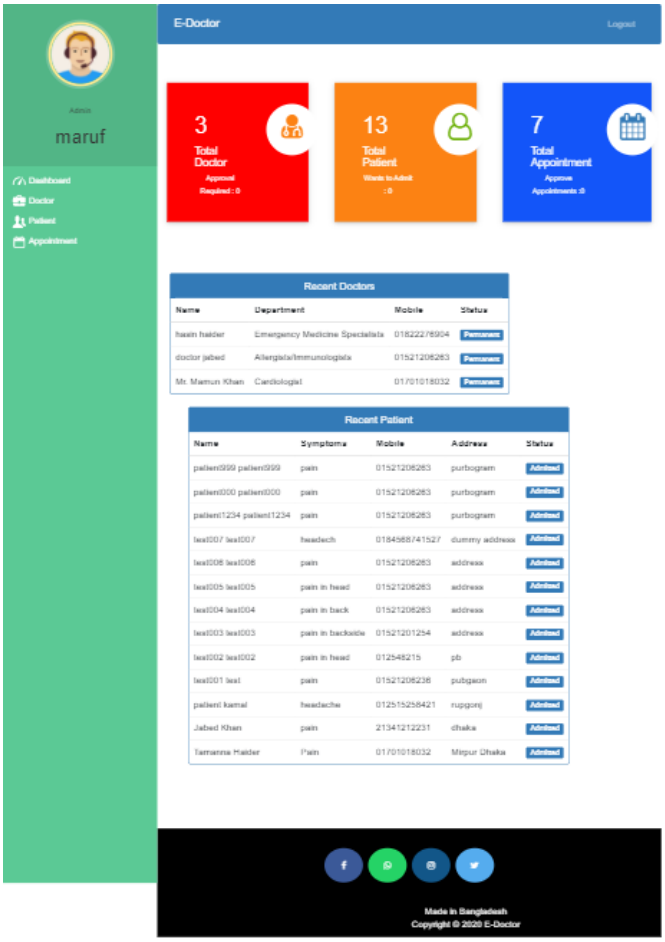

Figure: 4.13 Design for IPAD PRO X

This is a tablet view of IPAD PRO X. When the viewport will be decreased the sections will be broken in parts automatically to give a good view experience.

Figure: 4.14 Design for iPhone X

This is a mobile view of iPhone X. When the viewport will be decreased the sections will be broken in parts automatically to give a good view experience.

4.4 Implementation Requirements

To implement the application, we used Django dependencies

Here is the list:

- asgiref==3.2.7
- astroid==2.3.3
- Babel==2.8.0
- bangla==0.0.2
- certifi==2020.4.5.2
- chardet==3.0.4
- colorama==0.4.3
- construct==2.5.3
- defusedxml==0.6.0
- dj-database-url==0.5.0
- Django==2.2
- django-allauth==0.42.0
- django-appconf==1.0.4
- django-chat==0.1.0
- django-compressor==2.4
- django-cors-headers==3.4.0
- django-crispy-forms==1.9.0
- django-hitcount==1.3.1
- django-jsonfield==1.4.0
- django-social-widgets==0.4.0
- django-summernote==0.8.11.6
- django-xhtml2pdf==0.0.4
- djangorestframework==3.11.1
- enmerkar==0.7.1
- future==0.18.2
- html5lib==1.0.1
- idna==2.9
- isort==4.3.21
- lazy-object-proxy==1.4.3
- mccabe==0.6.1
- model-mommy==2.0.0
- oauthlib==3.1.0
- pdfkit==0.6.0
- pefile==2019.4.18

- Pillow==7.0.0
- prices==1.0.0
- psycopg2==2.8.5
- pylint==2.4.4
- PyPDF2==1.26.0
- python-decouple==3.3
- python-ptrace==0.9.4
- python3-openid==3.1.0
- pytz==2019.3
- rcssmin==1.0.6
- reportlab==3.5.42
- requests==2.24.0
- requests-oauthlib==1.3.0
- rjsmin==1.1.0
- six==1.14.0
- sqlparse==0.3.1
- typed-ast==1.4.1
- typing==3.7.4.1
- urllib3==1.25.9
- webencodings==0.5.1
- whitenoise==5.0.1
- wrapt==1.11.2
- xhtml2pdf==0.2.4
- Python-memchashed

Chapter 5

Implementation and Testing

5.1 ER Diagram

Figure: 5.1 shows the Registration process. Patient and Doctor can request for registration and Admin needs to approve request. Then Patient and Doctor can login and do further tasks.

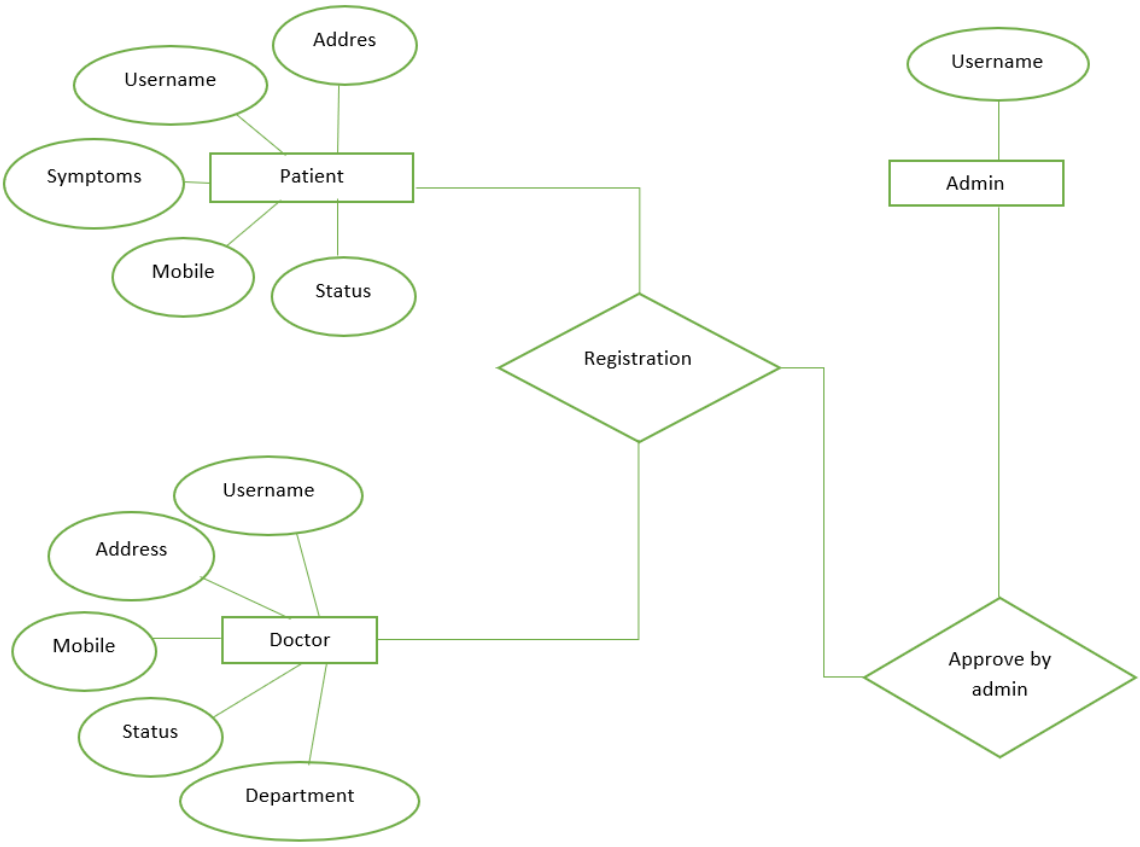

Figure: 5.1 ER Diagram for Registration

Figure: 5.2 shows the appointment process. Patient can request for appointment and Admin needs to approve appointment request. Then Patient and Doctor can message.

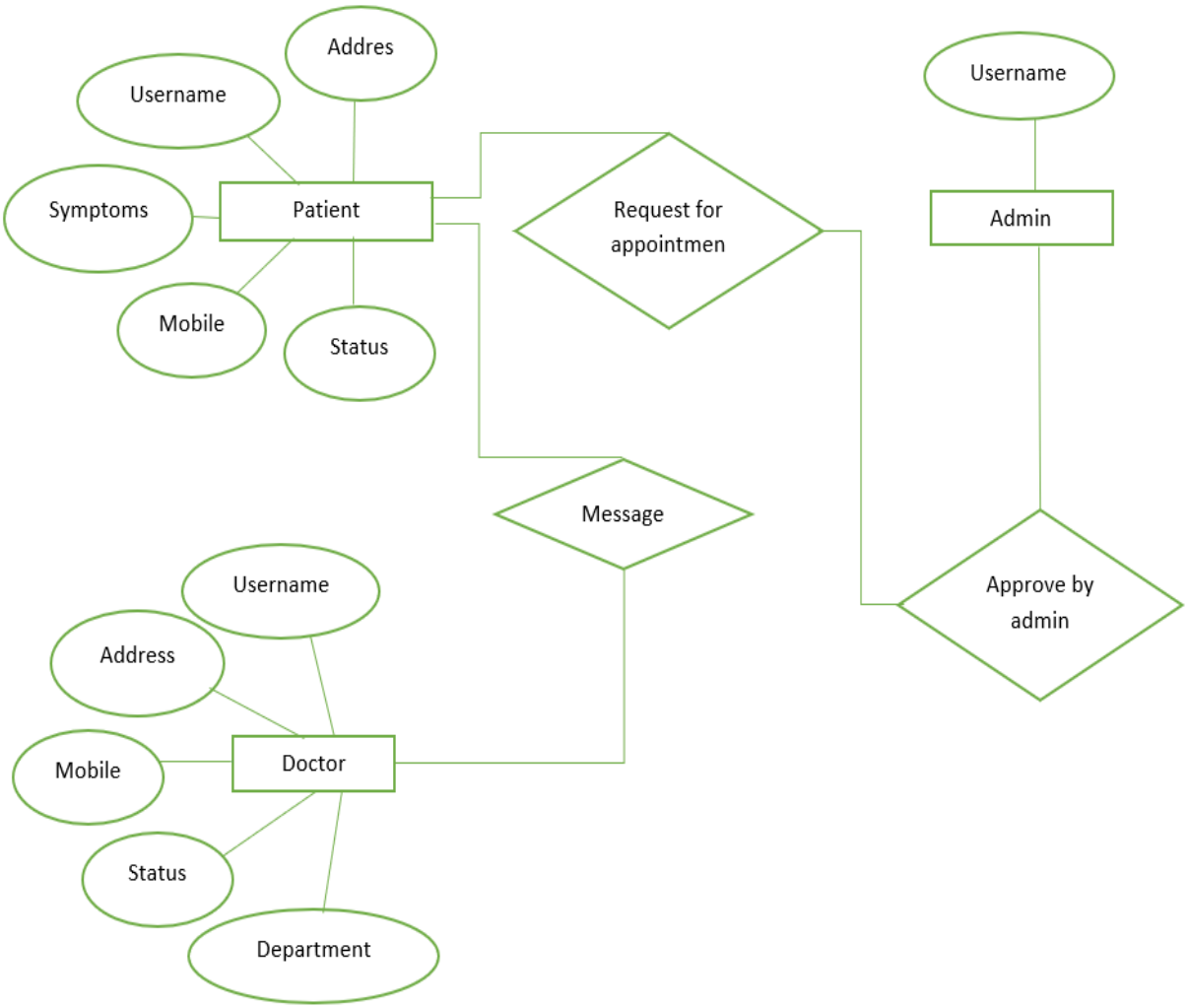

Figure: 5.2 ER Diagram for appointment

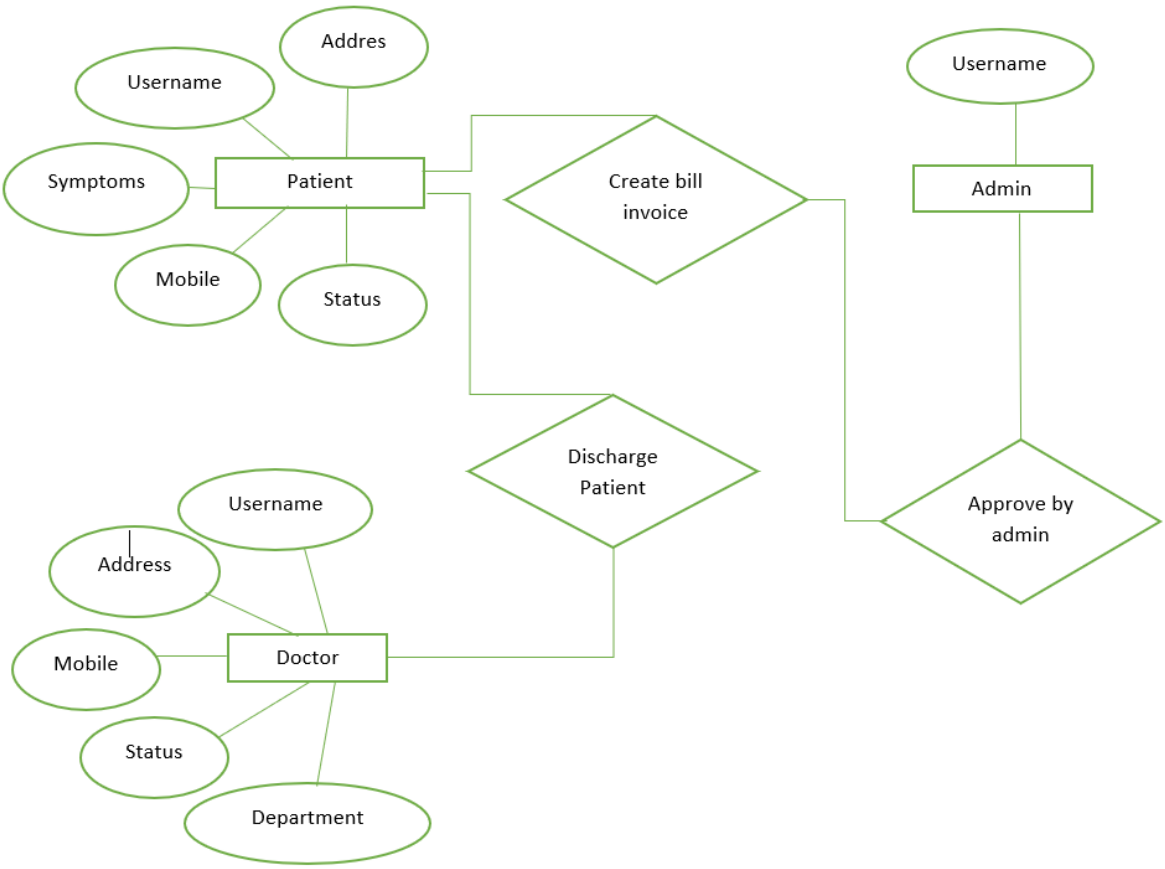

Figure: 5.3 ER Diagram for Discharge

Figure: 5.2 shows the Discharge process. After the treatment patient will be discharged by doctor or Admin. While discharging Admin will generate a bill and the invoice will be downloadable from patient dashboard.

5.2 Implementation of Front-end Design

We firstly designed the UI then we started implementing the web template. We used a lot of JavaScript because we used Ajax to communicate with our backend of Chat Application.

5.3 Testing Implementation

We used python unit test for Hospital Management Web Application. which is functional based testing. For API testing we used Postman software.

5.4 Test Results and Reports

Our testing result is really good. It is an almost bug free application. To get more accuracy we can use more QA Tool on it. No system is absolutely perfect. We will try to make our project more accurate and efficient for real time bug fixing.

Chapter 6

Impact on Society & Environment

6.1 Impact on Society

In our society current hospital management system is not so updated and automated. If our project can be implemented properly then the whole hospital management system will be easy to manage and beneficial for both Admin and Patients. Considering COVID-19 situation it will be very effective as there is less risk to meet personally. It will be time and money consuming. It will reduce travel cost, money and easy for patient as they can book appointment from home and no need to go to hospital.

6.2 Impact on Environment

This project will make a great effect on social environment. The social environment refers to the immediate physical and social setting in which people live or in which something happens or develops. It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact. Our project will not have any negative impact on environment.

CHAPTER 7

CONCLUSION & FUTURE SCOPE

7.1 Conclusion

A Web Application for Hospital Management System is designed using HTML, CSS, JS, jQuery, Python, Django, SQLite database. Here Doctors and Patients can register their account and Admin needs to approve the registration and then they will be able to login their account using username and password. Then Patents can request for appointment and admin will approve appointment request and after approving the pending request, both Doctor and Patient will see the appointment from their dashboard. Patient will have to give description of problem and select the preferred doctor and department while booking appointment. Doctor can consult patient through chat application. Admin can update user's information. Doctor will have a record of current patient and discharged patients. The discharge right is given to admin and doctor. After discharge Admin will generate a bill and the invoice will be sent to patient. Our project purpose was to make the online appointment booking and chat with doctor-patient, Admin-Doctor.

7.2 Future Scope

Our project A Web Application for Hospital Management System is very effective to reduce the risk of danger of meeting face to face, it's easy to use and both patient, doctor and administrator will be benefitted. Though in Bangladesh there are such website like TONIC, Popular, Square, but they are just for private use and doesn't give all the features like ours. Also, our project will be free to use for all hospitals and organizations with terms and condition. We have plan for following updated in future:

1) Direct voice, video calling Feature
2) Able to use Internationally
3) For both private and Government use
4) Application compatible for all operating system

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