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Company project on

A Senior Design Project

Report On

Personal Health Tracking System

submitted in partial fulfillment of the requirement for the degree of

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In

School of Computer Science and Engineering

Submitted By

SEEMA G AGER	**01FE19BCS097**
VIRUPAKSHA B M	**01FE20BCS425**
SNEHA KASHETTI	**01FE19BCS112**
SAMARTH H	**01FE19BCS094**

Under the guidance of

Prof. Lalitha M

SCHOOL OF COMPUTER SCIENCE & ENGINEERING

HUBBALLI – 580 031

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KLE Technological University, Hubballi.

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SCHOOL OF COMPUTER SCIENCE & ENGINEERING

CERTIFICATE

This is to certify that Senior Design Project entitled "Personal Health Tracking System " is a bonafied work carried out by the student team Seema G Ager (01fe19bcs097), Virupaksha B M (01fe20bcs425), Sneha Kashetti (01fe19bcs112), Samarth H (01fe19bcs094) in partialfulfillmentof completion of Seventh semester B. E. in Computer Science and Engineering during the year 2022-2023. The project report has been approved as it satisfies the academic requirement with respect to the project work prescribed for the above said program.

Guide

Prof. Lalitha M

Head, SoCSE

Dr. Meena S. M

External Viva -Voce:

Name of the Examiners	Signature with date
1.	
2.	

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Virupaksha B M - 01FE20BCS425
Seema G Ager - 01FE19BCS097
Sneha Kashetti - 01FE19bcs112
Samarth H - 01FE19BCS094

ABSTRACT

The lack of doctors in India is one issue facing the healthcare sector, which has a significant impact on patients' access to quality care. In particular for patients who live in remote areas, mobile health (MH) technologies and electronic medical records constitute a potent option that can assist both health professionals and patients in daily health monitoring and treatment. In this situation, we suggest creating a website for managing a patient's medical data. The proposed work is composed of three modules; First one is User Registration. Second one is Medical Record Scan/ Storage and the third one is Report and Consultation Module. The database structure was created using MongoDB. Using ExpressJS, ReactJS and NodeJS, the web interface was developed as a mean for users to create, store, and access the user and patient information.

Keywords : *Medical Records, MERN Stack, Login, Registration*

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Chapter 1

INTRODUCTION

In the past, the bond between a doctor and patient was not as close-knit as it is now. The patient's personal background was not necessarily of interest to the doctor, who was primarily focused on the condition. Of course, when a family is treated by the same doctor, this eventually results in links and helps the latter recognize the patient's personality and, as a result, memorize his numerous interventions, making it possible to avoid repeating questions. Each doctor had his own method of operation, and since he didn't have a strong memory, his consultations needed to be recorded. The practitioner cannot help asking questions to determine the condition from which his patient is suffering, especially in the scenario where the patient has multiple ailments treated by various specialists. However, if the patient changes doctors, he would have to start over from scratch. In other words, even though a doctor's findings during a consultation were routinely documented, they could not be shared. However, the rapid advancement of medical research has brought up significant problems with regard to responsibility, openness, and trust between patients and healthcare providers. The holding of a medical file today reflects the concern that consultation tracking has become realistically necessary.

The medical record has turned into a crucial tool for doctors. It is now a common practice in medicine and is governed by relatively tight legal regulations in various nations. Due to the fact that it addresses long-term therapies, chronic diseases, comprehensive exams, and even surgical operations, its interest is even greater. It is crucial at the hospital because it should give medical professionals who don't know the patient a true picture of his personal condition and the pathologies to which he has been exposed. This saves time and prevents the prescription of unnecessary therapies. The medical record is the doctor's instrument for the job, enabling him to gather data on the patient's health and use it throughout the course of therapy.

All the experts who provide a patient with care have gradually come to rely on the data in the medical file, which is now naturally incorporated into the care system. The regulations for information transmission and collecting had to be formalized as a result of this.

It is important to distinguish between medical information and its medium, or its shape and content. The sources of the medical information are numerous (interview data, examination data, additional examination results, for e.g., images and CT scan report). Paper documents are still frequently used as the delivery method for this information. However, it is becoming

less and less used and is frequently permanently replaced by computer technologies.

It is evident that the paper record materializes medical information and enables its traceability, but technical advancement and the Internet's phenomenal growth have made it feasible to be free from the paper record without losing the information and even its traceability.

Public health policies in several industrialized nations are influenced by the abandoning of the paper medium, which is gradually being replaced by the computer medium, and they tend to support the transfer of medical data on smartphones. In actuality, today's mobile phones are utilized for more than just voice calls and text messages. There are now more applications available, including email, web browsing, music, and video. The widespread use of smartphones with huge touch displays has sparked new interests, including one in a more comprehensive understanding of the health record.

The expansion of networks has led to an exponential increase in tablet and smartphone applications, some of which let patients create their own health records and present them to the doctor of their choosing. When necessary, the practitioner might add to it and impart it. The user could therefore invite everyone involved to participate by adding to it, for instance, during medical appointments.

To enhance the caliber of the medical treatment given to the patient, we are asked to design, create, and install a software platform for the monitoring his medical file. For this, we decided to use a online website because it is open source, cost-free, and has a sizable community in comparison to other platforms.

1.1 Motivation

- With 462 million active netizens plus 430 million mobile broadband users in India, e-health solutions and services have the potential to revolutionize patient care.
- Real-time platforms, such as telemedicine, remote patient monitoring, teleconsultation, video conferencing, and medical record systems, enable better delivery systems for healthcare (MCRs).
- A vital component of leading a healthy, balanced and active lifestyle is keeping track of your health and fitness.
- The patient's medical information needs to be protected in terms of privacy and security.
- There is a demand for a very well maintained and organized medical system for managing records that may be successful in enhancing health records accessibility and accuracy in hospitals as health records management is frequently deficient in many places.

1.2 Literature Review / Survey

[1] In this paper, the mobile application presented in this paper allows the user to enrich his medical file from documents collected in paper form healthcare professionals. It facilitates the management of the medical file since it will be used only by the patient himself. In addition, this mobile application will ensure the security of the patient's medical record. Indeed, this security is based on the Cloud which is a fairly new concept. It offers IT services in the form of an on-demand service, accessible through an Internet connection. This security is represented in our application by the fact that each user has a storage space of which he is the only one able to manage it thanks to his Google account.

[2] In this paper, the web application and EHR management system was integrated to the telepresence system through the development of a wireless data hub, which hosts the application and manages the medical information using MySQL. A web application, using Flask, serves as the main user interface for all functionalities in the patient's and doctor's side. The developed web application has a responsive HTML template that could adapt to numerous screen sizes and was tested on an ASUS Vivo Stick and other operating systems. It is capable of two-way video telecommunication with minimal delay even at low Internet speeds, e.g., 400-Kbps. Tested by medical professionals, the developed web application has the following results on usability metrics: 93.89 percent of completion rate, 93.58 percent of overrelative efficiency and high SUS of 82.5. Different areas for improvement of the study includethe improvement of the web application and EHR security through different encryption and data validation forms, and to seek advice from hospitals that are currently using telepresence systems. Furthermore, this research will extend the reach of medical doctors to rural areas in providing proper medical services through information and communication technology (ICT).

[3] In this paper, a Remote Health Monitoring System is developed which mainly consists of health monitoring sensors and a Microcontroller. The patient's body temperature, Electrocardiogram, heart rate and Oxygen saturation in blood (SpO2) are monitored, displayed and stored in the system. These parameters are sent to the website using Arduino Ethernet Shield accessed by the health care providers. Hence, the doctor can provide necessary medical assistance to the patients. Deaths due to cardiac diseases and health condition related to abnormal heart rate are increasing. So, regular health checkup for the patients is necessary. Due to the prevailing pandemic situation, it is highly difficult for a patient to visit hospital or health care centers. This system helps to monitor the state of the patient from the comfortof their homes and the doctor can analyze the health data, provide medical assistance and recommend medicines.

[4] A Blockchain, being a distributed network for storage of data can overcome the mentioned problem. The data blocks in the Block chain are immutable and secure. In this research paper a system is introduced where the patient is given complete control over his

medical records. It mainly comprises three roles namely Doctor, Patient and Management. The patient has monopoly over his medical records which provide him the authority to grant access over his medical records. The Medical records are securely stored using the Inter Planetary File System. Thus, one can completely rule out the part of a mediator and the patients have complete command over their medical information.

[5] Design of a Web-based and Electronic Health Record Management System for Medical Teleconsultation. This paper aims to study developed a telepresence system, which includes a robot with integrated medical devices such as otoscope, stethoscope, and ultrasound probe. One important aspect of the telepresence system is the wireless data hub that hoststhe web application, and the electronic health record (EHR) management system.It consistsof the user accounts database (both for the patient and the doctor), patient information, consultation records, and medical files which can be accessed through a web application.

[6] Seamless Electronic Medical Record for Health Management System in Emergency Patients. This paper aims to introduce health management platform based-on seamless Electronic Medical Record (sEMR) approach. The purpose of our system is to help emergency patients who need urgent care after being discharged from the hospital. This system can make it possible to provide rehabilitation, health promotion, reduce disability and complications. The program displays specific diseases information from the hospital database so that the treatment history can be exchanged among hospitals.

[7] M-Health Application for Managing a Patient's Medical Record based on the Cloud: Design and Implementation. In this Paper, we propose to design and build a mobile application for the management of a patient's medical data on the Cloud. The mobile application presentedin this paper allows the user to enrich his medical file from documents collected in paper fromhealthcare professionals. It facilitates the management of the medical file since it will be used only by the patient himself. This mobile application will ensure the security of the patient's medical record.

[8] A web-based electronic medical records and hospital information system. In this paper a model was designed based on the research and analysis of health facilities in Vietnam. Here every patient will have a unique Patient Identification (PID). This will allow all information related to patients to be included in the server database according to their PID. Once patient information is transmitted from clinical stations to the database, the doctor will login to the system using the unique PID and view all patient information on a server database to assist in the diagnosis and treatment.

1.3 Problem Statement

- To design and Develop a Personal Health tracking system that converts all medical records into a digital format which helps to access past medical history by doctors to treat patients.

Modules:

- User Registration
- Medical Record Scan/ Storage
- Report and Consultation Module

1.4 Applications

- Electronic medical records and mobile health technology are a potent combination that can aid in daily healthcare monitoring and care for patients, especially those who live in remote locations.
- Enables the user to add paper records gathered by medical experts to his medical file. Because only the patient will use it, it makes managing the medical file easier.
- It is portable and convenient, making it simple for clinicians to monitor patients from a single app. Patients may easily check their own status by wearing a small gadget like a bracelet.

1.5 Objectives and Scope of the project

1.5.1 Objectives

- To design a user-friendly web interface.
- To Manage login and registration details of the user.
- To validate all the fields such as username and password and do not take invalid values
- To make records accessible for doctors by some credentials/authentication.
- To store and retrieve patient's data securely
- All the records given manually, scanned copy and inputs from sensor should store in the database properly.

1.5.2 Scope of the project

Patient health record systems represent the emergence of a new millennium of usercentric software applications in the healthcare industry. With the aim of enhancing health outcomes and lowering costs, these systems build a foundation for the new paradigm of health care that respond and facilitates patient-provider contact. At the client, system, and industry levels, this growth has produced new sets of information and capabilities, presenting opportunities and posing obstacle.

Chapter 2

REQUIREMENT ANALYSIS

2.1 Functional Requirements

- User(Doctor/patient) shall be able to login using his/her login credentials.
- The system shall be able to validate the credentials.
- The system shall be able to store the details of the user.
- User(patients) shall be able to access his/her own report.
- User(Doctor) shall be able to search any one of the patients report.
- User(Doctors) shall be able to view the patients report.

2.2 Non Functional Requirements

- The system should have a user-friendly interface.
- The system should be available 24x7.
- Every input that requires authentication should be properly handled.
- The system should not take more than 3sec to load the page.
- System should be compatible with different web browsers.

2.3 Software Requirements

2.3.1 MERN Stack

MERN stands for MongoDB, Express, React, Node, after the four key technologies that make up the stack.

- MongoDB — document database
- Express(.js) — Node.js web framework
- React(.js) — a client-side JavaScript framework
- Node(.js) — the premier JavaScript web server
- Express and Node make up the middle (application) tier. Express.js is a server-side web framework, and Node.js is the popular and powerful JavaScript server platform. Regardless of which variant you choose, ME(RVA)N is the ideal approach to working with JavaScript and JSON, all the way through.

Working

The MERN architecture allows you to easily construct a three-tier architecture (front end, back end, database) entirely using JavaScript and JSON.

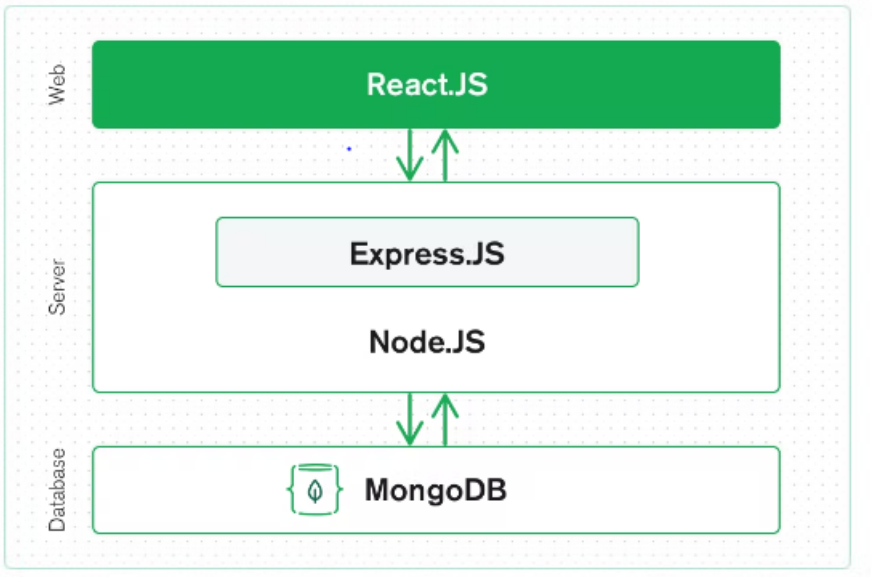

Figure 2.1: MERN Stack

React.js front end

React.js, a declarative JavaScript framework for building dynamic client-side apps in HTML, makes up the top tier of the MERN stack. React enables you to link simple components to data on your back-end server, connect complicated interfaces to those connections, and render those interfaces as HTML. React excels at handling stateful, data-driven interfaces with little effort and code, and it includes all the features you'd expect from a contemporary web framework, including excellent support for forms, error handling, events, lists, and more.

Express.js and Node.js server tier

The server-side framework Express.js, which functions inside a Node.js server, is the next level below. It is true that Express.js describes itself as a "fast, unopinionated, minimalist web framework for Node.js." Express.js offers robust models for handling HTTP requests and responses as well as URL routing (correlating an incoming URL with a server function). You can connect to the Express.js functions that power your application by sending XML HTTP Requests (XHRs), GET requests, or POST requests from your React.js front end. These functions then access and update data in your MongoDB database using the Node.js drivers for MongoDB, either through callbacks or promises.

MongoDB database tier

If your application stores any data (user profiles, content, comments, uploads, events, etc.), then you're going to want a database that's just as easy to work with as React, Express, and Node. That's where MongoDB comes in: JSON documents created in your React.js front end can be sent to the Express.js server, where they can be processed and (assuming they're valid) stored directly in MongoDB for later retrieval.

Chapter 3

SYSTEM DESIGN

The System Design signifies the logical structure and flow of the system. It is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements.

3.1 Architecture Design

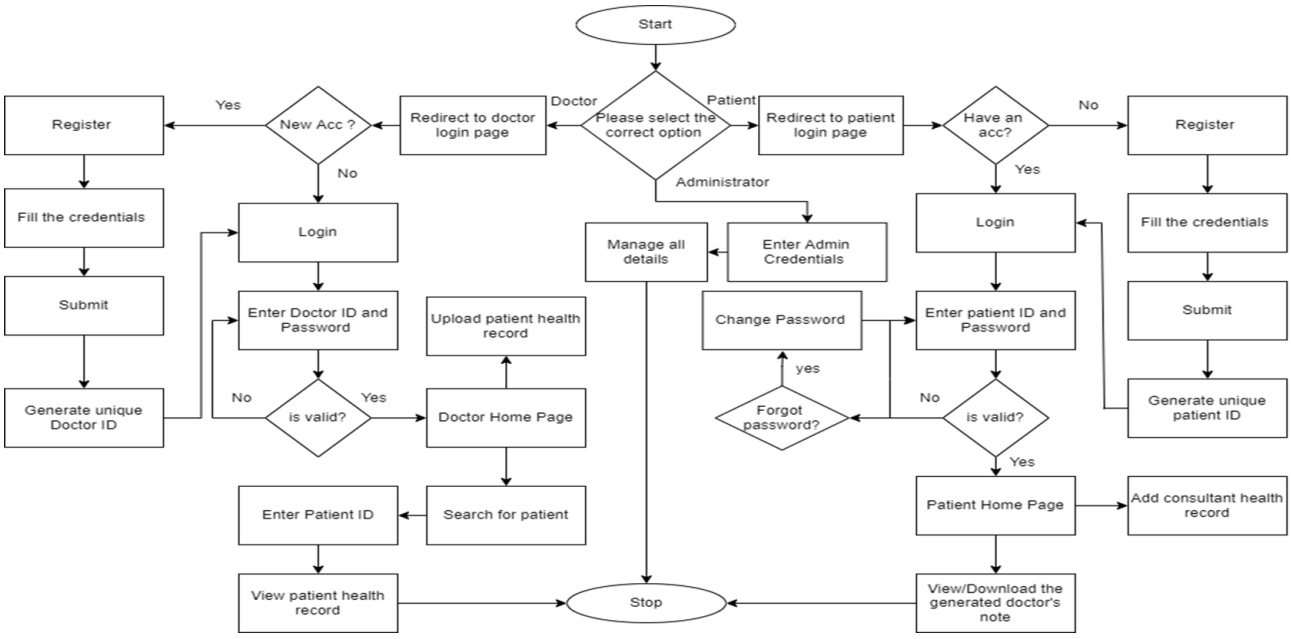

Figure 3.1: Architecture Design

This is the architecture design for our system which ask us to select the option like docter,patient,and administration. If we select docter it will redirect to docter login page if we are new user it ask us to register and it will generate unique docter Id if he already registered it will ask to login by enetering docter id and password after logged in he can upload patient health record and view patient health record

If we select admin it will ask us to login with his credentials after logged in he can manage all details of patient and docter

If we select patient it will ask us to register if we are new user,if he already registered he can login into the system using patient id and password after logged in he can view and download the the generated docter note

3.2 User Interface Design

3.2.1 Usecase Diagram

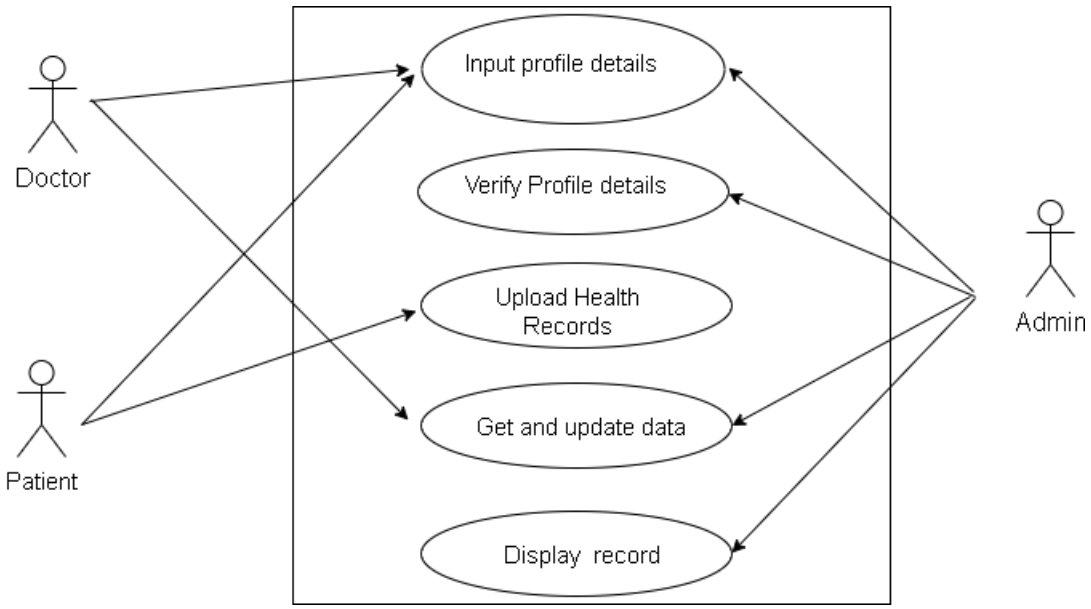

Figure 3.2: Use Case Diagram

The Use case diagram identify the interactions between the system and its actors. The use cases and actors in use-case diagrams describe what the system does and how the actors use it. In this diagram where doctor can input profile details like doctor name, phone number,date of birth, email id etc..and get and update the data. and Im the same way patient can also input profile details like his name, phone number, patient adress and etc.. And also patient can upload his health records. And admin can input profile details like admin name, admin phone number, e-mail id etc.. Admin can verify the profile details of doctor as well as patient.. And admin can get and update the data of patient and doctor, admin can display the records of patients and doctor.

3.2.2 Sequence Diagram

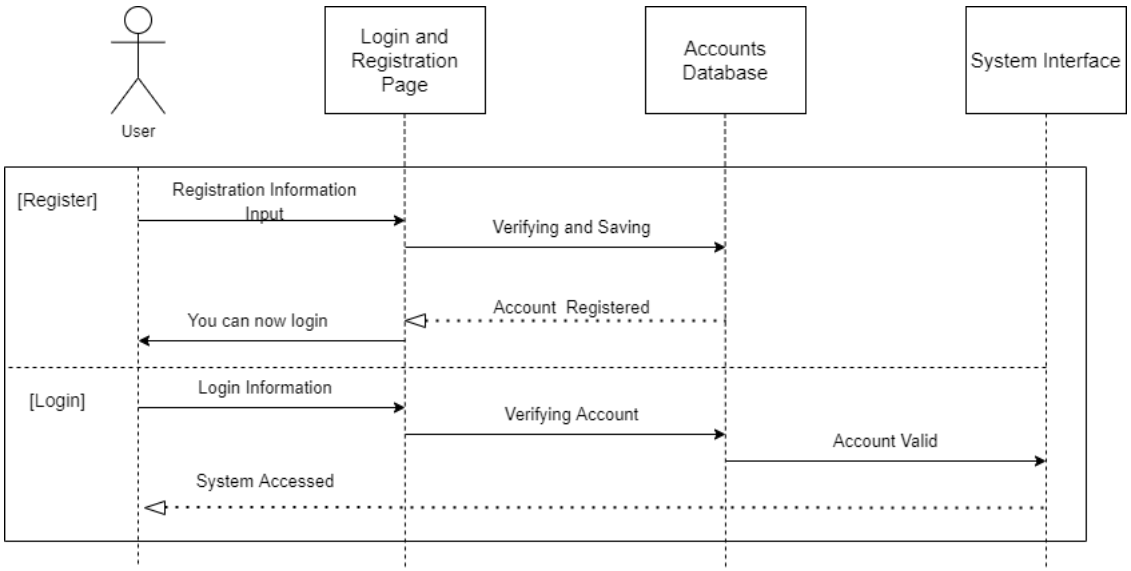

Figure 3.3: Sequence Diagram

A sequence diagram is a diagram created using the Unified Modeling Language (UML) that shows the flow of messages sent and received by objects during an interaction. A group of objects that are represented by lifelines and the messages they exchange over the course of an interaction make up a sequence diagram. Here there are three components: Login and Registration page, Accounts Database, System interface. For registering the user should input his information. After verifying it will be saved in the database. Then user will get the notification as registration successful, you can login now. For login to system, user should give the login information. After verifying the credentials, the user get login to the system.

Chapter 4

RESULTS AND DISCUSSIONS

4.1 Module 1: User Registration

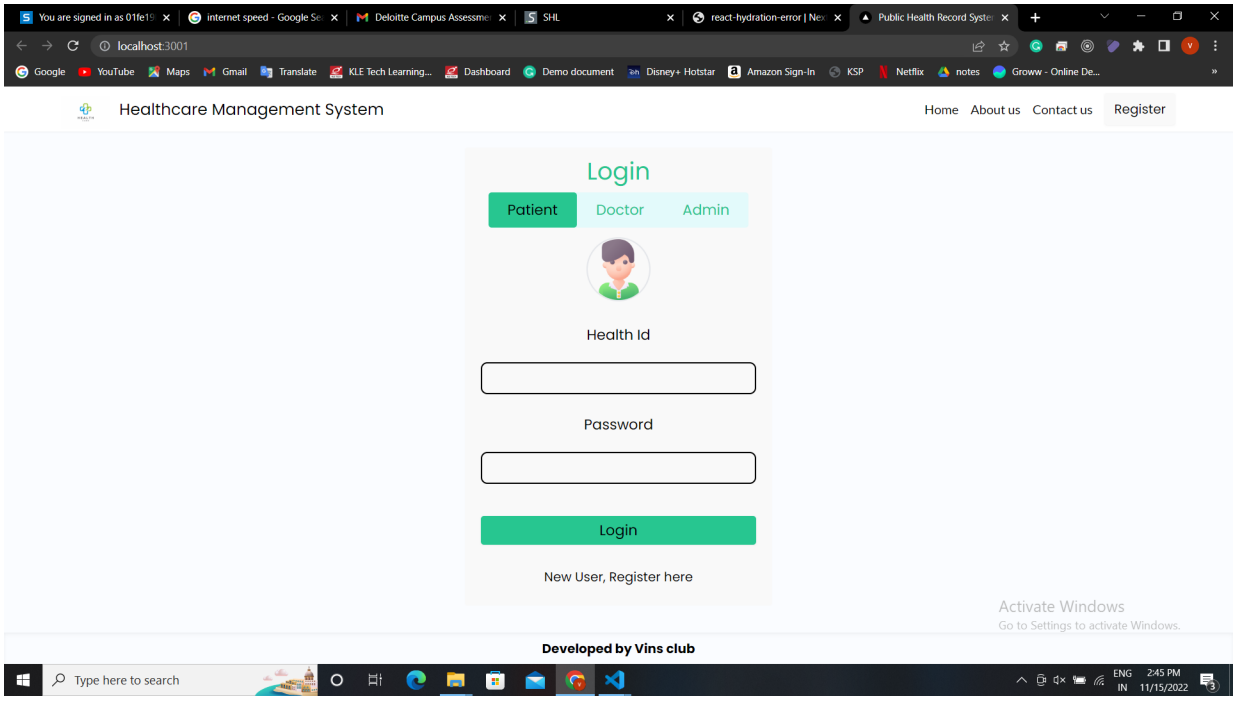

Figure 4.1: Pateint Login Page

This is the login page, contains options like patient ,doctor and admin here patient has option to login using unique patient id and password. In this page we have option of home, about us, contact us where u can contact the site and register where in u can register to the system.

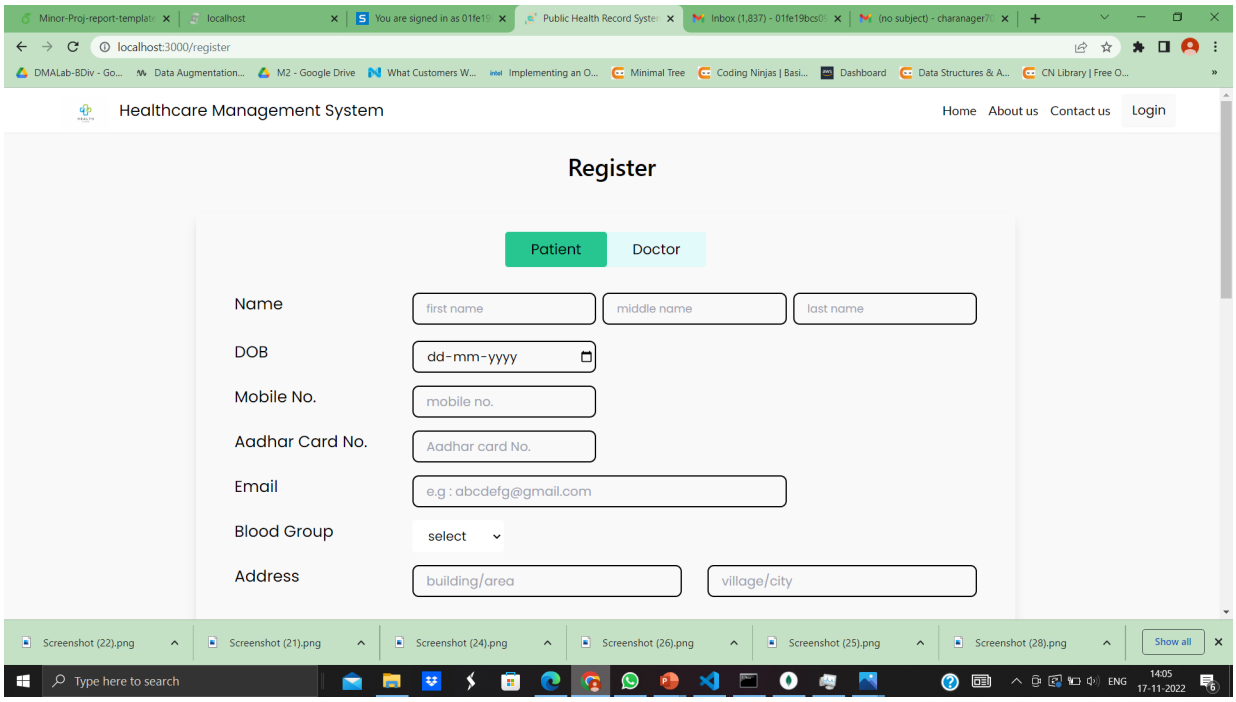

Figure 4.2: Register page 1

This is an Register page of doctor and patient ,here patient can register using patient name, date of birth, mobile no, Adhar card no, email id, patient has option to choose his blood group and he has to provide his address.

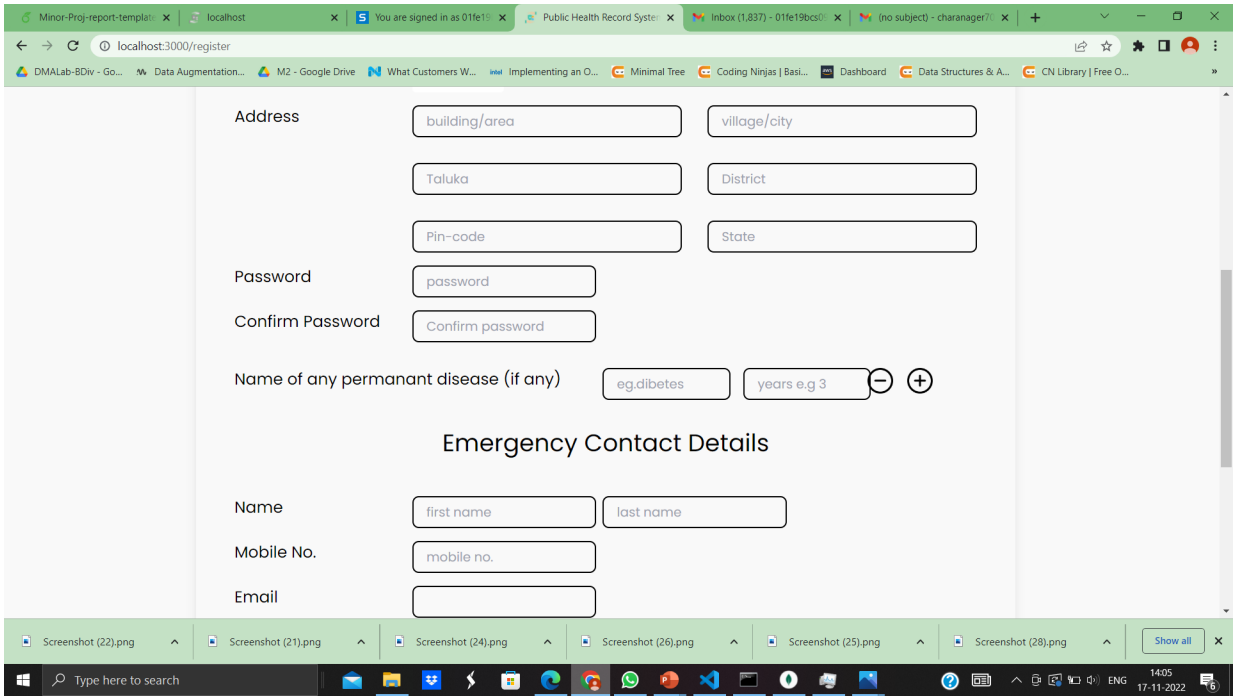

Figure 4.3: Register page 2

Continuing with the Registration page patient has to provide his address in that he has to provide village/city, Taluka, district, pin-code number and state. Patient has to mention name of any permanent disease if he is suffering with. And Emergency details like name , mobile no and email id.

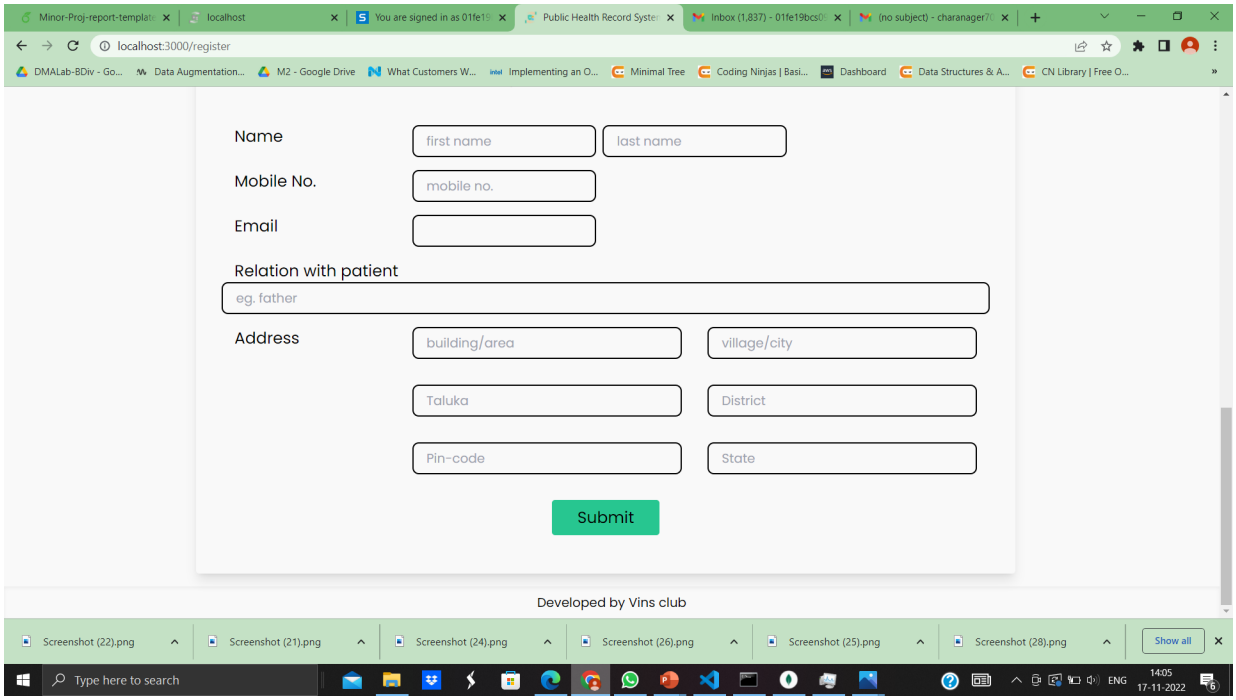

Figure 4.4: Register page 3

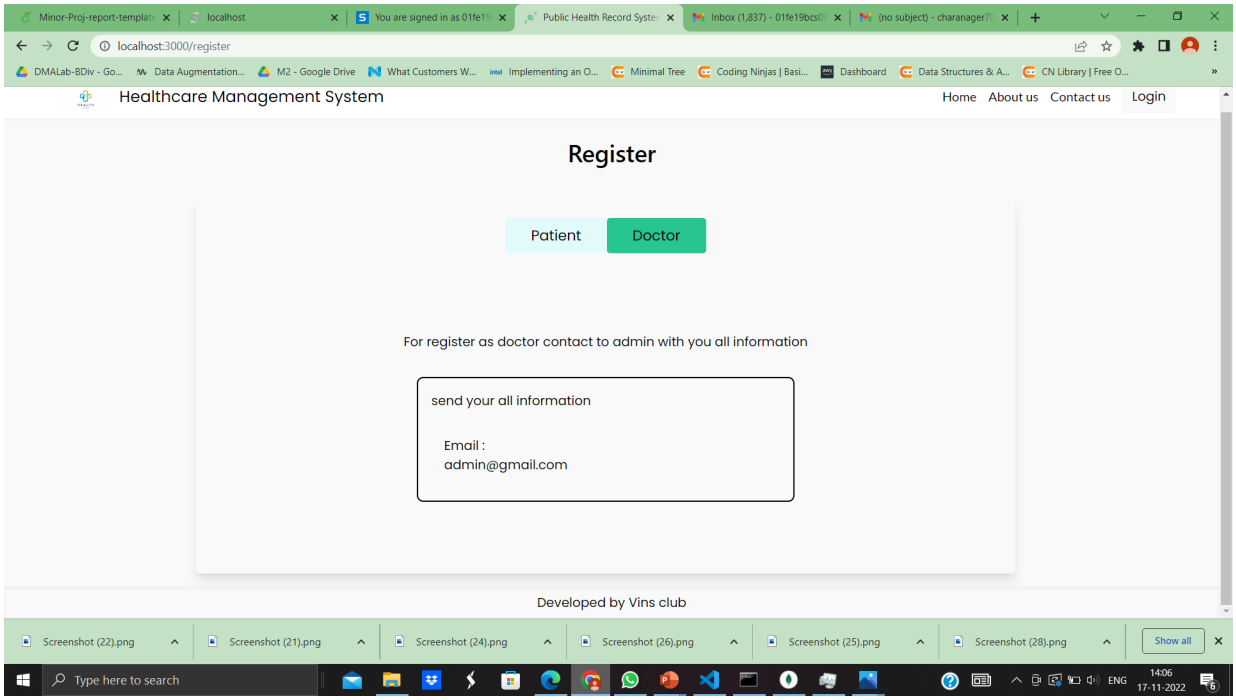

Figure 4.5: Doctor Login

In the same way doctor has a registration page, for register as a doctor, doctor has to contact admin with all the information.

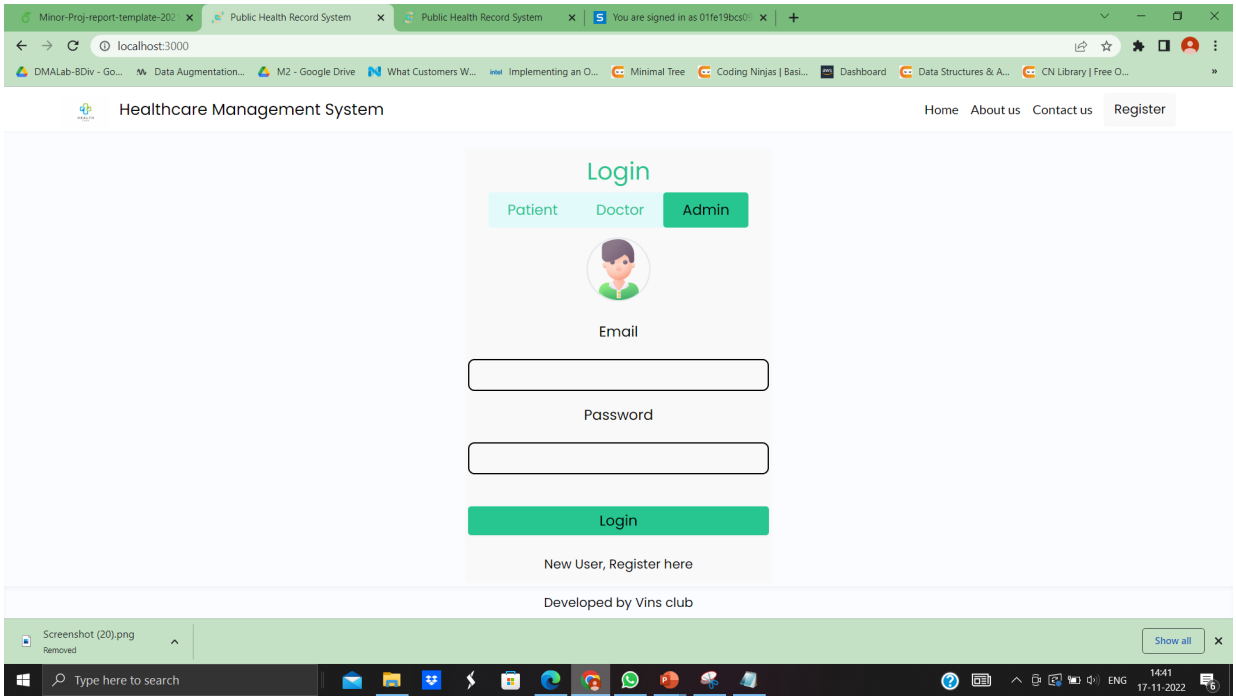

Figure 4.6: Admin Login

This is the Admin login page. In admin login page , here admin has to login using his email id , password .

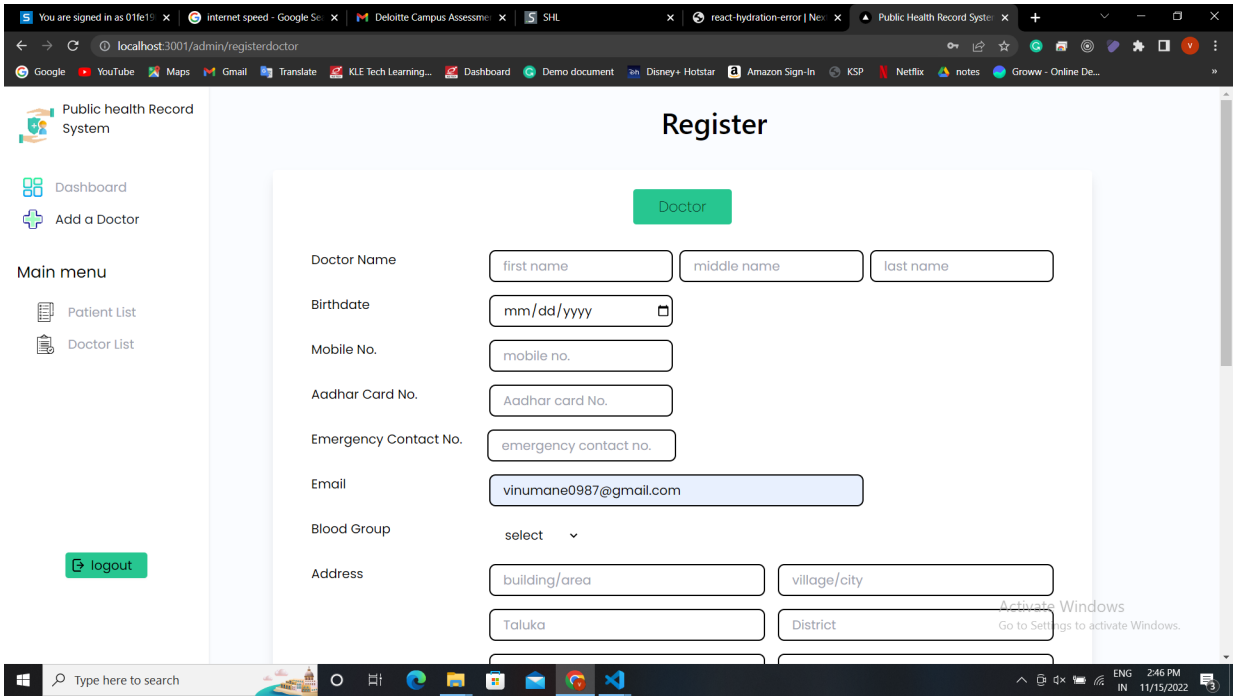

Figure 4.7: Doctor Registration 1 by admin

Here, In this page the admin can register the new doctor by filling the doctor details which is mailed by the respective doctor.

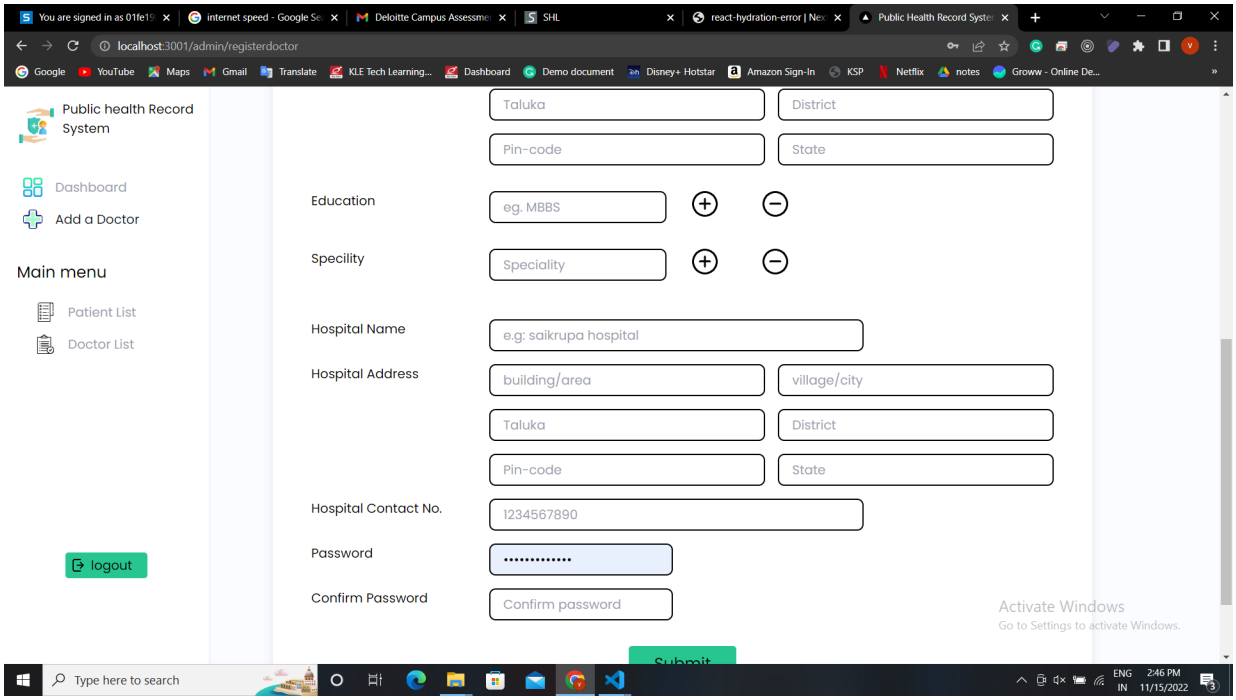

Figure 4.8: Doctor Registration 2 by admin

4.2 Module 2: Medical Record Scan/ Storage

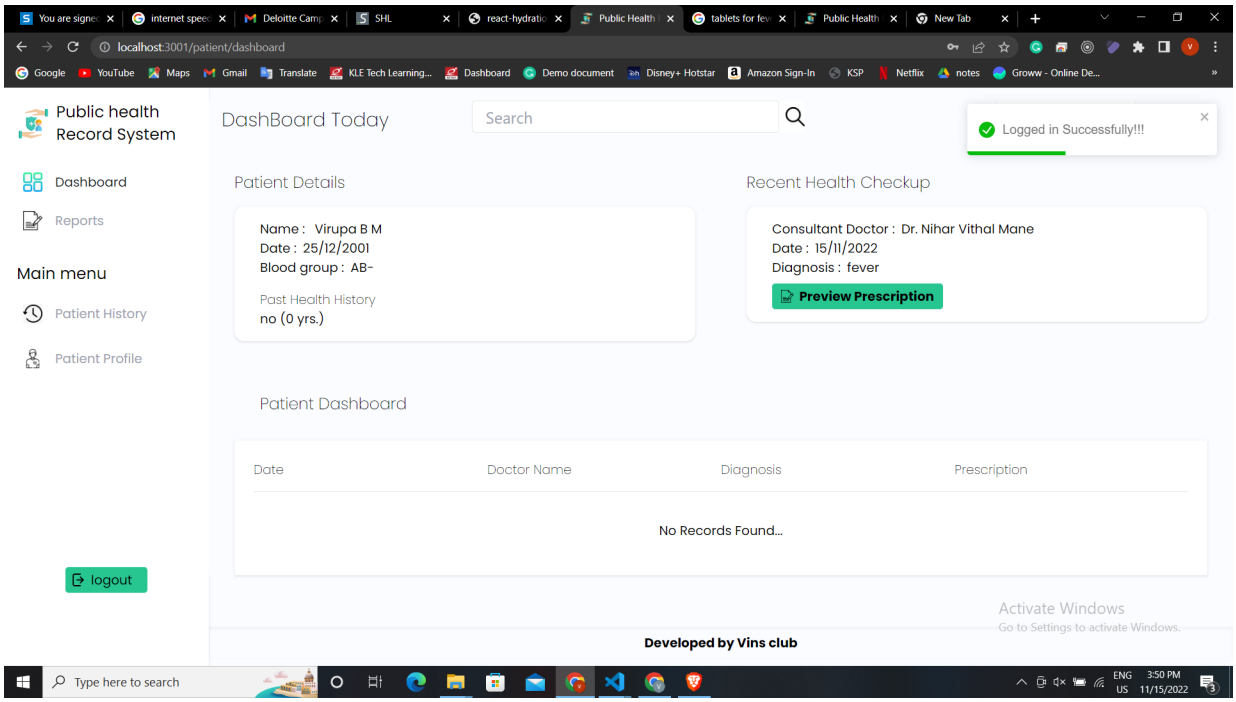

Figure 4.9: patient Dashboard

This is the patient Dashboard which contains patient details and patient's recent health checkup. Patient can add the new diagnosis.

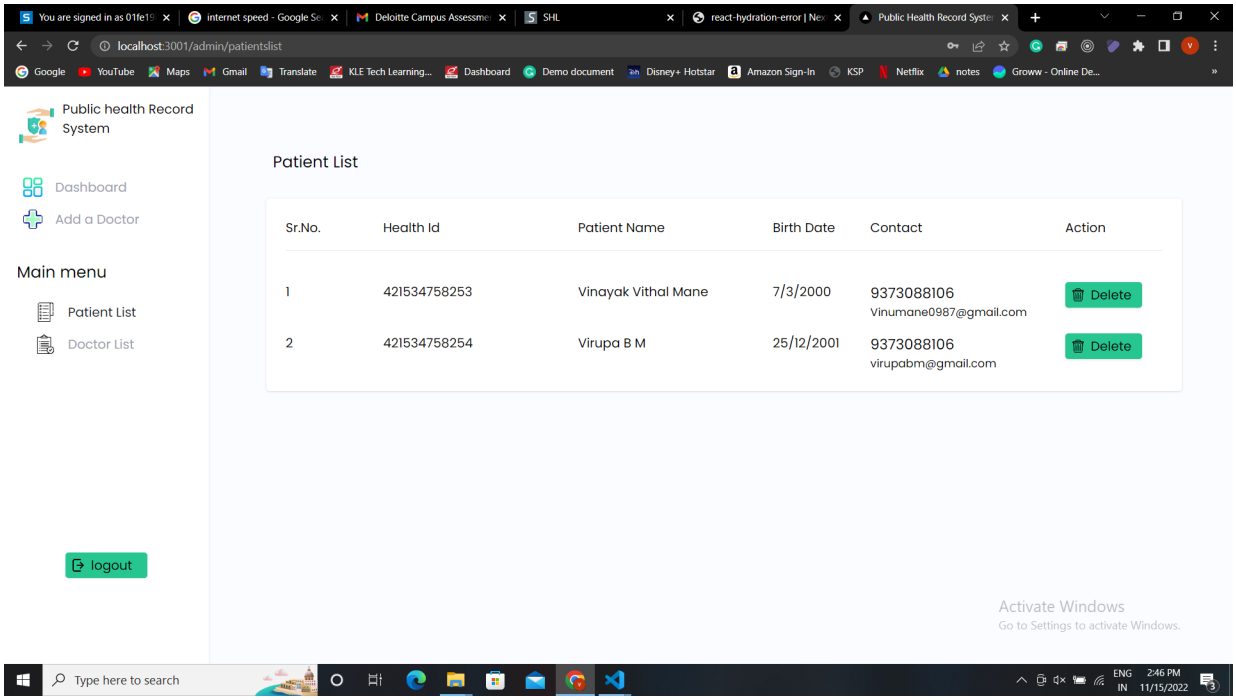

Figure 4.10: patient list in Admin Dashboard

The above image depicts the list of patients which contains patient's heath ID, name, DOB and contact. Admin can manage the patient list.

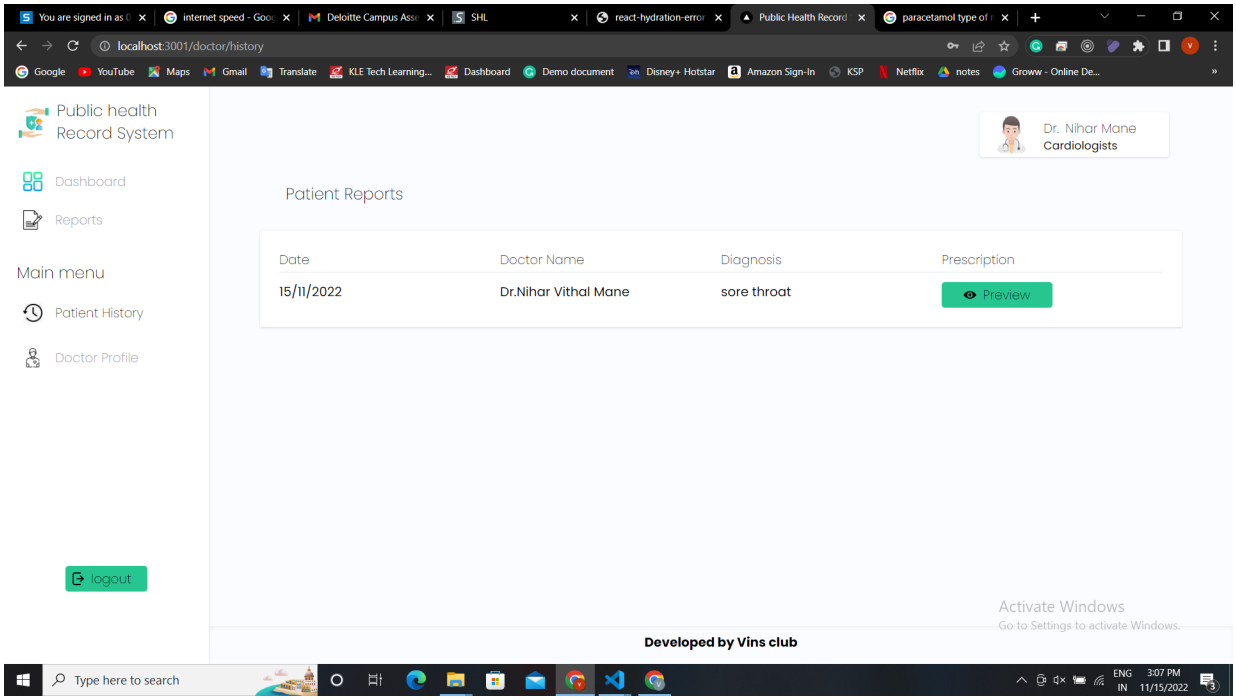

Figure 4.11: Patient reports

The above image depicts the reports of patients which contains consultant doctor, diagnosis and prescription of the report.

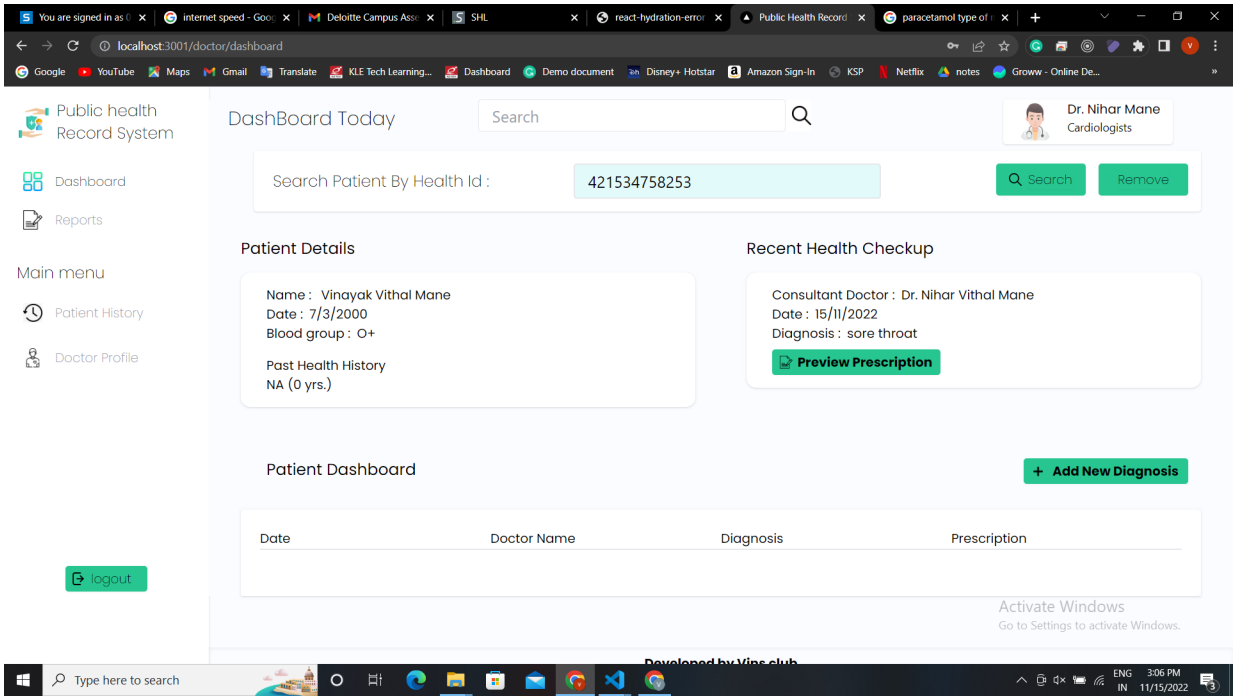

Figure 4.12: Patient history

The above image depicts history of patients.

4.3 Module 3: Report and Consultation Module

This module deals with displaying the patient list , patient details and generations of reports.

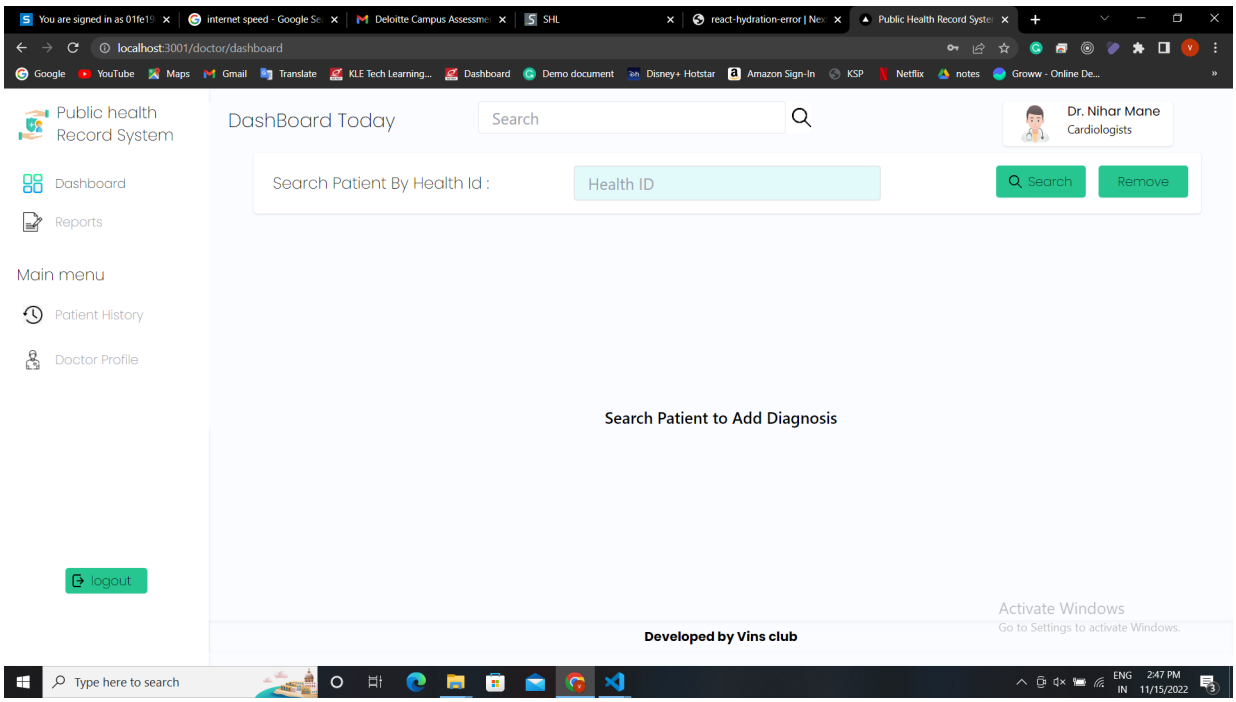

Figure 4.13: Doctor Dashboard

This figure displays doctors dashboard where he is provided with an option to search patient by health id and also he has option to remove and search, and he is provided with dashboard, reports , patient history and doctor profile and In doctors dashboard there is an option to logout.

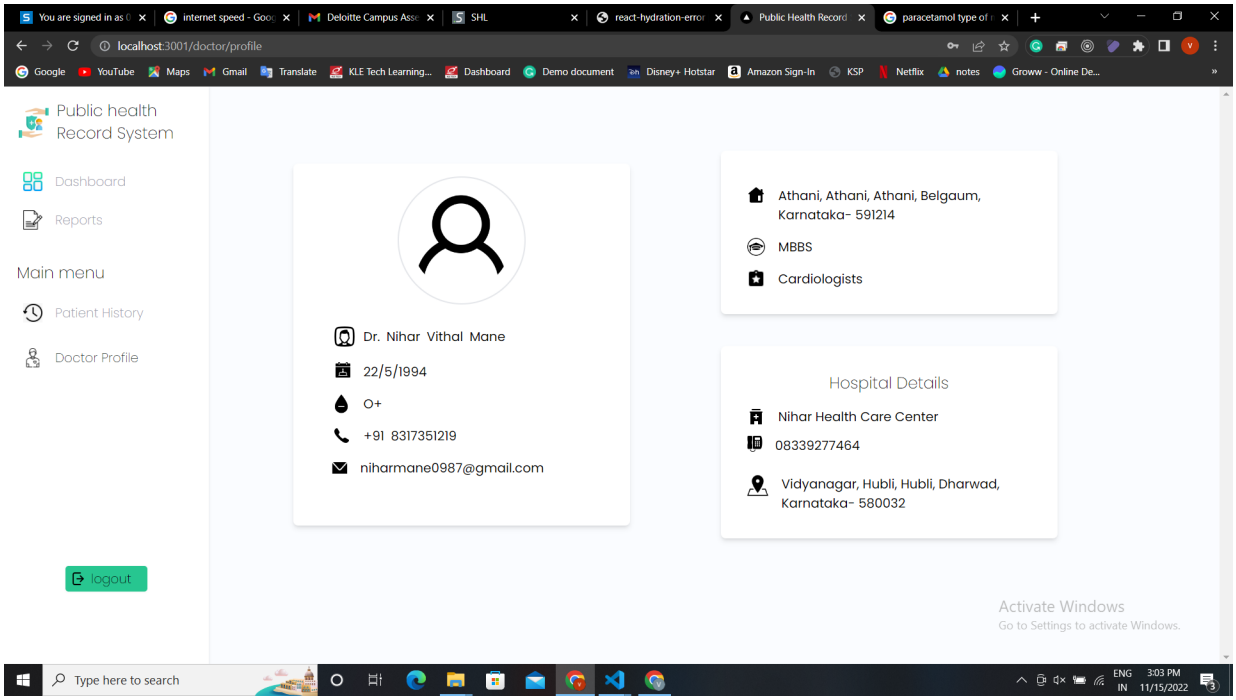

Figure 4.14: Doctor Profile

When an chosen option of Doctor profile in the doctor dashboard it displays the details of doctor, in doctor profile we can see the doctor name, phone number, email id ,doctor's address and we can see the hospital details.

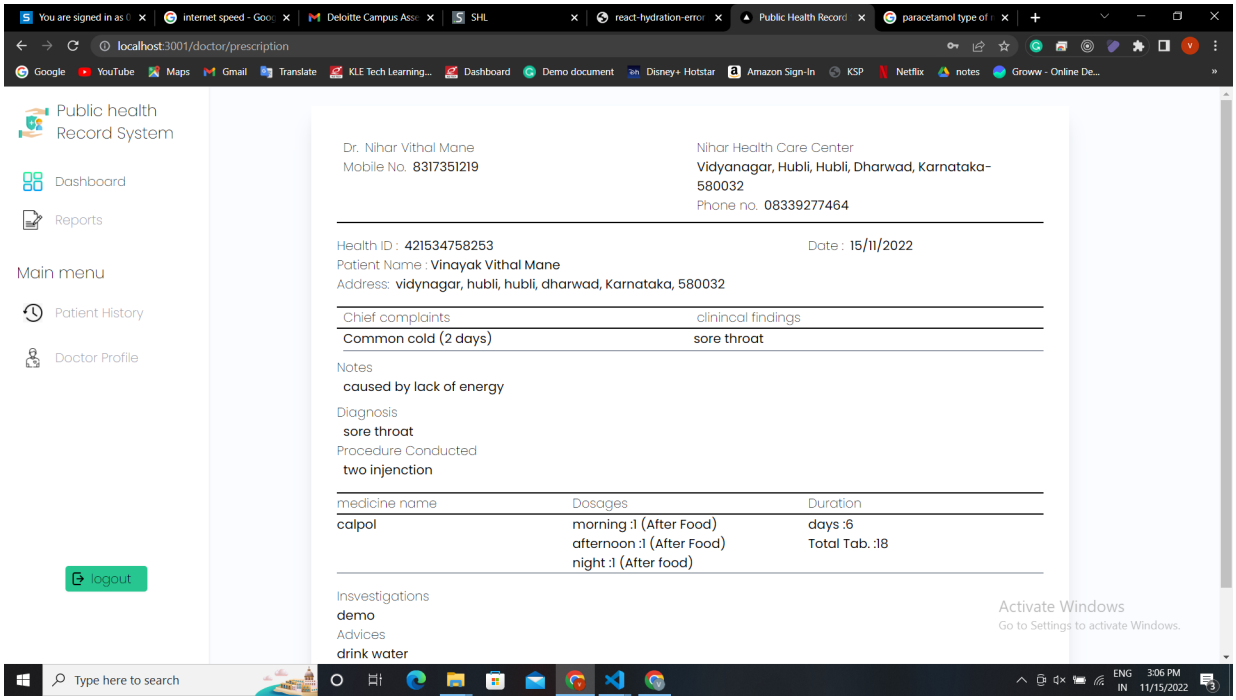

Figure 4.15: Patient record

In the doctors dashboard there is an option of reports, from this option patient reports can be displayed. The report consists of unique health id the patient, patient name, patient address along which date of he diagnosed. It also includes patients disease details and also notes given by the doctor on what he was diagnosed and also it includes procedure conducted and medicines whatever prescribed to him.

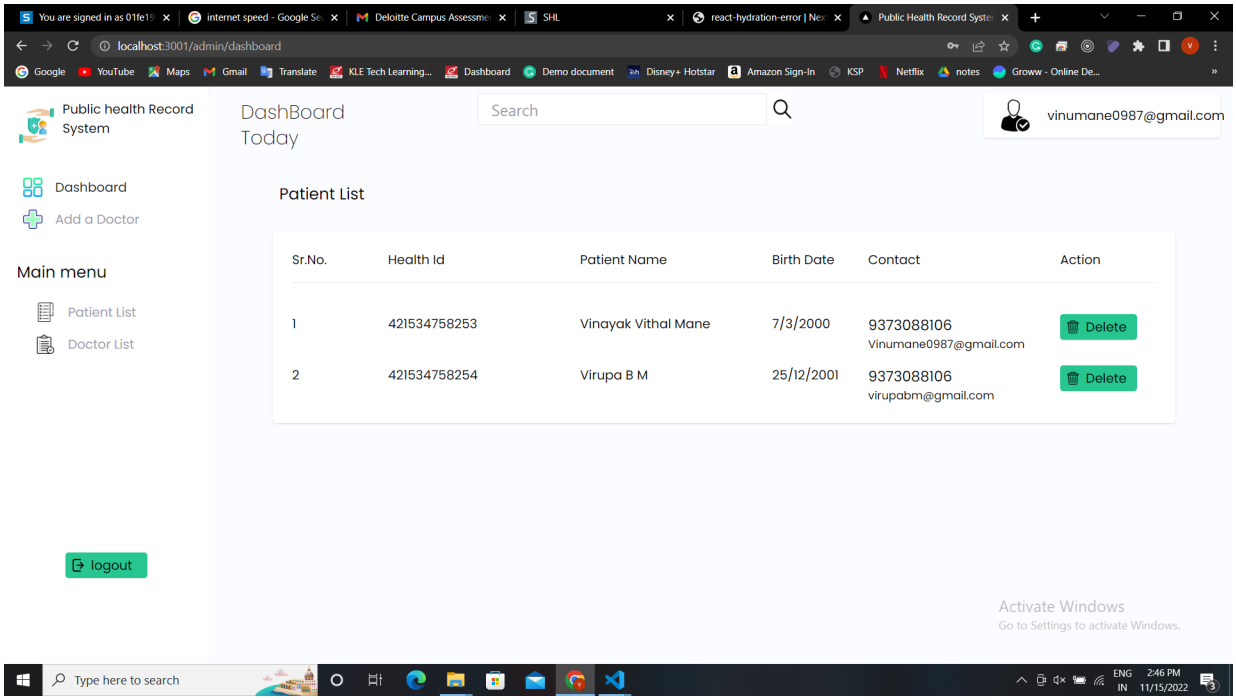

Figure 4.16: Admin Dashboard

Now here we continue with admin dashboard , here admin has option to add doctor and he also has option to view the patient list as well as doctor list. So by choosing the patient list option he can view the list of the patients as it is displayed here. Patient list contains of health id , patient name , birth date ,contact and action where admin can delete the data if he no more wants patient data in the same way he can also view the doctors list.

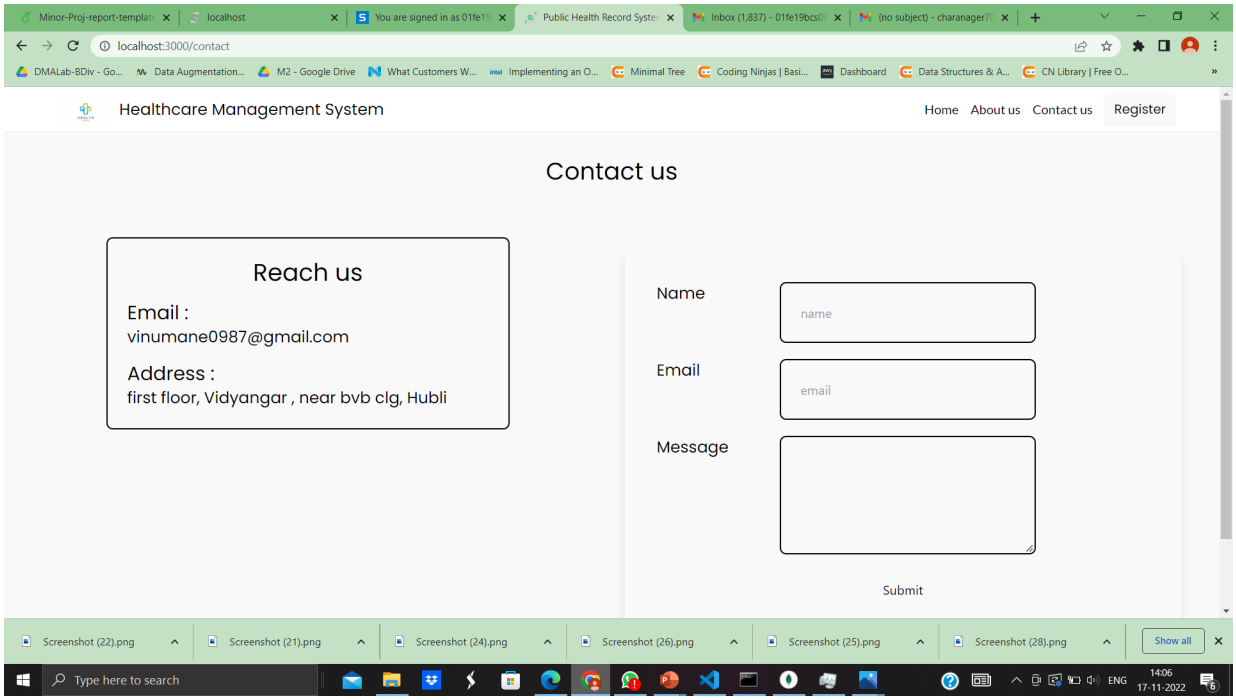

Figure 4.17: About Page

This is an in general about page about the healthcare management system ,in this page we have option of home, about us, contact us where u can contact the site and register where in u can register to the system. And it takes details like name, email, and message.

Chapter 5

CONCLUSION

The Personal Health Tracking system provides complete visibility through the entire healthcare visit. It is useful in tracking the progress of the patients. Additionally, it helps to keep centralized, secure patient records. Clinical data, not financial or billing data, are the primary concern.

Chapter 6

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