Online Doctor Consultation and Medical Prescription

Report

A web application – mini project

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ABSTRACT

Online Doctor consultation and medical prescription is a web application of encoded information and services exclusively meant for patients who connect with doctors and get a prescription from the doctor. The purpose of this application is to benefit people or patients during emergency cases who do not have doctors in their area, instead of going to a hospital that is too far away. Through the login form, patients can consult the doctor by explaining their health issues in a given text form or images and get the prescription from the doctor through email or WhatsApp in printable format. This web application was implemented by using frontend languages like HTML, CSS, JavaScript, frameworks for the application, and storing the patient's list in the database. This project was implemented using power BI. An admin can see the patients view those who are suffering from common health issues in the form of visualization. Also can see patients' lists in the form of reports each day. An admin consult the doctor immediately and get awareness about patients.

TABLE OF CONTENTS

LIST OF FIGURES

1. Introduction

1.1 Overview of the project

The main purpose of the project is to develop an E-health-field system basic frame combined with the responsive web design technology. It provides a worthwhile guideline on E-health web applications for people self-care management. And the model is designed to be applied to develop a specific application aiming at diabetes self-care management. The website contains a signup and login page for both doctors and patients. The page contains login for admins who can access all the details of doctors and patients. The web page stores all the details for further use. The webpage shows the top doctors and gives their information in the contact us page. The diabetes patients can also check the hospitals that are only for diabetes which can easily help them to consult the doctor easily through the service page during emergency situations.

1.2 Chapter Wise Contents

Chapter 2 contains literature survey. It covers all the sources we have gone through to obtain the information required for our project.

Chapter 3 is system analysis. It gives the details of the hardware and software requirements. It also gives a details account of the design of the project.

Chapter 4 is testing. It involves the tests carried out on the project.

Chapter 5 contains results. It includes all the outputs of the projects with detailed description.

Chapter 6 contains conclusion. It includes the advantage of the project to the society and scope for future development.

2. Literature Review

2.1 Emergency services survey in INDIA 2015-2019[1]

While the internet has long been a source of medical information, it has only recently been used for online private patient-doctor consultations. Online Medical Consultation (OMC) is now offered by many providers internationally with diverse models and features. This study reports a review of the literature on OMCs and an empirical analysis of 28 existing OMC web sites to explore their major themes, modalities, costs, and geographical coverage. These features have been studied for a better understanding of the promise on which these services operate.

Regardless of the different labels given to OMC, academic works have reported several advantages and raised multiple concerns regarding particular OMC practices. OMC is a growing phenomenon featuring several interaction modalities, serving various medical consultation purposes, and accessible to consumers throughout the world. The contribution of this work is to present the current status and synthesize features of available OMC services.

Online Medical Consultation (OMC) is the term used in this paper to refer to internet-based remote patient-doctor (consumer-provider) medical consultations. OMC can be regarded as part of telemedicine where the term “Remote Consultation” refers to “consultation via remote telecommunications, generally for the purpose of diagnosis or treatment” (NLM, 2014). However, this paper distinguishes OMC from remote consultations in three main aspects. First, the definition of OMC excludes non-internet-based consultations like telephone-only or radio-based consultations. Second, OMC carries a paradigm shift in the way patients seek medical consultation where they can independently "shop around" for medical consultation the same way they do for online services. Third, OMC is about direct patient-doctor consultations, therefore it will not include doctor-doctor (provider-provider) consultations or consultations for health education and other purposes.

With OMC, the service is usually open to patients with a wide range of medical needs coming from different regions or countries. Patients may choose or be assigned to any doctor/ care provider who is available online. They are not restricted to a specific provider either by previous knowledge or by geographical closeness. The aim of the research reported in this paper is to explore OMC practices on the global level. It examines features and themes evident in the literature and in a range of currently operating OMC services.

Databases including MEDLINE searched for relevant publications mainly within the past five years. Multiple search terms were used, combining "online consultation" with "health or medical", using the MeSH term "remote consultation", or using "e-visit", "econsultation", and "video consultation".

With OMC, patients don't have to leave their homes or places of work, sit in traffic then sit in a room with other patients, perhaps catch or cause an infection meantime, and then return to where they came from. A baby's mother may not need to go with her child to a clinic for diagnosis of a simple condition such as diaper rash that doctors can accurately recognise from some images. Patients with chronic diseases may benefit from OMC to perform their regular routine checks and get test results with no need to go to a clinic unless requested.

2.2 MEDICAL SPECIALITY

Information obtained from almost all OMC sites (96%) showed no restriction to a specific medical specialty. They appear to have flexibility to expand services and ability to recruit specialist consultants in all fields. Some sites claim to have hundreds of participating consultants from multiple countries.

2.3 COST

Regardless of some promotional offers, almost all OMC sites (93%) charge fees for their services. In most cases, consumers have to pay for the service directly at the site, but a few providers offer the possibility of private insurance or government reimbursement. The cost of an OMC service ranges from a few dollars (Evaidya, India) to more than $700 (Cleveland e-consult service for specialized second opinion). Payment schemes vary, such as paying per consultation or as monthly plans. The average cost for a single OMC service in the US is around $33 and ranges from $18 to $50 (excluding the cost of Cleveland e-consult). Among the 28 OMC providers, two are free (Partners HealthCare, Medanta) and serve as second opinion services (one is e-mail based and the other supports video).

2.4 GEOGRAPHICAL LOCATION AND COVERAGE

Most OMC sites (79%) offer their services worldwide and are not bound by the country where their operating business is legally based. The remaining 21% are limited to the country of operation due to their dependence on local insurance or government rebates, for example, two US-based companies, and three Australian providers. Figure 2 shows countries where operations are based.

OMC is a growing phenomenon featuring several interaction modalities, serving various medical consultation purposes, and accessible to millions across the world. Online medical consultations are readily accessible and very topical. A simple internet search of 'online doctor', or 'online medical consultation', returns hundreds of links for sites ranging from free ask-the-doctor sites to highly prestigious sites with sophisticated diagnostic tools and multi-interactive options. OMC may be unevenly available worldwide. The countries of operation for OMC sites may need further analysis to correlate with local factors. Factors may include scale of internet services, recognition by professional bodies, and availability of reimbursement systems, not to mention cultural and linguistic factors that may have significant impact on OMC raise.

Future research is in progress to fully describe OMC models of service and models of care, and to investigate OMC services adoption and quality from both providers' and consumers' perspectives. Since OMC providers and consumers are more autonomous than conventional telemedicine, there is a need for their quality to be evaluated using innovative criteria that are adapted to their unique nature. Professional, legal, and financial systems will need to be modified in order to create the proper environment for OMC growth, and at the same time to ensure good health outcomes with patient and clinician satisfaction. The challenges and opportunities for health service provider organizations responding to the rise of OMC services also merit further investigation. Our work casts light on a new avenue for consumer choice, an open market space for health care provider.

3. System Analysis

3.1 Problem Definition

Develop a web application to provide facilities to patients who does not have proper transportation and during late night emergencies.

3.2 Hardware Specification

System	: I3/I5 Processor
Hard disk	: 500 GB
RAM	: 4GB
Monitor	: Standard LED Monitor
Input Devices	: Keyboard and Mouse

3.3 Software Specification

Operating System	: Windows
Scripting & Markup Languages	: JavaScript, HTML, CSS
Technologies	: Frontend framework Bootstrap
Server-side scripting language	: PHP
Tools/IDE	: Visual Studio Code, Power Bi

3.4 Project Implementation Details

It contains a navigation bar which contains several components as:

- Home: It displays basic information about the website and also contains all the navigations which direct us to other forms.
- About: This template provides the information about the website and the services that are provided and can be accessed by users.
- Sign Up: It is a page where any user can sign up if they do not possess account and create new account such that they can get access to further information.
- Prescription: To provide the prescription to the patients either via gmail or whatsapp, the doctors can use this page.
- User Login: This page of the website directs user to enter a username and respective password to use the services provided.
- Doctor Login: Doctor Login from the website requests a doctor to login by providing the required credentials to get access to the patients and their emergencies.
- Admin Login: This form requests the admin to provide their credentials and login successfully so that they can view the doctors and patients who are accessing the website and are providing or receiving any sort of help.
- Services: Services page of the website displays a template where a user/patient can post their emergency and receive the help through Email or any available media platform.

3.5 UML Diagrams

Unified Modeling Language (UML) is a general purpose modelling language. The main aim of UML is to define a standard way to visualize the way a system has been designed. It is quite similar to blueprints used in other fields of engineering.

UML is not a programming language, it is rather a visual language. We use UML diagrams to portray the behavior and structure of a system. UML helps software engineers, businessmen and system architects with modelling, design and analysis. The Object Management Group (OMG) adopted Unified Modelling Language as a standard in 1997. Its been managed by OMG ever since. International Organization for Standardization (ISO) published UML as an approved standard in 2005. UML has been revised over the years and is reviewed periodically.

3.6 Purpose of UML:

Complex applications need collaboration and planning from multiple teams and hence require a clear and concise way to communicate amongst them.

Businessmen do not understand code. So UML becomes essential to communicate with non-programmers essential requirements, functionalities and processes of the system. A lot of time is saved down the line when teams are able to visualize processes, user interactions and static structure of the system.

UML is linked with object oriented design and analysis. UML makes the use of elements and forms associations between them to form diagrams.

Diagrams in UML can be broadly classified as:

Structural Diagrams – Capture static aspects or structure of a system. Structural Diagrams include: Component Diagrams, Object Diagrams, Class Diagrams and Deployment Diagrams.

Behavior Diagrams – Capture dynamic aspects or behavior of the system. Behavior diagrams include: Use Case Diagrams, State Diagrams, Activity Diagrams and Interaction Diagrams.

3.6.1 Activity diagram:

At the login page the person has to enter Username and Password which if are correct then the login is successful else it redirects to the login page to check the credentials.

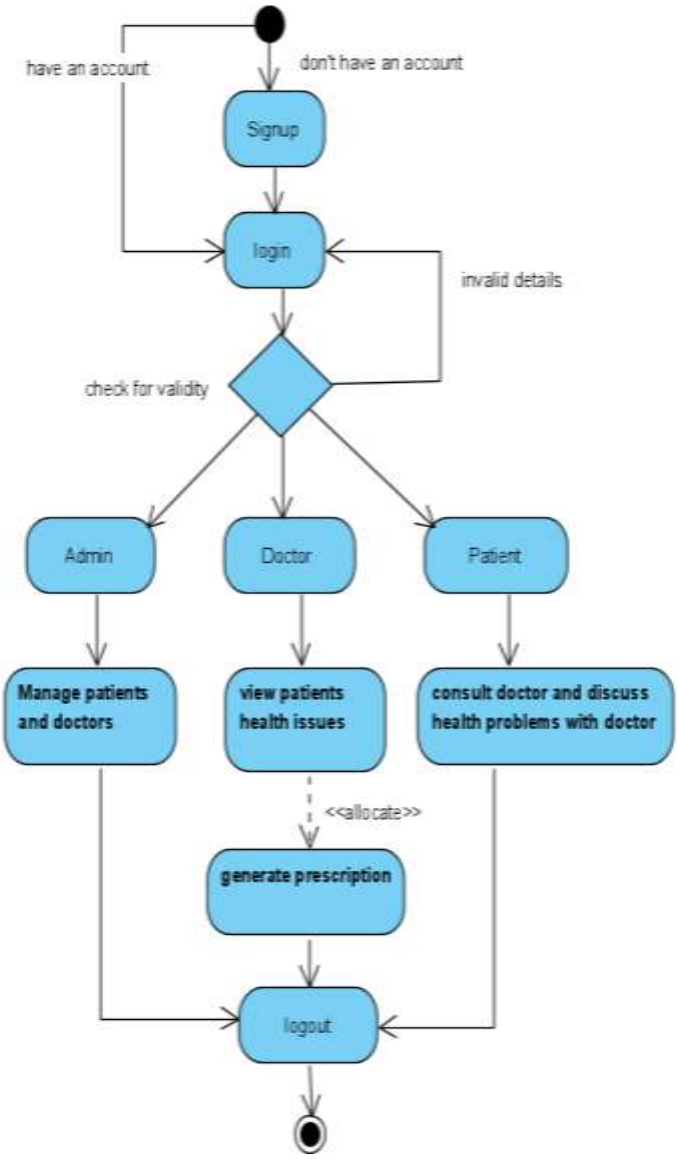

Fig1. Activity diagram

3.6.2 Use Case Diagram:

The user has to provide the credentials like Username and Password which are authorized by server. Then the server sets the possible options that a user can choose.

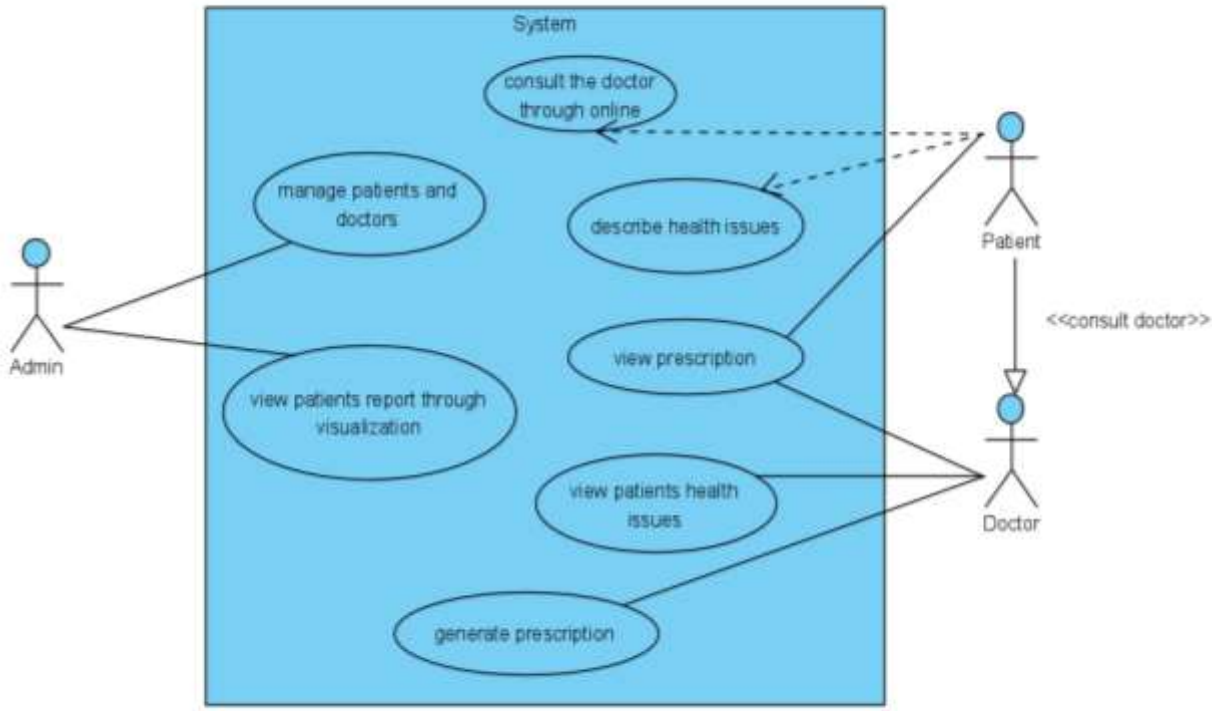

Fig2. Use case diagram

3.6.3 Class Diagram:

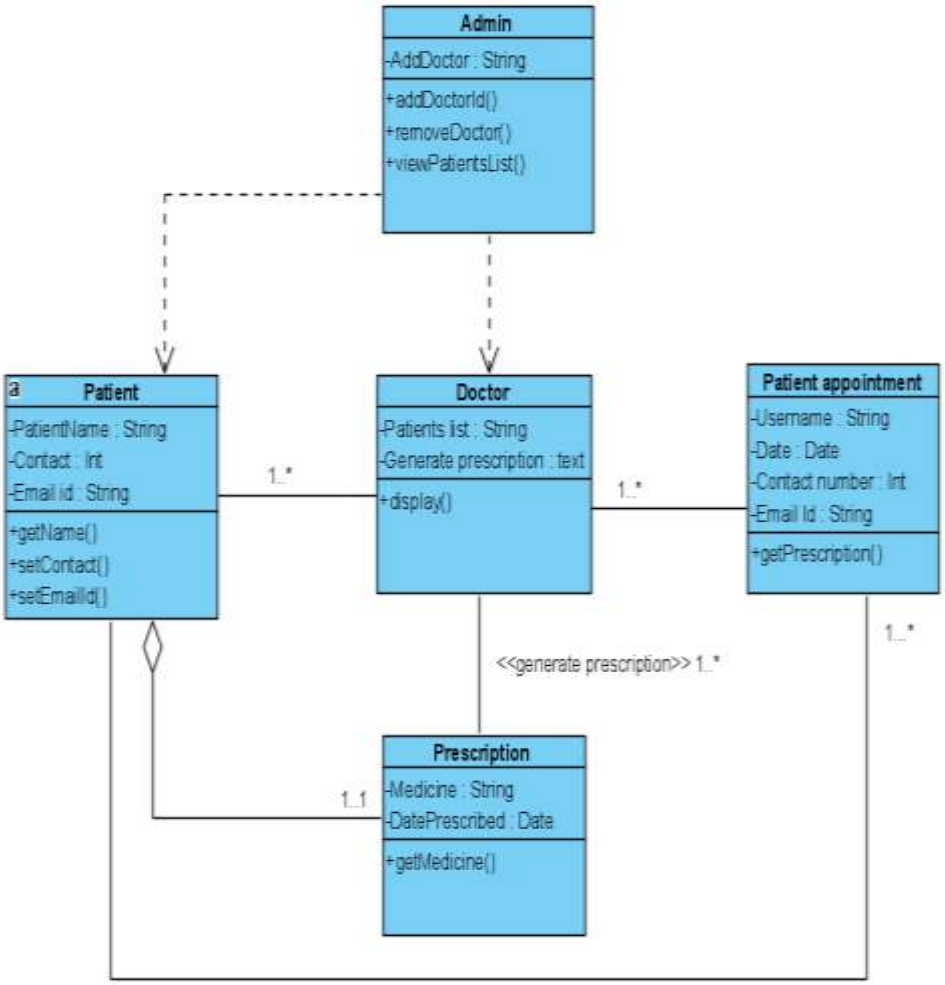

Fig3. Class diagram

3.7 About Power BI

Power BI is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Your data may be an Excel spreadsheet, or a collection of cloud-based and on-premises hybrid data warehouses.

Power BI Tool:

Power BI tool is a Business Intelligence and Data Visualization tool for converting data from various data sources into interactive dashboards and analysis reports. Power BI offers cloud-based services for interactive visualizations with a simple interface for end users to create their own reports and dashboards.

- Pre-built dashboards and reports for SaaS Solutions
- Power BI allows real-time dashboard updates.
- Offers Secure and reliable connection to your data sources in the cloud or on-premises
- Power BI offers Quick deployment, hybrid configuration, and secure environment.
- Allows data exploration using natural language query
- Offers feature for dashboard visualization regularly updated with the community.

Types of Power BI tools

Now in this Power BI desktop tutorial, we will learn about types of Power BI tools.

Some Important Power BI tools are:

Power BI Desktop

Power BI desktop is the primary authoring and publishing tool for Power BI. Developers and power users use it to create brand new models and reports from scratch. Costs: Free

Power BI service

Online Software as a Service (SaaS) where Powe Bl data models, reports, dashboards are hosted. Administration, sharing, collaboration happens in the cloud.

Power BI Data Gateway

Power BI Data Gateway works as the bridge between the Power Bl Service and on-premise data sources like DirectQuery, Import, Live Query. It is Installed by Bl Admin.

Power BI Report Server

It can host paginated reports, KPIs, mobile reports, & Power Bl Desktop reports. It is updated every 4 months and installed/managed by the IT team. The users can modify Power Bl reports other reports created by the development team.

Power BI Mobile Apps

Power BI mobile app is available for iOS, Android, Windows. It can be managed using Microsoft Intune. You can use this tool to view reports and dashboards on the Power Bl Service Report Server.

Data sources for the Power BI

Data source	Description
Excel (.xlsx, xlxm)	A workbook can have data entered manually or data, which is queried and loaded from external data sources.
Comma Separated Value (.csv)	Files are simple text files with rows of data. Every row can contain one or more values, which is separated by a comma.
Power BI Desktop (.pbi)	You can use Power BI Desktop to query and load data from external data sources.
Databases in the Cloud	It allows you to connect live to Azure SQL Database, Azure SQL Data Warehouse, etc.
Databases on-premises	You can connect directly to SQL Server Analysis Services Relational model databases. A Power BI Enterprise Gateway is required.

Power BI data sources

Power BI Dashboard

Power Bl Desktop is an enlargement tool used to generate dashboards and reports. Power Bl applications will be accessed by other users through desktop and mobile devices.There are Power BI components are 5 main components released in the market.

- **Power Query:** It can be used to search, access, and transform public and internal data sources.
- **Power Pivot:** It is used for data modeling for in-memory analytics.
- **Power View:** This component allows you to visualize, analyze, and display data.
- **Power Map:** It brings data to life with interactive geographical visualization.

4. Testing

1. Validation Testing performed.

2. Required fields are marked so that the user knows those are mandatory.

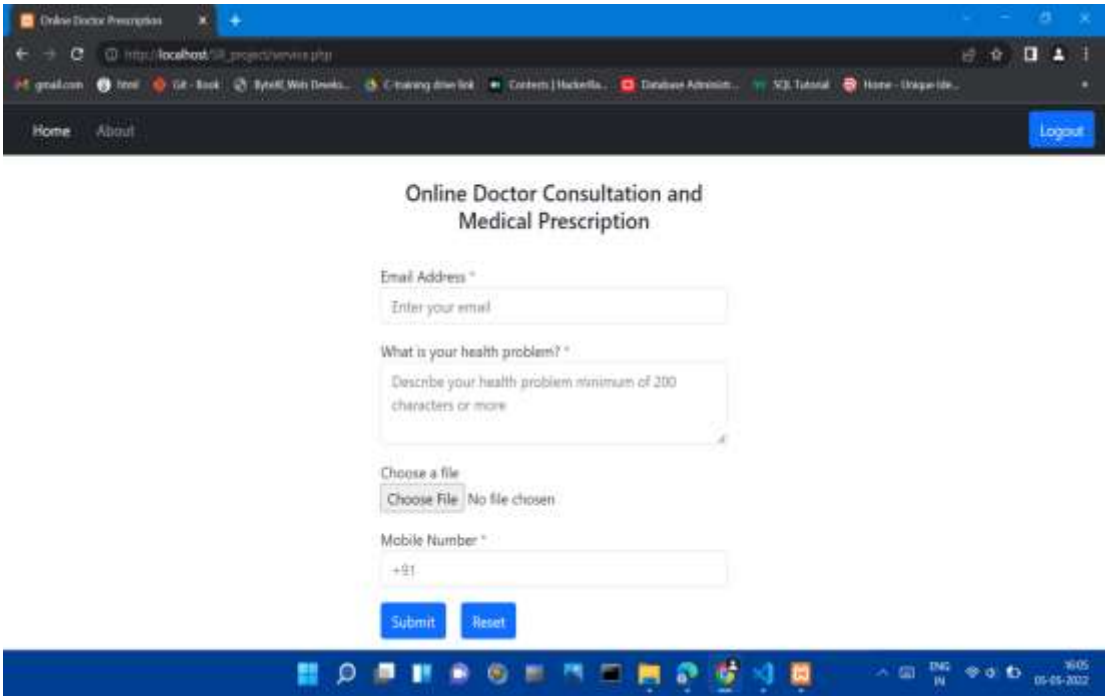

Fig4.1. Online doctor consultation form

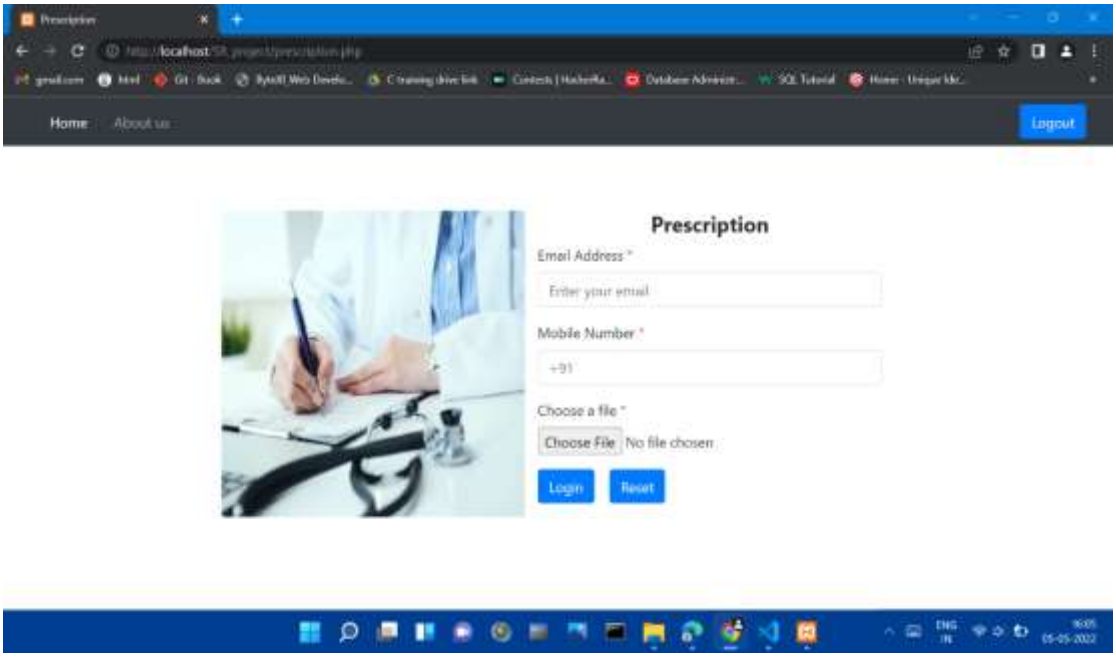

Fig4.2. Prescription form

5. Results

5.1 Home

Main page includes a ‘navigation bar’ containing a home page, about the hospital, contact us, a login dropdown menu consisting of patient login, doctor login, admin login, diabetes patients login and a signup button. There are ‘three slide’ moving and two ‘thumbnails’ of hospitals.

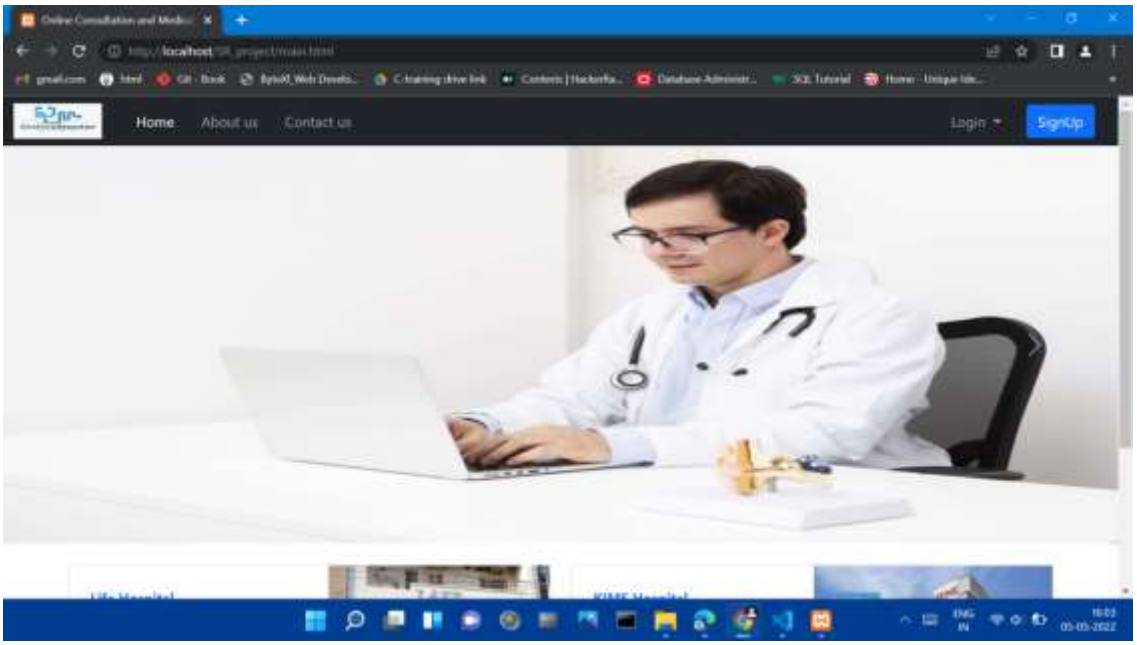

Fig 5.1 Home page1

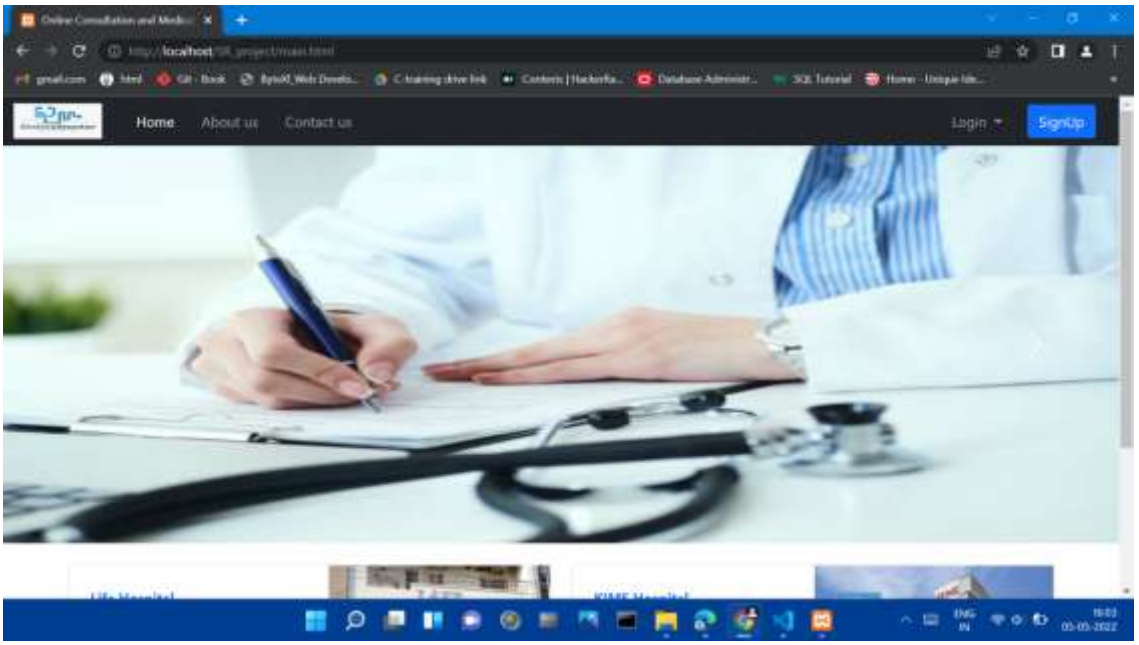

Fig 5.1.1 Home page2

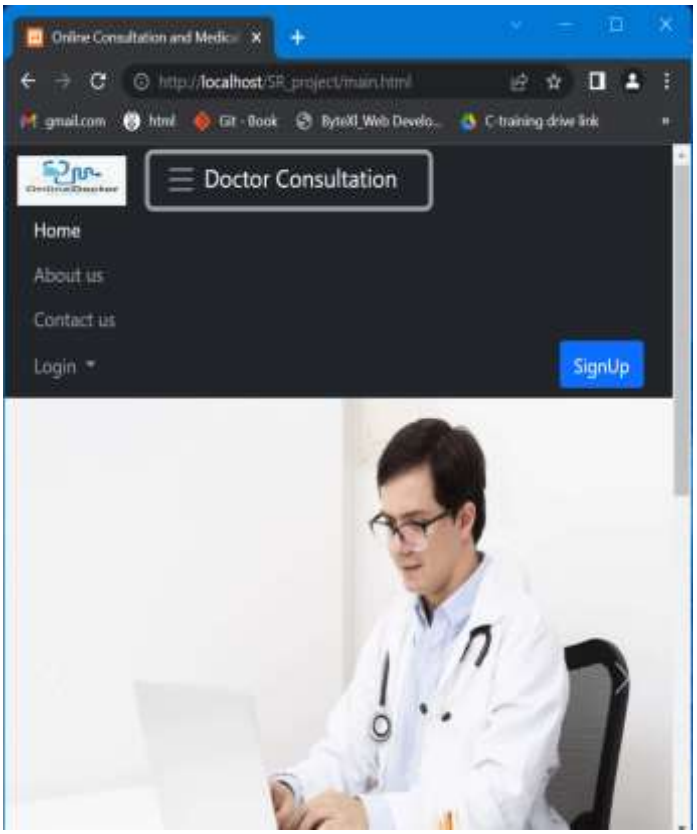

Figure 5.1.2 Home page (mobile view)

5.2 About page

This ‘about’ web page gives the overview of hospital.

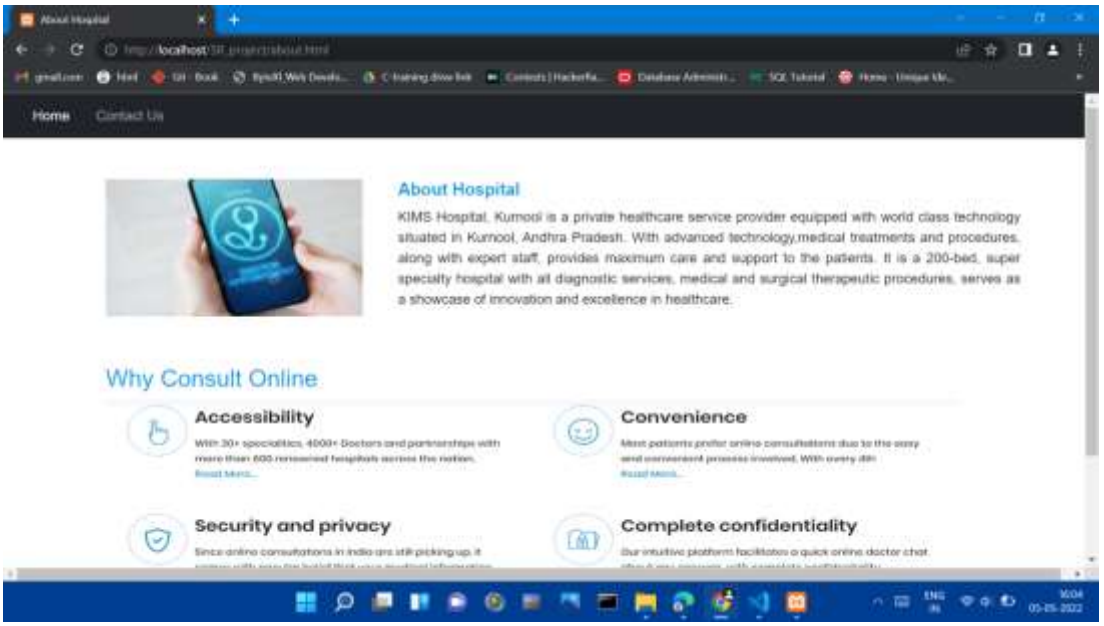

Fig 5.2 about page

5.3 Contact Us

This webpage shows the top doctors and gives their information in the contact us page. Supportive doctors will help you through ‘contact us’ web page.

Fig 5.3 contact us page

5.4 Sign up

It is a page where any user can sign up if they do not possess account and create new account such that they can get access to further information.

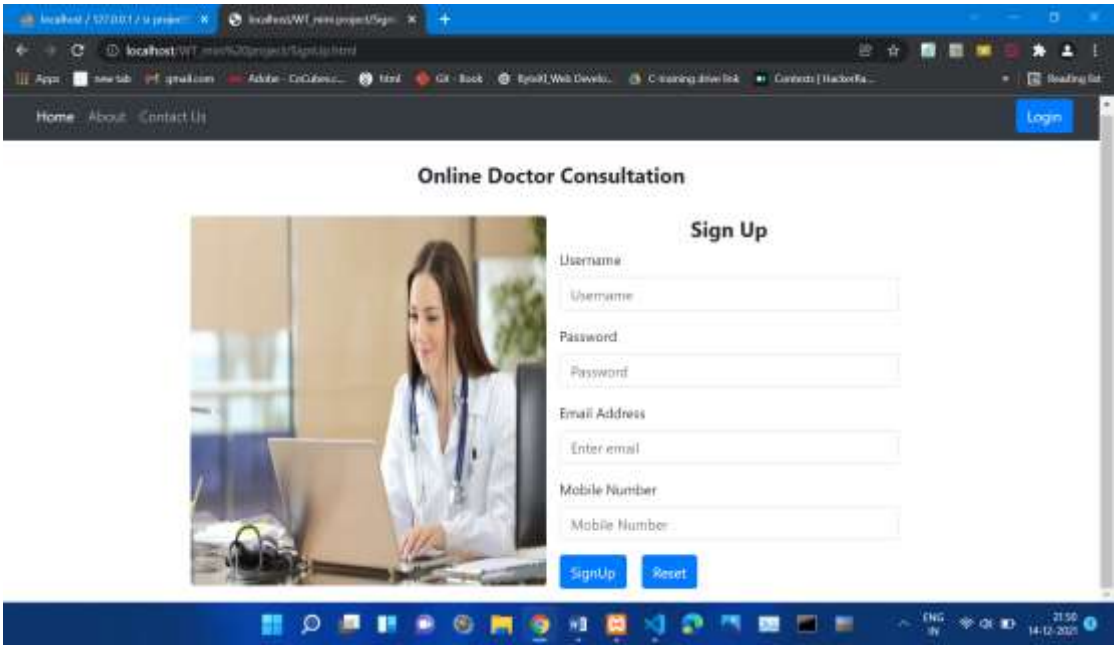

Figure 5.4 sign up page

Login

A ‘login’ form is to consult the doctor through a web application by explaining their health issues in a given text form or images and get the prescription from the doctor through email or WhatsApp in printable format.

5.5 User/Patient Login

The user login is a page where a patient or an user provides their credentials to get further access of the services.

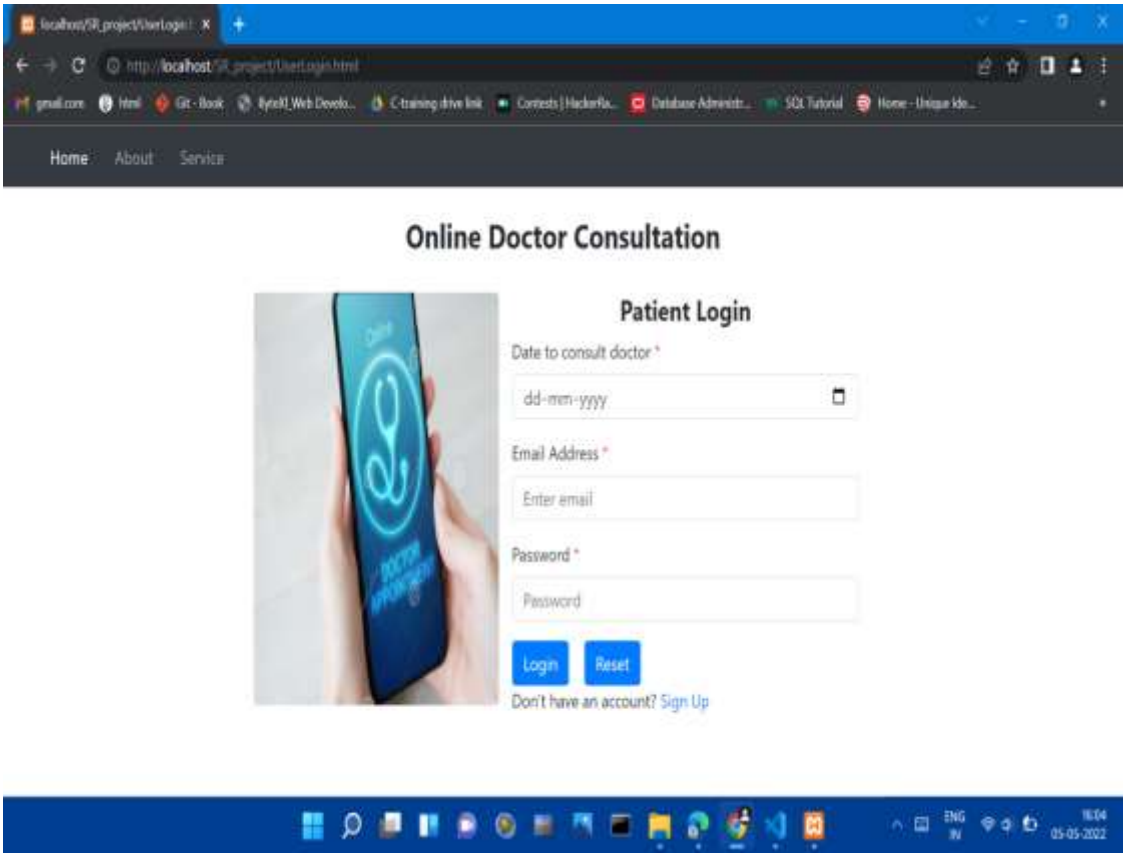

Fig 5.5 user/patient login page

5.6 Doctor Login

A doctor see the list of patients that who are connected and provide service to patients. Doctor Login from the website requests a doctor to login by providing the required credentials to get access to the patients and their emergencies.

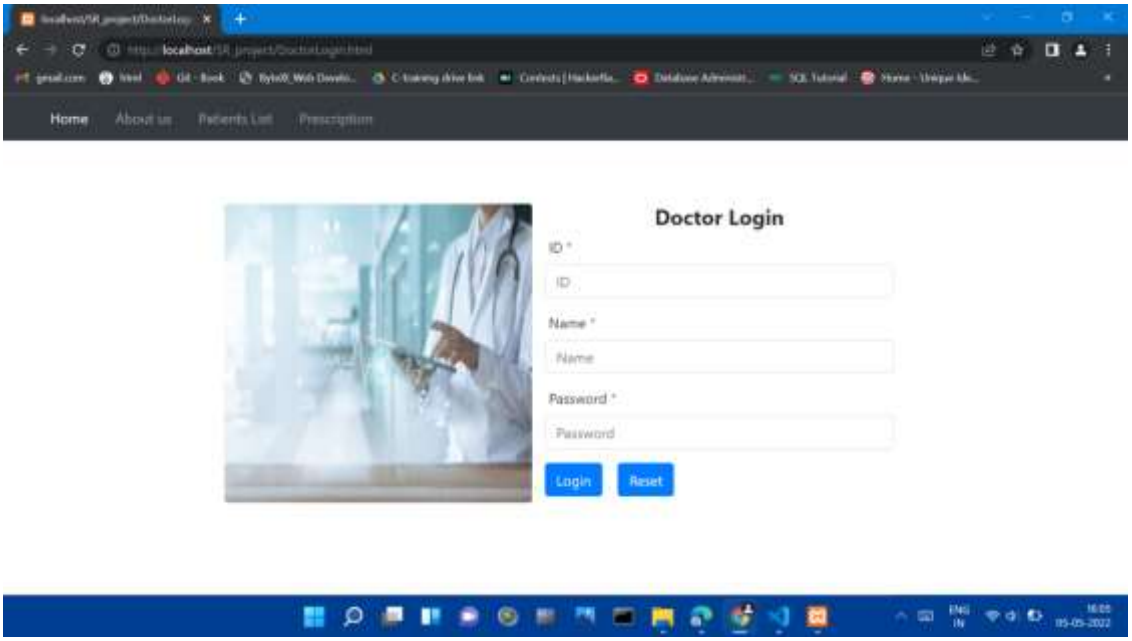

Fig 5.6 doctor login page

5.7 Prescription page

A doctor, once he gets to know how the patient should be gtreated, the treatment will be given in the form of prescription either through gmail or whatsapp.

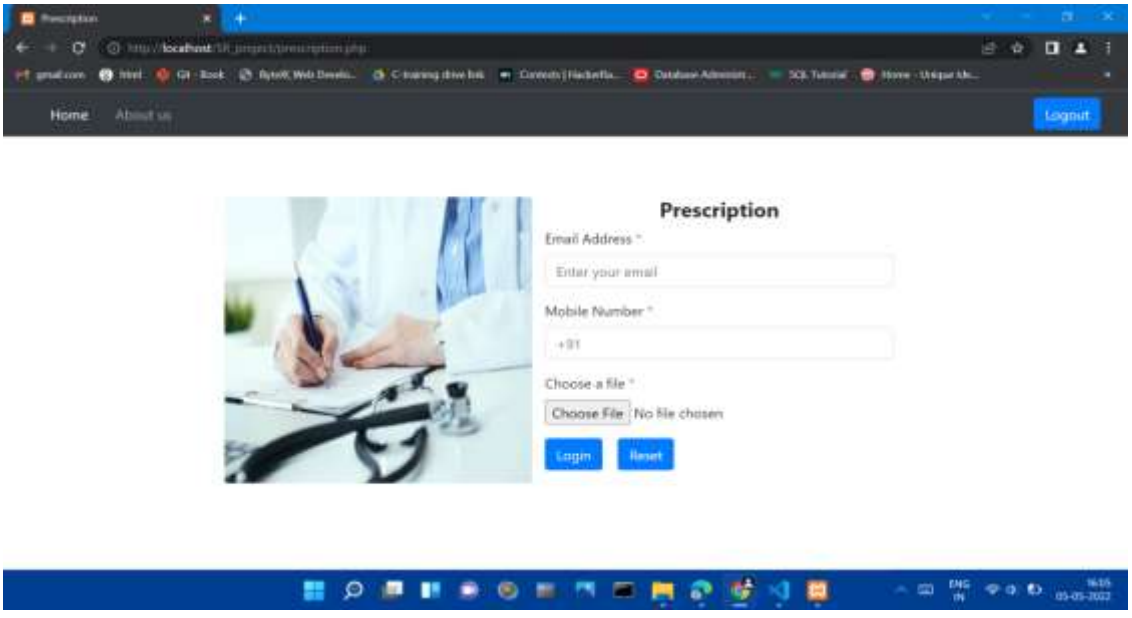

Fig 5.7 Prescription page

5.8 Admin Login

Admin login requests admin of the website to provide the details which makes them to add or view doctors and users.

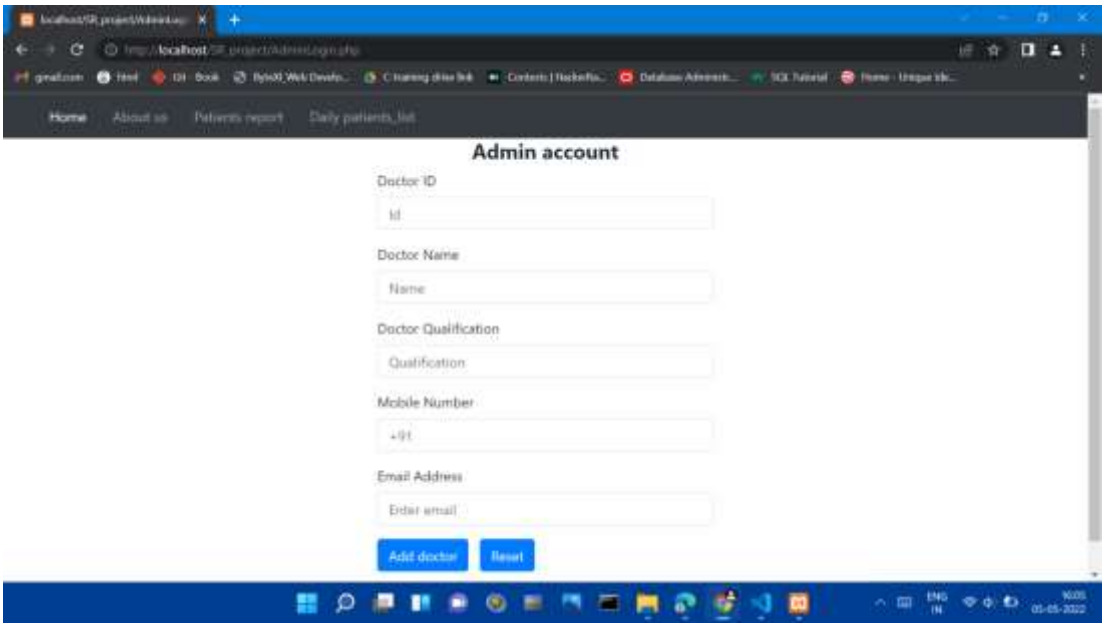

Figure 5.8 admin login page

5.9 Service Page

Services page of the website displays a template where a user/patient can post their emergency and receive the help through Email or any available media platform.

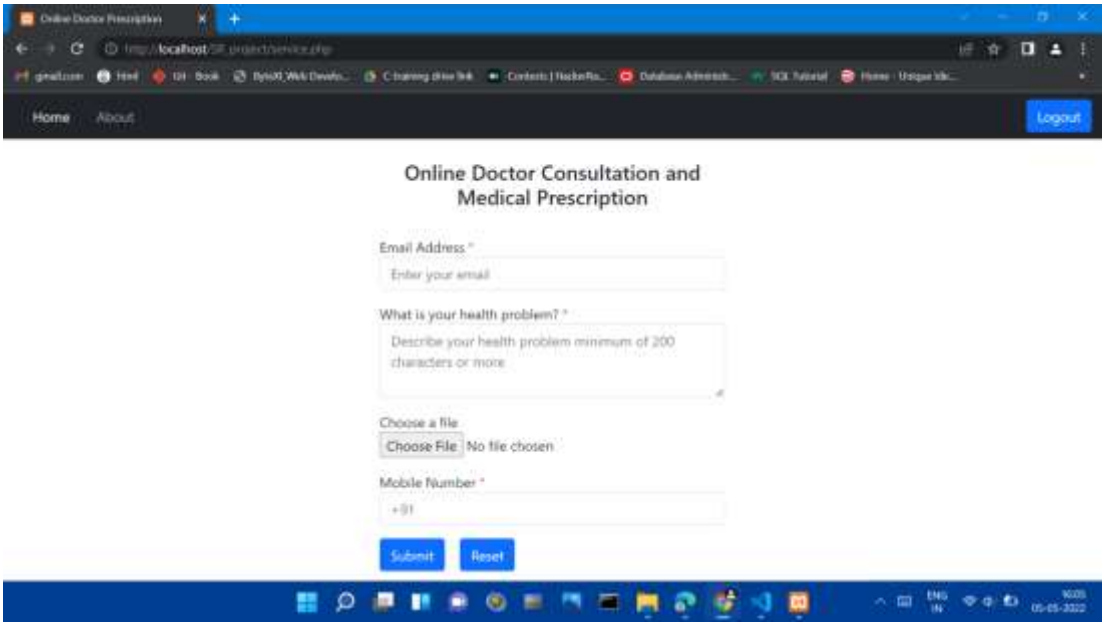

Figure 5.9 service page

5.10 Patients report using Power BI

Power Bi is a tool which can be used when the data is to be summarized into reports. The visualization that is given by Power Bi tool is very understandable. Power Bi tool does not take duplicate entries which makes it more accurate.

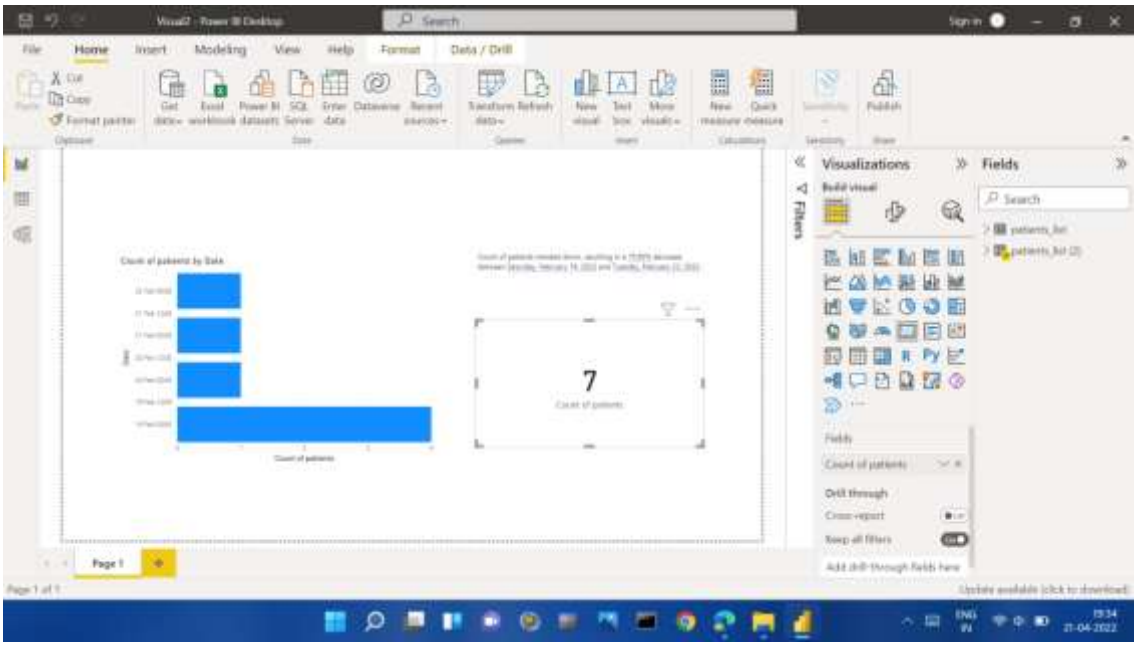

Fig 5.10 Each day count of patients

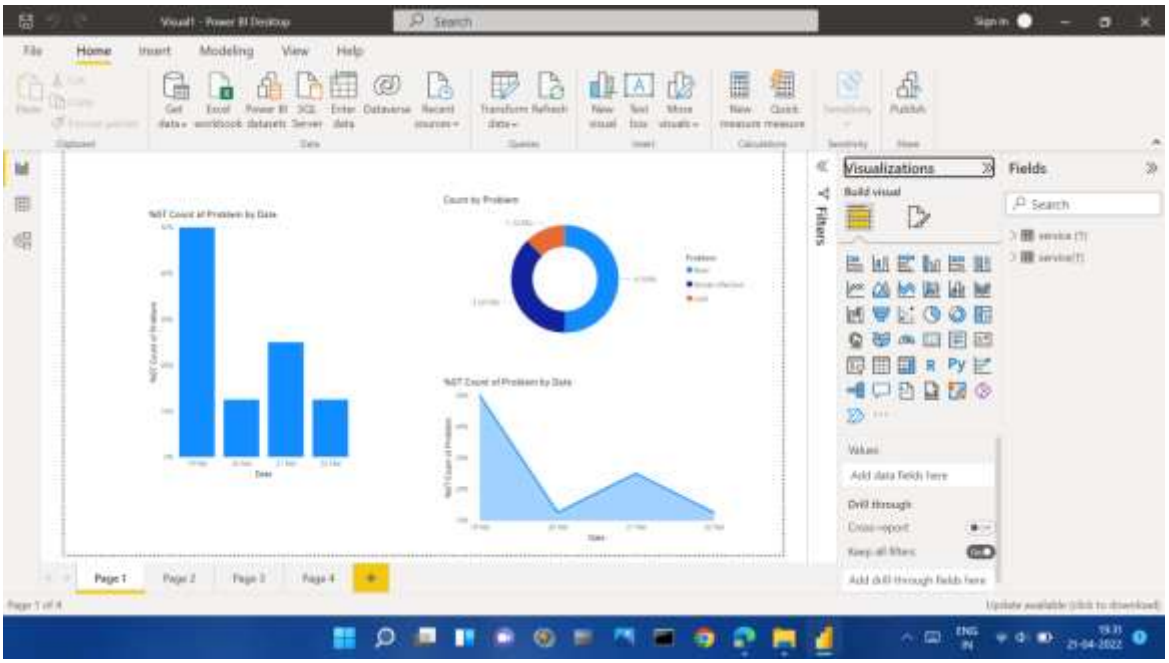

Fig 5.10.1 Patients daily list

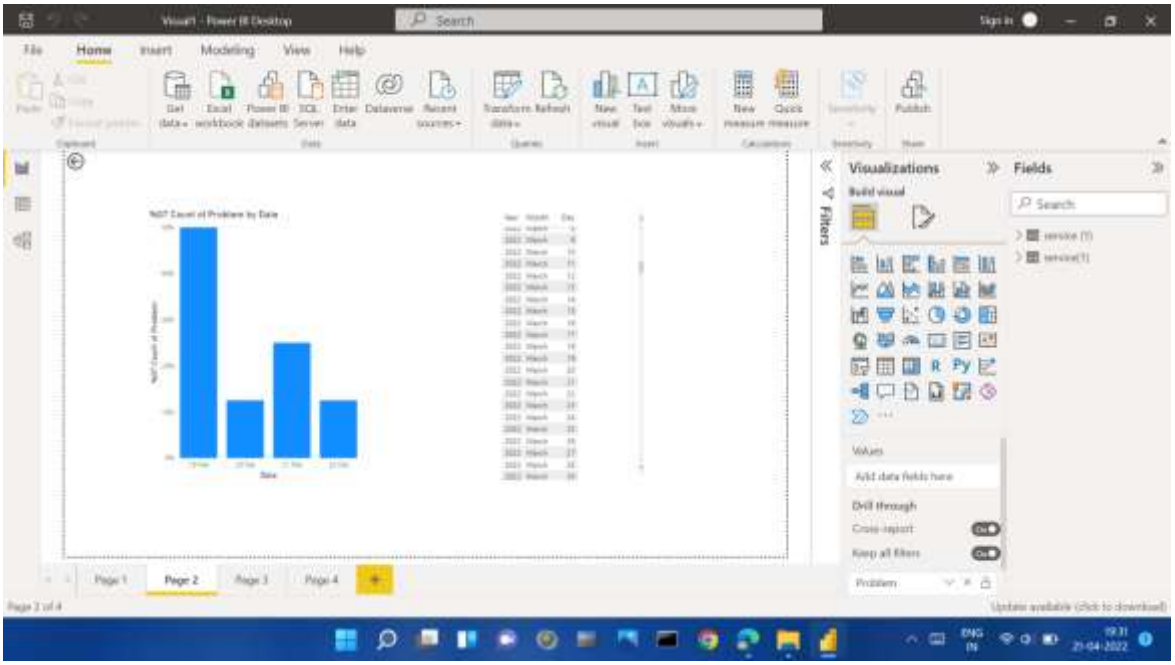

Fig 5.10.2 Patients daily report

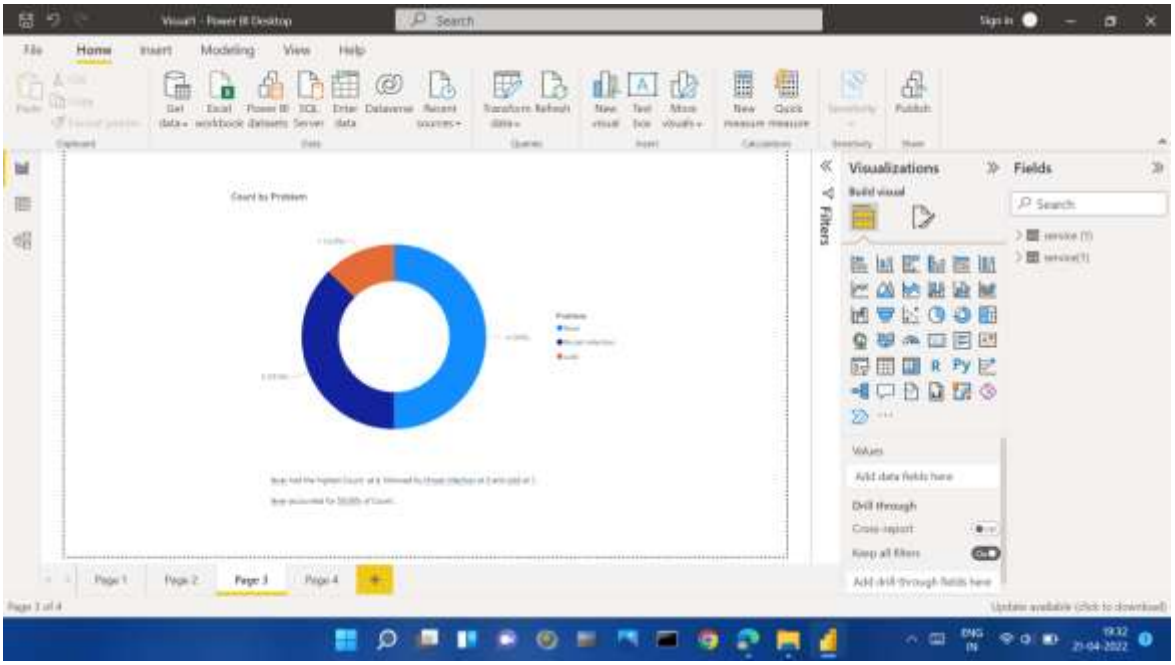

Fig 5.10.3 Patients common health issues

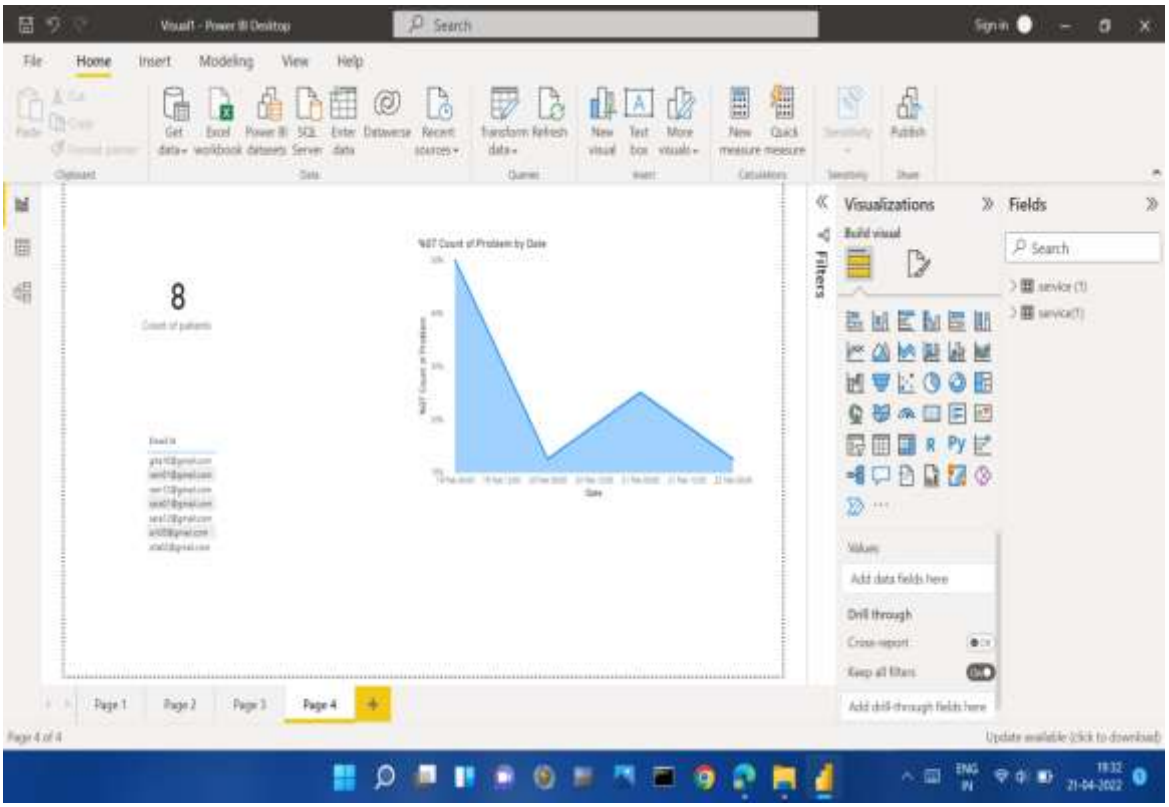

Fig 5.10.4 Patients common health issues report

6. Conclusion

Health systems are under increasing pressure to save money and improve equality. There are hopes that, over the next decade, digital health and specifically, the internet, harnessed as a health service tool, can address these aims by shaping individuals service use and health perceptions. Patients use the internet to comment on their experiences of health and care services. This application will helpful to patients in emergency cases that do not reach hospital, who does not have doctors in area, during emergency situations.

Ensuring that the Internet becomes a suitable, ubiquitous medium for supporting health applications is a challenging task. Not only must the Internet provide connectivity among the participants in health-related information transactions, but it must also ensure that such transactions can occur predictably, efficiently, and without endangering patient safety. Consumers must be able to determine the quality and provenance of the information they retrieve from the Internet. Care providers who access patient records remotely must be assured that the network will be available when and where needed. Administrators must be sure that bill payment and enrollment information is not corrupted as it crosses the Internet. Without proper security protections, use of the Internet to transmit medical records could make personal health information more susceptible to breaches of confidentiality and loss of integrity

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