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INSTITUTE OF ENGINEERING
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[SANEPA, LALITPUR]

A
MINOR PROJECT
ON
VIRTUAL HOSPITAL

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A PROJECT REPORT SUBMITTED TO THE DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR IN ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMPUTER ENGINEERING

SANEPA, LALITPUR, NEPAL

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DECLARATION

We hereby declare that the report of the project work entitled "VIRTUAL HOSPITAL" which is being submitted to the Sagarmatha Engineering College, Tribhuvan University, in the partial fulfillment of the requirements for the award of the Degree of Bachelor in Computer Engineering, is a bonafide report of the work carried out by us. The material contained in this report has not been submitted to any University or Institution for the award of any degree.

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ABSTRACT

In the 21st century, there has been a lot of change in the advancement of science and technology but due to this pandemic most people cannot use proper use of online systems in the context of developing countries like ours. In this pandemic everybody is going through a tough time. So, the online system has become one of the solutions to control this world pandemic. So, it's a better time to make efficient use of an online system. Due to this pandemic we people have become aware about many things. Most of the universities in Nepal have already online classes which is one of the advancement and involvement in the online or internet system. Online system makes the user comfortable with many of the things. In cities or towns most of the hospitals are crowded and the patients cannot get the time to meet the doctor because of their busy schedule. So "Virtual Hospital" can be one of the solutions. So the doctor or the patient can login from the website and can make their appointment according to their qualification and specialty. This can save both the doctor and patient time. As well there won't be so much crowd in the hospital. So, this Virtual Hospital may be one of the solutions to overcome the crowd in the hospital. It will not only ease the Health Care system of the country but also it will make 100 times more efficient for us. Mostly it can also be useful to kids who are afraid of going to the doctors. It mainly aims to the people who need to visit doctors frequently. The doctor can give time to patients and prescribe medicine to the patients. So it could be one of the solutions to overcome the crowd in Nepalese small hospitals which cannot handle the growth of disease with the increase of the patients during this pandemic time, as we hear most of the people are afraid to get admitted due to this pandemic.

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LIST OF ABBREVIATIONS

HTML: Hypertext Markup Language

CSS: Cascading Style Sheets

JS: Java Script

DFD: Data Flow Diagram

E-R: Entity Relationship

OAS: Online Appointment System

1. **INTRODUCTION**

This proposal is in the reference to the project named "VIRTUAL HOSPITAL. During this pandemic all over the world most of the patients suffering from other diseases rather than COVID-19 are afraid to go to hospital. This platform also provides the online medical services to the people where the patient can interact with the doctor. The doctor can provide the medical suggestion and prescription to his/her email. The patient needs to explain his/her sufferings. In case of emergency, the patient directly needs to contact the nearest hospital. So the patients do not need to deteriorate the health condition due to lack of time and resources and allowances.

1.1 Background

Online services are rare in context of Nepal. This online platform helps to provide service to the patient in need within a short period of time. Looking at the scenario of Nepal, most of the patients must directly visit the doctor, according to the doctor's arrival time. Government hospital doctors cannot give much time in their respective hospitals, so the patient cannot get enough time to meet the desired doctor that they want to meet. Due to the unmanaged coupon system patients have to stands for a long time in a queue and find it difficult to visit the doctor. So it has created a problem regarding most of the patients. So this online platform could be one of the solutions.

1.2 Problem Definition

In a developing country like Nepal, there are no good hospitals and good doctors in every place. The patient has to travel a long way to visit and follow up with the doctor. Due to difficult geographical conditions, long routes and lagging behind in the advancement of transportation people are suffering a lot of problems to get proper health follow-up. They have to travel a long way and have to line up the whole day to get the appointment of the doctor. During this pandemic too, many people get to suffer from many other diseases. But they don’t want to show up to the hospital due to the scary situation of spreading COVID-19 all over the world. Most of the patients could not be able to visit the doctor in time, get medical benefits in time and get the prescription of the doctor in time which leads to the degrading of the health condition of the patients. So it has become one of the major problems. On our research we have found various other problems which is summarized as:

- 64% of the people surveyed reported that due to this pandemic there has been a lot of ignorance of their health condition as it was not feasible to go and check out a Doctor for minor health issues.
- 47% of Old Aged people agreed that their healthcare is being ignored because of lack of time with their wards and lack of continuous guidance

1.3 Problem Solution

A feature including the details of the renowned doctors and their specialties will be available on the web application aimed to simplify the doctor consultation and daily Health Monitoring. This helps to facilitate each and every patient for their general health checkup and for their follow-up from home and patients do not need to face problem-related problems while travelling to the hospital and lining up in the hospital to take coupons for the appointment of the doctor.

1.4 Objectives

Daily Monitoring

It has become very important nowadays, to keep a daily track of our blood pressure, diabetes, pulse rate and moreover. So, we have brought the facility of monitoring yourself on a daily basis and monitoring your health daily.

Virtual Prescription

We have taken the doctor patient relation into a new way of interaction by facilitating virtual prescription with reminders for your medicines and many more.

Panel of best doctors

We have brought you the best doctors where you can choose your own doctor, get appointments from them and additionally they can even monitor your daily diets , your health 24*7. The patient can select the doctors according to their qualification and specialties.

Storage of all previous Health Record

All the Medical data of the patients will be stored in highly secured servers with the highest available technology for its reliable storage and access control options and features.

Consult Your Doctor via Video Conferencing

You can schedule a call with your very own doctor at the convenience of you both. You and the doctor need to decide and fix timings according to your preferences thereby not disturbing your daily schedules or work life.

2. LITERATURE REVIEW

With newer technologies making it easier for doctors to attend to patients from anywhere, the concept of virtual hospitals is gradually taking root. As a central freestanding facility staffed with healthcare professionals, a virtual care center brings together a number of caregivers located anywhere in the world under one connected platform [1]. It even helps to minimize long queue and crowd, enable proper social distancing which will be fruitful under current situation.

Reducing outpatient waiting times has been the focus of a most of the studies because waiting and treatment times are usually regarded as indicators of service quality. The Patient's Charter of the UK Government sets a series of standards which state that all patients must be seen within thirty minutes of their appointment time [3,4].Because of Nepal's limited medical resources, long waiting times for registration are common in the health care system, and the registration waiting time is generally much longer than the consultation waiting time. Patients' satisfaction with appointment booking is influenced by their ability to book at the right time with the right health service providers. Several studies conducted satisfaction surveys and found that Web-based appointment scheduling is an extremely important feature, and most patients would use the service again[3].In Nepal the use of online services has increases rapidly in recent years including online shopping, online payment and even online health service named hamro doctor. So there is great potential of online health care system in our country.

According to (Peng Zhao et al., 2017 Apr; 19(4): e134.) there are two modes of Web-based appointment systems, asynchronous and real-time. Asynchronous system which uses telephone calls, emails is widely practiced in clinics and hospitals in Nepal. The asynchronous system needs scheduler and cannot be operated beyond business hours thus they are limited by the backlog of phone calls in the queue .Hence there is a need for real time virtual system. In Nepal, People using online services are satisfied more than people using traditional methodology. The most common reason given by participants for not using the real time OAS was that they were unaware of its existence. Other factors leading to the non-use of the OAS were that people did not have access to internet and smart mobile, and/or lacked the ability to operate a computer/mobile.

3. FEASIBILITY STUDY

We have done some research regarding the project implementation and found it to be technically feasible as well as economically justifiable. We are hopeful that with our dedication, hard work, support from mentors and grace of god we will be able to convert our raw idea into a working product. We have even taken different suggestions from the seniors regarding the minor project. We are hopeful to complete the project in time.

3.1 Technical feasibility

We all believe in learning and doing methodology. So it is challenging for us to work with React.js and django purely with very few knowledge of both of these frameworks within a limited time frame. Due to this ongoing pandemic we team members and mentors are far from each other and hence, we might face difficulties coordinating but we hope to cope up due to our vision and will.

3.2 Economic Feasibility

The cost for the competition of the project is under limitation. The components that we used on the project are open source. So, we don't think it will cost a lot to bring a simple demo of the project.

3.3 Time feasibility:

We can complete this project on time which can be clearly observed from work breakdown and time estimation of our project as shown in the graph below. We are so much dedicated that we are sure that we will complete the project within the scheduled time. Due to this pandemic and lockdown we group members cannot be together but we will try our best.

4.4 Operational Feasibility

As the project is completed there are no much difficulties in operation. People who have access to internet connection can easily get benefited with this application. We are even planning to collaborate with different medical organizations and to spread this service all over the country making every person access to health services.

4. METHODOLOGY

In this project we will use a web or mobile application to monitor the patient. The doctor and patient must login or sign up on the page to use the facility. The new member must sign up first with verified details. Then only the member can access the services. So the patient or the doctor must compulsorily have mobile or internet access at the beginning. The data of the doctors are taken from the renowned hospitals. As well all the patient interaction will be updated in the database. After the video conferencing all the video will be recorded and kept in the database which makes it easier for the doctor and patient as well. Because many of the documents are lost to the patients, so it resolves the problem of losing the important documents. As well if the patient has the internet facility it sends notification to the patient when to take the medicine.

In this way, this project will help in continuously monitoring and observing all the patients of a hospital. So, this can become one of the online medical facilities during this pandemic period to the needy and the middle class patient.

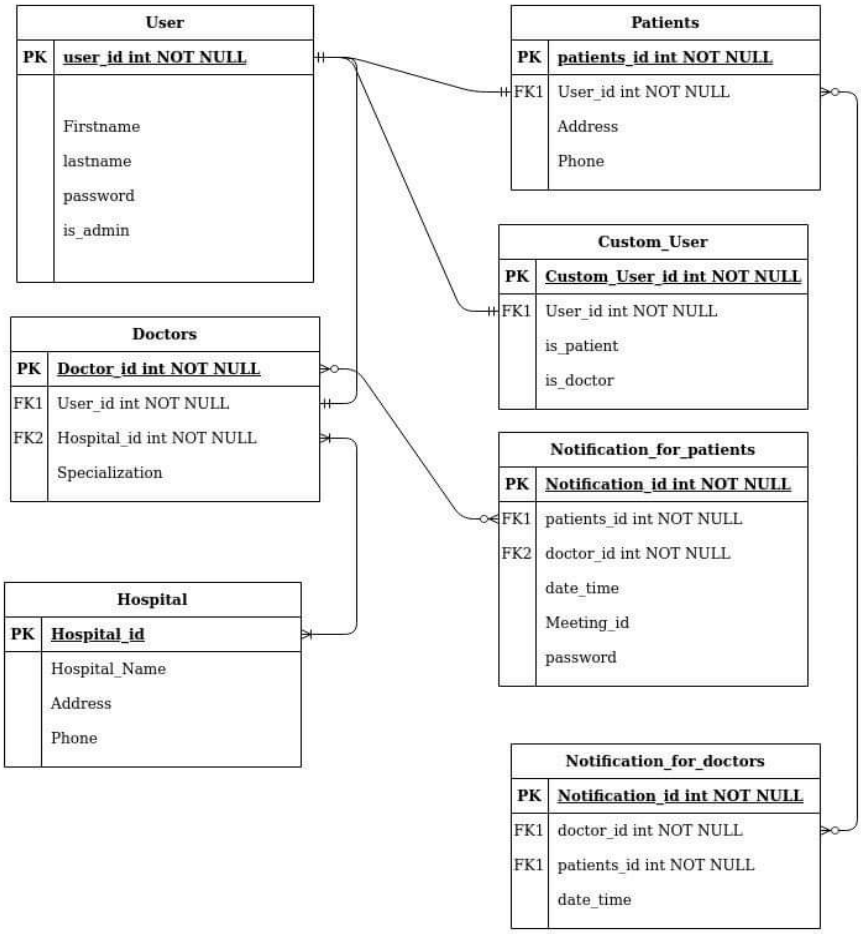


Fig 4.1 ER Diagram

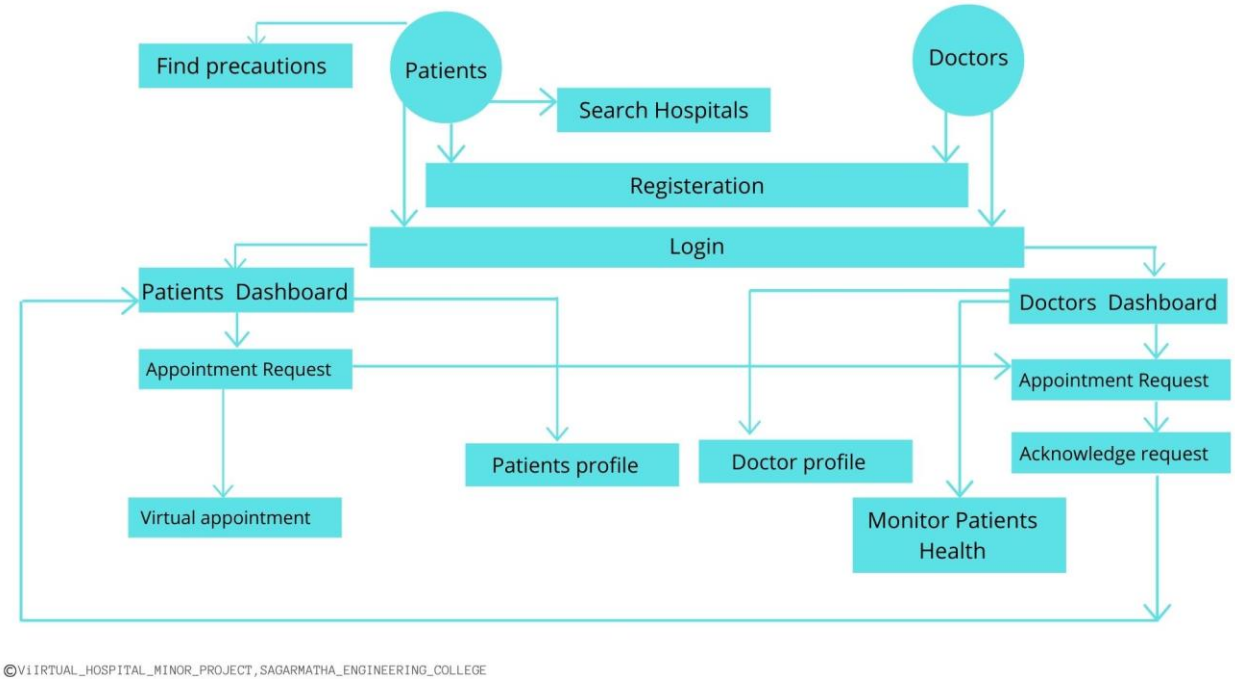


Fig 4.2 Block Diagram

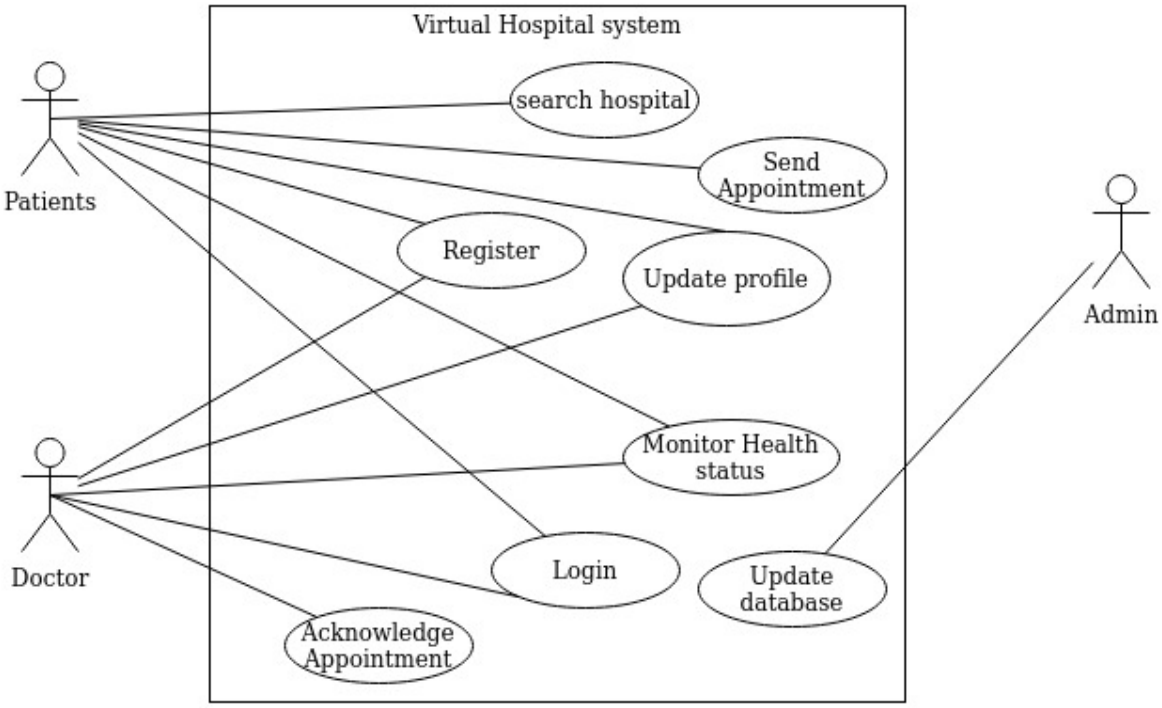


Fig.4.3 Use Case Diagram

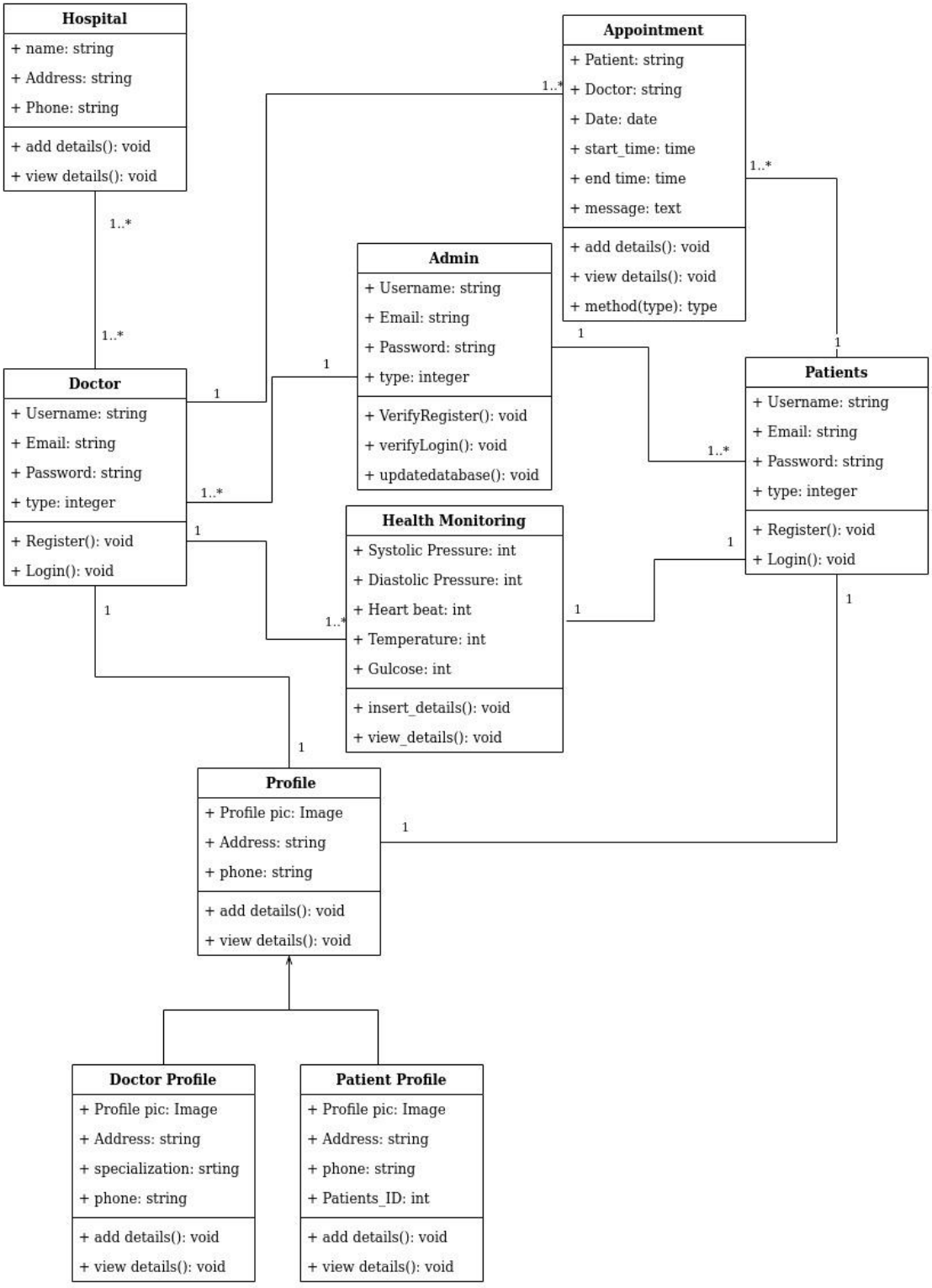


Fig.4.4 Class Diagram

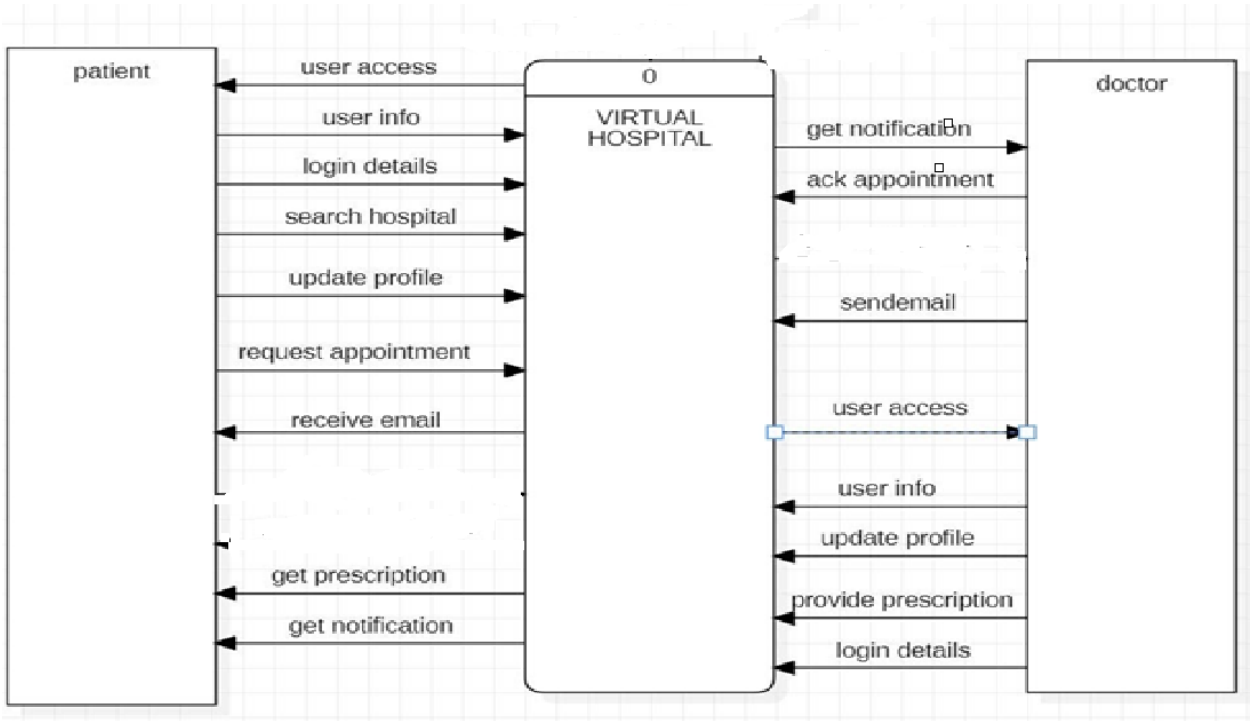


Fig 4.5 0 Level DFD

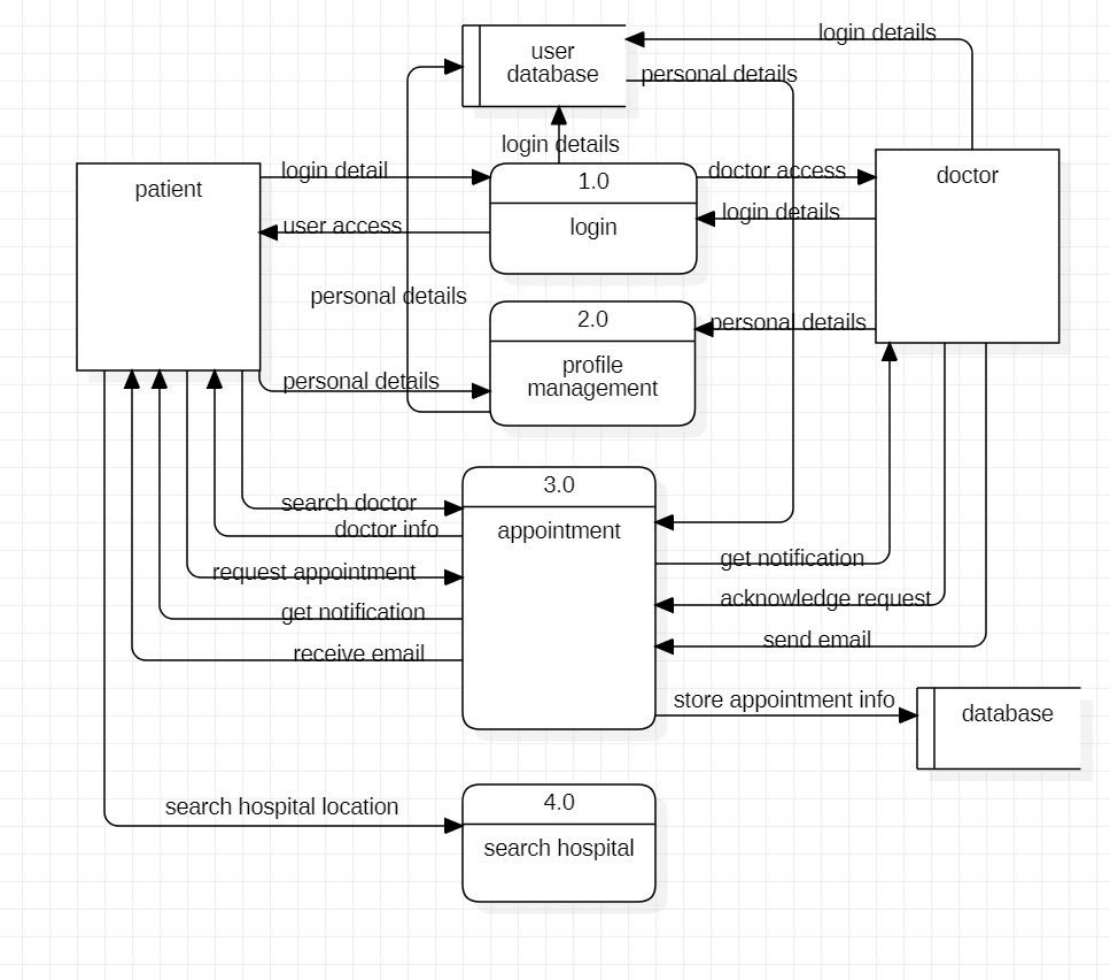


Fig 4.6 1 Level DFD

5. SYSTEM IMPLEMENTATION

A web page is a document that is suitable for the World Wide Web and web browsers. A web browser displays a web page on a monitor or mobile device. The web page is what displays, but the term also refers to a computer file, usually written in HTML or comparable markup language. Web browsers coordinate the various web resource elements for the written web page, such as style sheets, scripts, and images, to present the web page.

Creating a web site requires multiple steps which includes the following:

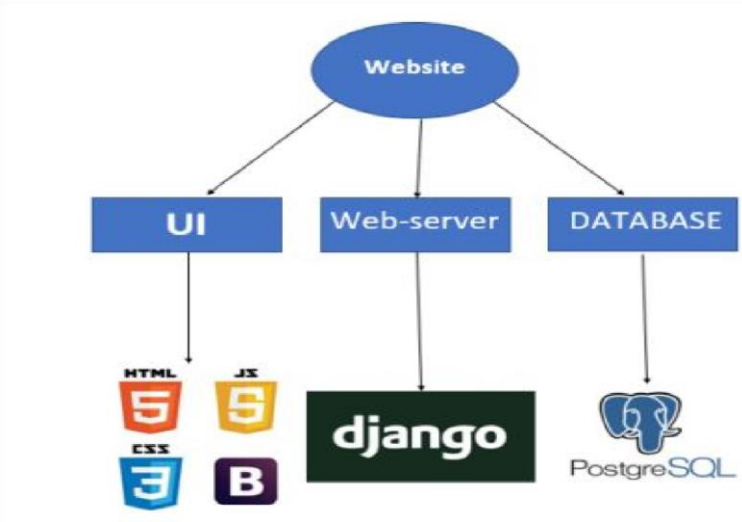
(a) Creating a UI (User interface)

(b) Scripting / Connecting to web-server

(c) Creating a backend or the database

4.1.1 UI Development

Technologies that we used to develop a User Interface are:



(a) HTML: It is the standard markup language which will be used while creating web pages and web applications. With Cascading Style Sheets(CSS) and JavaScript it forms a triad of cornerstone technologies for the World Wide

Web. Web browsers receive HTML documents from a webserver or from local storage and render them into multimedia web pages.

(b) CSS: It is a style sheet language which will be used for describing the presentation of a document written in a markup language. It will help in styling, decoration of our webpages.

(c) JavaScript: Bootstrap is a free and open-source front-end web framework for designing websites and web applications. It contains HTML-and CSS based design templates for typography, forms, buttons, navigation and other interface components, as well as optional JavaScript extensions. Unlike many web frameworks, it concerns itself with front-end development only.

5.1 Web-server

A web server is software and hardware that uses HTTP (Hypertext Transfer Protocol) and other protocols to respond to client requests made over the World Wide Web. The main job of a web server is to display website content through storing, processing and delivering webpages to users. Besides HTTP, web servers also support SMTP (Simple Mail Transfer Protocol) and FTP (File Transfer Protocol), used for email, file transfer and storage.

Web server hardware is connected to the internet and allows data to be exchanged with other connected devices, while web server software controls how a user accesses hosted files. The web server process is an example of the client/server model. All computers that host websites must have web server software.

Web servers are used in web hosting, or the hosting of data for websites and web-based applications -- or web applications. In our project we have used Django as our webserver.

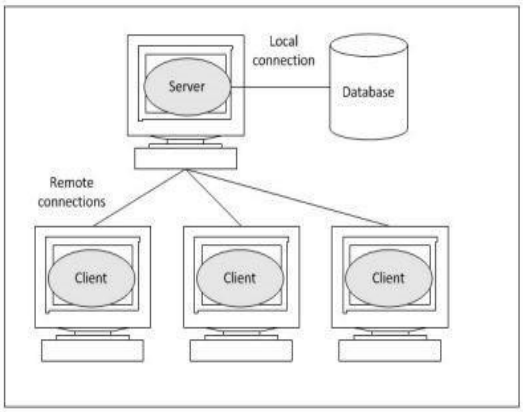
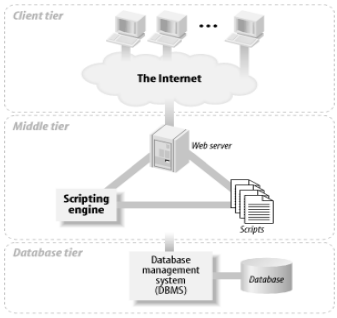


Figure: Webserver

5.2 Database

A database server or DBMS searches and manages data that's stored in databases. A database is a collection of related data, and an application can have more than one database. A database might contain a few entries that make up a simple address book of names, addresses, and phone numbers. At the other extreme, a database can contain tens or hundreds of millions of records that describe the catalog, purchases, orders, and payroll of a large company.

Database servers are complex software. However, the important component for web database application development is the applications interface that's used to access the database server. For all but the largest applications, understanding and configuring the internals of a database server is usually unnecessary.



6. EVALUATION AND RESULTS

We are doing our projects in an iterative way on the weekly basis as per the suggestion of our mentor. We mainly focused on the appointment of the patient. Some of the basic features have been added up which have been included below.

a. Patient's Login/Signup Form
b. Doctor's login/Signup Form
c. Patient Dashboard
d. Doctor's Dashboard
e. Request appointment to doctor by patient
f. Acknowledge the appointment of patient and provide the details of the meeting

g. Home page

Some of the pages have been included below.

Fig 6.1 Home Page

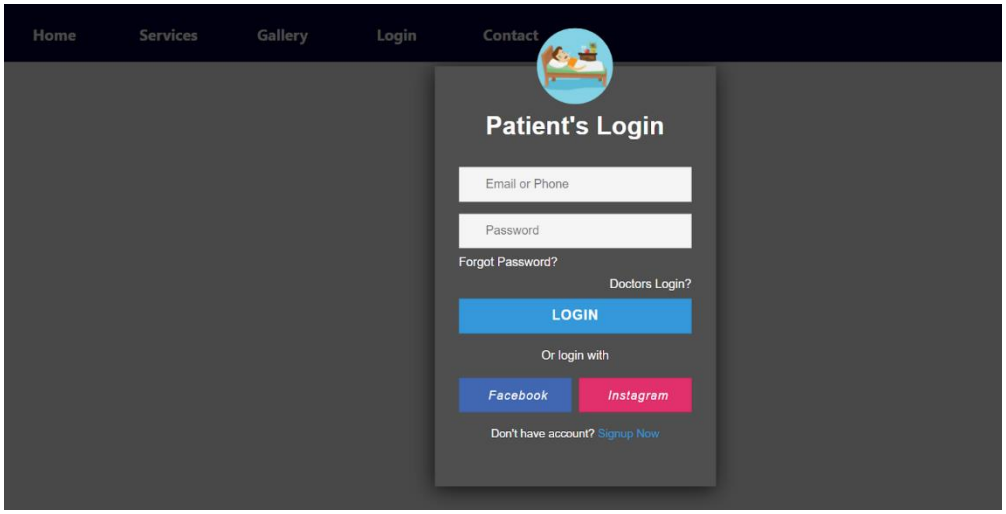


Fig 6.2 Patient's Login

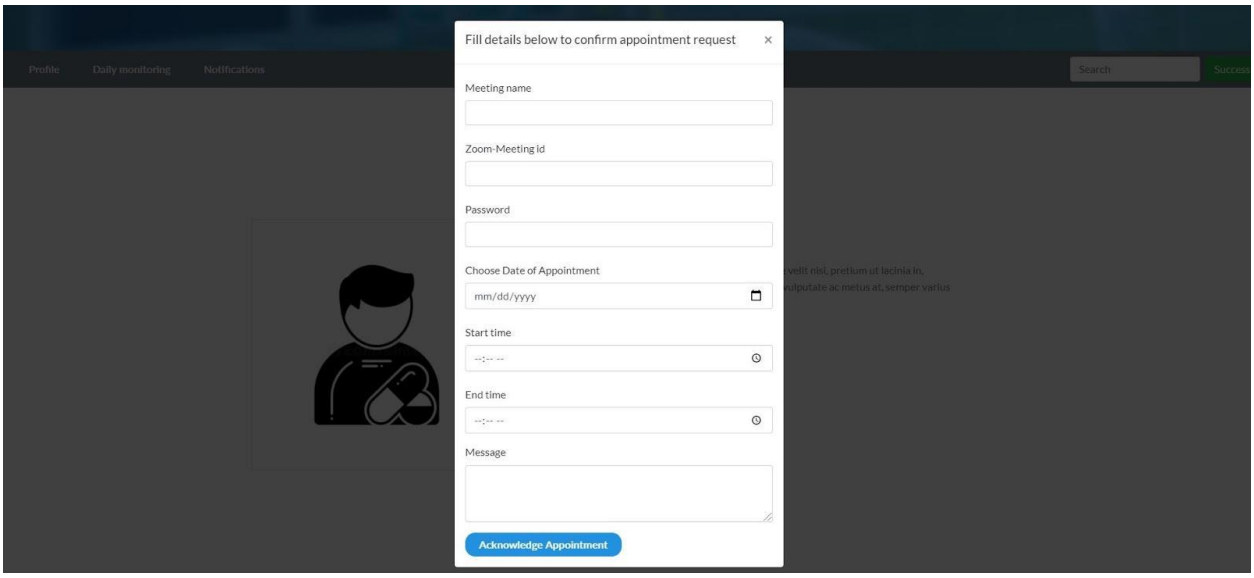


Fig 6.4 Appointment Form of the doctor for patient

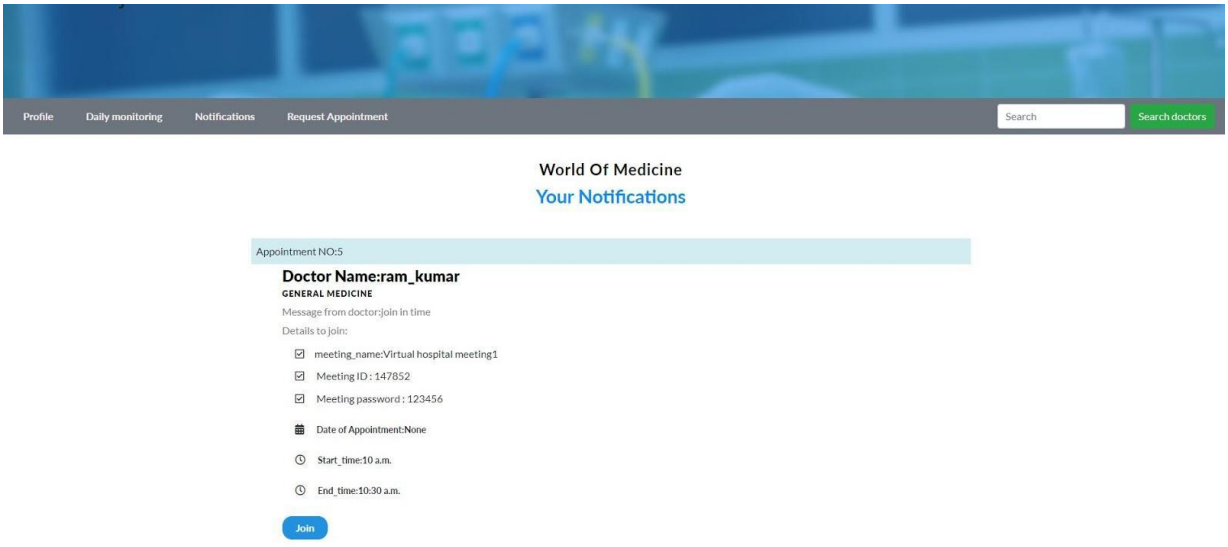


Fig 6.4 Acknowledge form by Doctor to a Patient

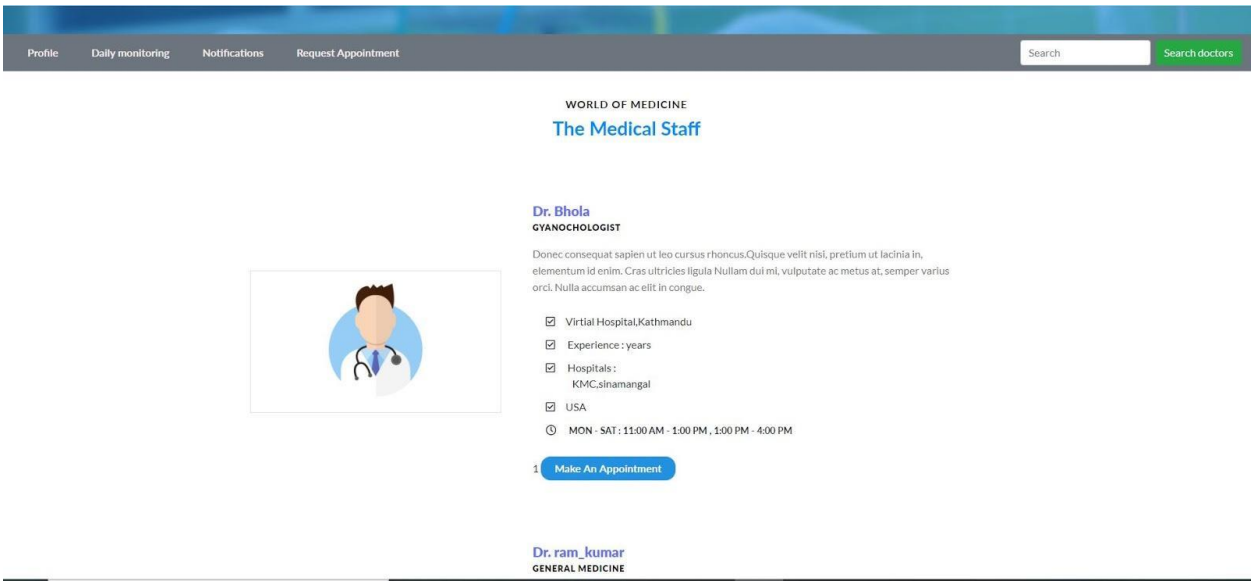


Fig 6.5 Request appointment to doctor by patient

7. CONCLUSION

After the completion of the projects patients would be able to search for the best doctors and hospitals nearby them. They can take video appointments as well as offline appointments. This application also consisted of predicting some common diseases. It aims towards the better treatment of Old Aged Persons, children and also towards the people who need OPD/Doctors assistance quite often from their birth or due to an accident. Thus an online system can bring a vast difference in the field of medical in the developing country like Nepal.

REFERENCES

1.Virtual hospitals – The future of healthcare Vishal Duggal.Available:https://www.engineersgarage.com/featured/virtual-hospitals-the-future-of-healthcare/

2.Wikipedia:VirtualHospital,Available:https://en.wikipedia.org/wiki/Virtual_Hospital

3.Cao, W., Wan, Y., Tu, H. et al. A web-based appointment system to reduce waiting for outpatients: A retrospective study. BMC Health Serv Res 11, 318 (2011). https://doi.org/10.1186/1472-6963-11-318

4.peng zhao,IIIhoi Yoo, Jaie Lavoie,Beau James Lavoie and Eduardo Simoes: Web-Based Medical Appointment Systems: A Systematic Review.J Med Internet Res. 2017 Apr; 19(4): e134. Published online 2017 Apr 26. doi: 10.2196/jmir.6747

5.Hamro Doctor: First Online Healthcare portal Niraj,Published on January 5, 201 Available:https://techsathi.com/hamro-doctor-nepals-first-online-health-portal