

# **FINAL PROJECT REPORT**

## **VIRTUAL DOCTOR**

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# **VIRTUAL DOCTOR**

## **A PROJECT REPORT**

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# **ANNA UNIVERSITY, CHENNAI**

## **BONAFIDE CERTIFICATE**

Certified that this Report titled “**VIRTUAL DOCTOR**” is the bonafide work of **ROGITHKUMAR B(2019202047)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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## **ABSTRACT**

One of the most important discoveries and creative developments that is playing a vital role in the professional world today is blockchain technology. Blockchain technology moves in the direction of persistent revolution and change. It is a chain of blocks that covers information and maintains trust between individuals no matter how far they are. Key concerns with blockchain applications in healthcare includes Network infrastructure security at all levels, Identity verification and authentication of all participants, Uniform patterns of authorization to access electronic health information.

The application will have three sides, One for Doctors and another one for patients and admin to manage both. The Doctors can voluntarily register themselves on our website for their particular profession and the people who are in need for a particular profession doctor they can approach that doctor with their appointment time. And if the doctor is okay with their appointment he/she can accept their proposal and he/she will consult virtually. The same information on the blockchain could allow individual patients to easily unlock and share their health data with other providers or organizations, through a shareable private key. This could help to make health information technology (HIT) interoperable and collaborative between different users.

Solidity language is used to write smart contracts, and with the help of ganache we can deploy the contracts. It gives the GUI to view the blocks, ethers and gas used for transactions. We also use web3.js which is a Javascript library used to connect the deployed smart contract through the front end UI. This will be a web based application. Tools and Technologies: Remix IDE, Solidity, Ganache, web3.js, HTML5, CSS5, Bootstrap .

## ACKNOWLEDGEMENT

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**Rogithkumar B**

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# **CHAPTER -1**

## **INTRODUCTION**

### **1.1 GENERAL**

Recently, the use of technology in Medicine and Healthcare has grown to a greater extent particularly during the pandemic period. The circulation of people in public is reduced considerably and people wish to do all possible work through online websites and mobile applications. Websites are the most popular and convenient means by which people can contact hospitals and other healthcare divisions. All the healthcare sectors require large database management systems to handle huge amounts of data regarding patients, doctors, consulting, and treatments. To solve this problem, a database management system is developed for the hospitals to maintain all the data efficiently that can be accessed by patients, doctors, and administrators via a common website. This system facilitates the patients to book appointments online and to view their medical profiles.

### **1.2 PROBLEM STATEMENT**

The motive of the project is to store the medical records in a secure platform. The existing system stores the medical records of the patients in the Databases. In this project, the system will store the data and records of the patients and doctor in the Ethereum Blockchain. Blockchain technology increases the security in medical records.

### **1.3 MOTIVATION & OBJECTIVES OF THE STUDY**

To Create a online application for connectioning patients and doctors virtually and store the patients medical records in blockchain. The main motive to store the patients records is to maintain them for future use. So that the other healthcare organisation know the medical history and gives the treatment clarifying the patients medical history

## 1.4 DOMAIN

A blockchain is a distributed database that is shared among the nodes of a computer network. As a database, a blockchain stores information electronically in digital format. Blockchains are best known for their crucial role in cryptocurrency systems, such as Bitcoin, for maintaining a secure and decentralized record of transactions. The innovation with a blockchain is that it guarantees the fidelity and security of a record of data and generates trust without the need for a trusted third party.

One key difference between a typical database and a blockchain is how the data is structured. A blockchain collects information together in groups, known as blocks, that hold sets of information. Blocks have certain storage capacities and, when filled, are closed and linked to the previously filled block, forming a chain of data known as the blockchain. All new information that follows that freshly added block is compiled into a newly formed block that will then also be added to the chain once filled.

A database usually structures its data into tables, whereas a blockchain, like its name implies, structures its data into chunks (blocks) that are strung together. This data structure inherently makes an irreversible timeline of data when implemented in a decentralized nature. When a block is filled, it is set in stone and becomes a part of this timeline. Each block in the chain is given an exact time stamp when it is added to the chain.

## **CHAPTER -2**

### **LITERATURE SURVEY/RELATED WORK**

#### **2.1 USER INTERACTIVE HOSPITAL MANAGEMENT SYSTEM BY USING WEB APPLICATION**

The project methodology [1] is divided into four modules: administration, doctor, sister, and employee. If a patient is visiting the hospital for the first time, they must register their name at the front desk. They may schedule an appointment with a specific specialist based on their issue. All of the patients' names will be shown on a digital display screen located outside of each hospital. This method employs a queueing strategy to show the names of patients one by one. Employees first register and log in to the employee module, then register the names of patients and provide initial care, unless there is an emergency, in which case they send patients to the emergency room, otherwise they generate bill with prescription.

#### **2.2 FUNCTIONAL DESCRIPTION OF ONLINE MEDICAL MANAGEMENT SYSTEM USING MODERN TECHNOLOGY**

The proposed framework in [2] describes an idea for a web-based platform that would enable many medical/hospital procedures to be performed remotely using Web, networking, cloud, and android programming technology, which could be very useful in implementing online medical management features. It was created to make it simple for various emergency systems to exchange and share information. OASIS created the EDXL-HAVE (HAVE) XML messaging standard in the context emergency management. A HAVE schema contains a root feature that uniquely defines the reporting facility's responsible organisation. Each facility is defined using a set of attributes and sub-elements that allow for a thorough description of hospital departments, facilities, and resources.

#### **2.3 PAPERLESS HOSPITAL SERVICE**

This work [3] begins by registering the patient's information, such as if he or she is a new patient. For an existing patient, the app goes straight to the app and logs them in with their unique id and password.

## **2.4 ADVANCED HOSPITAL DATABASE MANAGEMENT SYSTEM**

This methodology [4] is the system that will be used in any Hospital, Clinic, Dispensary, or Pathology labs to obtain information from patients and then store that information for future use. Patients' information is gathered by simply writing the patient's name, age, and gender.

## **2.5 DEVELOPMENT OF HOSPITAL INFORMATION MANAGEMENT SYSTEM. INTERNATIONAL JOURNAL OF ADVANCED ENGINEERING**

The fundamental premise [9] is to deliver the medical report history of a specific person (patient) at any time and without charge. This application is basically to develop services using android studio.

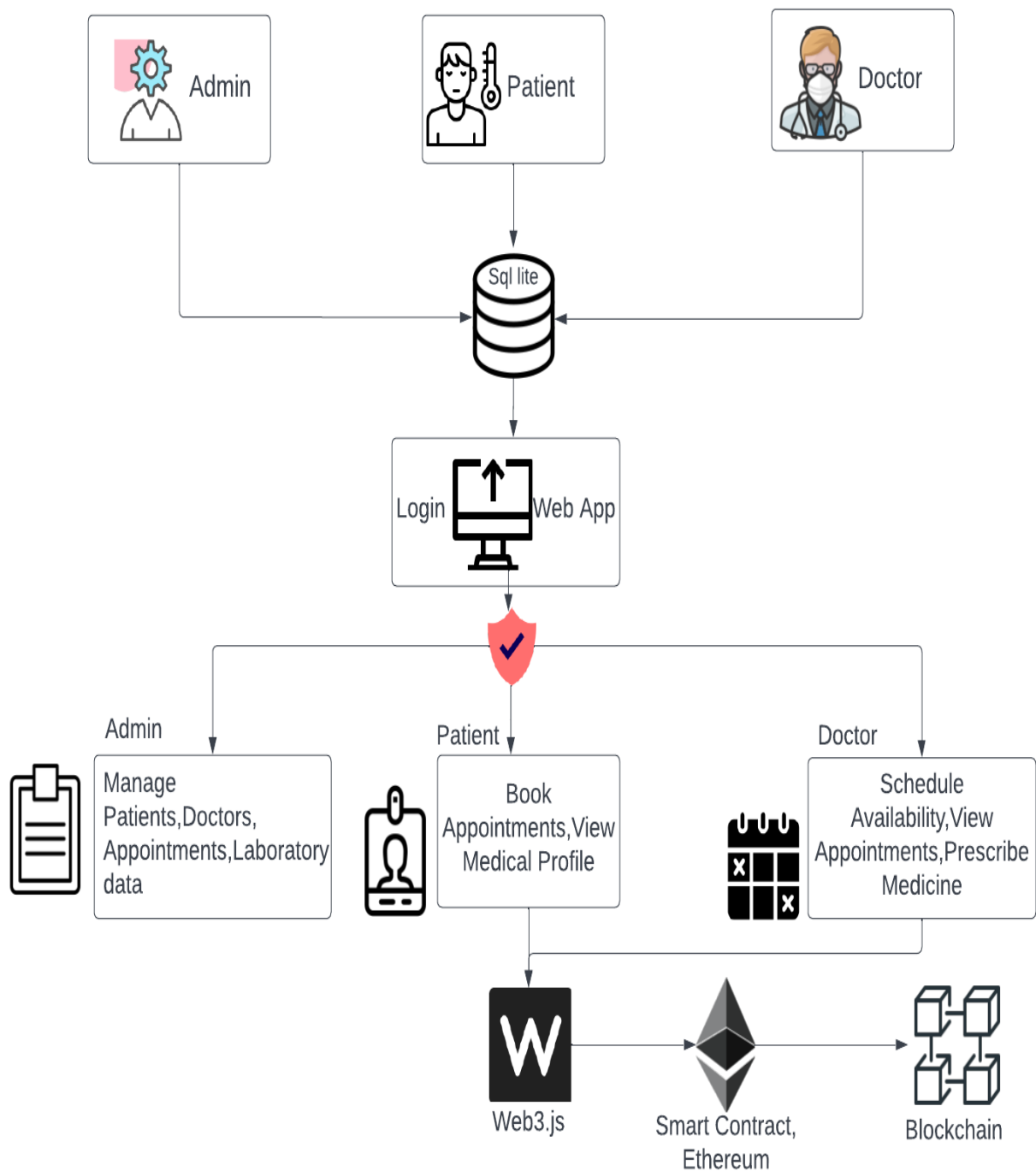
## **2.6 DESIGNING A WEB BASED HOSPITAL MANAGEMENT SYSTEM FOR MOUAU CLINIC**

[5] proposes a web-based real-time system for improving medical research and analysis. The framework is web-based, with a MySQL database and C# programming language. The spiral software development model was introduced and used in the development of this method. HTML (Hypertext mark-up language) allows for the development of a simple and intuitive user interface on the front end. C-sharp allows links from the text entered in the generated graphic user interface to be sent to the database in the centre. The MySQL database is used in the backend.

## CHAPTER -3

### SYSTEM DESIGN

#### 3.1 ARCHITECTURE DIAGRAM



**Fig3.1 Architecture Diagram**

### **3.1 ARCHITECTURE EXPLANATION**

The architecture diagram represents the online doctor consultation Management System which has three main modules, Admin module, Patient module and Doctor module. The Admin, Patient and Doctor has the accessibility and are connected to the Blockchain where interaction and exchange of data takes place.

The Blockchain holds all necessary details of the registered patients. The login control is accessible by admin, patient and doctor where, admin could manage patient's records, check for doctor's availability and so on. The patient could book appointments online based on the specialization and availability of doctors, could update their personal details and view their medical profile. The doctors could manage and view their everyday appointments, view patient's medical records and could prescribe medications online.

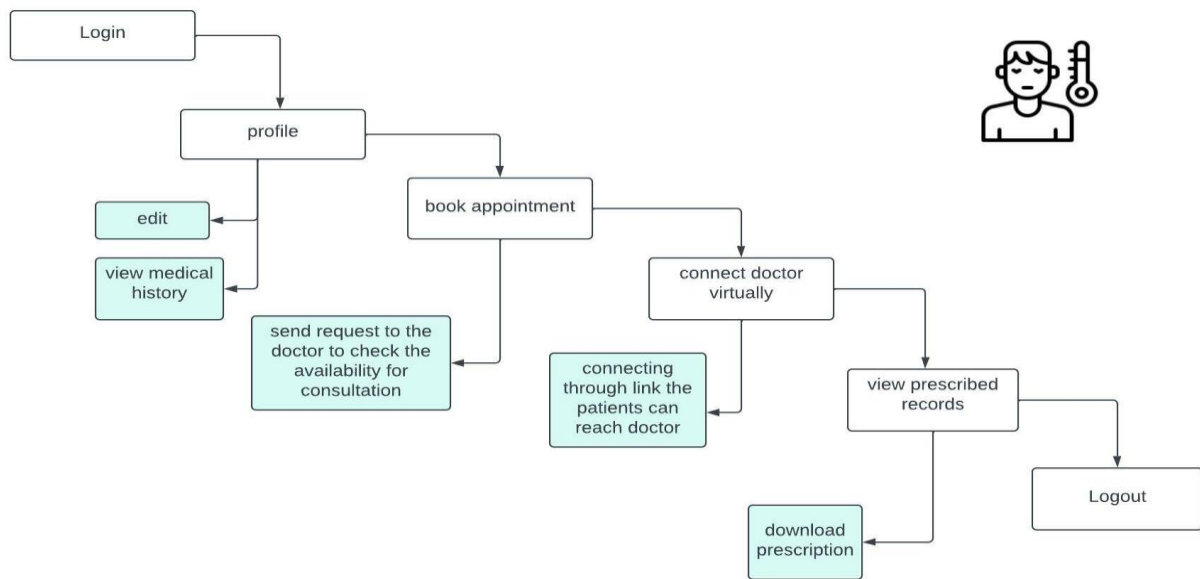
### **3.2 LIST OF MODULES**

- Patients
- Doctors
- Admin
- Appointment bookings
- Online prescriptions

### **3.3 MODULES DESCRIPTION**

#### **PATIENT MODULE:**

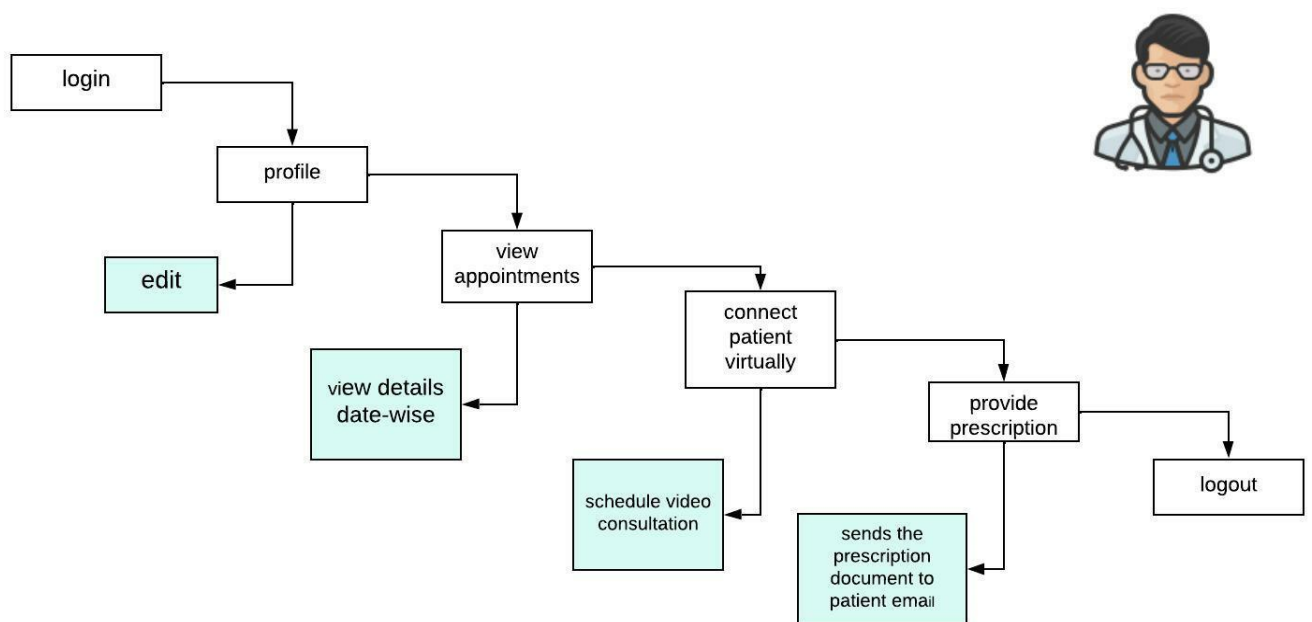
This module allows patients to feed their details like Date of Birth, Age, Blood group, Address, Email, contact number and also lets them in uploading their profile picture. If the patient's appointment is confirmed, they can view their appointment sheet. In case if the patient wants to cancel the appointments, they can go through the cancellation process through the website.



**Fig2.2 patient flow diagram**

## DOCTOR MODULE:

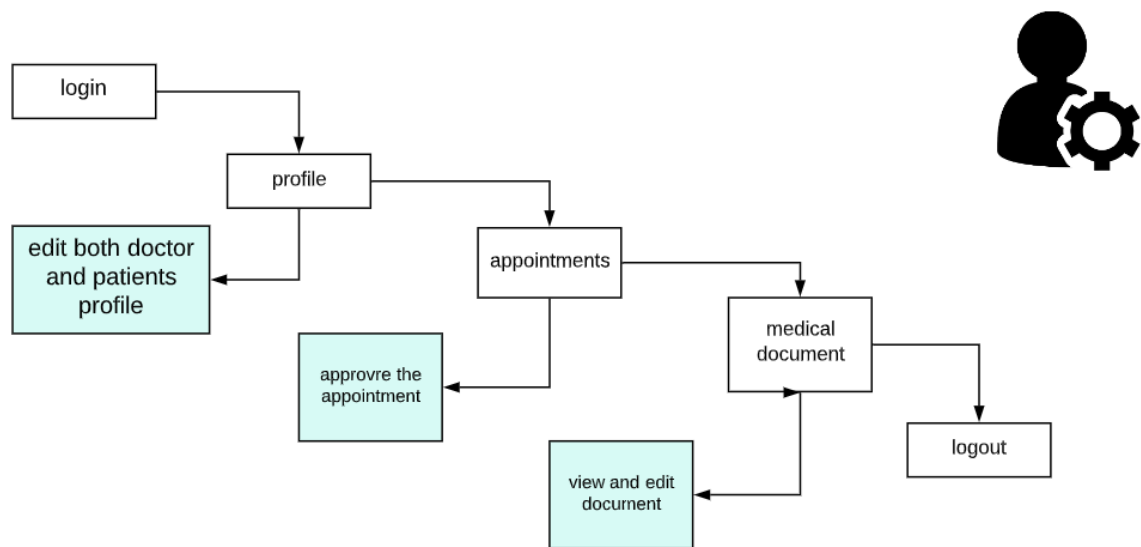
Doctors can update their details (i.e., Name, specialization, doctor id, etc.) after login and can access his patient's details, give medications regarding the appointment considering the medical history of the patient (previous appointments with all other doctors and their prescriptions with Laboratory Test Reports).



**Fig2.3 Doctor flow diagram**

## ADMIN MODULE:

This Module includes all the Patient, Doctor personal, and medical profiles that can be accessed from the database. In here, adding new doctor profiles and deleting resigned doctors are processed. Also, the list of appointments with their status such as 'Booked', 'Consulted', 'Not Consulted', 'Cancelled' can be viewed by an admin. The patient is intimated with a remainder regarding the appointment on the booked date via Email from this Module. This module also includes a Laboratory section to view and upload Lab Reports prescribed by the doctor based on Appointment ID



**Fig2.4 admin flow diagram**

## APPOINTMENT BOOKINGS:

For fixing the appointment, the patient has to choose the doctor through the specialization required and available date and time of that particular doctor which will be displayed while booking. Before the appointment date, our application reminds the patient regarding the appointment through Email.

## ONLINE PRESCRIPTIONS:

This module enables the doctors to provide medications through Online Prescription which will be added to the database in the patient's medical history and can be viewed by the patients and Laboratory (in case if Lab Test Prescriptions are available).



# CHAPTER -4

## IMPLEMENTATION

### 4.1 PLATFLOM / FRAMEWORK

- Operating System - windows os
- Programming Language - python django
- Environment - web3 js
- Code Editor - visual studio code

#### Major libraries used

- **Web3 -**

Web3.py is a python library for interacting with Ethereum.its commonly found in decentralized apps to help with sending transactions,interaction with smart contracts,reading block data and a variety of other use cases.the original API was derived from the Web3.js javascript API,but has since evalved toward the needs and creature comforts of python developers.

- **WebSocket –**

The WebSocket client library can be used to create a synchronous (blocking) WebSocket client or an asynchronous (non blocking, event driven) client. Both versions can interact with our API successfully, so the choice would depend upon the specific requirements of the implementation (such as whether other tasks needed to happen in parallel).

- **WebRTC –**

Web Real-Time Communication (WebRTC) is a specification for a protocol implementation that enables web apps to transmit video, audio and data streams between clients and server.

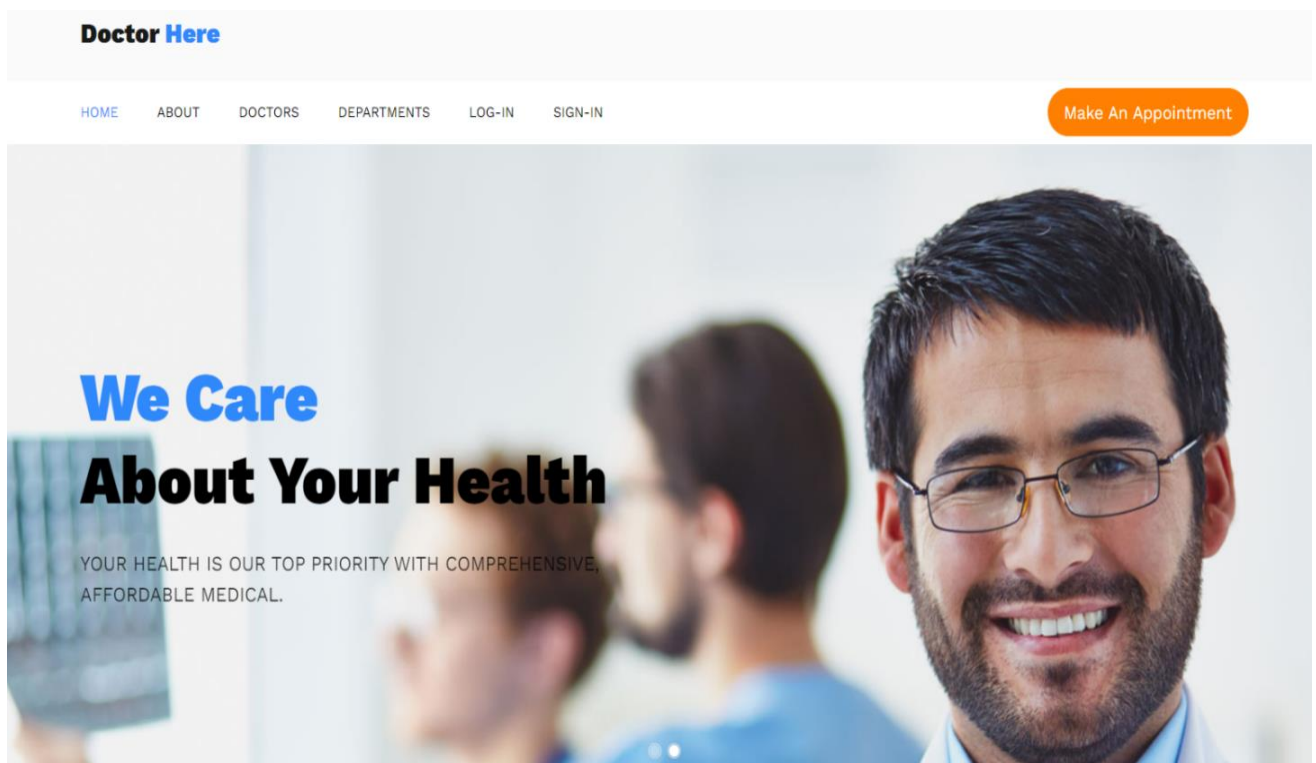
- **Pillow –**

Python pillow library is used to image class with it to show the image. The image modules that belong to the pillow package have a few inbuilt functions such as load images or create new images.

## 4.2 MODULE BASED SCREENSHOTS

### HOME SCREEN:

This home Page shows both doctors and patients login, list of the doctor and the list of the department of doctors. This is shown in **Fig 4.1**



**Fig4.1** home page

## DOCTOR SCREEN:

This doctor screen shows a dashboard option where the patients appointment request will be accepted by the doctor, patients option shows the list of the patients details and the doctor schedule shows the meeting option where the doctor connect with the patients virtually. This is shown in **Fig 4.2**

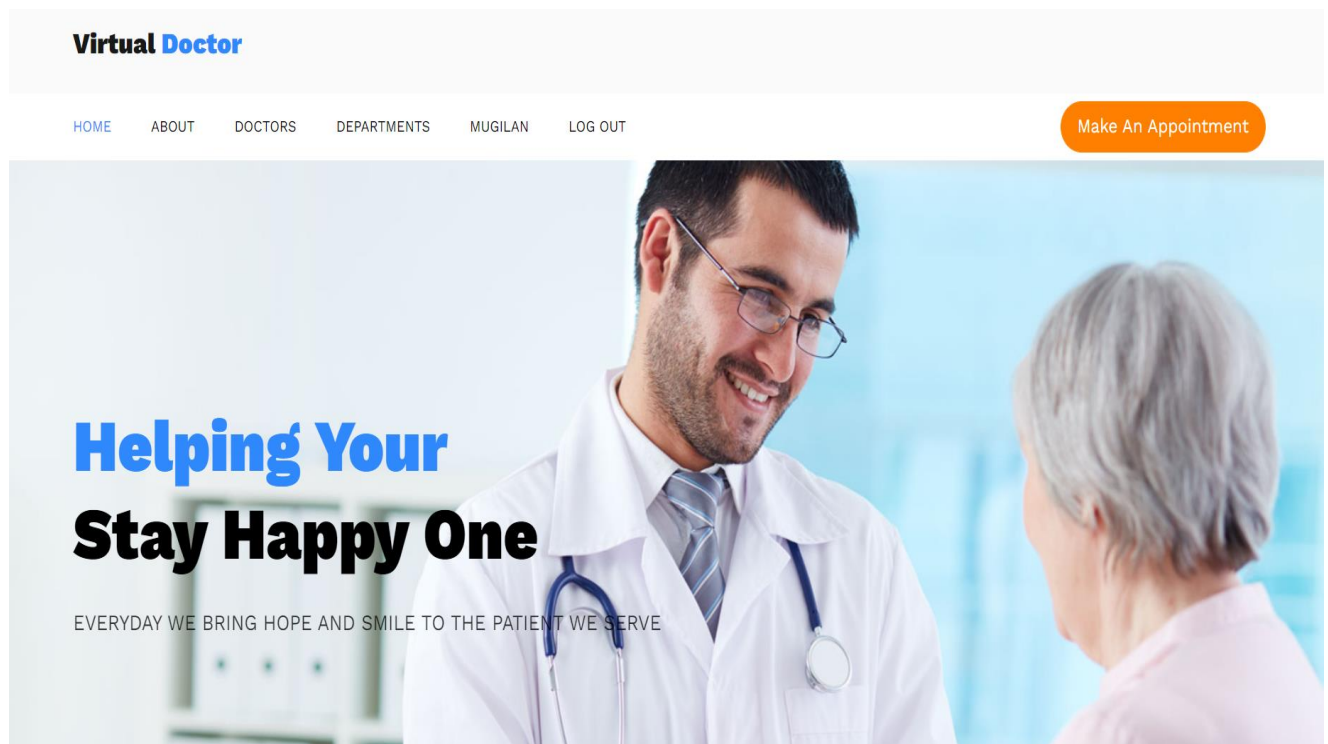
The screenshot displays the 'Virtual Doctor' interface. On the left is a sidebar with navigation links: 'Main', 'Dashboard', 'Patients', and 'Doctor Schedule' (which is highlighted). The top header is blue and contains the 'Virtual Doctor' logo and the user's name 'gowthaman'. The main content area is titled 'Schedule' and contains a table of appointments. Each row in the table includes the patient's name, phone number, appointment date, time, address, and a 'Meet ID' button.

Patient Name	Phone Number	Date	Time	Address	Meet ID
arun	9873241173	2020-10-29	6 pm	TH road, Chennai, Tamil Nadu, 600081	Meet
anbarasan	7895462202	2020-11-01	8pm	VV koil street, Chennai, Tamil Nadu, 987878784	Meet
mugilan	3456778856	2022-04-29	6pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet
mugilan	8787986543	1998-02-22	3pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet
mugilan	8787986543	1998-02-22	3pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet
mugilan	8787986543	1998-02-22	3pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet
mugilan	2345678765	1998-01-28	6pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet
mugilan	2345678765	1998-01-28	6pm	no.7 m street mmc, Chennai, Tamil Nadu, 600051	Meet

**Fig4.2 Doctor Screen**

## PATIENT SCREEN:

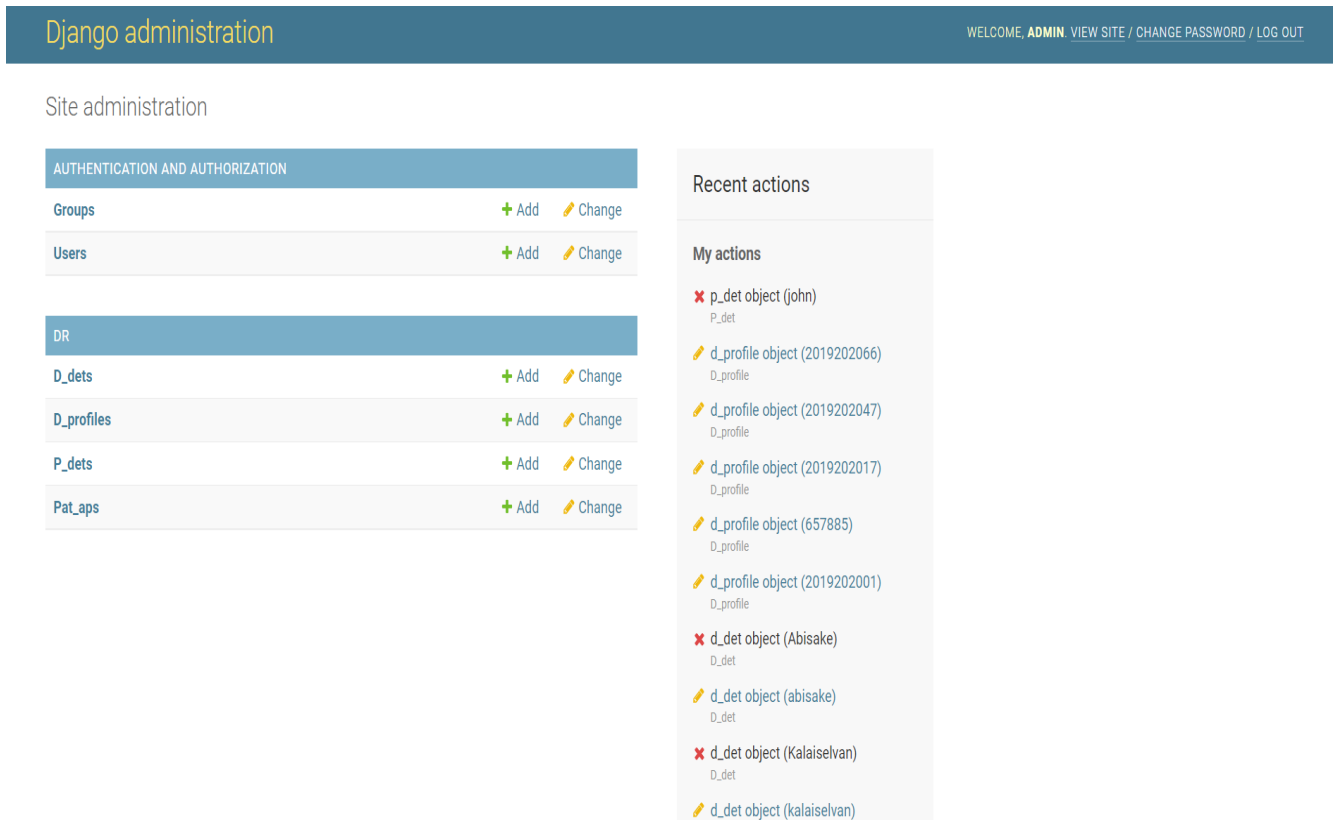
This home Page shows both patients login, list of the doctor and the list of the department of doctors,apptointment option for make appointment.ones the appointment is accepted by the doctor the doctor name will be displayed in the oppointment list. This is shown in **Fig 4.3**



**Fig4.3 Patient Screen**

**ADMIN PAGE:**

This admin page manage both the doctor and the patients details and maintance the document of patients and the doctor prescription. This is shown in **Fig 4.4**



**Fig4.4 Admin page**

**APPOINTMENT BOOKINGS SCREEN:**

This appointment page shows the appointment form which has the basic information of the patients. Once the appointment request is sent it will first approved by the admin. This is shown in **Fig 3.5**

Consultation

mugilan

Age

Select Your Services

Phone

mm/dd/yyyy

Time

Address line

Select Your State

Select Your City

Zipcode

Message

Appointment

30

Years of Experienced

4500

Happy Patients

84

Number of Doctors

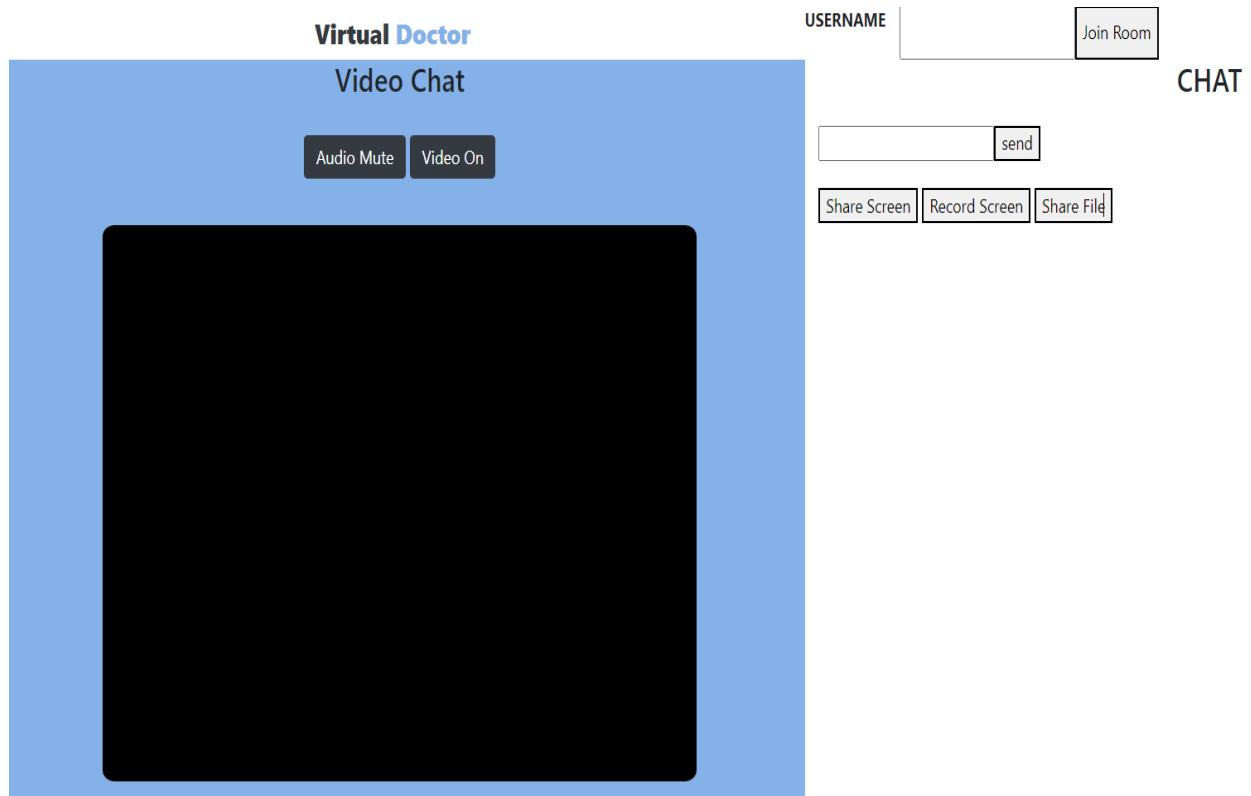
300

Number of Staffs

**Fig4.5 Appointment screen**

## VIDEO CHAT SCREEN:

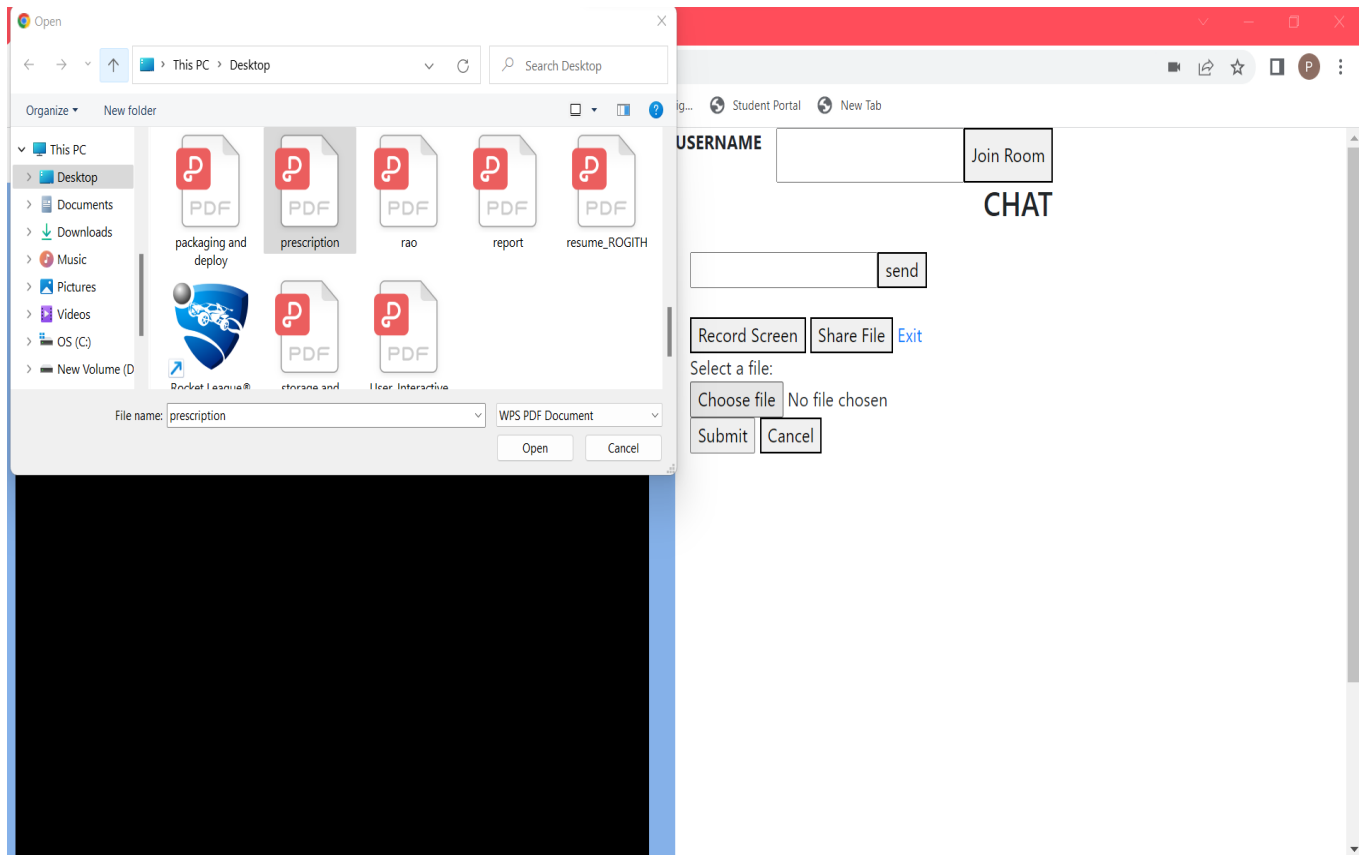
This video chat screen will be connected using a join id,ones we connected to the meet we can make chat,record screen and share files. This is shown in **Fig 3.6**



**Fig4.6 Appointment screen**

## SHARE FILE SCREEN:

This share file option is used to share file both from the doctor and the patients. The doctor can send the Prescription and the patients can send the test reports and laboratory reports. This is shown in **Fig 3.7**



**Fig4.7** Share file screen



## **CHAPTER -5**

### **CONCLUSION AND FUTURE WORK**

#### **5.1 CONCLUSION**

Since the online doctor consultation system is essential for maintaining detail about the Doctor, Patient, medical document etc., it is understood that on the introduction of the virtual doctor Project into play, the work at the application would be seamless and efficient. Transferring the patient data would take only seconds compared to the traditional way of sending the file manually. By implementing this web-based application, managing the patient records will be very much easier, efficient and less time consuming. Since the history and reports are already in the system, it would be simple for physicians and patients to access the records and reports, and the patient will not have to bring all of the reports, large xrays, and MRI videos, etc. Since the patient's information is already stored in the database during registration, there is no need to fill out a form in an emergency. The doctors will review the patient's information on their system and issue a prescription with a single click, which will be sent to the pharmacist. This can save a lot of time because the pharmacist will know which medications to have on hand ahead of time, and contact between the doctor and the patient will be improved because the patient will get as much help online as they need. It will assist in reducing many manual efforts, cost as well as the amount of time spent on them.

#### **5.2 FUTURE WORK**

The current system performs only minimal functionality. This project Can be extended to include real time medical data transfer e.g files and document during the video/audio chat feature. The system can also be encrypt the videp/audio/text communication channel to secure the communication between two or multiple patients.

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