

**A PRELIMINARY REPORT ON
“AAROGYA CENTRE: A COMPLETE HEALTHCARE WEBSITE”**

SUBMITTED TO
SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE
IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE OF

**BACHELOR IN ENGINEERING
(COMPUTER ENGINEERING)**

SUBMITTED BY

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**UNDER THE GUIDANCE OF
PROF. J. Y. KAPADNIS**



DEPARTMENT OF COMPUTER ENGINEERING

PVG'S COLLEGE OF ENGINEERING
206, DINDORI ROAD, MERI, MHASRUL, NASHIK-422004

2021-2022

AFFILIATED TO



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CERTIFICATE

This is to certify that the project entitled
“Aarogya Centre: A Complete Healthcare Website”

Submitted By

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Are the bonafide students of this institute and the work have been carried out by them under the supervision of **Prof. J. Y. Kapadnis** and it is approved for the partial fulfillment of the requirement of Savitribai Phule Pune University, for the award of the degree of **Bachelor of Engineering** (Computer Engineering)

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Date:

ACKNOWLEDGMENT

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We would like to express the deepest appreciation towards **Dr. A. R. Rasane**, In-charge Principal, PVG's College of Engineering, Nashik, and **Prof. J. Y. Kapadnis**, Head of Department of Computer Engineering whose invaluable guidance supported us in completing this project

At last, we must express our sincere heartfelt gratitude to all the staff members of the Computer Engineering Department who helped us directly or indirectly during this course of work.

Mr. Bharat Firake

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Mr. Rahul Mahajan

Mr. Prathamesh Gadkari

ABSTRACT

During the COVID-19 pandemic, everybody was forced to restrict their human interaction to avoid the spread of coronavirus. All the doctors and other employees in the medical industry were working day and night to eradicate the virus. Getting health-related consultation from doctors was risky as an individual had to physically go to a doctor for a checkup. Artificial Intelligence (AI) is the fastest-growing field and is expanding rapidly in other work sectors including the medical sector.

Our proposed system is to develop a platform in which all queries related to health can be fulfilled. To start, every individual will need to create a profile on the platform by providing a few details. The user can insert their previous medical records onto the profile so that they can store their entire medical history in one place. On the platform, there will be three modules, chatbot, video chat, and appointment booking. The chatbot can predict the disease and give healthcare advice according to details provided by the user. In the video chat module, the user will be able to communicate with a doctor through video call or only through chat. In the appointment booking module, users can book an appointment with different doctors and hospitals for checkups.

With the help of the platform, an individual can save a lot of time and money for simple health-related problems. The platform would also be beneficial for people living in remote areas as they can easily access good medical consultations.

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LIST OF ABBREVIATION

ABBREVIATION	ILLUSTRATION
RTC	Real Time Communication
GIPS	Global Internet Protocol Solutions
IETF	Internet Engineering Task Force
W3C	World Wide Web Consortium

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CHAPTER 01

INTRODUCTION

With increasing birth rate and decreasing death rate due to advancement in the medical field, it's found that the number of doctors is less to serve the need of the increasing population. During the COVID-19 pandemic, everybody was forced to restrict their human interaction. So, getting health-related consultations from doctors was risky as an individual had to physically go to a doctor for a check-up. Minor health-related issues can be resolved at home under proper assistance. So, in this case, an AI-powered platform can help to resolve these issues without leaving the comfort of home.

Artificial Intelligence (AI) can be defined as an industry that is related to the automation of intelligent behaviors and it must be based on applying theoretical principles as well as the operation of applicable models. It is the study of intelligent agents. The term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem-solving. Artificial Intelligence gives the supreme power to mimic the human way of thinking and behaving to a computer. According to Buchanan B. G., AI is created from fantasies in the 19th century, when science fiction writers had used the prospect of intelligent machines to foster non-human's intelligence, thence to make us think about our human characteristics.

A chatbot is a computer program that conducts a conversation via auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than a human. For various practical purposes like customer service or information acquisition, a chatbot is being used in the dialog system. Most chatbots use natural language processing for interpreting the user input and generating the corresponding response but certain simpler systems search for the keyword within the text and then provides a reply based on the matching keywords or certain pattern. Today, chatbots are part of virtual assistants such as Google Assistant and are accessed via many organizations' apps, websites, and instant messaging platforms. Non-assistant applications include chatbots

used for entertainment purposes, research, and social bots which promote a particular product, candidate, or issue.

Imagine a world where your phone, TV, and computer could communicate on a common platform. Imagine it was easy to add video chat and peer-to-peer data sharing to your web app. That's the vision of WebRTC.

One of the last major challenges for the web is to enable human communication through voice and video: RTC. RTC should be as natural in a web app as entering text in a text input. Without it, you're limited in your ability to innovate and develop new ways for people to interact.

Gmail video chat became popular in 2008 and, in 2011, Google introduced Hangouts, which uses Talk. Google bought GIPS, a company that developed many components required for RTC, such as codecs and echo cancellation techniques. Google open sourced the technologies developed by GIPS and engaged with relevant standards bodies at the IETF and W3C to ensure industry consensus. In May 2011, Ericsson built the first implementation of WebRTC.

WebRTC implemented open standards for real-time, plugin-free video, audio, and data communication. The need was real:

- Many web services used RTC, but needed downloads, native apps, or plugins. These included Skype, Facebook, and Hangouts.
- Downloading, installing, and updating plugins is complex, error prone, and annoying.
- Plugins are difficult to deploy, debug, troubleshoot, test, and maintain—and may require licensing and integration with complex, expensive technology. It's often difficult to persuade people to install plugins in the first place!

1.1. Motivation

We often need to consult a doctor for small problems and with the advancement of science and a general unbalance in the birth and death rate, the doctor-patient ratio is also highly affected. Plus, in situations like the ongoing pandemic, where we are restricted to the bounds of our homes, the need for an AI-powered platform that could help resolve these issues without leaving the comfort of our homes increases significantly.

1.2. Problem Definition

To develop an AI-powered platform that can provide immediate quality medical consultation to everyone at any place, make communication between patient and doctor easier, and also can store users' previous as well as current medical data.

1.3. Objectives

- To provide a platform which makes receiving healthcare immensely easy wherever and whenever required.
- To develop a user-friendly UI for the user to easily understand the use of website.
- To minimize physical tasks, which can be easily performed online whilst sitting at home, as much as possible.
- To facilitate online appointment booking, medical records sharing and video conferencing with a health official without having to be physically present at a clinic.

1.4 Project Scope

The purpose of the “Aarogya Centre: A Complete Healthcare Website” is to provide a connection between patient and doctor through messaging and videocall using Web RTC API, and to book an appointment for the hospitals to reduce waiting time, storing previous and current medical records. A chatbot that works on the “Bag

of Words Algorithm” generates precise solutions for the asked question by the user so that patient doesn’t have to visit any doctor again and again for minimal queries.

Our Project aims at Business process automation, i.e. we have tried to computerize process of Appointment Booking, Video-Calling, Chatbot:

- In our website, the user has to fill the data about himself and previous records.
- Be easy to operate.
- Be easy to understand by the user and operator.
- Have a good UI.
- Be Expandable.

CHAPTER 02

LITERATURE SURVEY

- **McKinsey & Company on Transforming healthcare with AI:**

“In their research paper, they have hailed the significant potential of Artificial Intelligence in the healthcare industry claiming it could change the way healthcare is delivered. A report with the European Union’s EIT Health explores the way it can support improvements in care outcomes, patient experience, and access to healthcare services. It can increase productivity and the efficiency of care delivery and allow healthcare systems to provide more and better care to more and more people. AI can help in improving the experience of physicians, enabling them to spend a lot of time in direct patient care and reducing burnout.”

- **Konstantin Kalinin on Medical Chatbots:**

“The best healthcare chatbots are those that run on exclusive AI/ML technologies, support non-scripting intent-based dialogs, protect PHI, and make an impression of an intelligent being overall.” “An anytime physician appointment chatbot is the most straightforward variant of implementing AI-powered conversational technology without significant investment.”

- **Cynthia Onyefulu on Online Appointment System and Services:**

“The online appointment system is regarded as “a win-win solution for patients and physicians...”. This view was also expressed by other people. This may be one of the reasons why there are several types of research about online or web-based appointment systems. In India, the authors concluded that although the appointment system has several benefits, it is also affected by multiple factors such as the “arrival and service time variability, patient and provider preferences, available information technology,

and the experience level of the scheduling staff". However, online scheduling, they stated, has more advantages compared to the traditional appointment system. According to these authors, in the traditional appointment system, the scheduling is done by coming to the facility, in such cases, the waiting time tends to be reasonably long. The waiting time for the advisee is minimized with the online appointment system."

- **Priyasankari M on User Dialogue Technology:**

"She proposed an idea in which it uses user dialogue. User dialogue is a linear design that proceeds from symptom extraction to symptom mapping, where it defines the corresponding symptom then diagnosis the patient where it's a major or minor disease."

- **Tobias Kowatsch on Text based Chatbots:**

"He says that in past years text-based chatbots are made. They are working on a few diseases only. They are making an application mobile coach in which they use a mobile chat app in which patients can communicate with a doctor. The doctor will be chatting with them daily and suggest to them how to maintain their health. They can give them pieces of advice and suggestions. They are fetching data from Google & doctor."

- **Divya Madhu on prediction of disease through AI:**

"She proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments. If a person's body is analysed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. Some Challenges are research and implementation costs, and government regulations for the successful implementation of personalized medicine, they are not mentioned in the paper"

CHAPTER 03

SOFTWARE REQUIREMENTS AND SPECIFICATIONS

3.1 Assumptions and Dependencies

We assume that users would be familiar with modern technology, such as video calling and texting, for which a system with an embedded webcam is required, and has prior experience with online booking systems. In short, the user should be familiar with different websites.

3.2 Functional Requirements

3.2.1 Portability

The Web application is designed to keep portability as the prime motive in the mind.

3.2.2 Maintainability

The Web application requires minimal maintenance which includes updation of Drivers and SDK.

3.2.3 Availability

The Web application is available across all platforms.

3.2.4 Accessibility

The User Interface of the application is designed by keeping the primary old age group in mind and can be accessed with ease.

3.3 External Interface Requirement

3.3.1 User Interface

Electronic Device for sending required inputs to the system and getting output as the same.

3.3.2 Software Interface Operating System (OS)

Windows 7 and above

3.4 Non-functional Requirements

3.4.1 Performance Requirements Performance consideration:

This system use for multiple data hiding formats it secure the data.

3.4.2 Safety Requirements Privacy:

All the data is being stored in secured way.

3.4.3 Software Quality Attributes:

1. Usability:

The system is user friendly and user interfaces is easy to use.

a. Learn-ability: The working of system should be easily understood by the user.

b. Operability: The system should be efficiently operated.

c. User Interface Aesthetics: The application should have minimal user interface.

d. Accessibility: The user interface of the application is designed by keeping all group in mind.

2. Performance Efficiency:

The application should not consume extra CPU Usage and should not hamper overall system performance.

a. Time Behaviour: It should behave appropriately and response in minimal time under stated conditions.

b. Resource Utilization: The application gets things done in the right manner with the minimal computing resources.

3. Compatibility:

The application works satisfactorily together on different devices with different hardware and software specifications considering all the basic requirements are satisfied.

a. Coexistence: The system would be visible to the user as it is designed.

b. Inter-Operability: The application should effectively communicate with other services.

4. Reliability:

The reliability of application is judged by providing specifies input and check whether it performance as expected under specified conditions.

a. Availability: The application system would be available 24 x 7.

5. Portability:

The application is designed keeping portability as the prime motive in the mind.

a. Install-ability: The application requirements are minimal so it would be installed in any computer or laptop.

3.5 System Requirements

3.5.1 Software Requirements

- **Operating System :** Windows 7 or later, macOS Sierra 11 or later
- **Front End :** HTML, CSS, JavaScript
- **Back End :** Python, MySQL

3.5.2 Hardware Requirements

- **Processor :** Intel i3 or later
- **Memory :** 2GB RAM or more
- **Display :** Super VGA with resolution of 1024 x 768 or higher
- **Camera and Microphone**
- **Bandwidth greater than 50 kBps (400 kbps)**
- **Latency under 150 ms**

3.6 Analysis Model

Step1: Planning and Requirement Analysis

Firstly, we divided the work into three parts, about searching different papers on healthcare websites, chatbots, appointment booking system and video-calling applications and existing system in available up to date. Search the different Algorithm available and best for Chatbot to work in efficient manner.

Step 2: Defining Requirements

Requirement from User will be only to fill the appropriate data and add appropriate documents. User can choose the option whether he/she want to book any appointment with doctor or can Videocall and chat with doctor.

Step3: Defining Architecture

The work Flow of the System is described in 4.1 System Architecture.

Step 4: Development

The process is written in Python and JS from Scratch. Some API are used to develop our project such as Web-RTC API for Video-calling feature.

Step 5: Testing and Integration

1) Unit Testing:

A unit test is a way of testing a unit - the smallest piece of code that can be logically isolated in a system. In most programming languages, that is a function, a subroutine, a method or property. The isolated part of the definition is important.

2) Integration Testing:

Integration testing (sometimes called integration and testing, abbreviated I&T) is the phase in software testing in which individual software modules are combined and tested as a group. Integration testing is conducted to evaluate the compliance of a system or component with specified functional requirements.

3) System Testing:

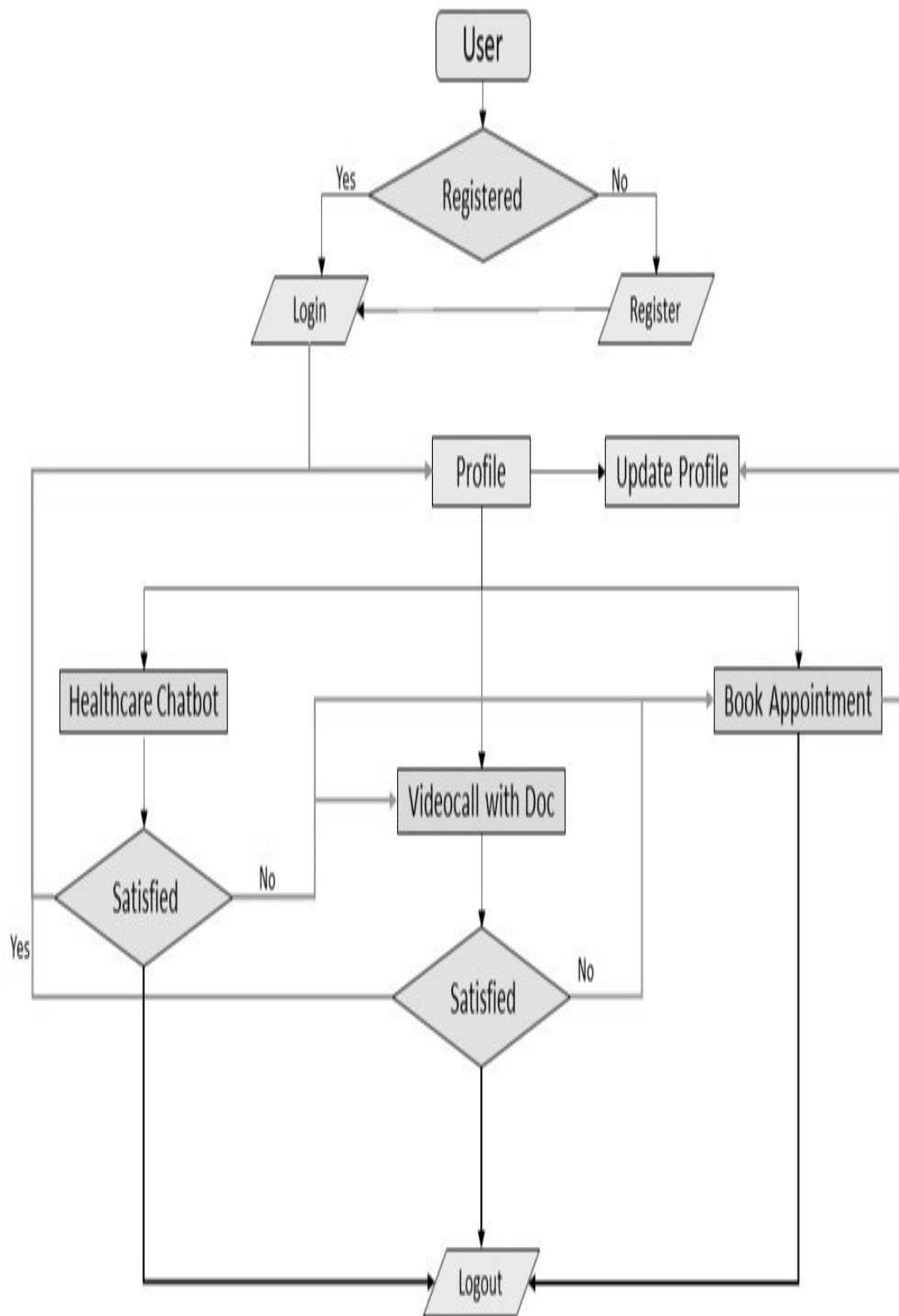
System testing is defined as testing of a complete and fully integrated software product. Firstly, module by module will be tested that is Unit Testing and then integrate two module and test and resolve error found at that moment.

Step 6: Deployment and Maintenance

Last but not least to deploy the project which provide the double security to Information provided by user and maintain confidentiality between Sender and Receiver.

3.7 System Implementation

3.7.1 Implementation Plan



3.7.1 Flowchart

3.7.2 Algorithm and API

- **Bag of Words Model**

This algorithm is used for finding the frequency of a word in a given sentence. It is a way of extracting features from the given text.

- **Example**

“I have fever”

“I have cough”

“I am feeling runny nose”

“I am having shortness of breath”

- **Assigning 1 to present word and 0 to absent word in first sentence**

“I” = 1

“have” = 1

“fever” = 1

“cough” = 0

“am” = 0

“feeling” = 0

“runny nose” = 0

“having” = 0

“shortness” = 0

“of” = 0

“breadth” = 0

- Similarly, creating matrices for all the sentences by assigning 1 to present word and 0 to absent word

“I have fever” = [1, 1, 1, 0, 0, 0, 0, 0, 0, 0]

“I have cough” = [1, 1, 0, 1, 0, 0, 0, 0, 0, 0]

“I am feeling runnynose” = [1, 0, 0, 0, 1, 1, 1, 0, 0, 0]

“I am having shortness of breath” = [1, 0, 0, 0, 1, 0, 0, 1, 1, 1]

- Matrix Representation of Bag of Words Model

Document	I	Have	Fever	Cough	Am	Feeling	Runnynose	Having	Shortness	of	Breath
1	1	1	1	0	0	0	0	0	0	0	0
2	1	1	0	1	0	0	0	0	0	0	0
3	1	0	0	0	1	1	1	0	0	0	0
4	1	0	0	0	1	0	0	1	1	1	1

- Find the class with the highest probability and return the corresponding response

- **Web-RTC API**

Web-RTC is a modern real-time communication technology. It does not require any additional plugins or applications for audio, video streaming and data sharing. It uses JS, application programming interface, and HTML5 to embed the communication technologies within the browser.

The WebRTC mainly consists of the following APIs:

- 1. getUserMedia:**

This API call in Javascript allows access to the local webcam and audio devices. Once we have access to the audio and video feed we can display the same on our page.

- 2. RTCPeerConnection:**

This API is used to establish a connection with a remote peer and share the local feed to implement a videocall. To establish a connection we do need a server but once a connection is established there is no need for a server anymore as we exchange data directly.

- 3. RTCDataChannel:**

This API is used to send and receive arbitrary data to/from a remote peer using a connection established with RTCPeerConnection API.

Why one should choose WebRTC for real time communication?

There are several reasons WebRTC is a great choice for a real time communications:

1. WebRTC is an open-source project.
2. It is available in all modern browsers.
3. WebRTC is not limited to only browsers because it is also available for mobile applications.
4. WebRTC is not only about for voice or video-calling, but you can use it to build a group calling service, add recording to it or use it only for data delivery.

In 2021 WebRTC got officially standardized, removing all doubts about its future prospects. Today, WebRTC is widely popular for video calling but it is capable of so much more.

A few things worth mentioning:

- WebRTC is completely free
- It comes as open-source project that has been embedded in browsers but you can take and adopt it for your own needs
- WebRTC constantly evolving and improving, so you need to keep an eye on it.

CHAPTER 04

SYSTEM DESIGN

4.1 System Architecture

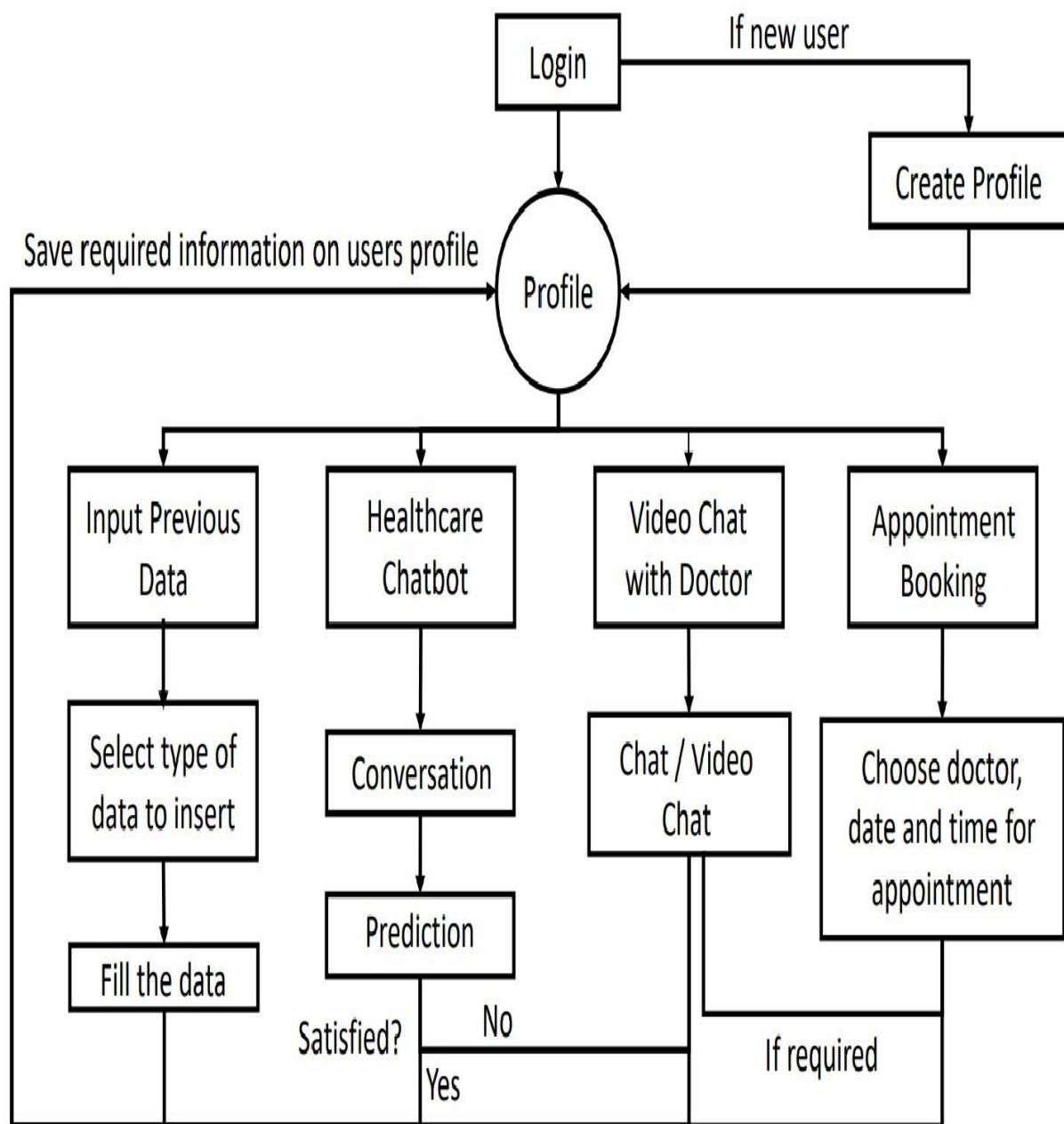


Fig. 4.1 System Architecture

In the proposed system, there will be four main features in a single web-application which are:

Module 1: Profile Creation

In this module, user has to create his own profile by registering on this website & entering his personal details. After creating profile, he can upload documents such as hospital reports & all, can update profile.

Module 2: Healthcare Chatbot

In this module, thanks to “Bag of Words” due to which user can ask certain questions to clear minimal queries about diseases & generate precise & accurate solution. Chatbot can also recommend doctors if he felt that disease according to chatbot is severe, then chatbot will show the doctor’s list according to disease. User must input accurate data and queries for getting precise solution.

Module 3: Video-chat with doctor

In this module, user can video-chat with doctor. Thanks to web-RTC API, through which peoples can communicate with each other. User can not only video-chat but texting can be done using this platform.

Module 4: Appointment booking

In this module, user can book appointment in three ways like virtual as for video-calling, in hospital for personal meet with doctor, and in home as shown in system architecture.

4.2 Data Flow Diagram

4.2.1 DFD Level 0

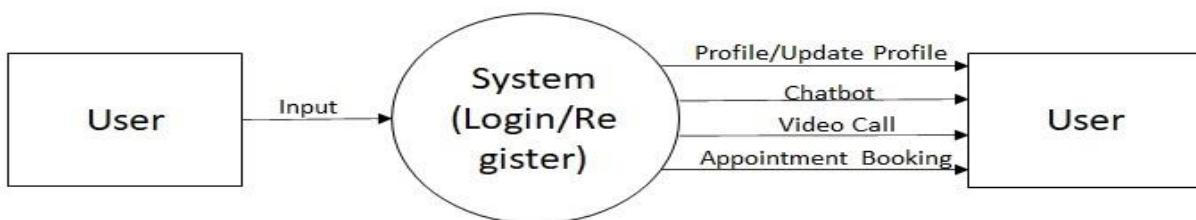
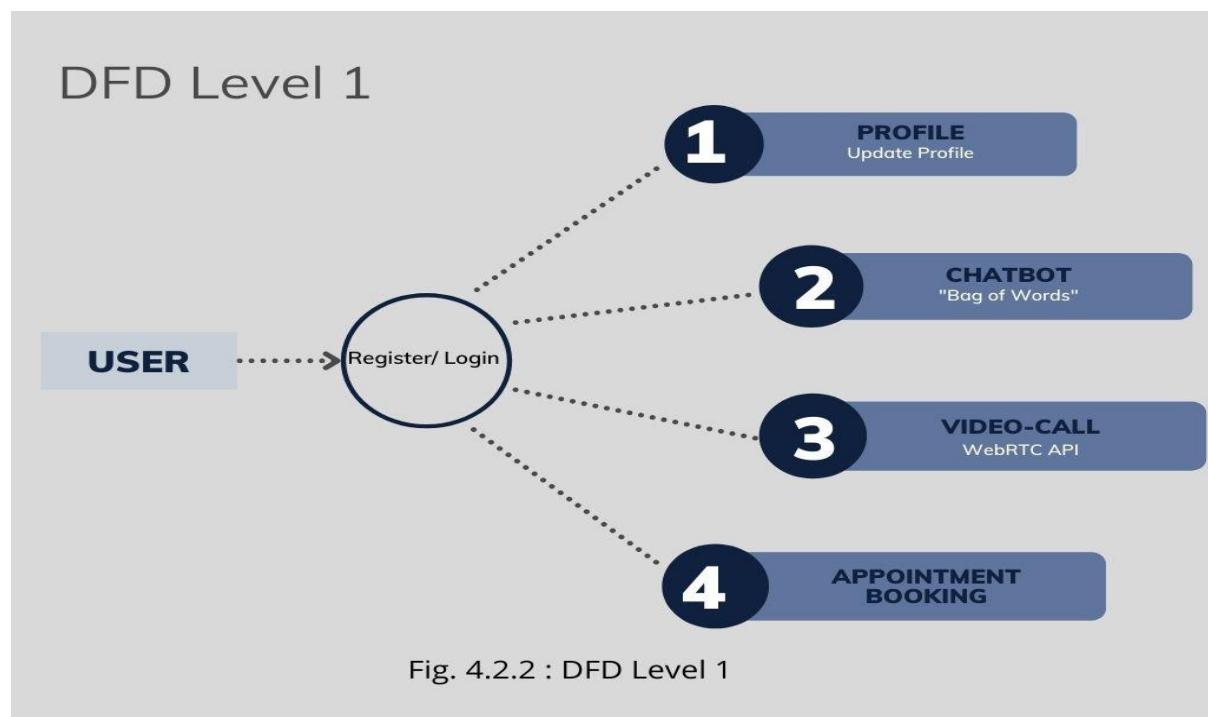


Fig. 4.2.1 : DFD Level 0

4.2.2 DFD Level 1



4.3 UML Diagram

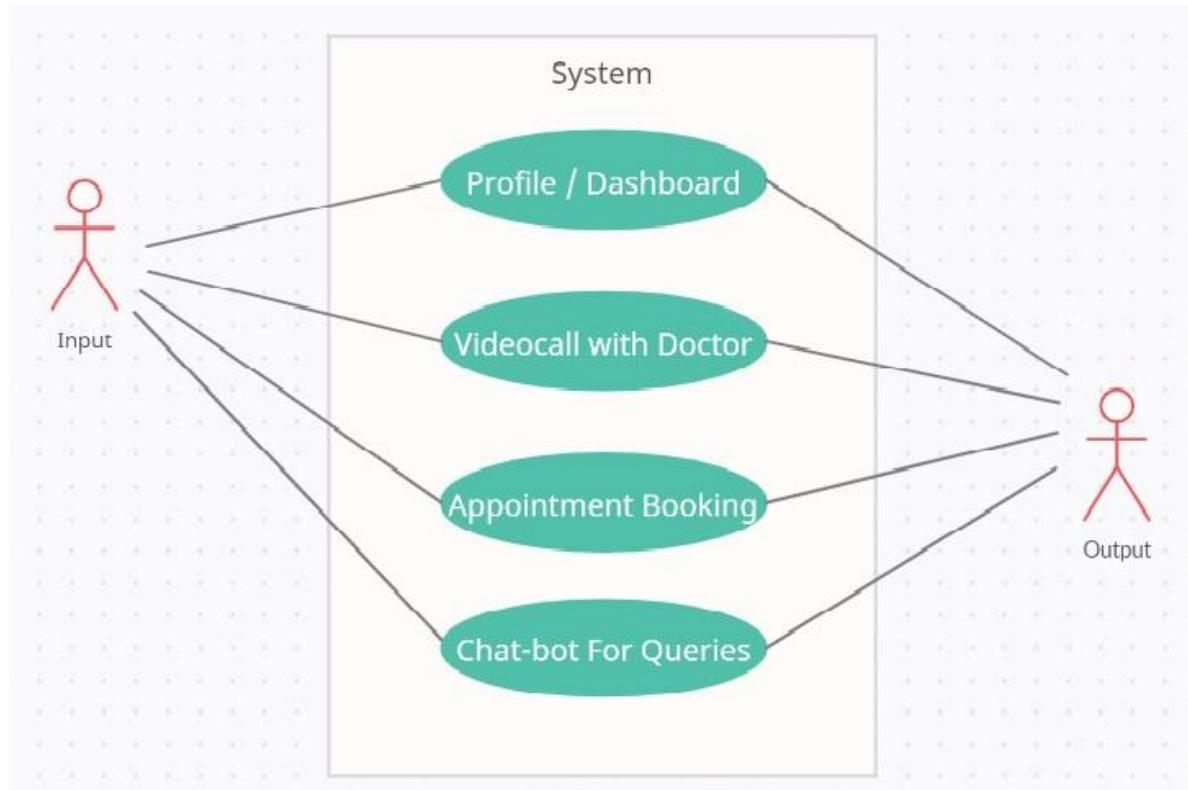


Fig. 4.3 : Use Case Diagram

4.4 Sequence Diagram

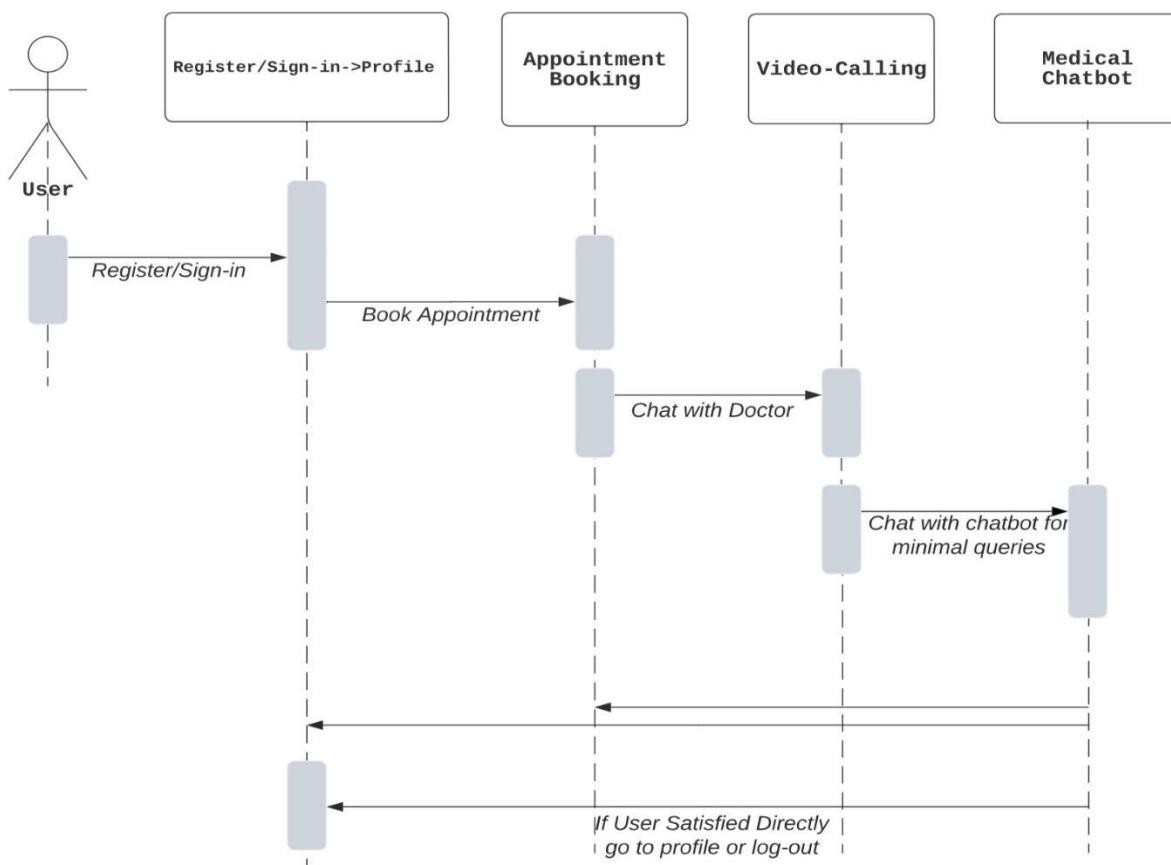


Fig. 4.4 : Sequence Diagram

4.5 Class Diagram

Class Diagram

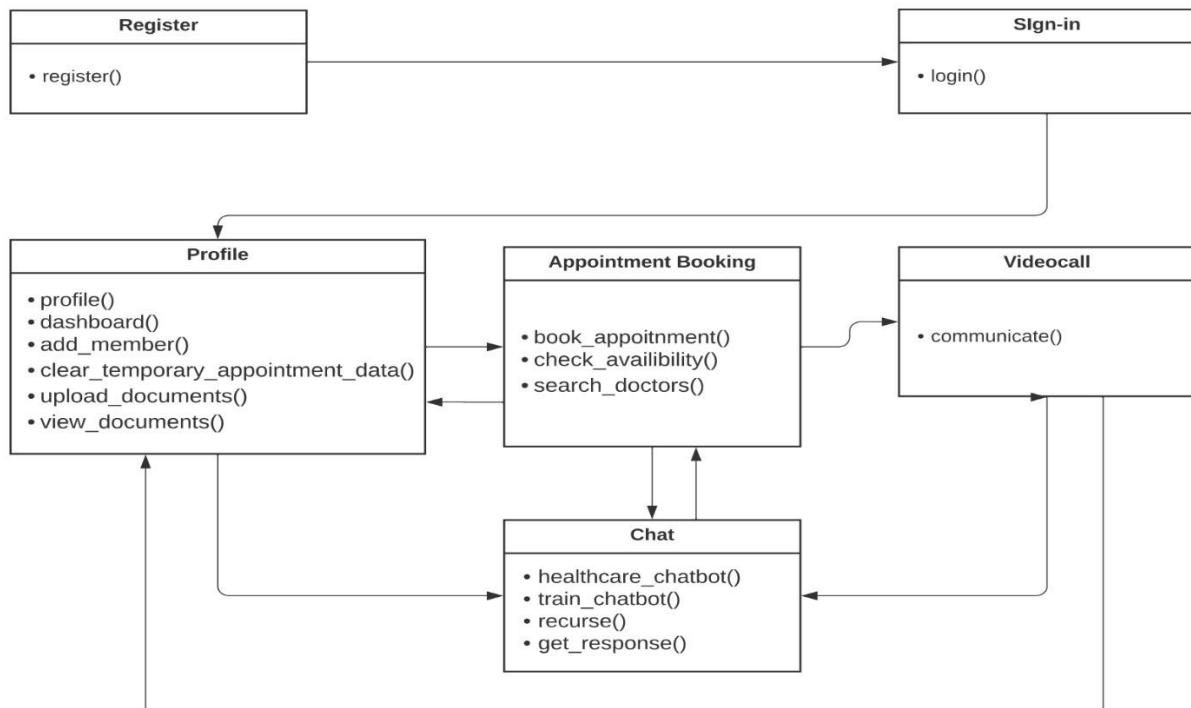


Fig. 4.5 : Class Diagram

4.6 Deployment Diagram

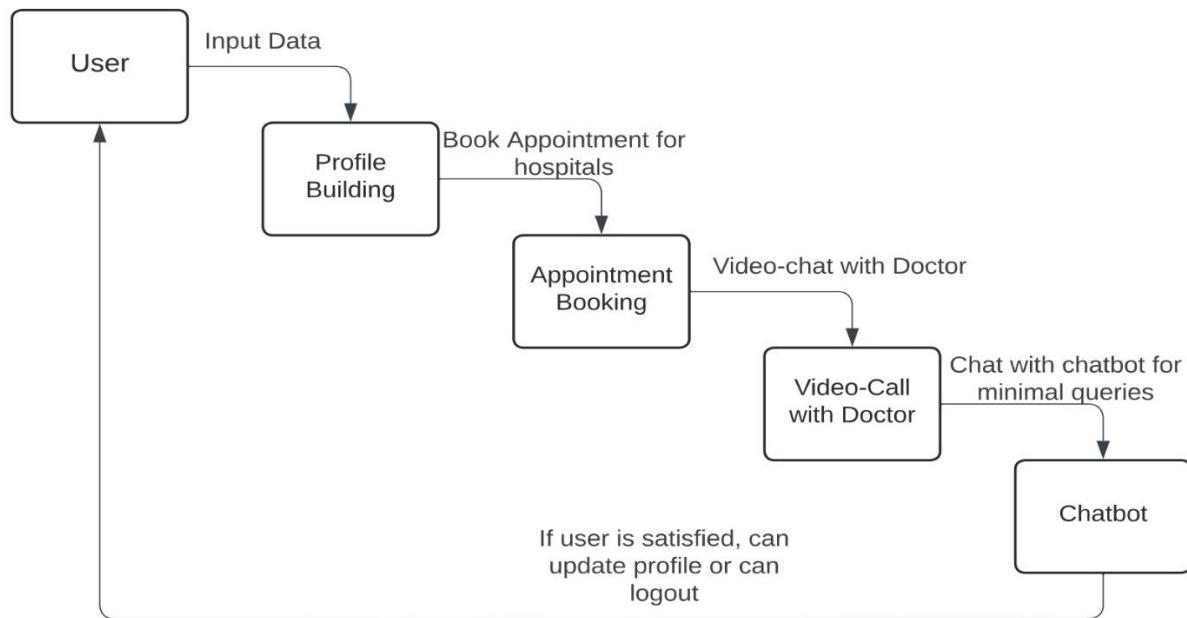


Fig. 4.6 : Deployment Diagram

CHAPTER 05

PROJECT PLAN

5.1 Project Estimate

5.1.1 Reconciled Estimate

The model followed is the Constructive Cost Model (COCOMO) for estimating the effort required in completing the project. Like all the estimation models, the COCOMO model requires sizing information. This information can be specified in the form of:

- Object Point
- Function Point (FP)
- Lines of Source Code (KLOC)
- For our project, we use the sizing information in the form of Lines of Source Code.
- Total Lines of Code for our project, KLOC=6k(approx.).
- Cost of each person per month, Cp=Rs.200 /- (per person-hour)
- **Equations**

The initial effort (E) in man months is calculated using the equation:

$$E = a * (KLOC)^b$$

Where, a=3.0, b=1.12, for a semi-detached project E=Efforts in person-hour

$$D=a*(E)^b$$

Where, a=2.5, b=0.32, for a semi-detached project D=Duration of project in months

- **Semi-detached project**

Project of moderate size and complexity, where teams with mixed experience levels must meet a mixed rigid and less than rigid requirements (project midway between embedded and organic types).

- Equation for calculation of Number of people required for completion of project, using the COCOMO model is:

$$N = E / D$$

Where N=Number of people required E=Efforts in person-month

D=Duration of project in months

- Equation for calculation of Cost of Project, using the COCOMO model is:

$$C = D * C_p * hrs$$

Where, C=Cost of project D=Duration in hours C_p=Cost incurred per person-hour
Hrs.=hours

Efforts:

$$E = 3.0 * (5.2) ^ 1.12$$

$$E=22.31 \text{ person-months}$$

Total of 22.31 person-months are required to complete the project successfully.

- Duration of project D = $2.0 * (E) ^ 0.32$

$$D=6.75 \text{ months}$$

The approximate duration of project is 7 months.

Number of people required for the project N=22.31/7

$$N=3.83.$$

N=4 people Therefore 4 people are required to successfully complete the project on schedule.

Cost of project C=4*30*210=25200/-

Therefore, the cost of project is 25200/- (approx.)

5.1.2 Project Resources

User must be familiar with websites, & should be known with all the personal data and existing medical records. User must be familiar with online booking platform & Video-call platform & basic working of chatbots.

Developer's Requirement:

The whole project is to be developed in Flask framework with Visual Studio 2010 as a editing software. Understanding of Python, JS, HTML, CSS is must to implement the concept.

5.2 Risk Management

5.2.1 Risk Identification

1. Have top software and customer managers formally committed to support the project?
 - No
2. Are end-users enthusiastically committed to the project and the system/product to be built?
 - No
3. Are requirements fully understood by the software engineering team and its customers?
 - Yes
4. Have customers been involved fully in the definition of requirements?
 - No
5. Do end-users have realistic expectations?
 - Yes
6. Does the software engineering team have the right mix of skills?
 - Yes
7. Are project requirements stable?
 - Yes
8. Is the number of people on the project team adequate to do the job?
 - Yes
9. Do all customer/user constituencies agree on the importance of the project and on the requirements for the system/product to be built?
 - Yes

5.2.2 Risk Analysis

ID	Risk Description	Probability	Impact		
			Schedule	Quality	Overall
1	If Input medical data is improper	Low	Low	High	High
2	If user is not familiar with the website	Low	Low	High	High
3	If query not asked properly	Low	Low	High	High

Table 5.2.2(a) Risk Table

Probability	Value	Description
High	Probability of occurrence is	>75%
Medium	Probability of occurrence is	26–75%
Low	Probability of occurrence is	<25%

Table 5.2.2(b) Risk Probability Definition

5.2.3 Overview of Risk Mitigation, Monitoring, Management

Following are the details for each risk.

Impact	Value	Description
Very high	>10%	Schedule impact or Unacceptable quality
High	5 – 10%	Schedule impact or Some parts of the project have low quality
Medium	<5%	Schedule impact or barely noticeable degradation in quality Low Impact schedule or Quality can be Incorporated

Table 5.2.3 (a) Risk Impact Definition

Risk ID	1
Risk Description	If Input medical data is improper
Category	Input
Source	Records
Probability	Low
Impact	High
Response	Mitigate
Strategy	Proper image format will provide proper output.
Risk Status	Occurred

Table 5.2.3(b) Risk ID 1

Risk ID	2
Risk Description	If user is not familiar with the website
Category	Input
Source	Website
Probability	Low
Impact	High
Response	Mitigate
Strategy	Better coding algorithm and input data will solve issue.
Risk Status	Identified

5.2.3(c) Risk ID 2

Risk ID	3
Risk Description	If query not asked properly
Category	Input
Source	Chatbot Algorithm
Probability	Low
Impact	Very High
Response	Accept
Strategy	Proper Chatbot Algorithm will solve issue
Risk Status	Identified

Table 5.2.3.(d) Risk ID 3

5.3 Project Schedule

5.3.1 Project Task Set

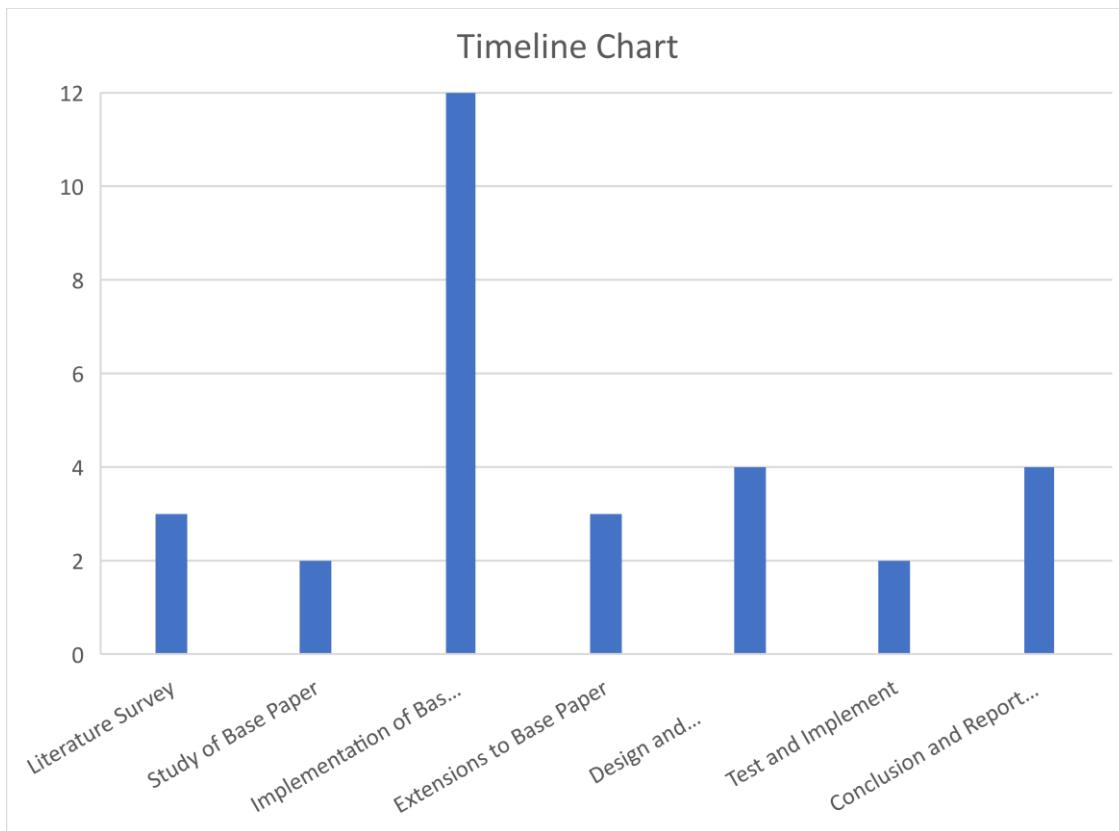
Major Tasks in the Project stages are:

- Task 1: Literature Survey
- Task 2: Study of Base paper
- Task 3: Implementation of Base Paper
- Task 4: Other Extra Modules Implementation
- Task 5: Testing/ Document Writing

5.3.2 Timeline Chart

Phase No.	Activity	Tentative work to be accomplished	Proposed Duration
1	Literature Survey	To study maximum 15 papers.	3 weeks
2	Study of Base Paper	To do a thorough study of the base paper	2 weeks
3	Implementation of Base Paper	To implement modules	12 weeks
4	Extensions to Base Paper	Enhancing base paper	3 weeks
5	Design and Implementation.	Actual Coding and designing.	4 weeks
6	Test and implement	Performing testing and quality assurance	2 weeks
7	Conclusion and Report Writing	Completion of documentation.	4 weeks

Table 5.3.2 Timeline Chart



CHAPTER 06

OTHER SPECIFICATIONS

6.1 Advantages

1. Minor medical queries can be resolved with the help of a chatbot. Thus, saving time and money for the user as the user will not require to visit the doctor.
2. User can store their previous and current medical records on their profile so they can access their medical records anytime and anywhere.
3. Messaging and video chatting with any kind of doctor can be done on a single platform instantly.
4. A generalized platform for booking an appointment in hospitals.

6.2 Limitations

1. For efficient working of the platform, an uninterrupted internet connection is required.
2. To generate precise predictions, accurate data should be provided to the chatbot.
3. Video chat or message can be only done with the doctor who is available for video chat or message.

6.3 Applications

1. Distant counselling for the patients who live in remote areas with the help of video chat.
2. All the hospitals can acquire this system to schedule their patient's appointments and check their patient's medical histories both at the same place. Resulting in a hassle-free procedure for both hospitals and patients.
3. The collected data from the chatbot and user profiles can be used for the research and development of different medicines.
4. Can be used as a secure platform to transfer and store medical records.

CHAPTER 07

RESULTS

- Screenshot

[1] Welcome Page

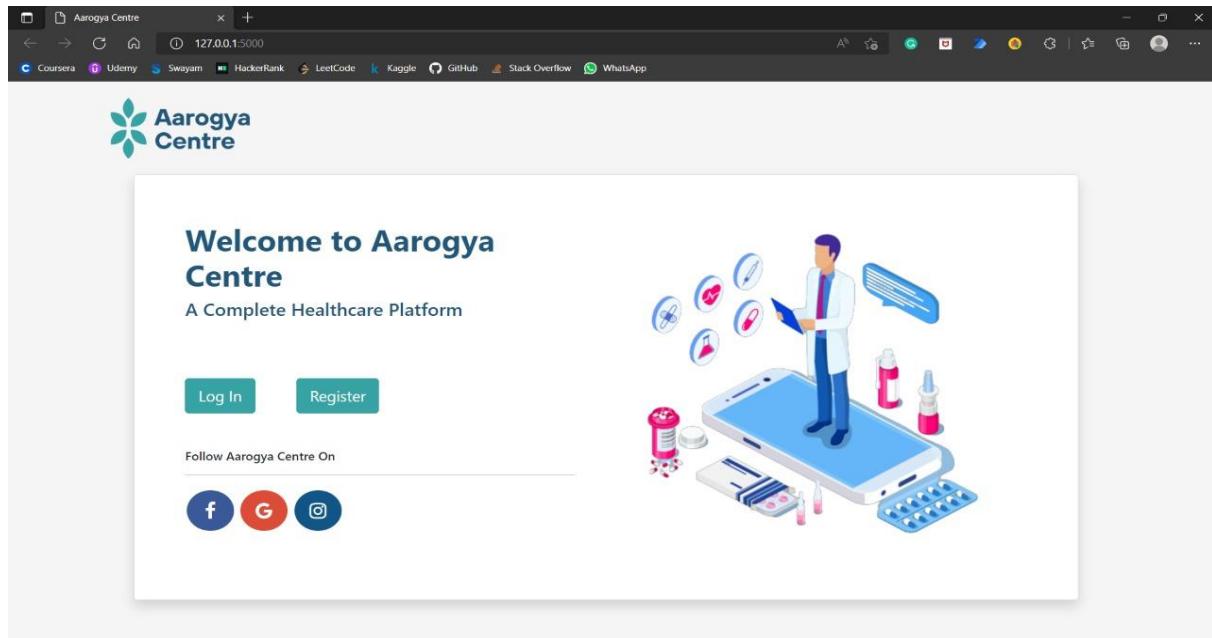


Fig. 1: Welcome Page

[2] Register Page

First name <input type="text" value="Enter your first name"/>	Last name <input type="text" value="Enter your last name"/>	Birth date <input type="text" value="dd-mm-yyyy"/>
Gender <input checked="" type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Other	City <input type="text" value="Enter city name"/>	Mobile number <input type="text" value="Enter your mobile number"/>
Email address <input type="text" value="Enter your email address"/>	Password <input type="text" value="Enter your password"/>	Re-enter password <input type="text" value="Re-enter your password"/>
User Category <input checked="" type="radio"/> Normal <input type="radio"/> Doctor		

Submit Already have an account? [Log in](#)

Fig. 2 : Register Page

[3] Login Page

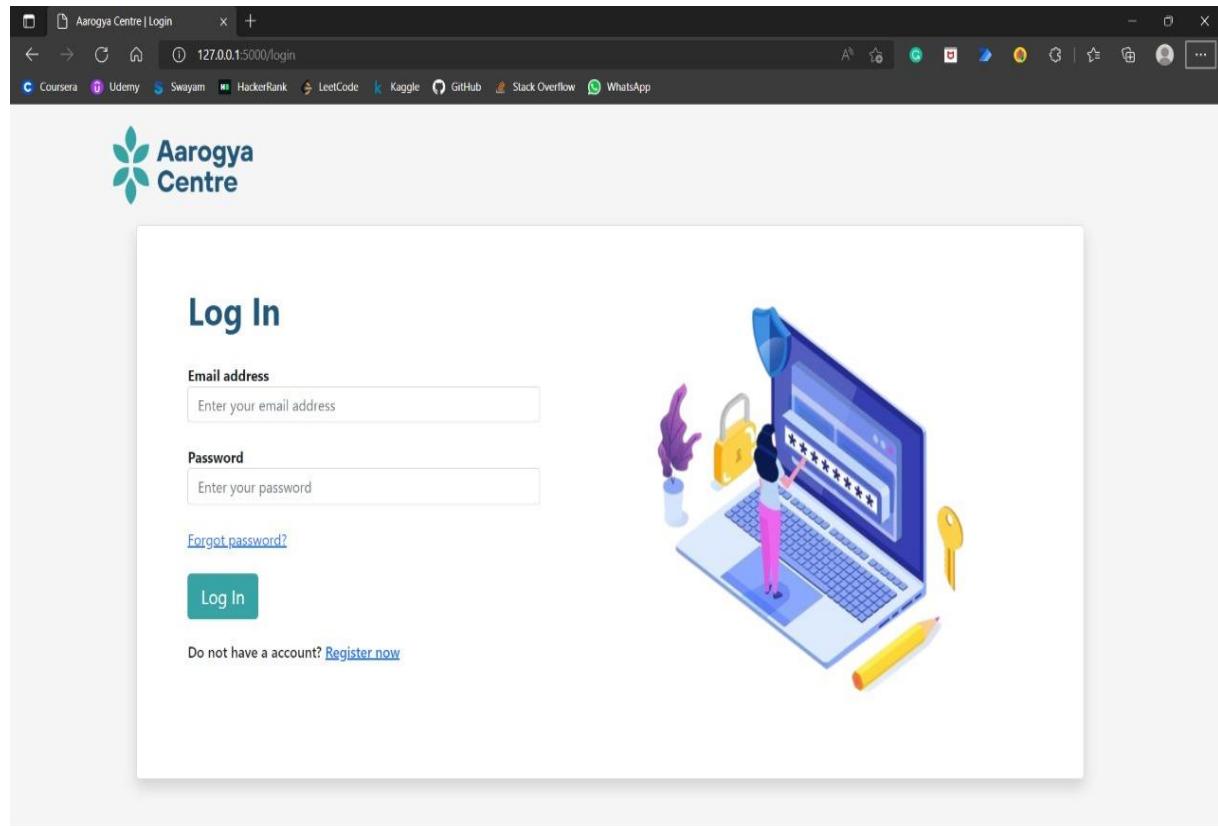


Fig. 3 : Login Page

[4] Update Profile

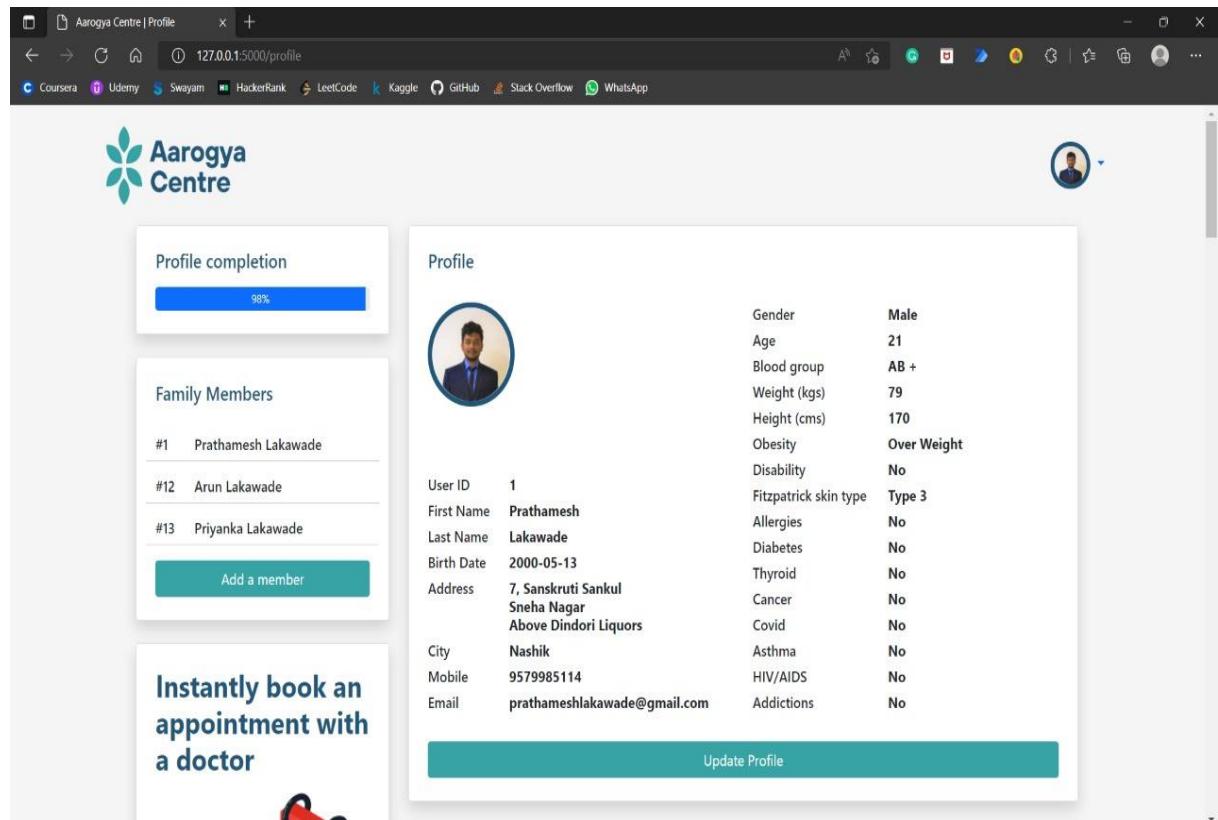


Fig. 4 : Update Profile

[5] Appointment Booking

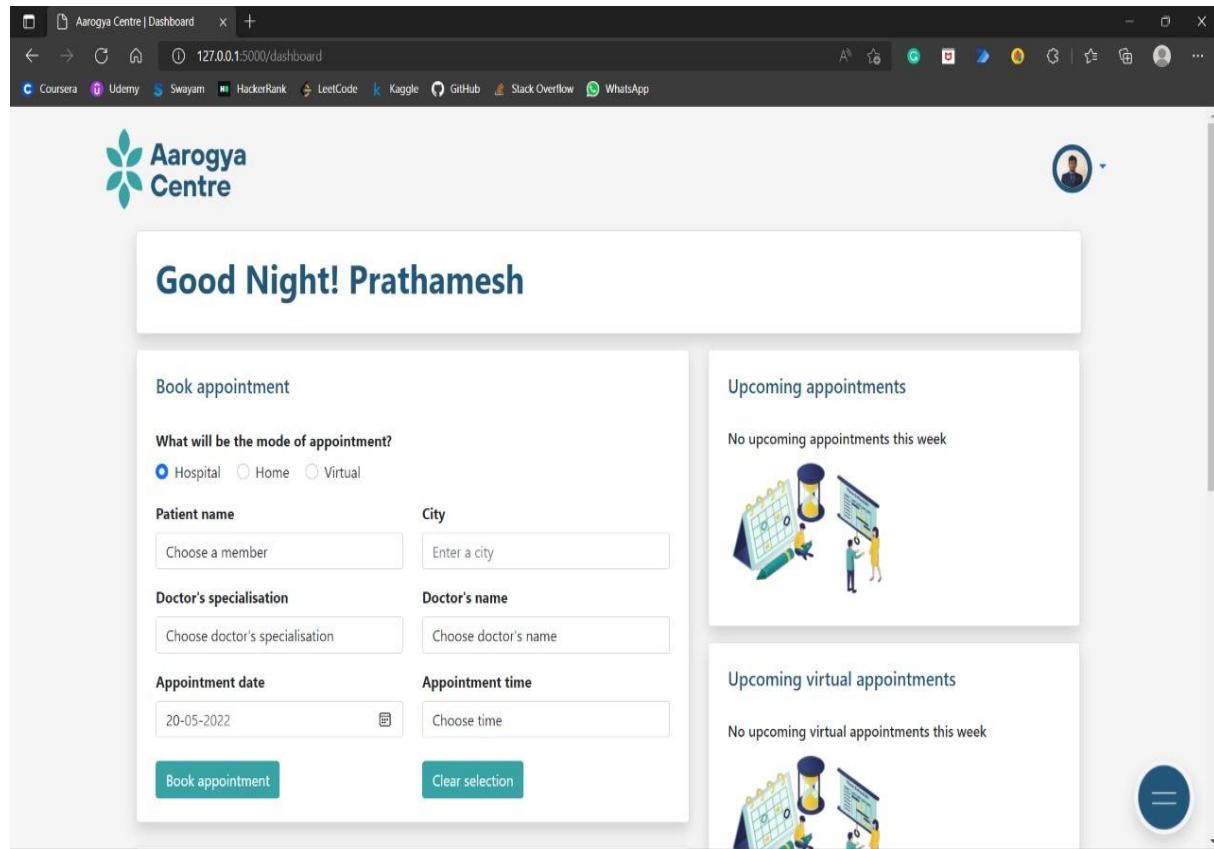


Fig. 5 : Appointment Booking

[6] Add Member

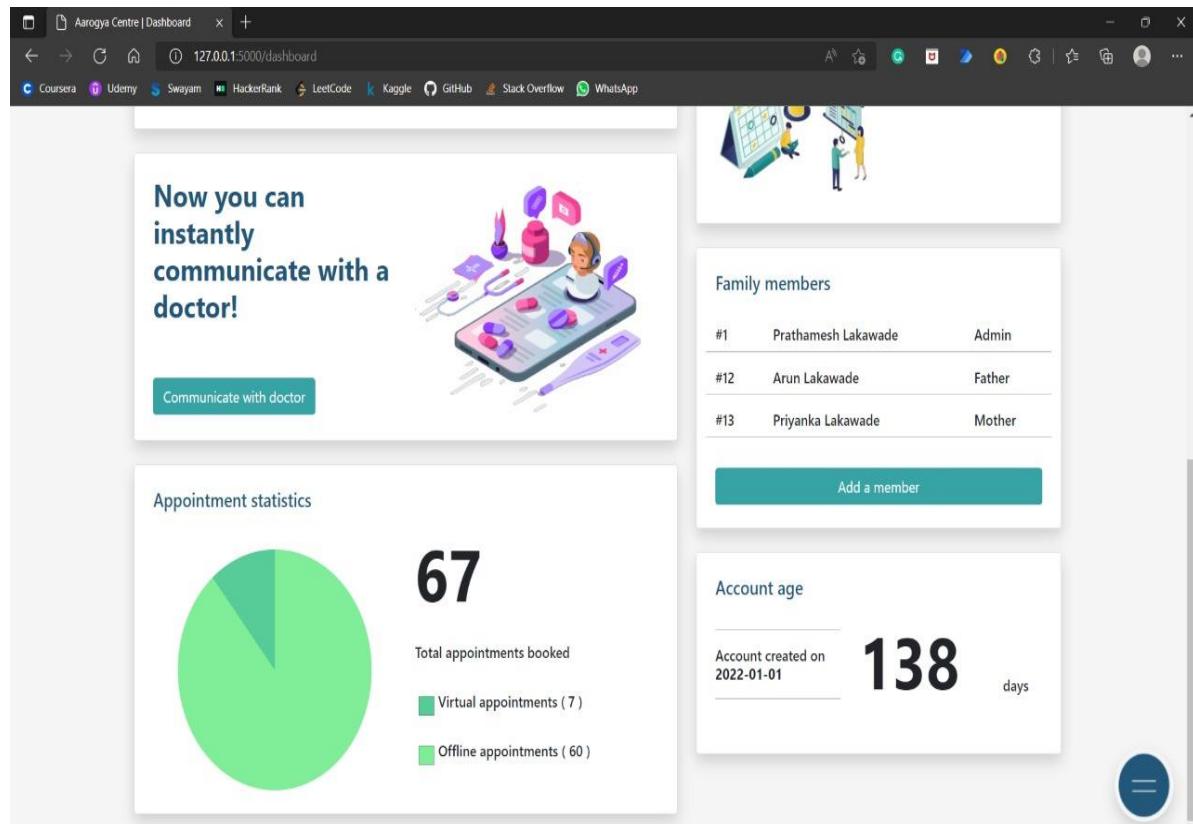


Fig. 6 : Add Member

[7] Upload Document

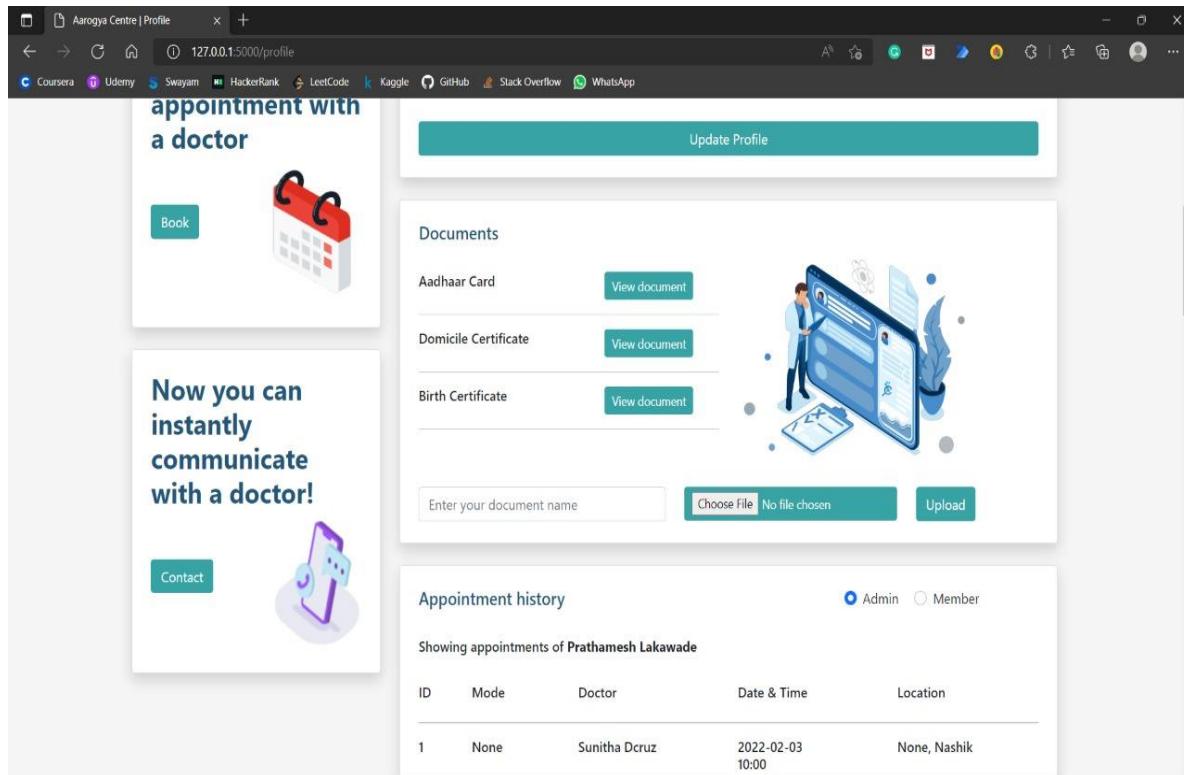


Fig. 7 : Upload Document

[8] Healthcare Chatbot

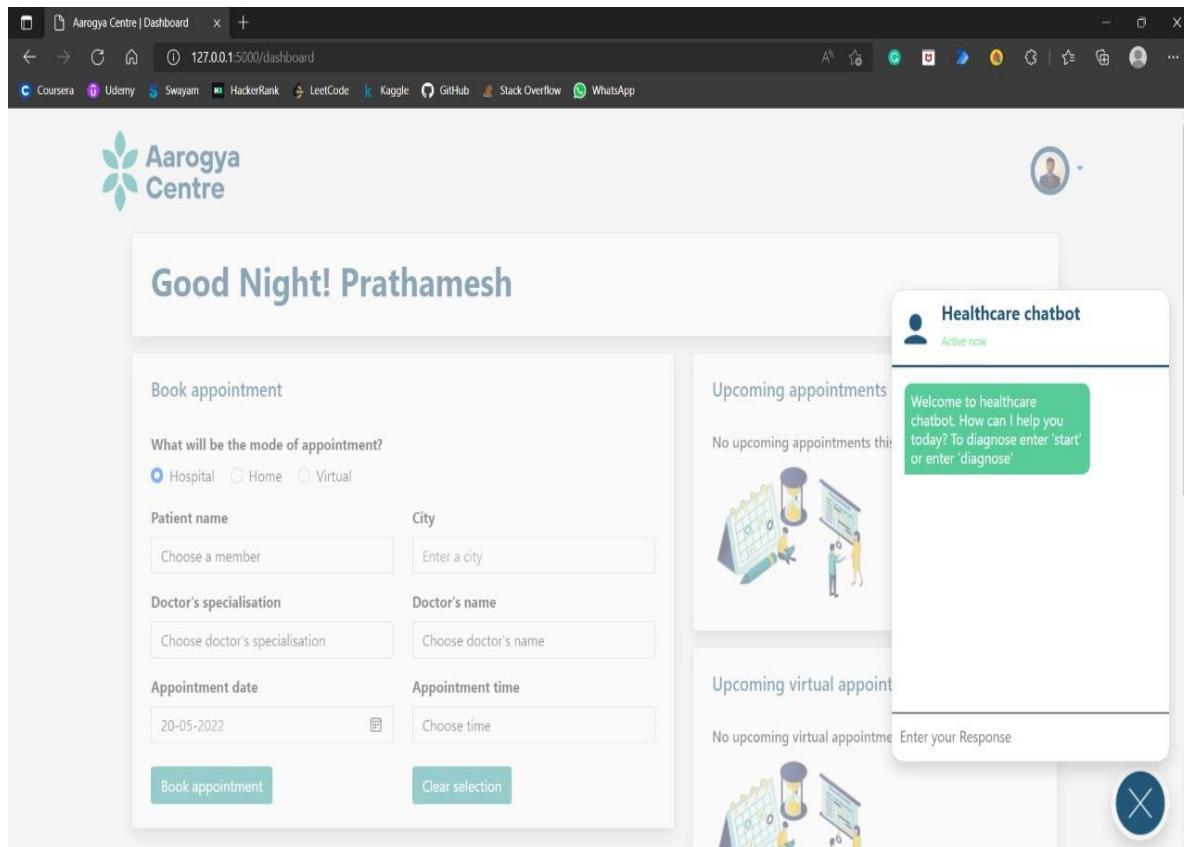


Fig. 8 : Healthcare Chatbot

[9] Video-Calling

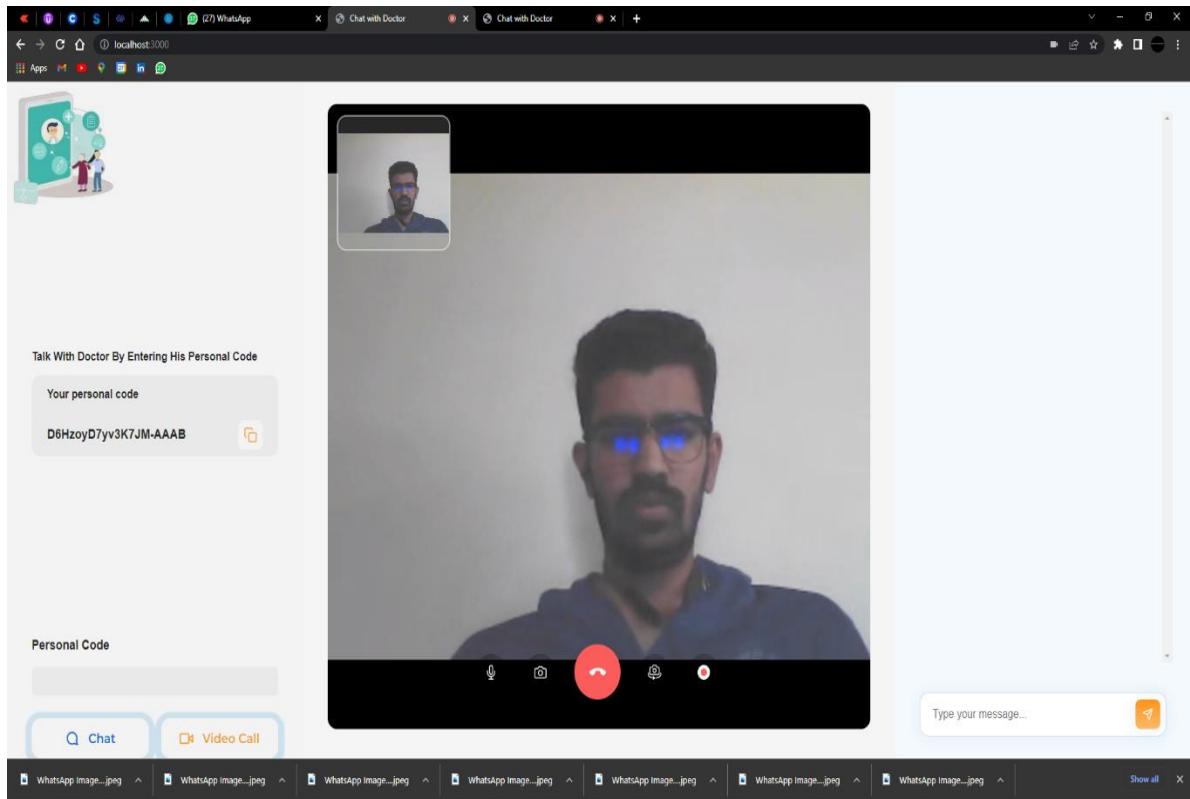


Fig. 9 : Video-Calling

CHAPTER 08

CONCLUSION

We are going to provide online healthcare services to people so that the physical interaction between the patient and the doctor decreases. The use of Web RTC API in the project allows the user to hold a video appointment with a practitioner thus overcoming the shortcomings that arise due to the use of a chatbot because an AI/ML chatbot can simulate a conversation with a user but it can only entertain a conversation for which it has been trained.

We can therefore conclude, that the AI-powered platform can provide immediate quality medical consultation to everyone at any place with an internet connection, make communication between patient and doctor easier through online messaging and, in its rare failure, video chatting with a medical professional, and can also store users previous as well as current medical data. Thus, taking the concept of medical healthcare to a whole new level on an online platform.

APPENDIX

Appendix A: NP Hard & NP Complete

NP Type

In computational complexity theory, NP (non-deterministic polynomial time) is a complexity class used to classify decision problems. NP is the set of decision problems for which the problem instances, where the answer is “yes”, have proofs verifiable in polynomial time by a deterministic Turing machine.

There are two types of NP:

1. NP Hard

A problem is NP-hard if an algorithm for solving it can be translated into one for solving any NP-problem (non-deterministic polynomial time) problem. NP-hard therefore means “at least as hard as any NP-problem” although it might, in fact, be harder.

2. NP Complete

In computational complexity theory, a problem is NP-complete when it can be solved by a restricted class of brute force search algorithms and it can be used to simulate any other problem with a similar algorithm.

P Type

A problem is assigned to the P (polynomial time) class if there exists at least one algorithm to solve that problem, such that the number of steps of the algorithm is bounded by a polynomial in “n”, where “n” is the length of the input.

Appendix B: Paper Publication & Project Competition

Name Of The Journal: International Journal For Research In Applied Science & Engineering Technology (IJRASET)



International Journal for Research in Applied Science & Engineering Technology (IJRASET)

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538

Volume 10 Issue IV Apr 2022- Available at www.ijraset.com

Aarogya Centre- A Complete Healthcare Website

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Abstract: During the COVID-19 pandemic, everybody was forced to restrict their human interaction to avoid the spread of coronavirus. All the doctors and other employees in the medical industry were working day and night to eradicate the virus. Getting health-related consultation from doctors was risky as an individual had to physically go to a doctor for a checkup. Artificial Intelligence (AI) is the fastest-growing field and is expanding rapidly in other work sectors including the medical sector. Our proposed system is to develop a platform in which all queries related to health can be fulfilled. To start, every individual will need to create a profile on the platform by providing a few details. The user can insert their previous medical records onto the profile so that they can store their entire medical history in one place. On the platform, there will be three modules, chatbot, video chat, and appointment booking. The chatbot can predict the disease and give healthcare advice according to details provided by the user. In the video chat module, the user will be able to communicate with a doctor through video call or only through chat. In the appointment booking module, users can book an appointment with different doctors and hospitals for checkups. With the help of the platform, an individual can save a lot of time and money for simple health-related problems. The platform would also be beneficial for people living in remote areas as they can easily access good medical consultations.

Keywords: Artificial Intelligence, Chatbot, Web Development, Prediction, Disease, Query Processing.

I. INTRODUCTION

With increasing birth rate and decreasing death rate due to advancement in the medical field, it's found that the number of doctors is less to serve the need of the increasing population. During the COVID-19 pandemic, everybody was forced to restrict their human interaction. So, getting health-related consultations from doctors was risky as an individual had to physically go to a doctor for a check-up. Minor health-related issues can be resolved at home under proper assistance. So, in this case, an AI-powered platform can help to resolve these issues without leaving the comfort of home.

Artificial Intelligence (AI) can be defined as an industry that is related to the automation of intelligent behaviors and it must be based on applying theoretical principles as well as the operation of applicable models. It is the study of intelligent agents. The term "artificial intelligence" is applied when a machine mimics "cognitive" functions that humans associate with other human minds, such as "learning" and "problem-solving". Artificial Intelligence gives the supreme power to mimic the human way of thinking and behaving to a computer. According to Buchanan B. G., AI is created from fantasies in the 19th century, when science fiction writers had used the prospect of intelligent machines to foster non-human's intelligence, thence to make us think about our human characteristics.

A chatbot is a computer program that conducts a conversation via auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than a human. For various practical purposes like customer service or information acquisition, a chatbot is being used in the dialog system. Most chatbots use natural language processing for interpreting the user input and generating the corresponding response but certain simpler systems search for the keyword within the text and then provides a reply based on the matching keywords or certain pattern. Today, chatbots are part of virtual assistants such as Google Assistant and are accessed via many organizations' apps, websites, and instant messaging platforms. Non-assistant applications include chatbots used for entertainment purposes, research, and social bots which promote a particular product, candidate, or issue.

II. PRELIMINARIES

A. Motivation

We often need to consult a doctor for small problems and with the advancement of science and a general unbalance in the birth and death rate, the doctor-patient ratio is also highly affected. Plus, in situations like the ongoing pandemic, where we are restricted to the bounds of our homes, the need for an AI-powered platform that could help resolve these issues without leaving the comfort of our homes increases significantly.



B. Limitation

For efficient working of the platform, an uninterrupted internet connection is required. To generate precise predictions, accurate data should be provided while conversing with chatbot. To generate precise predictions, accurate data should be provided to the chatbot. Video chat or message can be only done with the doctor who is available for video chat or message.

III. LITERATURE REVIEW

A. McKinsey & Company on Transforming healthcare with AI : [1]

"In their research paper, they have hailed the significant potential of Artificial Intelligence in the healthcare industry claiming it could change the way healthcare is delivered. A report with the European Union's EIT Health explores the way it can support improvements in care outcomes, patient experience, and access to healthcare services. It can increase productivity and the efficiency of care delivery and allow healthcare systems to provide more and better care to more and more people. AI can help in improving the experience of physicians, enabling them to spend a lot of time in direct patient care and reducing burnout."

B. Konstantin Kalinin on Medical Chatbots : [2]

"The best healthcare chatbots are those that run on exclusive AI/ML technologies, support non-scripting intent-based dialogs, protect PHI, and make an impression of an intelligent being overall." "An anytime physician appointment chatbot is the most straightforward variant of implementing AI-powered conversational technology without significant investment."

C. Cynthia Onyefulu on Online Appointment System and Services : [3]

"The online appointment system is regarded as "a win-win solution for patients and physicians...". This view was also expressed by other people. This may be one of the reasons why there are several types of research about online or web-based appointment systems. In India, the authors concluded that although the appointment system has several benefits, it is also affected by multiple factors such as the "arrival and service time variability, patient and provider preferences, available information technology, and the experience level of the scheduling staff". However, online scheduling, they stated, has more advantages compared to the traditional appointment system. According to these authors, in the traditional appointment system, the scheduling is done by coming to the facility, in such cases, the waiting time tends to be reasonably long. The waiting time for the advisee is minimized with the online appointment system."

D. Divya Madhu on Prediction of Disease Through AI : [4]

"She proposed an idea in which the AI can predict the diseases based on the symptoms and give the list of available treatments If a person's body is analyzed periodically, it is possible to predict any possible problem even before they start to cause any damage to the body. Some Challenges are research and implementation costs, and government regulations for the successful implementation of personalized medicine, they are not mentioned in the paper"

E. Priyasankari M on User Dialogue Technology : [5]

"She proposed an idea in which it uses user dialogue. User dialogue is a linear design that proceeds from symptom extraction to symptom mapping, where it defines the corresponding symptom then diagnosis the patient where it's a major or minor disease."

IV. PROPOSED SYSTEM

A. Architecture

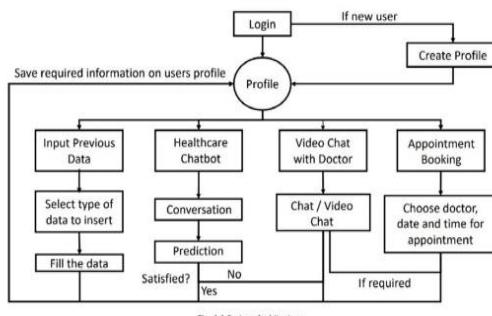
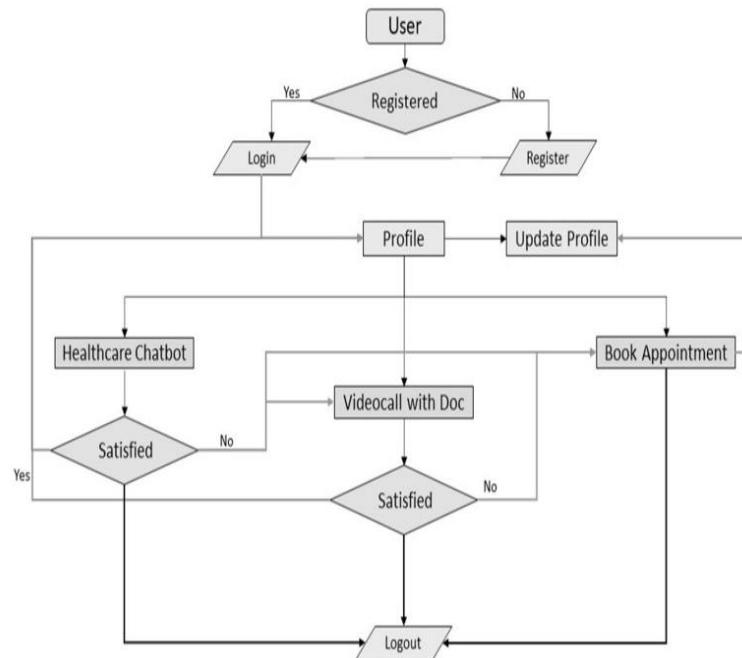


Fig. 4.1 System Architecture



In our proposed, when a user will reach to our platform, firstly he has to login to his account and if he is a new user then he has to register on our website and after registering he has to use those credentials used at the time of register to logon to our portal. At first, he has to submit all his past medical history so that while communicating with doctor or chatting with chatbot, he can get a better solution for his disease. He / She can also book appointment at specific hospital with any specialist through our portal. A chatbot is provided, so if a user has queries regarding his minor disease like sneezing, cold, etc. then he can chat with chatbot and according to his input a chatbot will give a precise solution on his disease and also chatbot will go through the suggestions given by doctor at the time of video call in textbox. When a user is done with his work then he can logout from his account.

B. Project Implementation



3.7.1 Flowchart

1) Module 1 (User Module)

The first Module is the User module where the user has to complete his profile details by registering on website. He / She has to fill the appropriate details for working of precise working of chatbot.

2) Module 2 (Chatbot)

Another module is of chatbot which works on ML algorithm ie. Bag of Words. For generating precise solution a user must have to save all data correctly.

3) Module 3 (Video-chat with Doctor)

This module works on the Web-RTC API for communication between user and doctor. Through this module user can chat with doctor using text and videocall.

4) Module 4 (Appointment Booking)

Through this module user can book appointment in hospitals with any specialist according to his / her need.



V. CONCLUSION

It has been a great pleasure for me to work on this exciting and challenging project. This project proved good for me as it provided practical knowledge of Python and MySQL. It also provides knowledge about the latest technology used in developing web enabled application and client server technology that will be great demand in future. This will provide better Opportunities and guidance in future in developing projects independently. We are going to provide online healthcare services to people so that the physical interaction between the patient and the doctor decreases. The use of Web RTC API in the project allows the user to hold a video appointment with a practitioner thus overcoming the shortcomings that arise due to the use of a chatbot because an AI/ML chatbot can simulate a conversation with a user but it can only entertain a conversation for which it has been trained.

We can therefore conclude, that the AI-powered platform can provide immediate quality medical consultation to everyone at any place with an internet connection, make communication between patient and doctor easier through online messaging and, in its rare failure, video chatting with a medical professional, and can also store users previous as well as current medical data. Thus, taking the concept of medical healthcare to a whole new level on an online platform.

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Project Competition : Project Mania 2022



Appendix C: Plagiarism Report

Abstract



Content Checked For Plagiarism

During the COVID-19 pandemic, everybody was forced to restrict their human interaction to avoid the spread of coronavirus. All the doctors and other employees in the medical industry were working day and night to eradicate the virus. Getting health-related consultation from doctors was risky as an individual had to physically go to a doctor for a checkup. Artificial Intelligence (AI) is the fastest-growing field and is expanding rapidly in other work sectors including the medical sector.

Our proposed system is to develop a platform in which all queries related to health can be fulfilled. To start, every individual will need to create a profile on the platform by providing a few details. The user can insert their previous medical records onto the profile so that they can store their entire medical history in one place. On the platform, there will be three modules, chatbot, video chat, and appointment booking. The chatbot can predict the disease and give healthcare advice according to details provided by the user. In the video chat module, the user will be able to communicate with a doctor through video call or only through chat. In the appointment booking module, users can book an appointment with different doctors and hospitals for checkups.

With the help of the platform, an individual can save a lot of time and money for simple health-related problems. The platform would also be beneficial for people living in remote areas as they can easily access good medical consultations.

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Introduction



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Chapter 01

1. Introduction

With increasing birth rate and decreasing death rate due to advancement in the medical field, it's found that the number of doctors is less to serve the need of the increasing population. During the COVID-19 pandemic, everybody was forced to restrict their human interaction. So, getting health-related consultations from doctors was risky as an individual had to physically go to a doctor for a check-up. Minor health-related issues can be resolved at home under proper assistance. So, in this case, an AI-powered platform can help to resolve these issues without leaving the comfort of home.

Artificial Intelligence (AI) can be defined as an industry that is related to the automation of intelligent behaviors and it must be based on applying theoretical principles as well as the operation of applicable models. It is the study of intelligent agents. The term "artificial intelligence (AI)" is applied when the machine mimics "cognitive" functions that the humans associate with other human minds, such as "learning" and "problem-solving. According to Buchanan B. G., AI is created from fantasies in the 19th century, when science fiction writers had used the prospect of intelligent machines to foster non-human's intelligence, thence to make us think about our human characteristics.

A chatbot is a computer based program that performs a conversation via auditory or textual methods. These programs are designed to provide a clone of how a human will chat and thereby it acts as a conversational partner rather than a human. For various practical purposes like customer service or information acquisition, a chatbot is being used in the dialog system. Most chatbots use natural language processing for interpreting the user input and generating the corresponding response but certain simpler systems search for the keyword within the text and then provides a reply based on the matching words. Today, chatbots are part of virtual assistants such as Google Assistant and are accessed via many organizations' apps, websites, and instant messaging platforms. Non-assistant applications include chatbots used for entertainment purposes, research, and social bots which promote a particular product, candidate, or issue.

1.1 Motivation

We often need to consult a doctor for small problems and with the advancement of science and a general unbalance in the birth and death rate, the doctor-patient ratio is also highly affected. Plus, in situations like the ongoing pandemic, where we are restricted to the bounds of our homes, the need for an AI-powered platform that could help resolve these issues without leaving the comfort of our homes increases significantly.

1.2 Problem Definition

To develop an AI-powered platform that can provide immediate quality medical consultation to everyone at any place, make communication between patient and doctor easier, and also can store users' previous as well as current medical data.

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Literature Survey



PLAGIARISM SCAN REPORT



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Chapter 02 2. Literature Survey 2.1 McKinsey & Company on transforming aid with AI : "In their analysis paper, they have hailed the various potential of AI among the help trade claiming it's going to modification the approach aid is delivered. A report with the eu Union's EIT Health explores the approach it'll support enhancements in care outcomes, patient experience, and access to assist services. it'll increase productivity and so the efficiency of provide and allow aid systems to provide further and better care to further and extra people. AI can facilitate in rising the experience of physicians, sanctioning them to pay an excellent deal of it slow in direct patient care and reducing burnout." 2.2 Konstantin politician on Medical Chatbots : "The best aid chatbots unit of measurement people that run on exclusive AI/ML technologies, support non-scripting intent-based dialogs, defend letter of the alphabet, Associate in Nursingd build a control of associate intelligent being overall." "An anytime doc appointment chatbot is that the foremost straightforward variant of implementing AI-powered informal technology whereas not vital investment." 2.3 divinity Onyefulu on on-line Appointment System and Services : "The on-line appointment system is taken into account "a win-win account patients and physicians...". This browse was in addition expressed by individuals. this might be one among the reasons why there unit of measurement several forms of analysis regarding on-line or web-based appointment systems. In India, the authors finished that tho' the appointment system has several blessings, it's in addition plagued by multiple factors just like the "arrival and repair time variability, patient and provider preferences, on the market data technology, and so the experience level of the programing staff". However, on-line programing, they declared, has further advantages compared to the quality appointment system. in step with these authors, among the traditional appointment system, the programing is finished by returning to the ability, in such cases, the waiting time tends to be moderately long. The waiting time for the mortal is weakened with the online appointment system." 2.4 Priyasankari M on User Dialogue Technology : "She projected an inspiration among that it uses user dialogue. User dialogue is that the linear vogue that yield from symptom extraction to symptom mapping, where it defines the corresponding symptom to identification the patient where it's a big or minor health problem." 2.5 Tobias Kowatsch on Text based Chatbots : "He says that in past years text-based chatbots unit of measurement created. they are performing on one or two of diseases entirely. they are making Associate in Nursing application mobile coach among that they use a mobile chat app among that patients can communicate with a doctor. The doctor ar attending to be chatting with them daily and suggest to them how to keep up their health. they'll offer them things of advice and suggestions. they are winning data from Google & doctor."

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System Requirements & Specifications

Dupli Checker

PLAGIARISM SCAN REPORT

0%	Plagiarised	100%	Unique
Date	2022-03-08		
Words	338		
Characters	2188		

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Chapter 03 3. package necessities and Specifications 3.1 Introduction 3.1.1 Project Scope The purpose of the "Aarogya Centre: an entire attention internetsite" is to supply a affiliation between patient and doctor through electronic communication and videocall mistreatment Web RTC API, and to book a briefing for the hospitals to cut back waiting time, storing previous and current medical records. A chatbot that works on the "Bag of Words Algorithm" generates precise solutions for the asked question by the user in order that patient doesn't got to visit any doctor once more and once more for nominal queries. 3.1.2 Assumptions and Dependencies We assume that users would be at home with fashionable technology, like video business and texting, that a system with AN embedded digital camera is needed, and has previous expertise with on-line booking systems. In short, the user ought to be at home with completely different websites. 3.2 practical necessities 3.2.1 Portability : the online application is intended to stay movability because the prime motive within the mind. 3.2.2 Maintainability : the online application needs nominal maintenance which incorporates updation of Drivers and SDK. 3.2.3 Availability : the online application is obtainable across all platforms. 3.2.4 Accessibility : The programme of the appliance is intended by keeping the first maturity cluster in mind and may be accessed with ease. 3.3 External Interface demand 3.3.1 programme : device for causation needed inputs to the system and obtaining output because the same. 3.3.2 package Interface package (OS) : Windows seven and on top of 3.4 Non-functional necessities 3.5 System necessities 3.5.1 package necessities • Operating System : Windows seven or later, macOS Sierra eleven or later • Front finish : HTML, CSS, JavaScript • Back finish : Python, MySQL 3.5.2 Hardware necessities • Processor : Intel i3 or later • Memory : 2GB RAM or a lot of • Display : Super VGA with resolution of 1024 x 768 or higher • Camera and electro-acoustic transducer • Bandwidth larger than fifty KBps (400 kbps) • Latency beneath a hundred and fifty ms

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Chapter 05

5. Other Specifications

5.1 Advantages

- 1. Minor medical queries can be resolved with the help of a chatbot. Thus, saving time and money for the user as the user will not require to visit the doctor.
- 2. User can store their previous and current medical records on their profile so they can access their medical records anytime and anywhere.
- 3. Messaging and video chatting with any kind of doctor can be done on a single platform instantly.
- 4. A generalized platform for booking an appointment in hospitals.

5.2 Limitations

- 1. For efficient working of the platform, an uninterrupted internet connection is required.
- 2. To generate precise predictions, accurate data should be provided to the chatbot.
- 3. Video chat or message can be only done with the doctor who is available for video chat or message.

5.3 Applications

- 1. Distant counseling for the patients who live in remote areas with the help of video chat.
- 2. All the hospitals can acquire this system to schedule their patient's appointments and check their patient's medical histories both at the same place. Resulting in a hassle-free procedure for both hospitals and patients.
- 3. The collected data from the chatbot and user profiles can be used for the research and development of different medicines.
- 4. Can be used as a secure platform to transfer and store medical records.

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Conclusion

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Chapter 06

6. Conclusion

We are going to provide online healthcare services to people so that the physical interaction between the patient and the doctor decreases. The use of Web RTC API in the project allows the user to hold a video appointment with a practitioner thus overcoming the shortcomings that arise due to the use of a chatbot because an AI/ML chatbot can simulate a conversation with a user but it can only entertain a conversation for which it has been trained.

We can therefore conclude, that the AI-powered platform can provide immediate quality medical consultation to everyone at any place with an internet connection, make communication between patient and doctor easier through online messaging and, in its rare failure, video chatting with a medical professional, and can also store users previous as well as current medical data. Thus, taking the concept of medical healthcare to a whole new level on an online platform.

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