



Web Application Development of “Doctors’ Support” at Limmex Automation

By

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Bachelor of Science in Computer Science**

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Attestation

This is to certify that the report titled **Doctors' Support** is completed by me, **Mohitul Shafir (1731490)**, submitted in partial fulfillment of the requirement for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). It has been completed under the guidance of **Ms. Moumita Asad** miss (Supervisor). I also certify that all my work is original which I have learned during my Internship. All the sources of information used in this project and report has been duly acknowledged in it.



Signature

Date

Mohitul Shafir

Name

Acknowledgement

First of all, I would like to thank **Almighty Allah (SWT)**, for his grace in accomplishing my internship report timely.

I would like to express my gratitude to the Faculty of Computer Science and Engineering department to keep internship credit in the curriculum of the graduation program and give me a scope of tasting the flavor of industry-oriented tasks and the field of work with my interest. I would like to thank specially and heartily to my supervisor, **Ms. Moumita Asad**, Lecturer, Department of Computer Science and Engineering, Independent University, Bangladesh, who encouraged and directed me with her continuous guidance, invaluable instructions, stimulating suggestions and thoughtful advice during pursuing this internship and preparation of this report.

I am also thankful to my technical supervisor **Shakhawat Hossain**, Lead Software Engineer, Limmex Automation from the core of my heart for his kind support, guidance, constructive, supervision, instructions and advice as well as for motivating me to do the internship smoothly at Limmex Automation.

I feel proud and gratified that I was always held the under supervision of the Web Application Development team and got advice directly from **Shakhawat Hossain** sir. Here, with daily reporting along with mental and professional support enhances my experience in the internship life.

I am also indebted to the employees of Software development team and also specially my office supervisor **Md. Fokhrul Tauhid** sir, General Manager, Limmex Automation who gave me immense support while working. Moreover, to prepare this report and other documentation regarding Internship Report and else I would show appreciation to all the members of Limmex team, who always advised me and helped me through hands and pens. Moreover, I must mention the wonderful working environment and group commitment of this organization that has enabled me to deal with a lot of things.

Last but not the least, I would like to thank my parents and other family members for their eternal support given to me.

Letter of Transmittal

Ms. Moumita Asad
Lecturer
Department of Computer Science and Engineering
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Subject: Submission of Internship Report for the completion of Graduation.

Dear Madam,

I am hereby submitting my Internship Report, which is a part of the Bachelor Program in Computer Science and Engineering curriculum. It is a great achievement to work under your active supervision. This report is based on, “Internship at Limmex Automation”. I have got the opportunity to work at Limmex Automation for three months, under the supervision of Shakhawat Hossain, Lead Software Engineer, Limmex Automation.

This internship has given me both academic and practical exposures. The internship has given me the opportunity to develop a network with the corporate environment. I tried to make this report as much informative as possible with the experience I have gained during my internship period. In order to prepare a well-organized internship report, I have followed the guidelines and described the required fields with sufficient details. I, however sincerely believe that this report will serve the purpose of my internship program.

I shall be highly obliged if you are kind enough to receive this report and provide your valuable judgement. It would be my immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,
Mohitul Shafir
ID- 1731490
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Evaluation Committee

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Signature

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Name

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Supervisor

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Signature

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Name

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Internal Examiner

Abstract

Internship is defined as obtaining practical experience from various organizations, which helps in the formation of a connection between theoretical and practical knowledge. It is very important because it is the first time for a student to acquire a keen practical knowledge from the different organizations. When I was offered an internship at Limmex Automation, I got the chance to work and learn with developer team. The project's goal was to create a framework for Limmex Automation named “Doctors’ Support”. This report covers the whole project that I learned about throughout my internship period.

I had to finish my learning sessions before working on any project, and in this learning session, I was allocated to develop landing page, dashboard, different interface for different parts and some back-end codes. It was almost like a skill test before the actual project was assigned.

I've detailed the information and experiences I've gained and the work I've done as an intern at Limmex Automation, in this report. I worked on a website application where the most of my tasks included developing the entire site.

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Chapter 1

Introduction

Internships are often very closely related to a student's academic and career goals. The purpose of internship program is to help students focus on their career interests and potentials. The whole program entitles to give the opportunity to learn, observe and determine their goals and aims. Internship provides a student an opportunity to relate their theoretical knowledge with the tough real world environments. Engineering, Technology & Sciences, a school under **Independent University, Bangladesh** offers undergraduate program in "Computer Science and Engineering". As a student of the undergraduate program, the program requires that we complete an **Internship Program** with a reputable company where I will be trained practically with working environment practices and get familiar with the industry. I worked at a software company named "Limmex Automation" where I have completed 3 months of my internship period. In this report, I have discussed my internship period at Limmex Automation, an overview of the work I have done, my experiences working for a reputed organization, what I have learned and how it has helped me to develop and grow with a professional way.

1.1 Overview/Background of the Work

Being an intern, the main challenge was to translate the theoretical concepts into real life experience. I started my Internship as a Junior Software Engineer at Limmex Automation on 15th June, 2021. Limmex Automation gave me the opportunity to work on a web application named Doctors' Support.

Generally, for taking appointment from a doctor, Patients need to call at hospital or chamber and assistants receive the call and this information are written on papers or note books. As they write these down in a notebook, doctors do not have any access in these when they stay out of the chamber. Doctors need to call their assistant every time for patient's update. Because of that doctors are not able to make any schedule

properly. Moreover, this existing method pose a high threat in terms of security of their information i.e. can get lost, unauthorized people can easily access the information, data confidentiality and integrity not maintained. No proper backups and the system are tedious.

This web based real time Doctors' Support system will solve all these problems. So, by using this system doctors can access real time date wise patient's appointment lists, medical records, can add prescriptions and check fees status. This will play an important role to make doctor's and patient's life more easier. All the data will be stored in the database for further reference or audit.

1.2 Objectives

Project objectives are what we plan to achieve by the end of our project. Objective of a project is specific, measurable and must meet time, budget and most importantly meet the client's requirements. The main objectives of this application are described below:

- Automate the current manual patient's data recording system and maintain a date wise patients' database, maintain data security and user rights.
- To provide information about fees, appointment time, appointment date and overall patients details.
- To compute the total fees according to date.
- To create a data bank for easy access or retrieval of patients details and the users who registered to the system.
- To access patient's list in the system from any place, so doctors can schedule their plan accordingly.
- To store patient's data in the database for further reference or audit.

1.3 Scopes

This web based real time Doctors' Support system will permit to register doctor and patient. It also provides log in page after registration process. It provides different user interface with different functionality for doctors and patients. Patient can search the doctor by the specific doctor's name, department (Example: Neurologist/Cardiologist) with available consultation days, times and fees. After searching specific doctor, patient can book a doctor. After booking, patient will go to new interface where he/she have

to pay the doctors' fees using online Payment Gateway. Patient will get an Invoice with Doctor's Name, Consultation Date, Time and Fees after successful payment.

Doctor can accept or reject booked appointment. In the case of appointment rejection, patient can book another date and time for this doctor or can book another doctor. The Doctor will be able to check medical records of the patients, see the list of all patients who have booked his/her appointment. In addition, the doctor can see the profile of his/her patients and their medical test report. Moreover, the doctor can add a prescription for his/her specific patient.

Chapter 2

Literature Review

A literature review is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. In other words, a literature review serves to situate the current study within the body of the relevant literature and to provide context for the reader. In such a case, the review usually precedes the methodology and results sections of the work.

2.1 Relationship with Undergraduate Studies

Knowledge and skills gained from undergraduate courses have helped in the development of “Doctors’ Support” project. It would have proven more difficult if these courses were not covered before working on this project. Some of the courses are:

- **CSE 203- Data Structure:** This course was about teaching how to handle and manipulate complex arrays, objects, classes, array of objects, objects of array, nested arrays, nested objects, etc. As “Doctors’ Support” involves many complex data structures, the skills gained from this course made handling them much easier.
- **CSE 213- Object-Oriented Programming:** This course is a deep dive into classes and its objects of programming. It also taught how to write modular programs which made codes less repetitive and more reusable. It helped to design “Doctors’ Support” code in a modular format. Also, as the application grew bigger, this practice helped avoid writing new modules from scratch by using parts of old modules and adding new functions to them.
- **CSE 303- Database Management:** This was the first course which taught how to design and plan a project. It covered popular planning and strategy practices such as System Development Life Cycle, Rich Picture, Requirement Analysis, Entity Relationship Diagram, Business Process Model and Notation Diagram and many

more. These techniques helped in the development planning and strategy of “Doctors’ Support”.

- **CSE 307 - System Analysis and Design:** This course introduced the tools and techniques for the design and analysis of information systems. Topics covered include Systems and models, Project management, Tools for determining system requirements, data flow diagrams, decision table and decision trees, Systems analysis, systems development life cycle models, Object-oriented analysis, use-case modeling, Unified Modeling Language, Feasibility analysis, Structured analysis, systems prototyping, system design and implementation, application architecture, user interface design, Front-end and backend design, database design, software management and hardware selection, Case studies of Information Systems. All these lessons helped to land the final project.
- **CSE 309- Web Applications and Internet:** This is the course where the development of web applications was taught. It covered very important technologies that are highly in demand in the industry, such as HTML, CSS, Bootstrap, JavaScript, PHP, jQuery, View Engines (Handlebars and embedded JavaScript), Node.js, Express.js, MongoDB. The tools and technologies learned from this course immensely contributed to the development of “Doctors’ Support” as it is a web application built with the web technologies and it has a backend server which had to be deployed to the server as well.

2.2 Related works

Most of the landing pages use simple HTML, CSS, Bootstrap, JavaScript, or JQuery for their development. Most of the time, WordPress is used to remove any level of hard coding or to faster the development. As our goal for this project is develop the web server, we used more complex development frameworks. It is challenging to find a related website that has used similar web technologies to our project. Some websites in the industry are stated below:

- **DocTime:** DocTime is an online medical service App, targeting the buoyant tele-health and e-pharmacy market. The interface is self-explanatory, and users can work on it from their phone. It has both web and mobile versions, and in the web version, the website uses Laravel framework, similar to our base frontend library.
- **Parentscare:** Parentscare is a similar health support site. Its landing page is also informative as our developed project. It has only web versions, and in the web version, the website was build by using a framework.

- **Bdcare:** Bdcare is the first and largest innovative online healthcare startup, built with a mission to create a “one-stop” healthcare platform for Doctors and Patients. It has both web and mobile versions, and in the web version, the website was build by using a framework.

Basically above three sites provide free health questions, Search for doctors, Patient referral, Consult a doctor, Book Checkup, Get Emergency Services and Read Health Article. Doctors' Support also have all these features along with medical records, check patients list, patients profile, medical test reports and add prescription for the patient.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

Work Breakdown Structure (WBS) is a hierarchical structure which demonstrates a project's breakdown into smaller segments. For our project, we have produced a WBS so that our work is coordinated. WBS covers a visual of all the scopes, risks, points of communication, responsibilities, costs and guarantees that it does not skip essential deliverable. For brainstorming and collaboration, it is the ideal tool for the team. In our WBS, we have used the top-down approach.

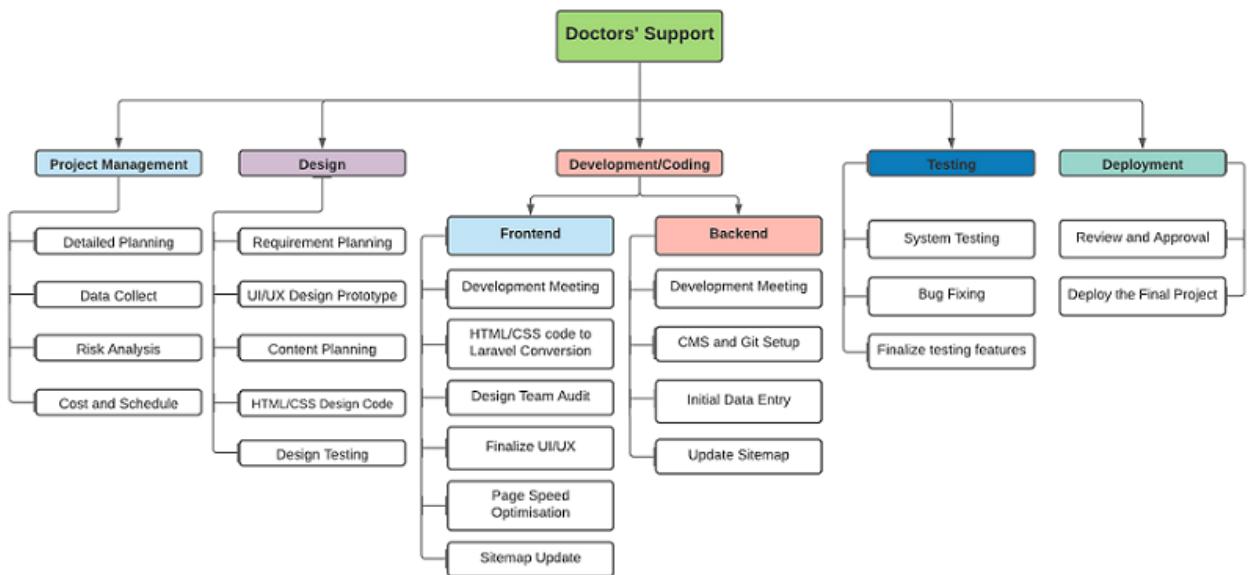


Figure 3.1: Work Breakdown Structure

3.2 Process/Activity wise Time Distribution

The estimated time required to end a project successfully defines process wise time distribution. This helps the developers create a mind map as to how efficiently they need to work in order to meet the deadlines. The most significant challenge in correctly designing an application is time and time management. So, first and foremost, the content must be fixed, and development must be based on this context. The technique of planning and regulating how much time to spend on various tasks is known as time management. Good time management allows an individual to do more in less time, reduces stress, and leads to professional success. Time distribution is greatly needed to complete any project.

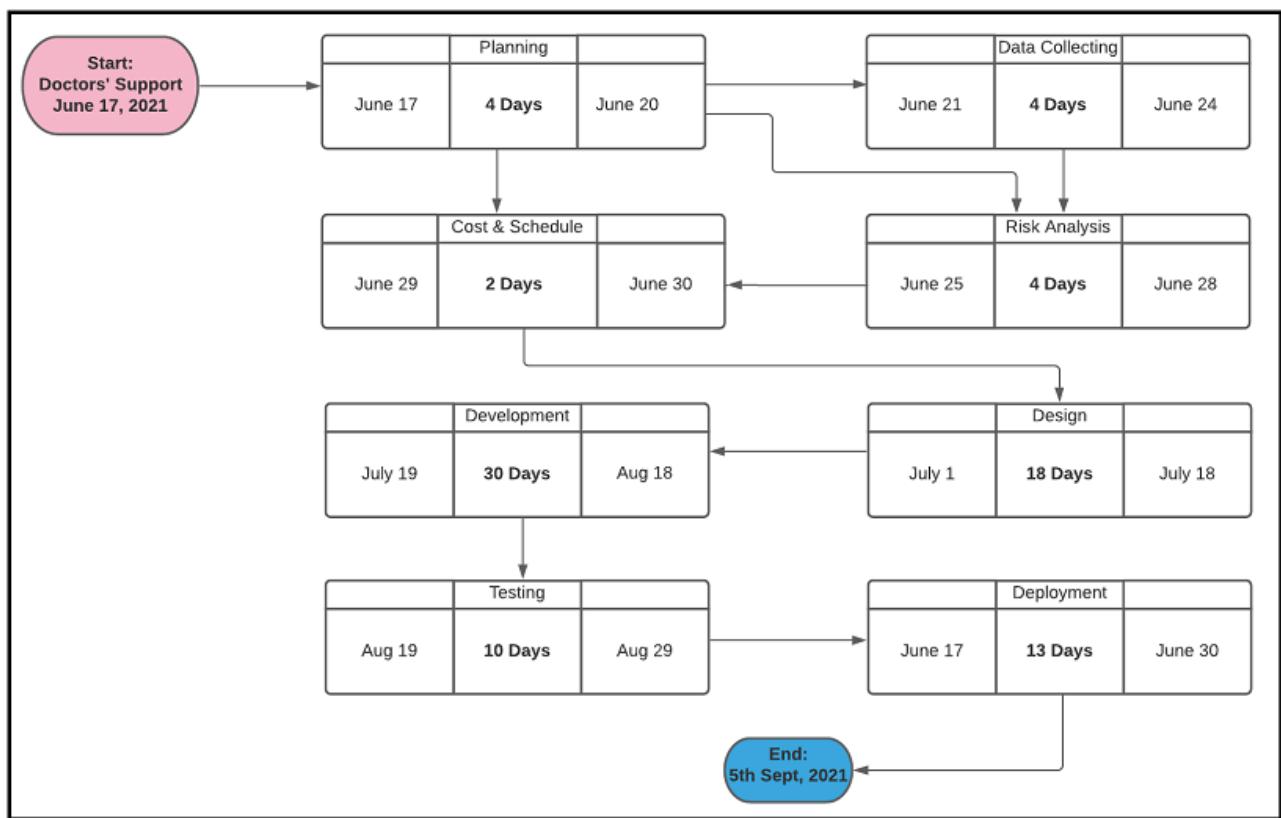


Figure 3.2: Critical Path Method for Doctors' Support

Here, we need 4 days for project planning, 4 days for data collecting, 4 days for Risk analysis and 2 days for Cost and scheduling. These four are the part of Project management and it considered 16.7% of the total works. After these parts, we need 18 days for designing which is considered 23.1% of the total works and 30 days for development/coding which is considered 38.5% of the whole project. After development, we need 10 days (12.8% of the works) for testing the project and 13 days (9% of the works) for Deployment of the project.

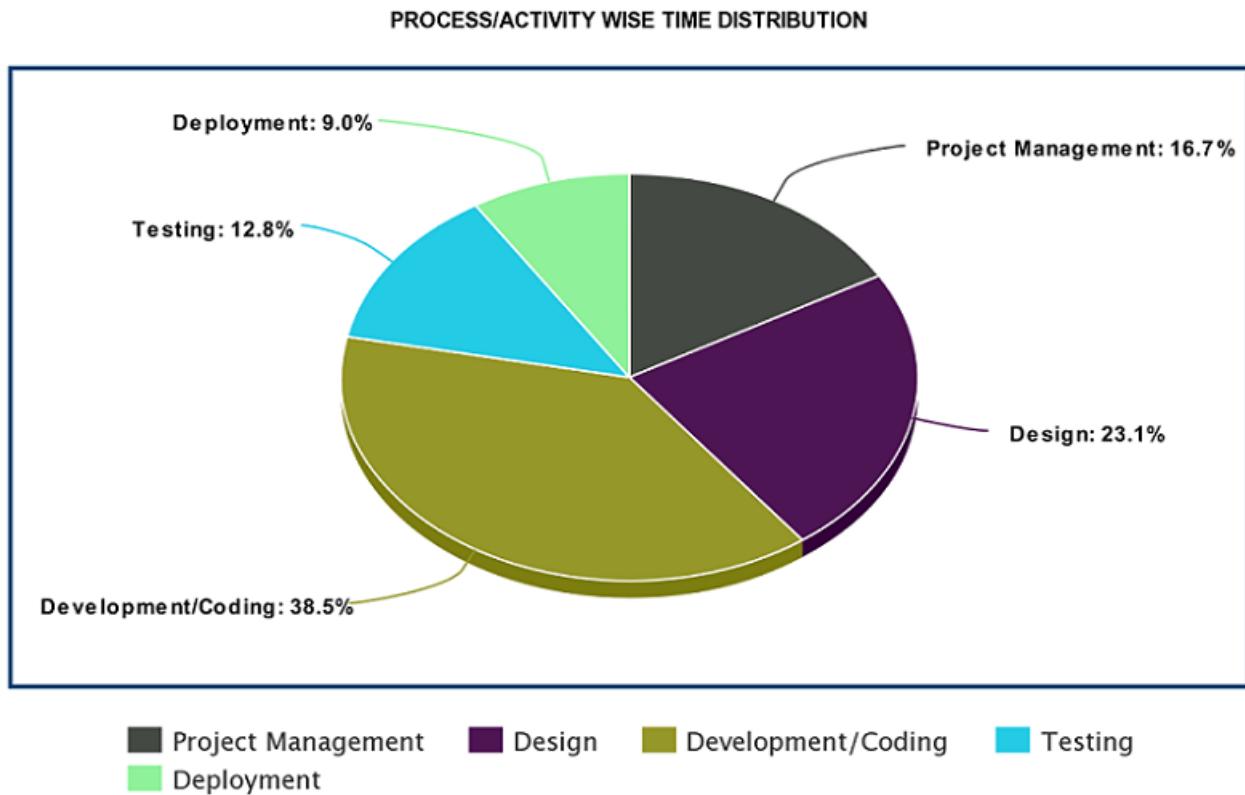


Figure 3.3: Process wise Time Distribution Chart

3.3 Gantt Chart

A Gantt chart is a project management tool assisting in the planning and scheduling of projects of all sizes, although they are particularly useful for simplifying complex projects. Project management timelines and tasks are converted into a horizontal bar chart, showing start and end dates, as well as dependencies, scheduling and deadlines, including how much of the task is completed per stage and who is the task owner. This is useful to keep tasks on track when there is a large team and multiple stakeholders when the scope changes. [1]

A Gantt chart is used for the following activities:

- Establish the initial project schedule - who is going to do what, when and how long will it take.
- Allocate resources - ensure everyone knows who is responsible for what.
- Make project adjustments - the initial plan will need many adjustments.

3.4. PROCESS/ACTIVITY WISE RESOURCE ALLOCATION & FINANCING

- Monitor and report progress - helps you stay on schedule.
- Control and communicate the schedule - clear visuals for stakeholders and participants.
- Display milestones - shows key events.

We have focused the gantt chart for Doctors' Support in the following:

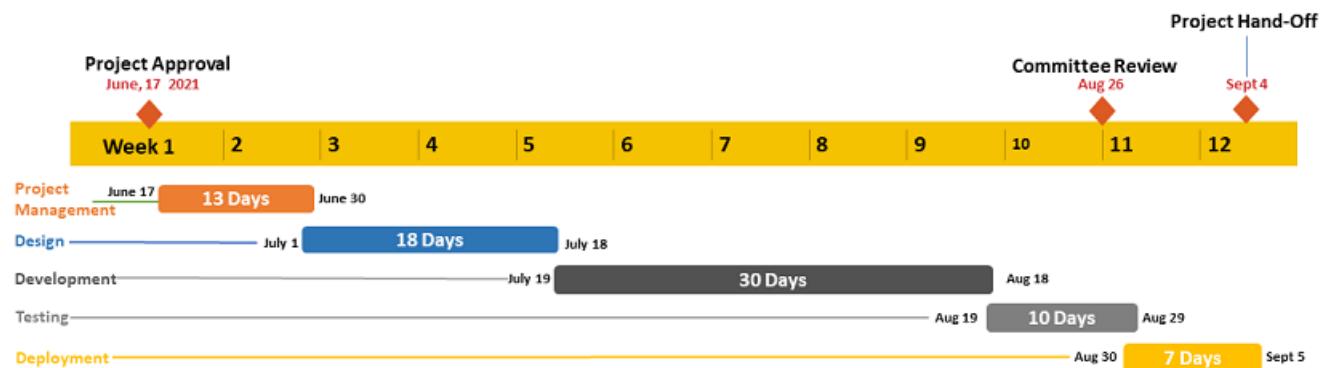


Figure 3.4: Gantt Chart for Doctors' Support

In this gantt chart, we focused on 5 steps of our development process. They are- Project management which was going for 13 days, Designing the project was going for 18 days, Development/Coding part was going for 30 days. After development we need to test our project which was for 10 days and finally we need 7 days for deploy the project.

3.4 Process/Activity wise Resource Allocation

Resource allocation is the process of assigning assets in a manner that supports your team's goals. For this project, the developers are considered as the primary resource followed by the computers used in the office, the servers required for the deployment of the project. Every employee of the company is considered a resource, hence everyone has assigned a particular assignment with certain deadlines, all of which collaborated to the entire production of the project. For this project, we need total 78 days for building the whole system. Following are the details of every step of the project:

- **Project Management:** This is the first period of the project, where the idea of the project was presented by the CEO of the company. During the first 2 weeks of the development process, the developers and the CEO engaged in 72 hours of discussion of how this project should be built from top to bottom, the approaches to be taken, creating smaller goals and setting deadlines for them and discussed the

3.4. PROCESS/ACTIVITIES PER PHASES & RESOURCE ALLOCATION & FINANCING

entire requirements for the completion of the project. For example, Computer specifications, software/tech to be used to build the application, features and developers required. This part considered 16.67% of the total works.

- **Design:** In this phase two UI/UX designers were worked almost 3 weeks (104 hours) designing the web pages of the application as well as the management team started working on the high level and low level diagrams for the project in order to get the bigger picture on sight. This part considered 23.08% of the total works.
- **Development/Coding:** At this stage, the designs for the web pages were complete and developers started working on writing the code for the front end and backend of the application, while the management team kept regulating whether all the deadlines were maintained. The whole process is going for 4 weeks which is approximately 180 hours and considered 38.46% of the total works.
- **Testing:** Testing started as soon as a feature was added to the site. Hence simultaneously the testing was being carried out by the developers. At the end of the implementation phase unit testing for the application started. This process is going for 10 days which is approximately 56 hours and considered 12.82% of the total works.
- **Deployment:** After the testing was truly completed, the team realized that it was behind schedule. For deployment, a VPS (Virtual Private Server) and a domain was bought to deploy the application on a live server. This is going for 7 days which is almost 40 hours of works and considered 8.97% of the total works.

Table 3.1: Table for Activity wise Resource Allocation

Activity wise Resource Allocation		
Activity	Days	Work Percentage
Project Management	13	16.67%
Design	18	23.08%
Development/Coding	30	38.46%
Testing	10	12.82%
Deployment	7	8.97%
Total	78	100%

3.5 Estimated Costing

The cost was calculated on the basis of the features the client demanded for the website. It depends on the size, requirements, functionalities and design of the website. This includes pre-designed themes, logo design cost, the cost for home page sliders, search engine optimization, chat option, social media connection, SSL certificates and many other tools that were used to build this website. The cost of developer and resources used were also taken into account. The estimated costs was Tk 1,74,500 (BDT) for the whole project. If any additional service support is required within 1 year of deployment, then some additional charges will be taken for hosting and domain.

Table 3.2: Table for Estimated Costing

Features	Costs
Internet Bills	4500
Domain Bills	3500
Hosting Bills	1500
Project Manager	40000
Frontend Developer	50000
Backend Developer	75000
Total Costs	1,74,500

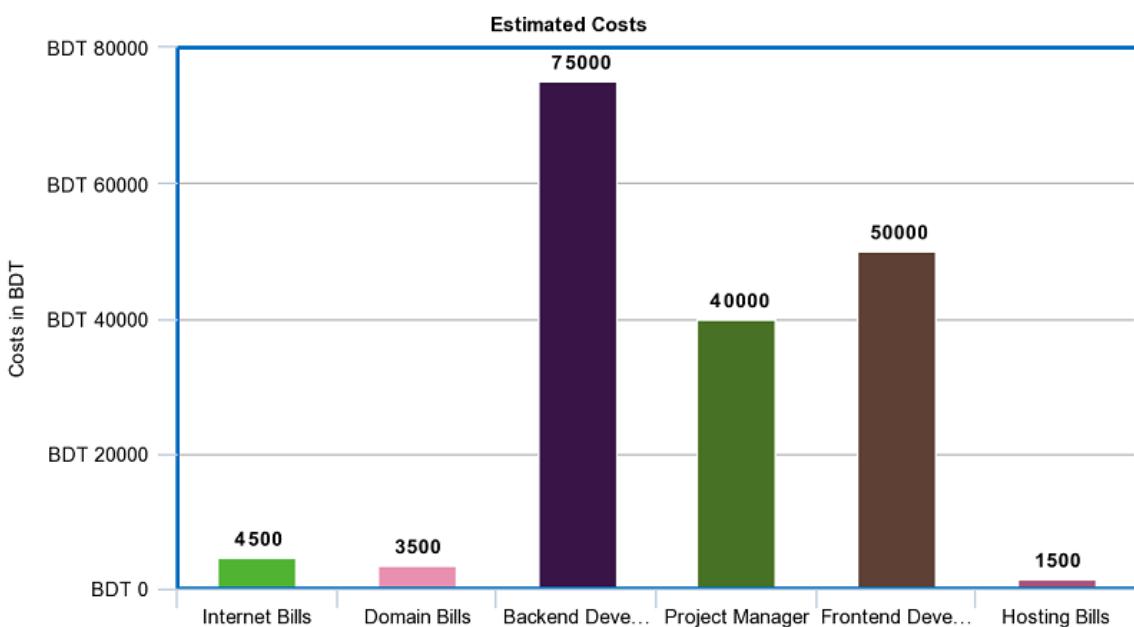


Figure 3.5: Chart for Estimated Costing

Chapter 4

Methodology

Methodology refers to the overarching strategy and rationale of our project. It involves studying the methods used in our field and the theories or principles behind the selection process to develop an approach that matches our objectives. The methodology is a system of methods that we use in a specific area of study or activity. The methodology is the detailed procedures used to identify, select, process, and analyze information about a subject. The website I have working on is one of the most complete and fully functional websites, and it is developed using modern web technologies.

4.1 Software Development Methodology

Software Development life cycle (SDLC) is a spiritual model used in project management that defines the stages include in an information system development project, from an initial feasibility study to the maintenance of the completed application. [2] There are different software development life cycle models specify and design, which are followed during the software development phase. These models are also called "Software Development Process Models." Each process model follows a series of phase unique to its type to ensure success in the step of software development.

Here, are some important phases of SDLC life cycle:

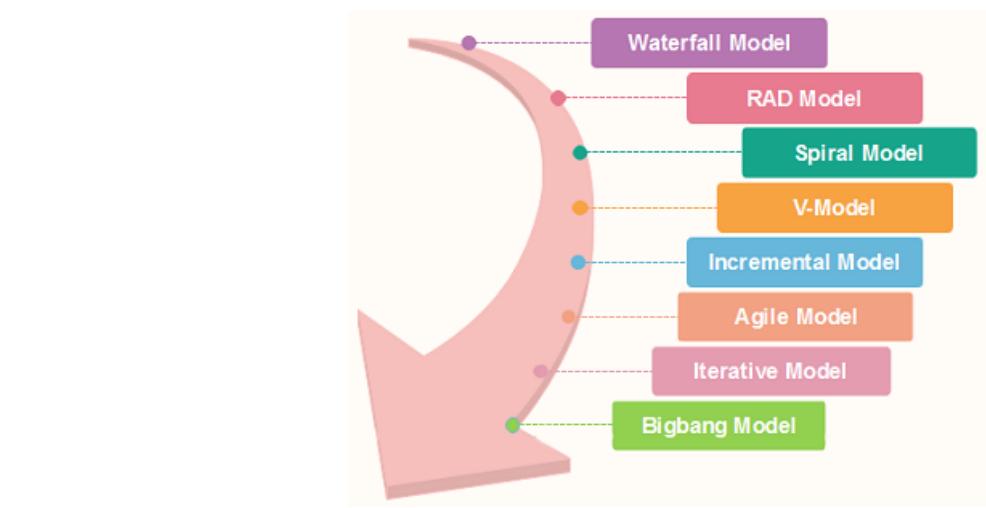


Figure 4.1: Software Development Life Cycle (SDLC)

For this project we have chosen the **Agile Methodology**. Sometimes it works in iterative development as well. Agile is a process by which a team can manage a project by breaking it up into several stages and involving constant collaboration with stakeholders and continuous improvement and iteration at every stage. This approach starts with customers portraying how the finished result will be utilized and what issue it will solve. It doesn't fabricate a whole framework on the double, yet rather grows steadily. [3]

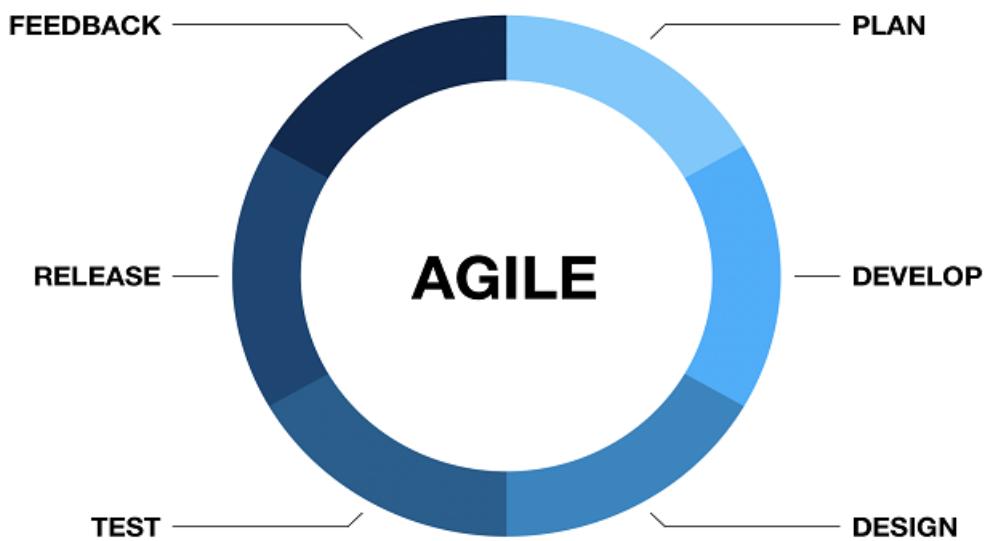


Figure 4.2: Agile Methodology

Reasons for choosing agile methodology:

1. **Faster time to market:** Heaps of people that choose to go lithe are pretty tired of multi month delivery cycles that frequently convey an inappropriate item to showcase and our clients simply aren't keen on purchasing. The possibility of two weeks' delivery cycles and quarterly release cadences is quite engaging. Our business sectors and our opposition are simply moving excessively quick. So, we must show signs of improvement at getting working items out the door faster.
2. **Customer satisfaction:** Building items our clients can utilize satisfies them. Having the option to frequent add new highlights based on their feedback makes them happy as well. As a product client, I don't know there is anything more terrible than putting resources into an item that doesn't work, doesn't do what we need it to do, and not being not able to see any way ahead for improving it. Agile helps us to build good relationships with our customers, one where we are working together to get problems solved.
3. **Build the right products:** Regardless of whether we are building the specific highlights that our clients are asking for, steady delivery encourages us to assemble them the manner in which our clients will really use them. At the point when we deliver in smaller increments, we have the chance to let our clients see the developing item, react to it, and change it as they go. Agile helps the customer and the team converge on the best possible outcome.
4. **Early risk reduction:** Agile doesn't regard risk as a different area to be overseen. Agile is risk management. By conveying early and getting feedback, we lessen the danger of building an inappropriate product. By ceaselessly incorporating and fabricating imperfection free programming, we decrease the risk that our stuff wasn't constructed right not long before we have to put it up for sale to the market.
5. **Better quality:** Agile fixes time, cost, and quality and gives us the tools to change the business and specialized extent of the arrangement. You probably won't get all that you sought after, however you can believe what was delivered.
6. **Efficiency:** People realize that the large forthcoming plans as a rule turn out pointless over the long run. Individuals realize that the individuals in their practical silos aren't working very well together. Lithe holds the guarantee of helping us wipe out the stuff we don't require and get down to the matter of building working software.

Chapter 5

Body of the Project

The body of the project in the report is a detailed discussion of the work for those readers who want to know in some depth and completeness what was done. The body of the project shows what was done, how it was done, what the results were, and what conclusions and recommendations can be drawn.

5.1 Work Description

Doctors' Support is a system that can manage relation between doctors and patients within a short way. In this system, we are going to create an easy, faster and smooth online support system between doctor and patient. By using this system people can easily get to know about the consultation date & time of doctors and make their appointment whenever they want. This is a web-based application system that overcomes the issue of managing and booking appointments according to user's choice and demands.

This system consists of five modules. These are-

1. **Registration and Login:** Where Patient and Doctor both can create and Login an account with their email and password.
2. **Searching Specialist:** Where Patient can search the doctor by the specific department with available consultation date and time and fees.
3. **Update Profile and Upload Report:** Where Patient and Doctor can update their profile and Patient can upload their medical test report.
4. **Appointment Booking:** Where Patient can book an appointment, pay the fees in online and get an Invoice after successful payment and Doctor can accept or reject booked appointment.

5. **Managing Patient:** Where Doctor can view the medical records, Patient list, patient profile, medical test report and add prescription for the patient.

Description of all modules:

- **Registration and Login:**
 1. **Patient Account Creation:** Patient can create an account with their Full Name, Gender, Email, Phone number, Address and Password.
 2. **Doctor Account Creation:** Doctor can create an account with their Full Name, Date of Birth, Gender, NID/Passport no, Bangladesh Medical & Dental Council (BMDC) Registration number, Email, Phone number, Address and Password.
 3. **Login Process:** Doctor and Patient can login their account with their registered email id and password.
- **Searching Specialist:** Patient can search the doctor by the specific doctor's name, department (Example: Neurology/Cardiology) with available consultation days, times and fees.
- **Update Profile and Upload Reports:** Patient and Doctor can update their profile from "Update Profile" section and Patient can upload their medical test reports.
- **Appointment Booking:** Patient can book a doctor from their registered account "Appointment" section. After booking, patient will go to new interface where he/she have to enter their payment transaction ID. Patient will get an Invoice with Doctor's Name, Consultation Date, Serial number and fees after successful payment. Doctor can accept or reject booked appointment. In the case of appointment rejection, patient can book another date for this doctor or can book another doctor.
- **Managing Patient:** The Doctor will be able to check medical records of the patients, see the list of patients who have booked his/her appointment. In addition, the doctor can see the profile of his/her patients and their medical test report. Moreover, the doctor can add a prescription for his/her specific patient.

5.2 System Analysis

System analysis is a problem-solving method that involves looking at the wider system, breaking apart the parts, and figuring out how it works in order to achieve a particular goal. It is applied to information technology, where computer-based systems require defined analysis according to their makeup and design. [4]

5.2.1 Six Element Analysis

Process	System Roles				
	Human	Computing Hardware	Software	Database	Comm. & Networks
Landing Page	User	Computer/ Smart Phone	Chrome, Firefox	MySQL	WAN/LAN
Login/ Signup	User	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
Add Doctor	Admin/Patient	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
Add Patient	Admin/Doctor	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
View Appointment History	Patient/Doctor	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
View report	Doctor/Patient	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
Doctor Search	Patient	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
Book Appointment	Patient	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
View Medical History	Patient/Doctor	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN
Change password or Username	Admin	Computer/ Smart Phone	Chrome, Firefox, Microsoft Edge, Opera etc.	MySQL	WAN/LAN

Figure 5.1: Six Element Analysis for Doctors' Support

5.2.2 Feasibility Analysis

The analysis of a proposed project is to determine whether it is feasible and should go ahead is called feasibility analysis. Confirmation of design, plan and strategy is the main priority of this analysis. This can be used to validate assumptions, constraints, decisions and approaches. [5]

There are some main parts of feasibility analysis. They are -

1. **Technical Feasibility:** In technical feasibility, evaluation of the software, hardware and the other technical requirements of the proposed system are performed. This evaluates the details of how we intend to deliver a product or service to customers. Employees, think materials, transportation, where our business will be located, and the technology that will be necessary to bring all this together.

Doctors' Support has been developed using the Laravel framework. The use of latest version of Laravel framework and the regular HTML, CSS, Bootstrap and JS helped to build a much efficient and faster website. Moreover, these technologies are very popular in the modern industry and are being used thoroughly with a growing community.

2. **Operational Feasibility:** Operational feasibility is a measure of how well a proposed system solves the problems and satisfies the system requirements identified during the scope definition and problem analysis phase. It is dependant on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented.

Doctors' Support has been developed in such a way that it can be conducted very easily. People will accept it without any doubt. It is a well planned system. People of all ages will be able to use it. It reduces physical and technical hardships. Users need not have a lot of technical knowledge to run this system. Every instruction is very clear to the users. We hope this system will be able to fulfill the requirements of the users.

3. **Economic Feasibility:** In economic feasibility, costs and benefits are identified. It determines cash flow and assigns values to costs and benefits. Development costs and production costs are included in economic feasibility. If this system can reach the users it will definitely bring benefits. On one hand it will reduce the costs of wasting human energy, pens and papers. On the other hand benefits will come depending on the uses.

5.2.3 Problem Solution Analysis

The main problem that a web developer has to deal with during the web development process is that the requirements are always changing. According to a poll done by Stack Overflow Developer, 33% of respondents contemplate developing a website with no specified requirements.[6] Gathering requirements is critical before beginning to create any product.

The following is a solution to this problem:

- Describe the project's scope.
- Make no assumptions about what is required.
- Communication between teams is essential.
- Make a list of requirements.
- Clients should be involved from the start.

Project Management: Multitasking can sometimes lead to more problems than it is worth. As a result, a skilled planner is necessary to make the work flow smooth and structured. It was tough for me to follow the entire procedure, and on top of that, we were dealing with a pandemic, so everyone had to adapt to a new method, which caused the project to take longer than usual.

Adapting to current market trends: As technology improves, so does the number of users; nowadays, everyone is addicted to their smart-phones, so being mobile-first or mobile-only is a challenge. The solution is to keep up with market developments.

5.2.4 Effect and Constraints Analysis

Effect: As before when the software was not present. It was difficult for the hospital to keep track of the history. The old system was to keep all details in a documented file. So, finding old histories and records about each hospital was hard and needed a lot of employers. For this reason, software is built to solve this issue. As the data is stored in the database, everything can be queried from the newly built software in a cloud. There will be no more shortages of manpower to go through all of the documents and keep track of everything the process in software.

Constraint: There are many difficulties while finding a solution for this software. The old system was tried for a while, but the manual process takes longer. The cost for the overall process was higher and the amount was not fixed. But for the current software, a certain amount of money has to be spent on the hosting, domain, etc. At first, the budget of the software was a problem for the software but later there were some changes that took place and minimized a few functions and workload for the software to meet up with the budget. This software was effective for the company. It saves time and extra money.

5.3 System Design

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. It is the process of defining, developing and designing systems which satisfies the specific needs and requirements of a business or organization.

5.3.1 Rich Picture

A rich picture is a drawing of a situation that illustrates the main elements and relationships that need to be considered in trying to intervene in order to create some improvement. It consists of pictures, text, symbols and icons, which are all used to illustrate graphically the situation. A rich picture helps us to see relationships and connections that we may otherwise miss. It helps identifying one or more themes participants may want to further explore and address. Rich pictures are therefore always used in the pre-analysis phase. [7]

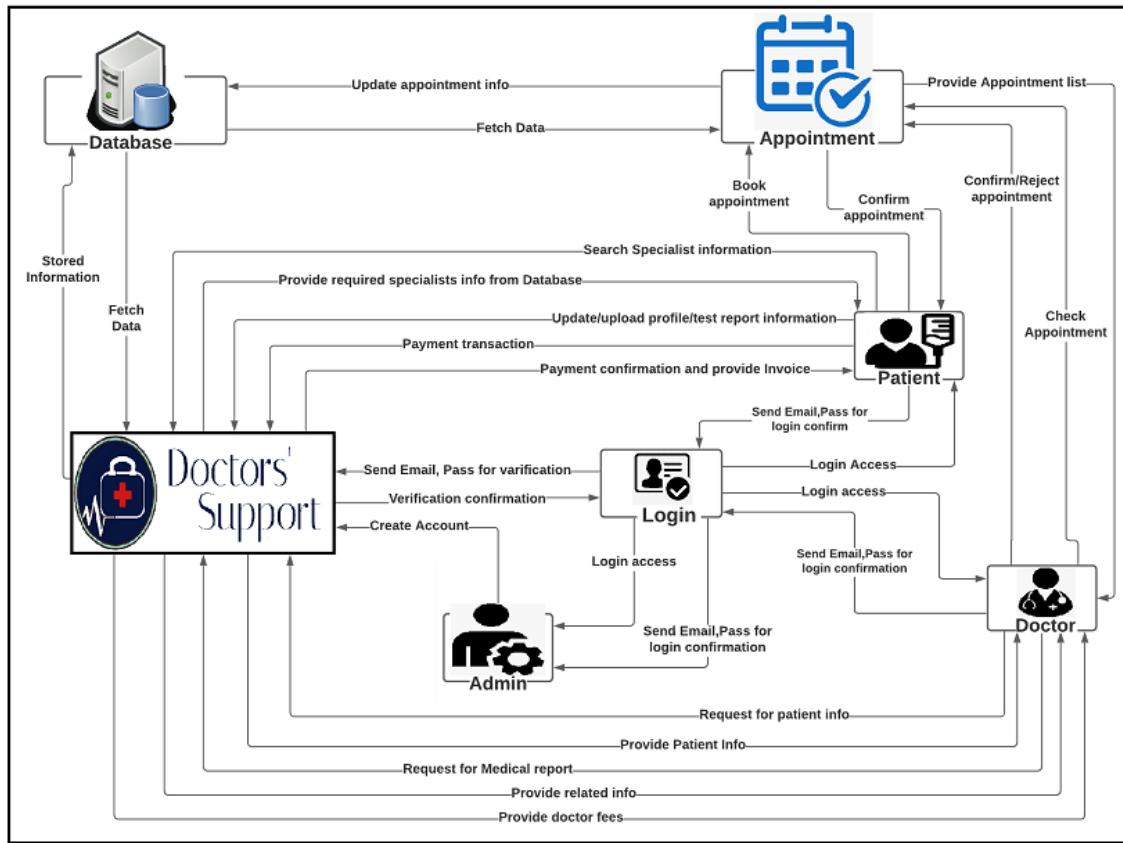


Figure 5.2: Rich picture for Doctors' Support.

5.3.2 UML Diagrams

A UML diagram is a diagram based on the UML (Unified Modeling Language) with the purpose of visually representing a system along with its main actors, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system. UML diagrams can be used as a way to visualize a project before it takes place or as documentation for a project afterward. But the overall goal of UML diagrams is to allow teams to visualize how a project is or will be working, and they can be used in any field.

Use case diagram:

A use case diagram is a way to summarize details of a system and the users within that system. It is generally shown as a graphic depiction of interactions among different elements in a system.

Use Case diagrams of Doctors' Support System are given below:

Module- 1: Registration and Login

Actors: Admin, Patient and Doctor

Goal in context: The diagram shown in figure: 5.3 represents the Registration and Login process of Doctors' Support system.

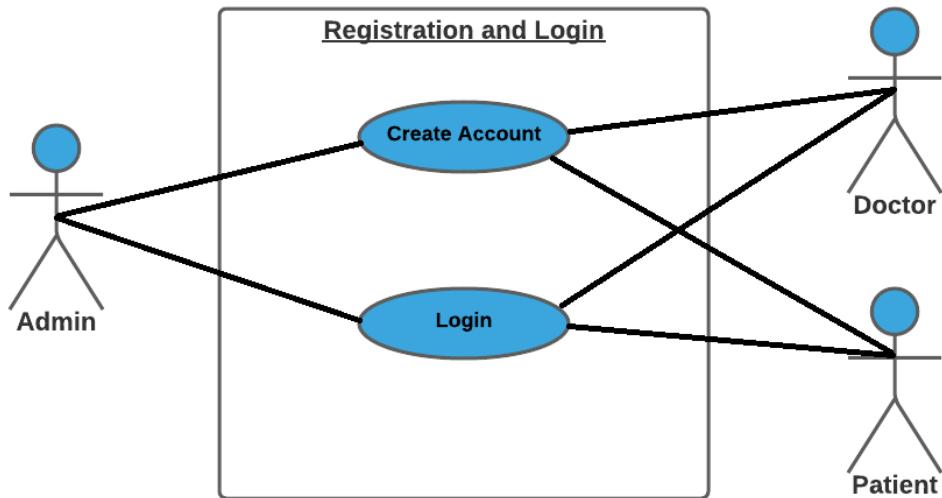


Figure 5.3: Registration and Login process for Doctors' Support

Module- 2: Searching Specialists

Actors: Admin, Patient and Doctor

Goal in context: The diagram shown in figure: 5.4 represents the Searching Specialists process of Doctors' Support system.

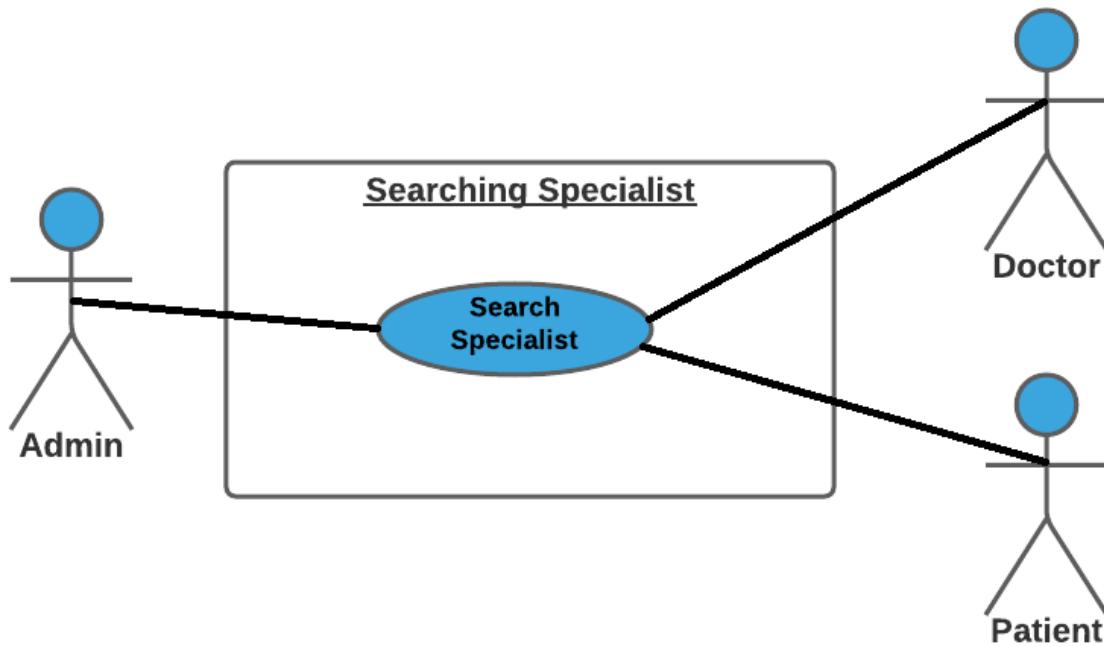


Figure 5.4: Searching Specialists process for Doctors' Support

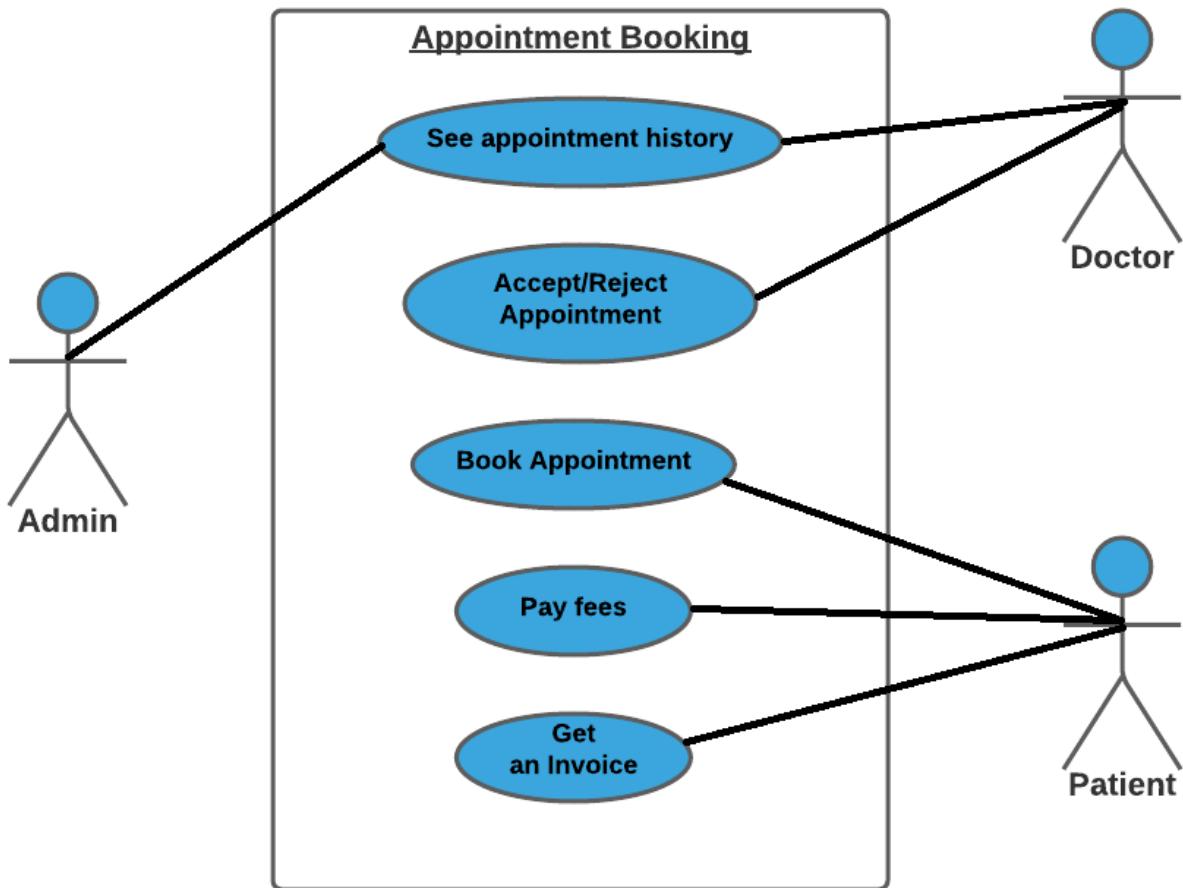
Module- 3: Appointment Booking**Actors:** Admin, Patient and Doctor**Goal in context:** The diagram shown in figure: 5.5 represents the Appointment Booking process of Doctors' Support system.

Figure 5.5: Appointment Booking process for Doctors' Support

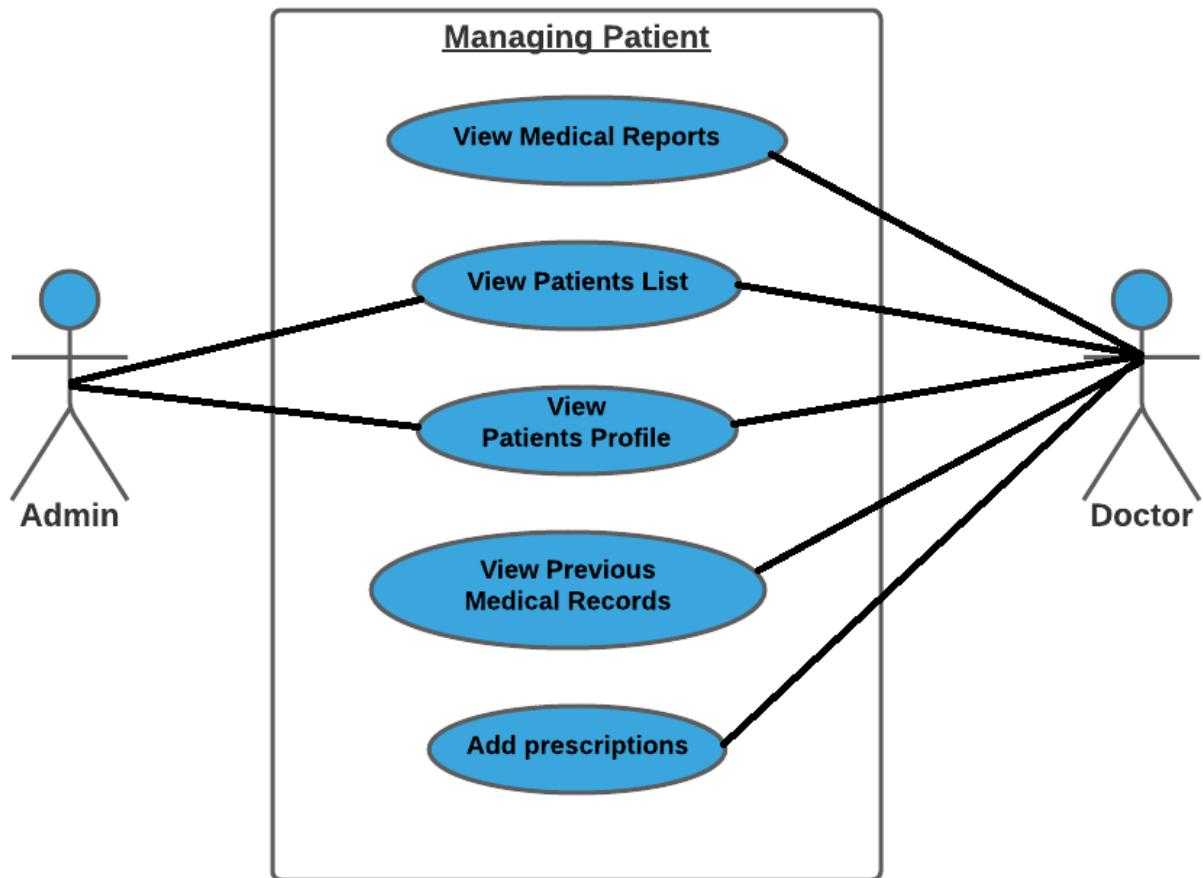
Module- 4: Managing Patient**Actors:** Admin and Doctor**Goal in context:** The diagram shown in figure: 5.6 represents the Managing Patient process of Doctors' Support system.

Figure 5.6: Managing Patient process for Doctors' Support

Activity diagram:

Activity diagram is another important diagram in UML to describe the dynamic aspects of the system. Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc. [8]

These are the activity diagram for Doctors' Support system-

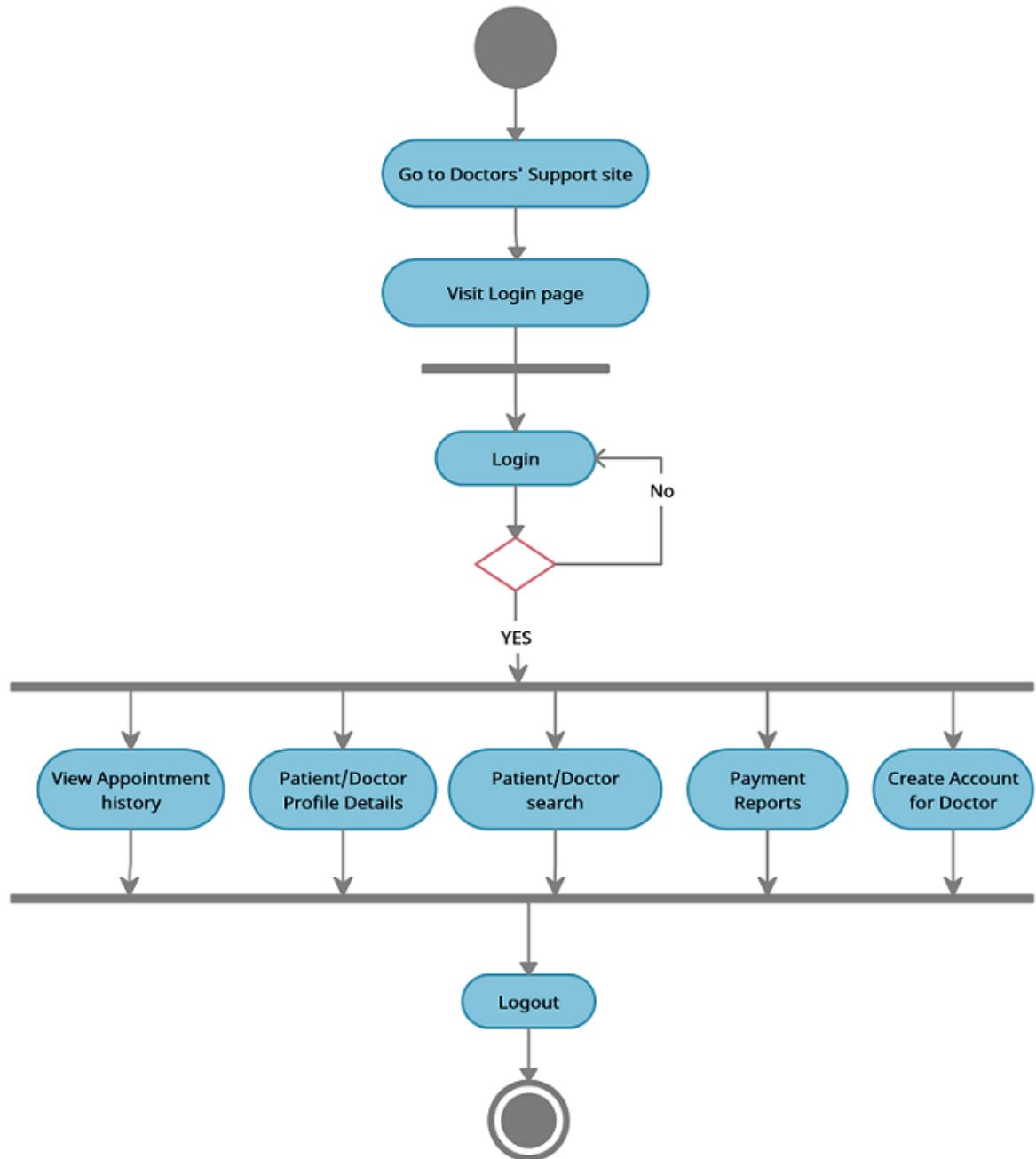


Figure 5.7: Activity diagram for Admin

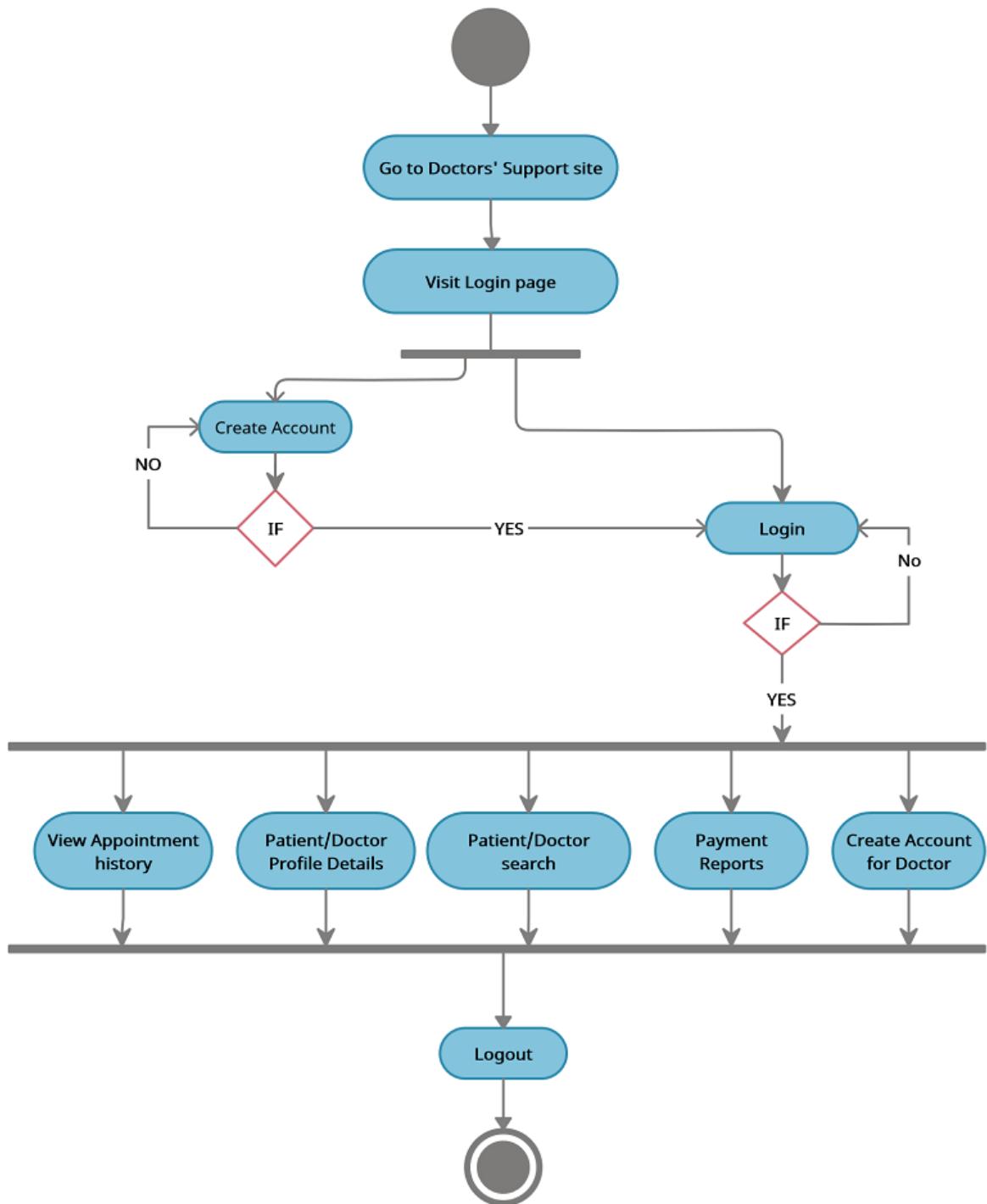


Figure 5.8: Activity diagram for Doctor

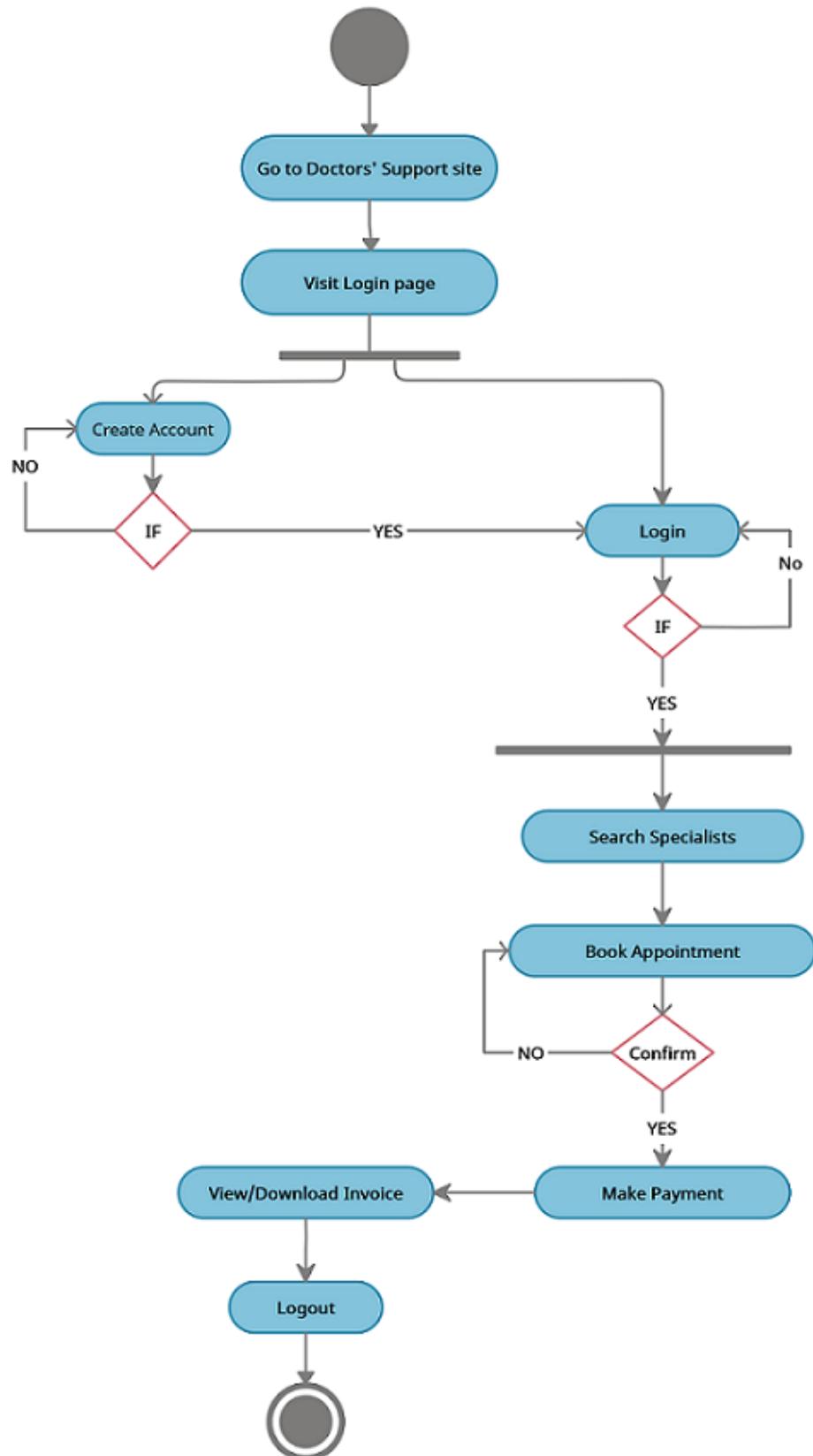


Figure 5.9: Activity diagram for Patient

Entity Relationship diagram:

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system. ER Diagrams are most often used to design or debug relational databases in the fields of software engineering, business information systems, education and research.[9]

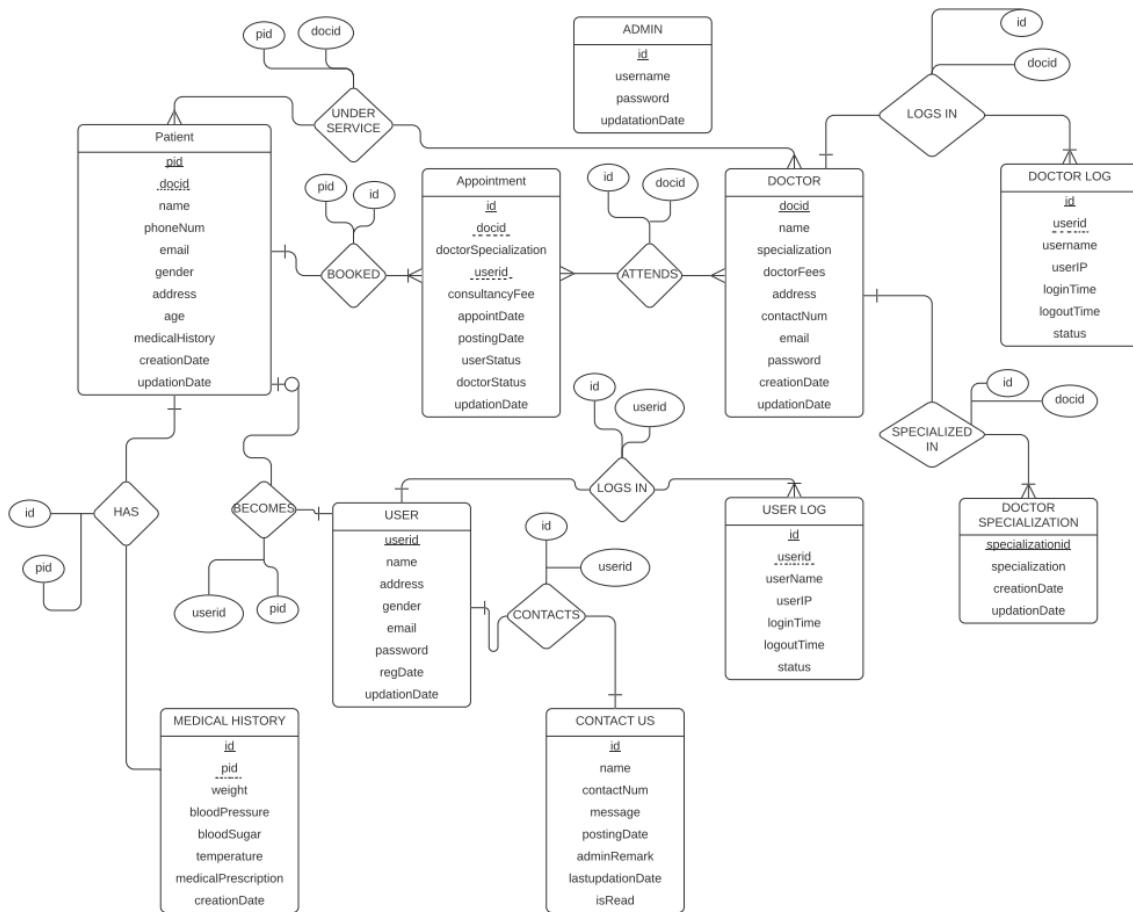


Figure 5.10: Entity Relationship diagram for Doctors’ Support

5.3.3 Functional and Non-Functional Requirements

Functional Requirements:

Functional requirements define the basic system behavior. This includes what the system does or can not do and can be thought of in terms of how the system responds to given inputs. If the functional requirements are not met, the system will not work. Functional requirements are product features and focus on user requirements.

Table 5.1: Functional Requirement- Sign up process

Function: Patient Sign up		
Input: Username/ email, password.	Process: Save sign up details to database.	Output: New user created and added to database.
Precondition: Must have internet access.		
Postcondition: User gets confirmation message and gets redirected to login page.		

Table 5.2: Functional Requirement- Book appointment process

Function: Book appointment		
Input: Personal in- formation like phone number, address, age etc.	Process: Save de- tails of the patient in database.	Output: Appoint- ment will be created and doctor will con- tact patient soon.
Precondition: Must have internet access.		
Postcondition: Get booking confirmation message and able to see it in history section.		

Table 5.3: Functional Requirement- reset password process

Function: Reset password		
Input: User email ad- dress and new pass- word.	Process: Replace old password with new one.	Output: New pass- word will be up- dated and added to database.
Precondition: Must have internet access.		
Postcondition: User will get notification of password reset successfully.		

Table 5.4: Functional Requirement- add doctor process

Function: Add Doctor		
Input: Provide doctors information	Process: Save doctors information to database	Output: New doctor will be created and add to database.
Precondition: Must have internet access.		
Postcondition: Notification of new doctor created will be given		

Table 5.5: Functional Requirement- search doctor process

Function: Search Doctor		
Input: Enter doctor name	Process: Call function to go through doctor database and find the match	Output: Searched doctor will be shown on the screen
Precondition: Must have internet access.		
Postcondition: Notification of found doctor will be given		

Table 5.6: Functional Requirement- Generate Report process

Function: Generate Report		
Input: Enter date	Process: Call function to go through that database and generate an automated report within the given date	Output: Creates table and shows report
Precondition: Must have internet access.		
Postcondition: Notification of view report will be given.		

Table 5.7: Functional Requirement- medical history process

Function: Medical history		
Input: Select Patient	Process: Call function to go through patient database retrieve information	Output: Show patients medical history
Precondition: Must have internet access.		
Postcondition: Show medical history on the screen.		

Non-Functional Requirements:

A non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. Non-functional requirement are contrasted with functional requirements that define specific behavior or functions.

Here we discuss some non-functional requirements-

Performance and Scalability: Response time of this system is quite instance you don't have to wait for too long. The login process is very smooth and logs in to one's account instantly. Other functions like booking appointment, search doctors, adding doctors, view medical history etc. are also very fast and smooth. The site is responsive for every device. It can be accessed from phone, tablet or laptop without compromising any function.

Portability and Compatibility: High end devices or equipment is not required; any web browser can be used to access this system but internet access is must. The portal is compatible with phone, table, laptop and desktop. It runs on any types of browser or operating system.

Reliability, Availability and Maintainability: The system has gone through several performance tests and based on test result it can be said that system will run smoothly for a long time. The maintenance is also easy, system has backups so when the main system goes under maintenance backup up system can be used.

Security: Accounts credential is saved into the database securely password of each user's account is encrypted and then saved to database the process is done automatically.

Usability: It means how easy it is for our users to use the system. Doctors' Support has been built in such a way that every process connects with another process with very less dependencies on the backend side. Users will be able to run the system very easily.

5.4 Product Features

Product features defines the functionality of the product and how that will benefit the users of the product. I have discussed the features of our website below:

5.4.1 Input

The following are the inputs for Doctors' Support:

Table 5.8: Input for Doctors' Support

Inputs of Doctors' Support	
Process	Fields type
Login	Email- string Password- string
Registration	Name - string Email - string Password - string Phone - integer Date of Birth - string Address - string
Search Doctor	Department- string Doctor Name - string
Book Appointment	Appointment Date - string Time - string
Confirm Appointment	Confirm/Reject - Boolean
Prescription	Medicine Name - string Medicine taking Time - string Medicine taking days - integer
Upload Medical Report	Image- Blob(Binary large Object)
Payment	Transaction ID - string

5.4.2 Output

The following are the outputs for Doctors' Support:

Table 5.9: Output for Doctors' Support

Outputs of Doctors' Support	
Process	Fields type
Login	On success- Redirect to user dashboard. On failure- Show error message “Please enter correct id or password”.
Registration	On success- Show success message “Registration successfully done!”. On failure- Show error message “Registration not done!”.
Search Doctor	On success- Show specific doctors profile. On failure- Show error message “Doctor not found!”.
Book Appointment	On success- Show success message “Appointment booked successfully!”. On failure- Show error message “Appointment not done!”.
Confirm Appointment	On success- Show success message “Appointment Confirmed!”. On failure- Show error message “Appointment Rejected!”.
Prescription	On success- Show success message “Prescription saved successfully!”. On failure- Show error message “Prescription not saved!”.
Upload Medical Report	On success- Show success message “Medical report uploaded successfully!”. On failure- Show error message “Medical report upload failed!”.
Payment	On success- Show success message “Payment Confirmed!”. On failure- Show error message “Payment not confirmed!”.

5.4.3 Architecture

An architecture defines the backbone of any structure. It is mapped to show how a structure will stand. For a website a website architecture defines the structure of the website, that is how the website will work, how the data will be transferred and where they will be stored.

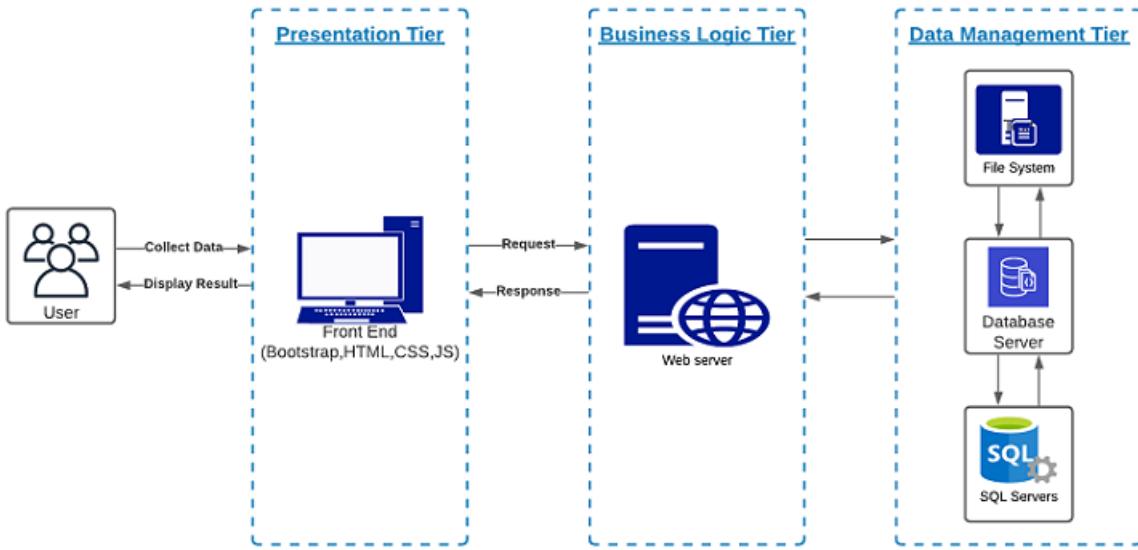


Figure 5.11: Website Architecture for Doctors' Support

To discuss more in details, we can refer to the architecture we designed for our project. Here the diagram clearly illustrates that user can only see and interact with the front end of the website, the frontend receives the request or commands from the users and transfer it to the web server, which then retrieves and stores data from the file system and database accordingly and sends it back to the frontend for the users as a response.

Chapter 6

Results & Analysis

While testing the program, there were several issues. This was a minor issue that we were able to resolve. After the resolving of these issues, test cases were documented. Testing methodologies have been used to justify all test cases. We did our testing on a local server. We'll test everything on the hosting again after it goes online. As a result, various modifications may occur at that time. There are few integration's possible. But it will be added in the future. So, all the tastings are not done. But up to the current feature available, all the testing is done, and it is running fine. But live testing with users is not done. Due to the pandemic, it was not possible.

6.1 Software Testing

Software testing determines the safety, accuracy, and quality of new software. Approval refers to the process of verifying that the generated computer software fits the clients' requirements. The main goal of software testing is to find bugs in the program.

The figure below shows the results of tasks that I have worked on. Each of the tasks is only provided if and only if it meets the requirements successfully.

Test ID	Test Case	Description	Steps to be Executed	Expected Result	Actual Result	Pass/Fail
T1	Patient Signup	User needs to successfully register in order to Book Appointment	1. Go to "Sign Up" page 2. Input all informations 3. Click on "Submit"	Information will be stored in the database and open an account for the user	Information stored in Database and account opened for that user	Pass
T2	Patient Sign in	User needs to "Sign In" with registered email and pass	1. Go to "Sign In" page 2. Input email, password 3. Click on "Submit"	Information will be check in the database if found redirect to user's dashboard	Information checked in the database if found redirect to user's dashboard	Pass
T3	View/Search Doctor	User needs to "Sign In" with registered email and pass	1. Go to "Doctor" section and view all Doctors list 2. Can search a doctor by giving Doctor's Name or Department	Information will be check in the database if found redirect to doctors list	Information checked in the database if found redirect to doctors list	Pass
T4	Book Appointment	User can Book Appointment	1. Go to Appointment section 2. Select Date, Department & Doctor 3. Click on "Submit"	Information will be stored in the database	Information stored in Database	Pass
T5	View Appointment History	User Can View Appointment History	1. Go to Appointment history section and view the list	Information will be check in the database if found redirect to Appointment history section	Information checked in the database if found redirect to Appointment history section	Pass
T6	Update Profile	User can update/modify their profile and reset password	1. Go to Update Profile section 2. Input information to edit 3. Click on "Submit"	Information will be stored in the database	Information stored in Database	Pass
T7	Upload Medical Test Report	User can upload their medical test report	1. Go to Report section 2. Click Upload and Select an Image file 3. Click on "Submit"	Information will be stored in the database	Information stored in Database	Pass

Figure 6.1: Testing Result for Patient

Test ID	Test Case	Description	Steps to be Executed	Expected Result	Actual Result	Pass/Fail
T1	Doctor Signup	User needs to successfully register in order to manage patient	1. Go to "Sign Up" page 2. Input all informations 3. Click on "Submit"	Information will be stored in the database and open an account for the Doctor	Information stored in Database and account opened for that Doctor	Pass
T2	Doctor Sign In	Doctor needs to "Sign In" with registered email and pass	1. Go to "Sign In" page 2. Input email, password 3. Click on "Submit"	Information will be check in the database if found redirect to doctor's dashboard	Information checked in the database if found redirect to doctor's dashboard	Pass
T3	View/ Search Doctor	Doctor needs to "Sign In" with registered email and pass	1. Go to "Doctor" section and view all Doctors list 2. Can search a doctor by giving Doctor's Name or Department	Information will be check in the database if found redirect to doctors list	Information checked in the database if found redirect to doctors list	Pass
T4	View Appointment history	Doctor can view Appointment history who appointed to him/her	1. Go to Appointment section 2. View the appointment list	Information will be check in the database if found redirect to Appointment list	Information checked in the database if found redirect to Appointment list	Pass
T5	Add Prescription	Doctor can add prescription for his/her patients	1. Go to Patient section and view all the appointed patients list 2. Click on "Detail" and view patient's profile and add prescription option 3. Fill-up the prescription form and click on "Submit"	Information will be store in the database and redirect to patient's prescription table from the database	Information stored in the database and redirect to view in the patient's prescription section	Pass
T6	Update Profile	Doctor can update/modify their profile and reset password	1. Go to Update Profile section 2. Input information to edit 3. Click on "Submit"	Information will be stored in the database	Information stored in Database	Pass
T7	View Medical Test Report	Doctor can view medical test report	1. Go to Report section and view the uploaded test report file	Information will be check in the database if found redirect to report interface	Information checked in the database if found redirect to report interface	Pass

Figure 6.2: Testing Result for Doctor

Test ID	Test Case	Description	Steps to be Executed	Expected Result	Actual Result	Pass/Fail
T1	Admin Sign In	Admin needs to "Sign In" with registered email and pass	1. Go to "Sign In" page 2. Input email, password 3. Click on "Submit"	Information will be check in the database if found redirect to admin dashboard	Information checked in the database if found redirect to admin dashboard	Pass
T2	View or Search Doctor/ Patient	Admin needs to "Sign In" with registered email and pass	1. Go to Doctor/Patient section and view all Doctors/Patients list 2. Can search a doctor/patient by giving Name/Phone	Information will be check in the database if found redirect to doctors/ patients list	Information checked in the database if found redirect to doctors/ patients list	Pass
T3	View Appointment history	Admin can view all Appointment history	1. Go to Appointment section 2. View the appointment history	Information will be check in the database if found redirect to Appointment history interface	Information checked in the database if found redirect to Appointment history interface	Pass
T5	View doctor/ patient profile details	Admin can view doctors'/patients' profile	1. Go to doctor/patient list 2. Select specific profile and see the details	Information will be check in the database if found redirect to specific profile interface	Information checked in the database if found redirect to specific profile interface	Pass
T6	View Payment Report	Admin can view payment report	1. Go to Report section and view the payment report interface	Information will be check in the database if found redirect to payment interface	Information checked in the database if found redirect to payment interface	Pass

Figure 6.3: Testing Result for Admin

6.2 Graphical User Interface Result

The graphical user interface is a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicator such as primary notation, instead of text-based user interfaces, typed command labels or text navigation.

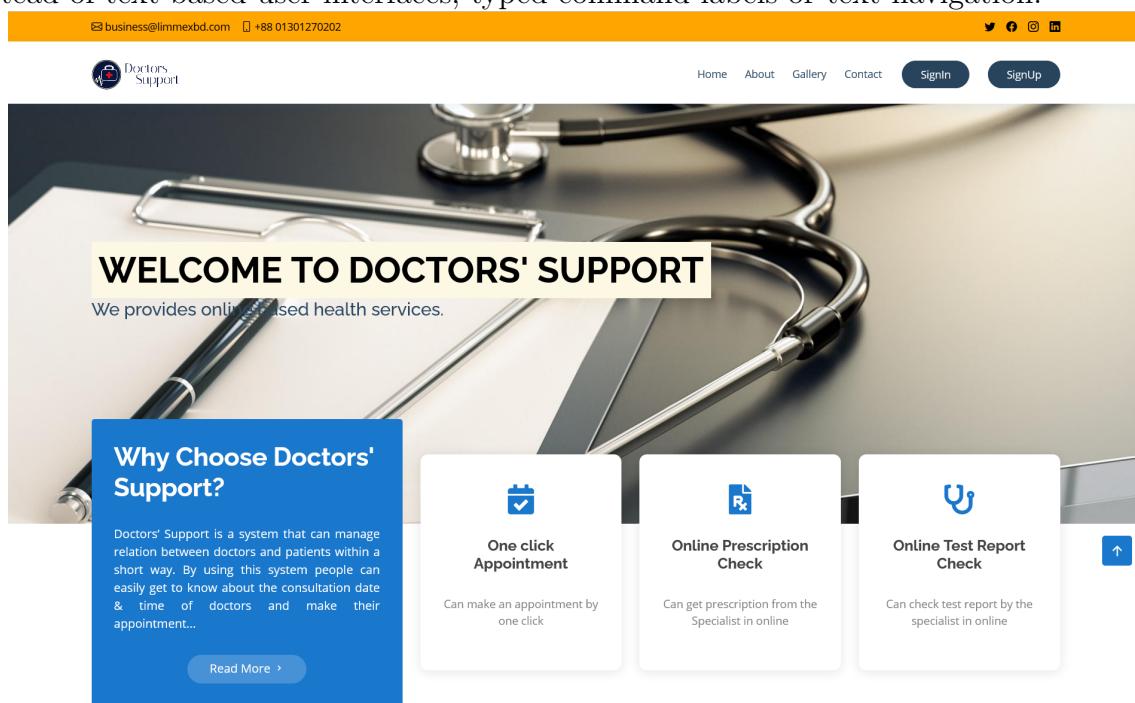


Figure 6.4: Landing Page-1 of Doctors' Support



About

What Doctors' Support do?

Doctors' Support provides free health articles, Search for doctors, Patient referral, Consult a doctor, Book Check-up, Get Emergency Services, medical records, check patients list, patients profile, medical test reports and add prescription for the patients

- Searching Specialist**
Patient can search the doctor by the specific department with available consultation date & time and their consultation fees.
- Appointment Booking**
Patient can book an appointment, pay the fees online and get an invoice after successful payment and Doctor can accept or reject booked appointment.
- Managing Patient**
Doctor can view the medical records, Patient list, patient profile, medical test report and add prescription for the patient.



5
Doctors



3
Patients

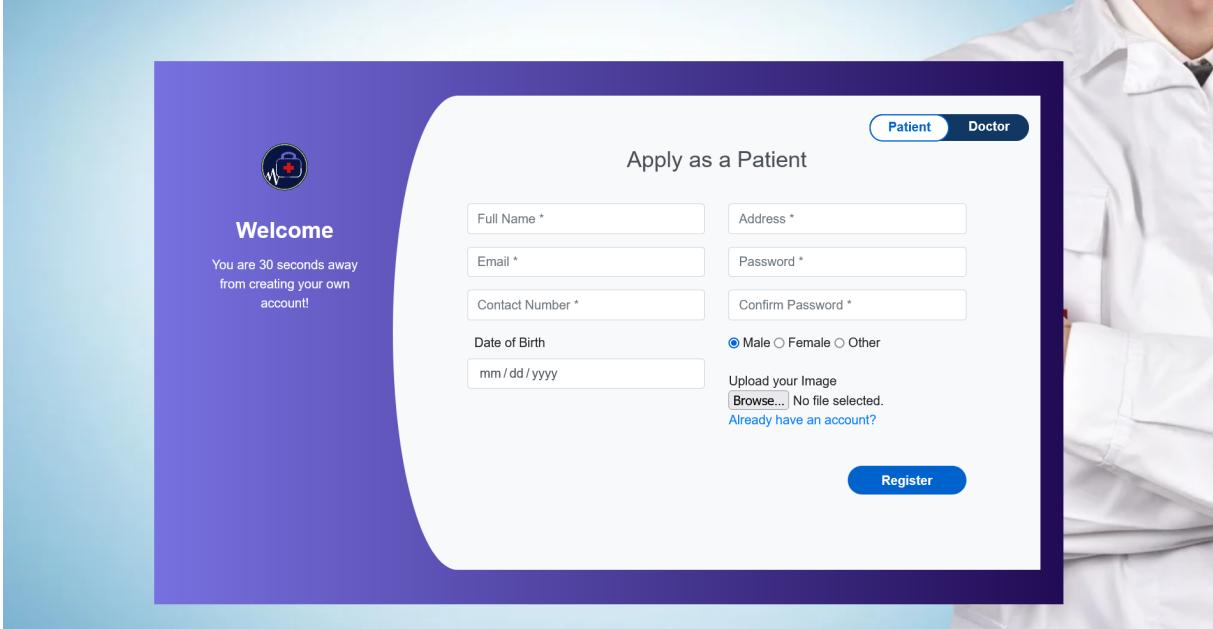


7
Departments



0
Hospitals

Figure 6.5: Landing Page-2 of Doctors' Support



The image shows a sign-up form for a patient. The background is purple on the left and features a doctor's white coat on the right. The form is titled "Apply as a Patient". It includes fields for Full Name*, Address*, Email*, Password*, Contact Number*, Confirm Password*, Date of Birth (with a mm/dd/yyyy input field), and gender selection (Male, Female, Other). There is also a section for uploading an image with a "Browse..." button and a note that no file has been selected. A link "Already have an account?" is provided. At the bottom right is a blue "Register" button. A navigation bar at the top right offers "Patient" and "Doctor" options.

Figure 6.6: Sign Up page for Patient

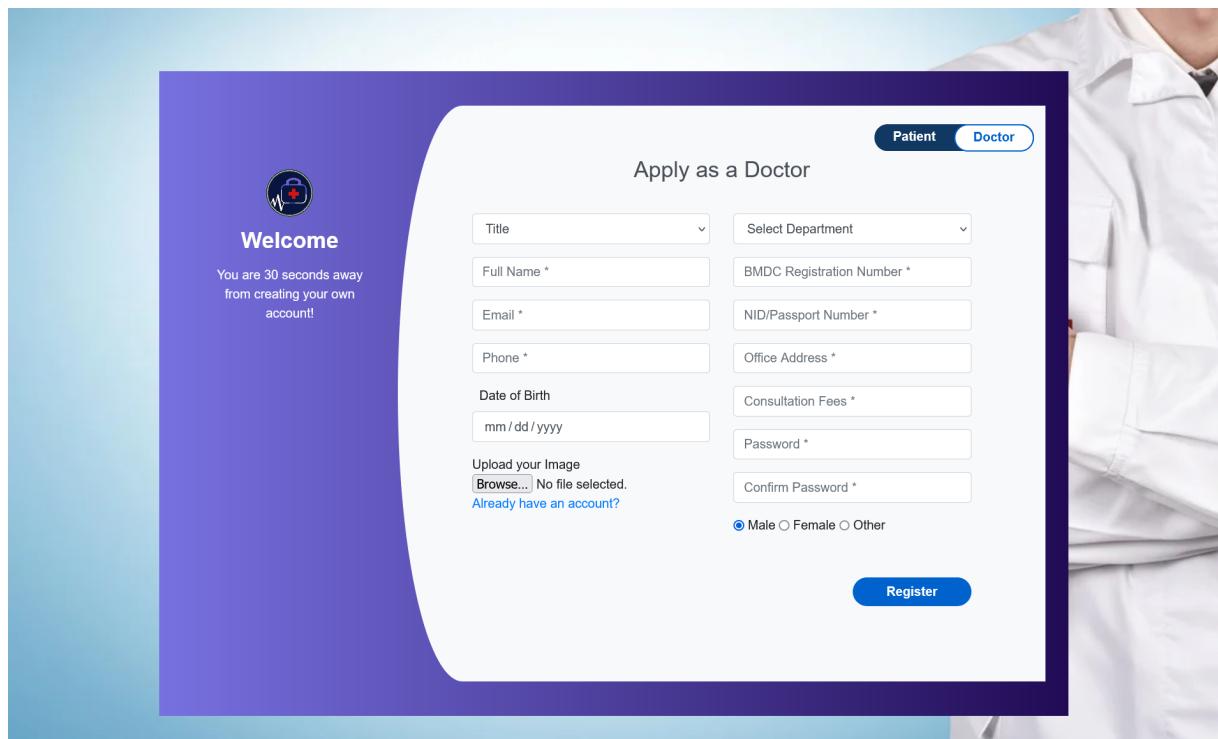


Figure 6.7: Sign Up page for Doctor

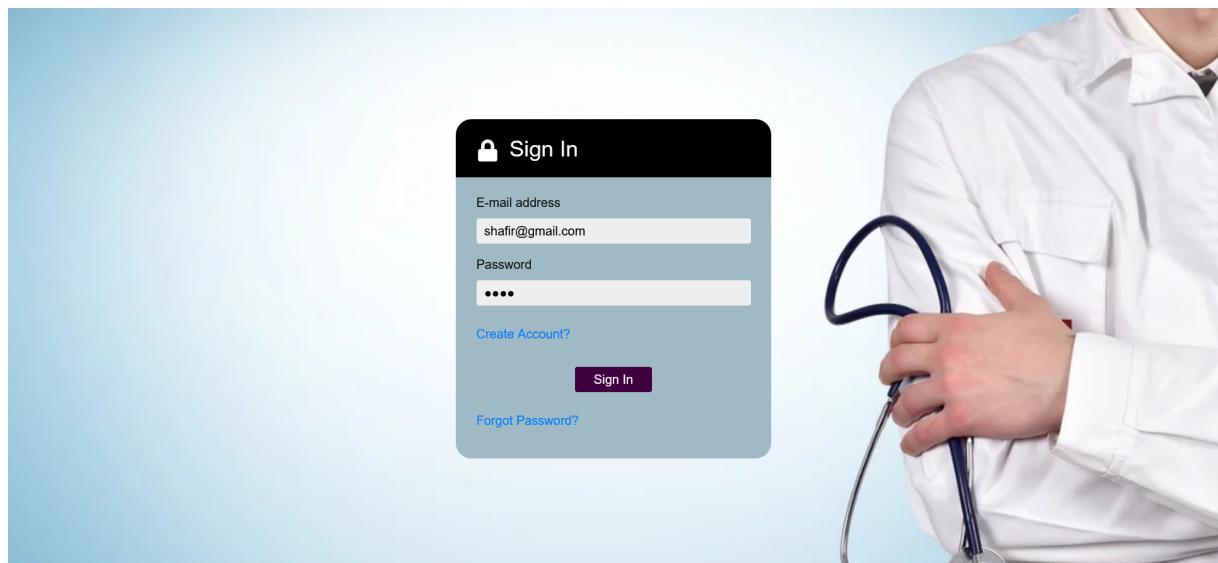


Figure 6.8: Sign In Interface for all users

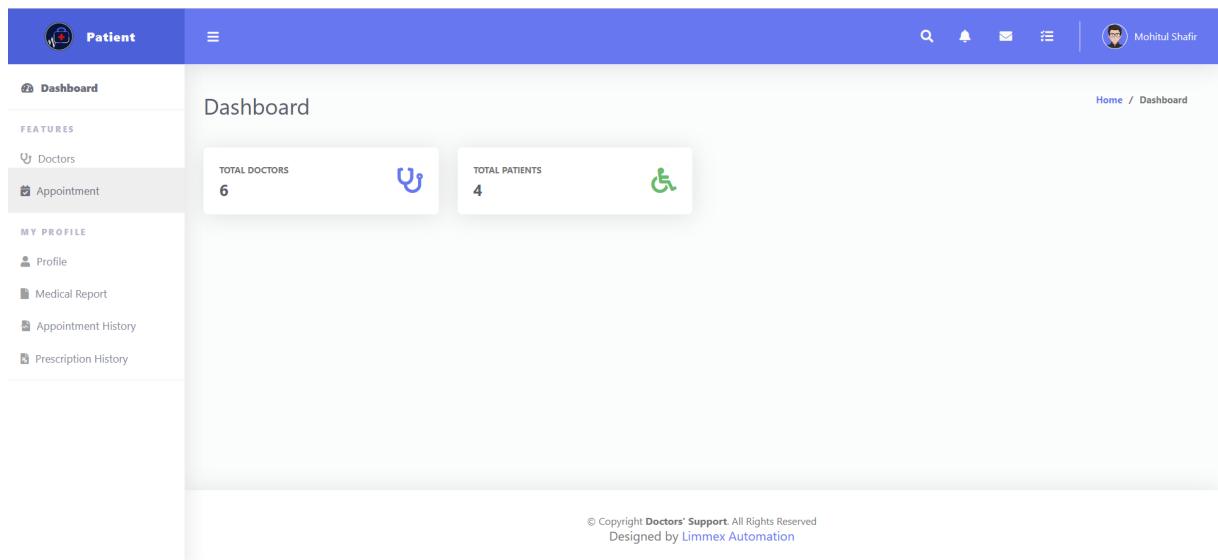


Figure 6.9: Patient's Dashboard

Doctors List					
Doctors List					
Show <input type="button" value="10"/> entries <input type="text" value="Search:"/>					
Name	Designation	Department	Office		
Brojo Gopal Paul	Assoc. Prof. Dr.	NEURO SURGERY	ZU Model Hospital, Feni		
Jalal Uddin Menon	Dr.	MEDICINE	Kadal Gazi Road, Feni Sadar, Feni		
Riaz Uddin Arafat	Prof. Dr.	MEDICINE	Kurmitola Hospital		
Shakila Rahman	Dr.	MEDICINE	Lab Aid, Uttara		
Shamsul Arefin	Asst. Prof. Dr.	PSYCHIATRY	Mohakhali		
Taiyeba Tabassum	Dr.	CHILD DEVELOPMENT	Mirpur 10		

Showing 1 to 6 of 6 entries Previous Next

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Designed by Limmex Automation

Figure 6.10: Search Doctor Interface (for Patients)

Make an Appointment

A doctor appointment booking system allows patients to book an appointment from the comfort of their homes, using their computer, laptop or mobile, and at any time. No matter where they are, they can contact doctors of their choice in any location.

Mohitul Shafir	shafir@gmail.com	01647664068
mm / dd / yyyy	Select Department	
Reason for Appointment		

Submit

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Designed by Limmex Automation

Figure 6.11: Make an Appointment Interface

Personal Information

Role	Patient
Name	Mohitul Shafir
Email	shafir@gmail.com
Phone	01647664068
Gender	Male
Date of Birth	1997-11-27
Address	Academy ,Feni
Created	2021-08-25
Last Modified	2021-08-25

Figure 6.12: Patient's Profile Interface

6.2. GRAPHICAL USER INTERFACE RESULTS

CHAPTER 6. RESULTS & ANALYSIS

The screenshot shows the 'Medical Reports' section of the patient interface. On the left sidebar, under 'FEATURES', 'Appointment' is selected. The main area displays a form for uploading medical reports, including a file input field with 'Browse...' and 'Upload' buttons, and a message 'Upload your report here'. Below this is a 'Reports List' table with columns: Testing Date, Test Name, Department, and Action. A message 'No data available in table' is shown. At the bottom, there's a footer with copyright information and navigation buttons for 'Previous' and 'Next'.

Figure 6.13: Upload Medical Report Interface for Patient

The screenshot shows the 'Appointment History' section of the patient interface. On the left sidebar, under 'FEATURES', 'Appointment' is selected. The main area displays a table titled 'Appointment List' with columns: Appointment Date, Doctor's Name, Department, Reason of Appointment, and Status. One entry is listed: '2021-09-11', 'Prof. Dr. Riaz Uddin Arafat', 'MEDICINE', 'Body Pain', and 'Accepted'. Navigation buttons for 'Previous' and 'Next' are at the bottom. The footer includes copyright and design information.

Figure 6.14: Appointment History Interface for Patient

6.2. GRAPHICAL USER INTERFACE RESULTS

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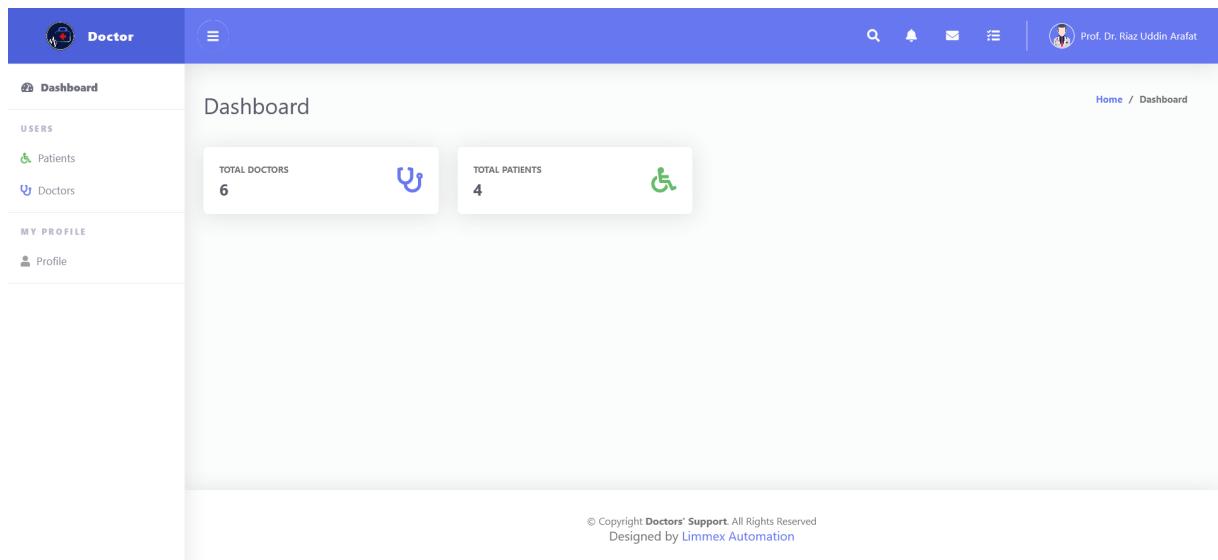


Figure 6.15: Doctor's Dashboard

The screenshot shows the Patients List interface. At the top, there is a blue header bar with a profile icon, a search bar, and a notification bell. Below the header is a sidebar on the left containing navigation links: Dashboard, USERS (Patients and Doctors), and MY PROFILE (Profile). The main content area is titled "Patients List" and displays a table titled "Today's Patients List". The table includes columns for Patient Name, Email, Phone, Appointment Reason, Status, and Action. Two patients are listed: Ahnaf Tazwar (Rejected) and Mohitul Shafir (Accepted). The table also shows the current date and time: "Current Date and Time: 2021-9-11 16:1". At the bottom of the page, there is a copyright notice: "© Copyright Doctors' Support. All Rights Reserved" and "Designed by Limmex Automation".

Figure 6.16: Patients List Interface for specific Doctor

6.2. GRAPHICAL USER INTERFACE RESULTS

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Patient Details

Name: **Mohitul Shafir**
 Phone: **01647664068**
 Email: **shafir@gmail.com**
 Date of Birth: **1997-11-27**
 Age: **23 Years 9 Months**
 Gender: **Male**
 Address: **Academy, Feni**

Prescription

Medicine Name	How many Times	How many Days	Suggestion (Optional)
Medicine Name	How many Times	How many Days	Suggestion (Optional)
Medicine Name	How many Times	How many Days	Suggestion (Optional)
Medicine Name	How many Times	How many Days	Suggestion (Optional)

Add More Remove Submit

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Figure 6.17: Add Prescription Interface for Doctor

Doctors List

Name	Designation	Department	Office
Brojo Gopal Paul	Assoc. Prof. Dr.	NEURO SURGERY	ZU Model Hospital, Feni
Jalal Uddin Menon	Dr.	MEDICINE	Kadal Gazi Road, Feni Sadar, Feni
Riaz Uddin Arafat	Prof. Dr.	MEDICINE	Kurmitola Hospital
Shakila Rahman	Dr.	MEDICINE	Lab Aid, Uttara
Shamsul Arefin	Asst. Prof. Dr.	PSYCHIATRY	Mohakhali
Taiyeba Tabassum	Dr.	CHILD DEVELOPMENT	Mirpur 10

Show 10 entries Search: Previous 1 Next

Showing 1 to 6 of 6 entries

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Figure 6.18: Doctors List Interface for Doctor

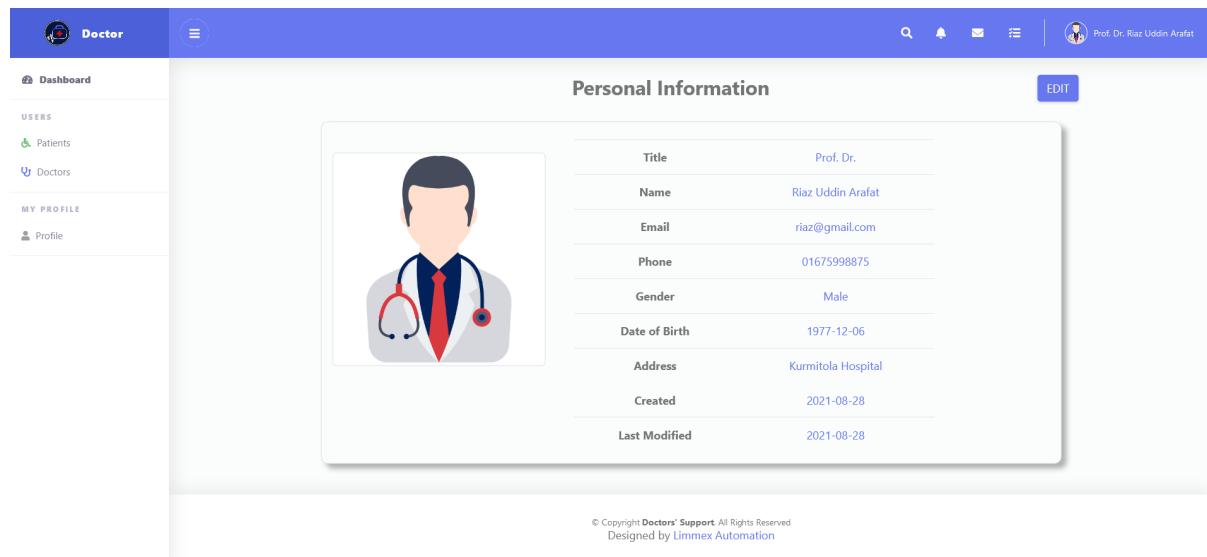


Figure 6.19: Doctor's Profile Interface

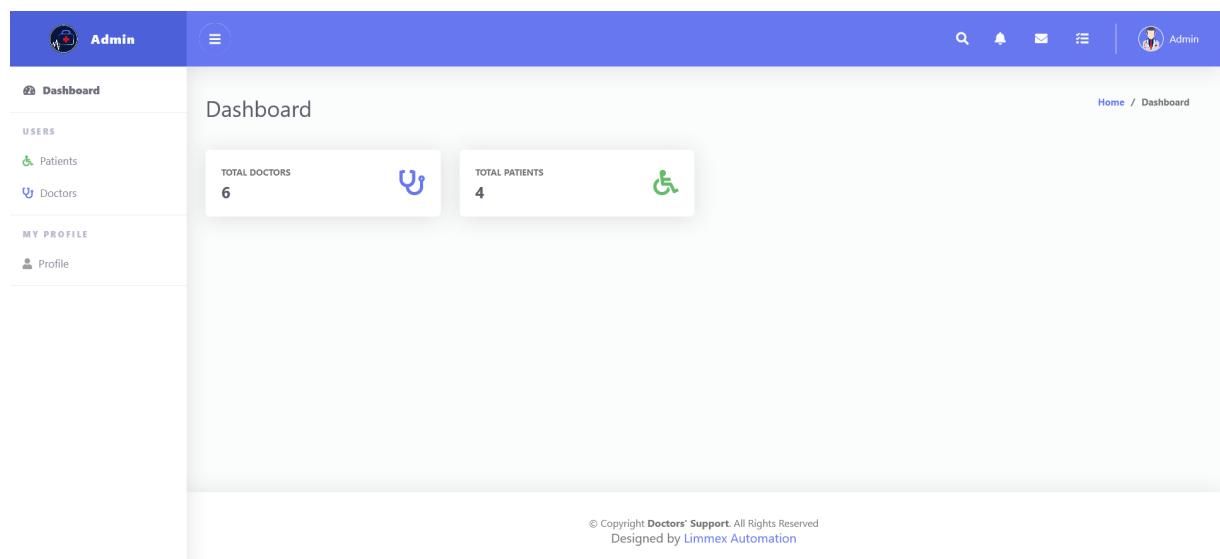


Figure 6.20: Admin's Dashboard Interface

6.2. GRAPHICAL USER INTERFACE RESULTS

Figure 6.21: Patients List Interface for Admin

Figure 6.22: Doctors List Interface for Admin

Chapter 7

Project as Engineering Problem Analysis

Engineering problem analysis is the internal guidance of a project. It can be described as the breaking down of sustainability, social and environmental effects and analysis, ethics and ethical issues into its basic elements to get at its essential features and their relationships to each other and to external elements.

7.1 Sustainability of the Project/Work

Sustainability of the product refers to its ability to be maintained and updated. In the modern world, every application being released needs to be maintained and continuously updated for its user base.

Now a days, In Bangladesh most of the people from all classes drastically use smart-phone. Smartphone and internet make people life easier. People are now searching for an easy solution of every situation which reduce the daily life hassles. So, people get more dependent into online based solutions.

A product can be sustainable in three main categories:

- **Community Sustainability:** After the deployment and official release of Doctors' Support, it is believed that it will have a strong user base since the target audience for the system is specifically narrow and concise. We can expect the users to refer to other users regarding the application and thus growing the user base. With a growing user base, it will also grow a community and hence it can be said that it is Sustainable in terms of Community.

- **Financial Sustainability:** This refers to how the application's running cost will be maintained after it has been released and whether it will generate enough revenue as acceptable profit. An application's running cost includes - server cost, database storage cost, third party API cost, etc. The initial release of Doctors' Support won't have any fees to use but as the user base grows there are plans to introduce new premium services which will eventually be used to generate revenue.
- **Organizational Sustainability:** It relates to how the organization will continue to operate after the release of the application. After the release of an application, usually the organization maintains the application via its current team, an extended team or by a fresh new team. Also, organizations update their project by adding newer features to it and organization may pivot to other projects, expand the teams, create new teams, etc. Doctors' Support has many more features planned for the future to be worked on and released. Since the application has further plans, the project will be maintained and updated after its release as well and release premium services to it. In conclusion, it can be said that the project is organizationally sustainable.

7.2 Social and Environmental Effects and Analysis

Social Effect: Health-care problems are becoming more common by the day, and in order to satisfy the demand, a platform is required. Tele-health care is redefining the healthcare system's environment. Many new organizations are offering healthcare services via social media and web portals, and the number of these businesses is growing as people enjoy and adapt to this service. Local hospital treatments are being supplemented by tele-medicine. Mainly the most important effect of the Hospital Management System on a social level is its time saving and hassle free quality.

Environmental Effects: The virtual health care system aided so many patients during this pandemic that they are considering consulting a doctor online for post-pandemic treatment. This became the standard for seeing a doctor. This technology is also incredibly eco-friendly since it reduces carbon missions. For example, individuals generally drive to the hospital or clinic to see a doctor, but now they get consulted from a doctor while at home, they don't need to visit hospital. It also helps to reduce medical office waste. For example, when a patient leaves a doctor's room, the room must be cleaned for the next appointment, which generates trash.

7.3 Addressing Ethics and Ethical Issues

In this era of technology trying to be someone became very easy, without knowing someone can try to impersonate you and use your credential to do illegal or commit any crime. It became vital to keep user data securely otherwise someone can easily attack the system and take user information.

Fraud and Identity Theft: The website does not allow any other third-party software to the database. Data are from what user provides no other information are stored. This system does not have a payment gate-way, so users will not be required to give any bank account or card information.

Data Security: Only the head developer will have access to the server and the database system. Database is secured with user name and password, without this logging information no one else can have access to the data collection.

No Discrimination: There are no discriminate of any kind based on race, sexuality, gender, religious beliefs, color, language, political or other opinion, national or social origin, property, birth, or other status.

Chapter 8

Lesson Learned

Internship is completely a new experience for me. I faced some challenges and problems during my internship period and I have to find out the solutions for those problems. I have learned so many things from my internship. This experience is completely a new learning for me and I have enjoyed it.

8.1 Problems Faced During this Period

During my internship program, I have faced lots of challenges while working on this Project.

Some of these are listed below:

- **Worldwide Pandemic of COVID-19:** Even though almost one and half year had gone by for the pandemic, the norms were still very disruptive during daily procedures. Due to the lockdown almost, every member had been working from home and therefore many aspects lacked communication in the beginning however with routine changes and different protocols being set like regular meetings, pair programming and issue reporting, we got into a new normal to work in with which we picked up our productivity gradually.
- **Adapting to New Technologies:** Since this was the first time, I have ever worked on a web application in an office environment I had to learn and adapt to new technologies of the company. Although acquiring the skill set was possible it became hard to apply them in real life situations.
- **Keeping up to Speed:** After learning new technologies and putting them to use was a slow process for me initially as it was the first time, I have ever used it with an office environment. Hence, it was quite difficult to meet weekly deadlines and this slowed down the overall pace at which the application was developing.

- **Identifying and Fixing Bugs:** Often there were bugs which were very hard to find, and even after they have been found it became a big problem to fix it. There were bugs that were so difficult to deal with that it would take a whole week to fix it.

8.2 Solution of those Problems

Solution for those problems are listed below:

- **Worldwide Pandemic of COVID-19:** As a solution to the lack of interaction within team members, we have been working on Discord servers during this period. We would be on voice channels during the entire work hours (10pm-5pm). We learned to do pair programming while sharing the screen.
- **Adapting to New Technologies:** In the beginning it was a difficult situation for me to adopt with new technologies. But after some days I habituate with the entire process by the help of my supervisor and support of web developer team.
- **Keeping up to Speed:** Initially it was a slow process for me as it was the first time, I have never used it with an office environment. After some days, It became easier to maintaining work load and speed.
- **Identifying and Fixing Bugs:** We have project boards linked to the shared file on google drive where we keep updating a list of bugs/features we are working on. This makes understanding the state of the code-base and fixing bugs easier for me and also for the web developer team.

Chapter 9

Future Work & Conclusion

The future of work describes changes in how work will get done over the next decade, influenced by technological, generational and social shifts.

9.1 Future Works

Doctors' Support system is the first version of the system. It has many sides for improvement. Some of them are:

- Add payment gateway
- Add premium features
- Add live chat system
- Add video consultancy option
- Add new user Nurse, Hospitals and Labs
- Add rating system for each service
- Improve existing features

9.2 Conclusion

The internship has been a very fruitful and worthy experience for me. I was able to work, hands-on, in an industry that I had no prior knowledge about. The process of transforming the rich theoretical knowledge with the practical knowledge of the industry has dawned on me and driven to seek excellence in the craft of Data Science.

Interns do not usually get to work on live projects and contribute to the workflow of an ongoing project in the office. But the people at Limmex Automation, felt that I was

worth giving a chance to and tasked me with such projects that would help me grow in every aspect of my career. Being the youngest there and the least experienced of the bunch, I got a lot of advice from the people of the company. I also learned the uses of tools and techniques for develop a project.

In the end, I would like to thank both my internal and external supervisors whose guidance and motivations have persuaded me to strive for the success in this project and for the endless projects to come in my way in the future.

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