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An Undergraduate Internship Report on Doctor Appointment System

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Independent University, Bangladesh

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An Undergraduate Internship Report on Doctor Appointment System

By

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Autumn, 2022

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January 03, 2023

Dissertation submitted in partial fulfillment for the degree of Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

This is to attest that the report was done by me, MD. KAWSAR- UL-HAQUE BHUYAN (ID: 1722072), and that it was submitted in partial fulfillment of the requirements for a Bachelor's Degree in Computer Science and Engineering from Independent University, Bangladesh (IUB). It was finished under the supervision of Sanzar Adnan Alam. I also attest that all of my work is genuine and is based on what I have learned and implemented during my internship. All information sources used in this project and report have been properly acknowledged. I also assert that neither this project nor any part of it has been submitted elsewhere for any degree of recognition.

kawsar

Signature

19 - 01 - 2023

Date

MD. KAWSAR- UL- HAQUE BHUYAN

Name

Acknowledgement

The internship I did with Inventive Apps Ltd. was an amazing opportunity for me to learn and grow professionally. As a result, I consider myself really fortunate to have been given the opportunity to be a part of it. I'm also glad for the opportunity to meet so many amazing people and professionals who guided me through my internship and helped me complete this report.

At the very beginning, I'd like to thank Almighty Allah for all of His blessings, which enabled me to deliver all the hard work and patience to successfully complete this report. Then I would like to convey my gratitude to MR Sanzar Adnan Alam, Lecturer, Department of Computer Science Engineering, Independent University, Bangladesh, for his valuable guidance and support, compassion, time, insightful comments, and thoughtful advice on various aspects of my internship and the preparation of this report. I've chosen this moment to gratefully acknowledge his contribution.

Keeping in mind the foregoing, I'd like to take this opportunity to express my gratitude and special thanks to the CTO of Inventive Apps Ltd, Md. Rishi, who, despite being extremely busy with his duties, took time out to hear, guide, and keep me on the right track, allowing me to carry out my project at their esteemed organization and extending during the training.

I would like to express gratitude to Abdullah Al Mamun & Saddam Hossain, Senior Developer, for participating in useful decisions, providing necessary advice and guidance, and organizing all facilities to make this internship journey easier.

Finally, I would like to express my deepest gratitude to my family for supporting me through this crucial period of my internship and always staying by my side. In terms of my professional development, this internship experience I gathered is a huge step forward. The best way for me to attain career goals is to make the most effective use of the skills and knowledge I've earned, and I'll continue to enhance them.

Letter of Transmittal

January 3, 2023
MR Sanzar Adnan Alam
Lecturer
Department of Computer Science and Engineering,
Independent University, Bangladesh
Subject: Submission of final Internship Report, Autumn 2022.

Dear Sir,
I am submitting my Internship Report, which is part of my Bachelor of Science in Computer Science degree, with the utmost admiration and respect towards you. Working under your close supervision is indeed a huge accomplishment. This report is based on Doctor Appointment System . Which I was assigned to develop during my internship.

I was fortunate to get an opportunity to work in Inventive Apps Ltd. as an intern for the IT Department under the supervision of Md. Rishi, CTO of Inventive Apps Ltd. This project provided me both academic as well as practical experience. My internship provided me with a wealth of new experiences because it was my first time working in a real business setting and under the supervision of a team.

I'd like to express my heartfelt gratitude for all of your advice and assistance. I hope and pray that this report meets all of your requirements and exceeds your expectations. If you would be so kind as to get this report and share your valuable opinion, I am grateful to you for dedicating your valuable time, expertise, guidance and support. I have tried my best to complete the report appropriately as much as possible. I would be available to explain any kind of queries related with my report anytime.

I, therefore, pray and hope that you would like and grant my report and give me an access to go
a long run.

Thank you.

Sincerely,
MD. KAWSAR- UL- HAQUE BHUYAN
ID: 1722072

Evaluation Committee

Signature

Name
Ms. Ajmiri Sabrina Khan
Internal Examiner-1 / Panel Member-1

Signature
Mr. Sarwar Shahidi
Name

External Examiner-2 / Panel Member-2

Signature

Name
Wariſ Akhond Rishi
Supervisor of the intern

Signature
Dr. Mahady Hasan
Name

Head, Department of Computer Science & Engineering

Abstract

This report is based on my three-month work experience with Inventive Apps Ltd. Bangladesh. I worked as an intern as a web developer in the company's current project. The project that I had to work under was ”Doctor Appointment System”. The main objective of the System is to connect Doctors and Patients quickly and easily. Patient can easily use the system forgetting an Appointment from Doctor.

In order to explain my work, I discussed the project's goals, its scope, as well as the details of the project management plan in building the website and deploying it. After that I've described the methodology I used to complete the website, from planning to requirement gathering, building, testing, and deployment. Before starting a project, it is necessary to analyze the outcome, draw graphical explanations of the website, consider the results, and finally obtain the analysis from the website. So I have discussed the detailed work description, system design, analysis, product features, input, and output in the body of the project. Then I have discussed the result and analysis based on those test results. Aside from explaining the project, I elaborated on my internship experience at Inventive Apps Ltd. the problems I have faced during this internship, and the solutions to those problems.

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Chapter 1

Introduction

An internship helps us to obtain job experience in the sector we want to work in. This not only provides us an advantage over other job seekers, but it also helps us prepare for what to expect in their sector and enhances our confidence at work. My major at Independent University, Bangladesh (IUB) is computer science. At my university, we must pass a course called Internship Program (CSC499), which is required. This subject, I believe, is very significant for all students since it allows them to apply what they have learned throughout their academic careers.

1.1 Overview/Background of the Work

Due to the ongoing COVID situation, almost all businesses have moved their services online. People in Covid-19 are compelled to stay inside their homes for their safety in the current situation. There are lots of people who can't go to the doctor. Due to the high number of COVID-19 patients in hospitals, they are afraid to leave. Many non-covid patients may require urgent medical attention but are reluctant to visit a hospital due to the current circumstances.Considering all of these issues, we decided to create Doctors Appointment and Prescription System, a web-based application that allows patients to consult with a doctor online without any hassle. Patients can look for a doctor and request an appointment as well as a prescription. This application also displays a specific patient's history, allowing the Doctor to prescribe based on the patient's history. The main goal of this application is to quickly and easily connect doctors and patients from any location via the internet. Patients can easily use this application by registering, and the doctor can prescribe medications based on the patient's medical condition.It also saves a lot of time for both the patient and the doctor because they can both stay at home.

1.2 Objectives

- Develop a web-based application.
- User Friendly system and easy to navigate.
- Easy Sign-up and Login Process.
- A system where patient can easily consult with doctor.
- Patient can Apply for Get Doctor Appointment easily.
- Doctors can view Patients List, Doctors List, Appointments List.
- Doctors can Generate Prescription to see the Patient Condition.
- People from all over the country can use the system.

1.3 Scopes

This project is a creation for managing the Patients queries of an existing website. This will be a web-based system. The user interface will be designed as a part of the project which will be minimal and easy to understand for the users. There will be a separate user interface for the Patients and Doctors, where they can manage the queries. The system will be made responsive so that it can be operated from both smartphone and desktop view. Some of the features of this system are:

- For the Patient user there will be sections like-Profile, Appointment, log out, etc.

- For the Doctor user there will be sections like View Appointments List,Patients List,Doctors List, Create Prescription, Download Prescription as PDF etc.

- Doctors will be able to Approve Appointment/Cancel Appointment.

- After seeing the Patient Condition/view the Patient Illness History Doctor will be Create Prescription for the Patient.

- All the information of the Patients, Appointments, Doctors & Prescriptions will be stored in the system database.

Chapter 2

Literature Review

The literature review in the report is based on the ideas, theories, and methodologies used to create the application. The goal of the literature review is to determine the need for further research (justifying your research). Identify the relationship between works in terms of their contribution to the topic and other works. Place your own research within the context of existing literature, arguing why more research is required. The undergraduate CSE program at our university is designed in such a way that we, the students, can learn the theory and apply what we have learned in the courses. The basics of understanding how real-world applications work in general ranged from 'Hello World' to solving complex mathematical equations. Having the opportunity to do so and find the project's relevance with some of the courses taught throughout the four-year undergraduate program at IUB was simply exceptional.

2.1 Relationship with Undergraduate Studies

My project for the internship includes front-end designing and back-end coding and database integration and managing the project, all of which I have learned from the core courses of my major. Some courses which are directly related to my project are Data Structure (CSE 203), Algorithm (CSE 211), Database Management (CSE303), System Analysis and Design (CSE307), Web Application and Internet (CSE309), Software Engineering (CSE451).

1. (CSE 203) & Algorithm (CSE 211): The building blocks of understanding how a project data can be handled.

2. Database Management (CSE303): In this course, I have learned the things that are needed to be done when beginning a project. How to

draw rich picture, write Six Element Analysis, Problem analysis, and solve the problems. I learned about ERD, where we can understand the connections between the Entities of our system. I also learned about SQL in this course. SQL is the most common language used by Database.

3. System Analysis and Design (CSE307): From the course have learned about Functional and Non-Functional requirements in a System. I have learned about UML diagrams and how to draw them correctly. I have also known about SDLC which is very important when starting a new Project.

4. Web Application and Internet (CSE309): This is one of the most important course. I have learned how to build a website from scratch. This course has taught me the fundamental of HTML, CSS, Bootstrap, JavaScript. All these languages are useful when implementing a website.

5. Software Engineering (CSE451): Many topics were taught in this course. For me, I think the topic that will be useful for my internship project is Software testing and SDLC. Software testing is a way to test the whole system in an organized manner and find out if there is any fault.

2.2 Related works

In this current COVID-19 pandemic, getting out has become completely unsafe. Therefore, seeking medical care in a hospital or doctor's chamber has become more difficult. However, other diseases besides corona have not stopped even in this condition. To address this situation, different health apps come forward to provide doctor consultation services online based on digital technology so that everyone can get the necessary health care in a safe and easy way at home. Now, anyone from all over the country can take the advice of an experienced doctor from any part of the country.
Following are some top health apps for online doctor consultation services in Bangladesh.

1. Praava Health: Praava has been founded in 2016. They are also helping people to consult with a doctor online. When we visit the Praava website, there are many options to select from. Someone with

very little knowledge might not understand properly. When we want to book an appointment with a doctor, we need to purchase a monthly plan which might be hassle for many people.

2. iCliniq: This is also a website by which normal people can consult with a doctor through online. When patients visit the website for the first time, they might get confused as there are many contents on their website. It might be challenging for a few to navigate through the system.

3. Doctor Dekhao: Doctor Dekhao offers health care in a single tap via their Android and iOS apps. The process is simple; we need to download the app on our phone and then create an account within a few taps. After that, we can make an appointment from the list of doctors and specialists and get the consultation via video calling. Besides, if we need to consult a doctor urgently, we may apply for an instant appointment. Once we are done with the video consultancy, we will get the e-prescription right into the app. On top of that Doctor, Dekhao offers medicine reminders as well as store medical reports. It comes with ten different packages starting from Tk. 100. Another best feature of Doctor Dekhao is having the service 24/7.

Chapter 3

Project Management & Financing

To begin a project, each company must establish a timeframe within which every aspect of the project must be determined, planned, and executed in accordance with this plan or schedule. This serves as a guideline for the company to track the progress of the project and ensure that the smaller goals and deadlines are met.

3.1 Work Breakdown Structure(WBS)

A work breakdown structure (WBS) is a project management tool that takes a step-by-step approach to complete large projects with several moving pieces. By breaking down the project into smaller components, a WBS can integrate scope, cost and deliverables into a single tool. While most WBSes are deliverable-based, they can also be phase-based.

We have also created a WBS for our project, as it breaks down the project into smaller parts and will help us complete the project quickly and effectively.

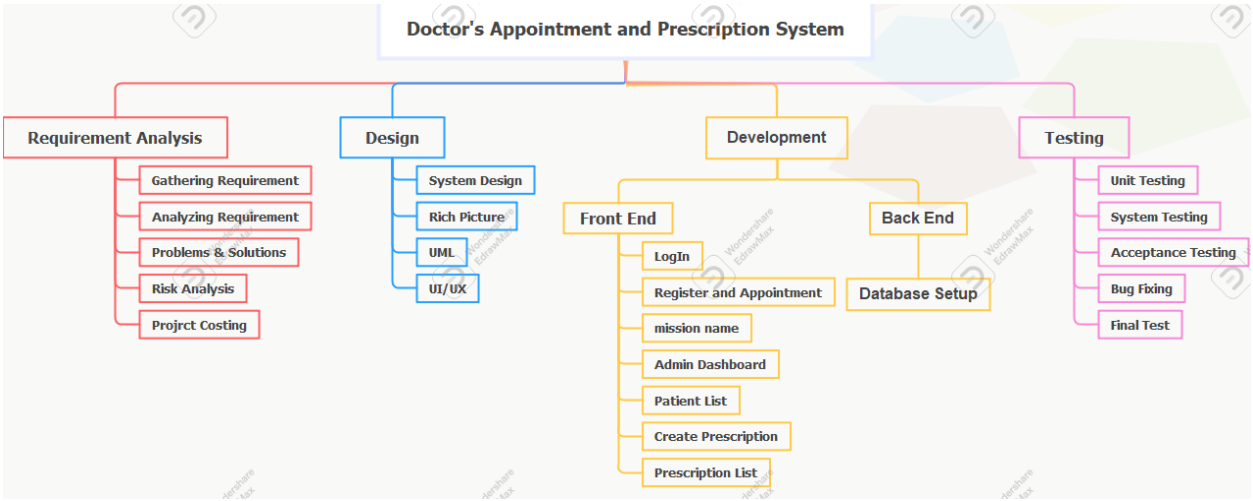


Figure 3.1 - Work Breakdown Structure

3.2 PROCESS/ACTIVITY WISE TIME MANAGEMENT & FINANCING

We can see from my work breakdown structure that the project has four processes. Each process has a specific time limit to complete it. When a project is divided into minor parts and assigned a deadline, the work is completed efficiently. If no timeline is specified, the project may take longer than expected. My project's process/activity time distribution is as follows:

Activity	Days
Requirement Analysis	11
Design	10
Development	30
Testing	11
Total	62

Table 3.1: Process/Activity wise time distribution

The critical path method is used to indicate the time allocation for the three-month project on a chart. The critical path in a project plan is the longest sequence of activities that must be completed on time for the project to be completed on time.

3.3 Gantt Chart

A Gantt chart, which is widely used in project management, is one of the most popular and useful methods of displaying activities (tasks or events) against time. The chart has a list of activities on the left and a time scale along the top. Each activity is represented by a bar, with the position and length of the bar reflecting the activity's start, duration, and end dates. This allows you to quickly see:

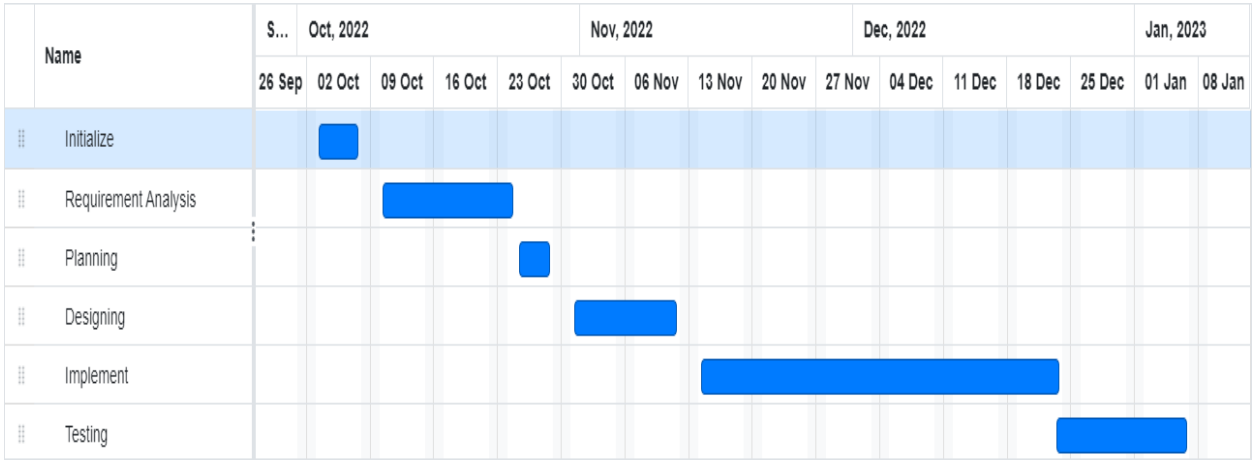


***Figure 3.2* - Gantt Chart**

3.4 Process/Activity wise Resource Allocation

For this project, the developers are considered the primary resource, followed by the computers used in the office and the servers (VPS) required for the deployment of the project. Every employee of the company is considered a resource; hence everyone has assigned a particular assignment with specific deadlines, all of which collaborated to the entire project production. Following are the details of every step of the project.

Initializing: During this time, the CEO of the company presented the project idea. Because this was an internal product, there were no delays, and the project paperwork was initiated.

Requirement Analysis: During the first few weeks, the CEO and developers discussed the project's fundamental requirements. Computer specifications, for example, software/tech required to build the application, features, and developers.

Planning: The developers and the CEO spent hours at this stage of the development process discussing how the project should be built, the approaches to be taken, and creating smaller goals and deadlines for them.

Design: To design the web pages of the application, few graphic designers were hired during this phase.
Implementation: The web page designs were completed at this point, and the developers began writing code for the front end and back end of the application, while the management team kept track of the deadlines.

Testing: Testing began as soon as a new feature was added. As a result, the testing was done simultaneously by the developers. The application's unit testing began at the conclusion of the implementation phase.

Estimated Costing

Cost estimation is an important aspect of project management and planning. This is due to the fact that a project is determined by at least three major constraints: scope, budget, and time. As a result, they are crucial for project management. The cost was determined based on the functionality of the system that the company required.

Requirements	Quantity	Amount(BDT)
Salary (3 months)	1	18000
Desktop Computer	1	40000
Printer	1	10000
Domain/Hosting	1	2000
Internet Bill(3 months)	1	3000
Subtotal		73,000

Table 3.2 - Work description-wise Estimated Costing

Chapter 4

Methodology

Successful projects are well managed. To efficiently organize a project, the manager or development team must select the software development methodology that will be most effective for the project at hand. The software development process divides software development work into phases in order to improve system design and project management. This is also referred to as the Software Development Life Cycle (SDLC). Every methodology has different strengths and weaknesses and exists for various reasons. SDLC is divided into seven phases: planning, analysis, design, development, testing, implementation, and maintenance.

I used the Agile development methodology for this project. I chose to work with agile for a variety of reasons. An agile methodology is a project management technique that is commonly used in software development. Agile approaches divide work into small chunks with minimal planning and completely avoid long-term planning. Iterations are short periods of time varying from one to four weeks.

Other methodologies include:

- Waterfall
- Prototyping
- Iterative and Incremental Development
- Spiral Development
- Rapid Application Development
- Kanban methodology
- Extreme programming (XP) methodology
- Adaptive project framework (APF) methodology.
- Lean methodology.

4.1 Agile Development

The Agile software development methodology is one of the most simple and efficient methods for converting a vision for a business need into software solutions. Agile software development approaches use continuous planning, learning, improvement, team collaboration, evolutionary development, and early delivery. It enhances adaptable responses to change.It encourages flexible responses to change. Agile software development emphasizes four core values:

1. Individual and team interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan



4.2 Why Agile for this project?

The primary advantage of agile software development is the ability to release software in iterations. Iterative releases increase efficiency by allowing teams to find and fix bugs while also aligning expectations early on. They also enable users to reap the benefits of software sooner, thanks to frequent incremental improvements. When the development process began, there was a lack of information in the project's requirement section, which was eventually filled in the future. As new features and design pattern updates became available, the design team implemented them gradually, as the agile methodology suggests.

4.3 Agile Implementation

Agile implementation is a type of project management that works in small increments and is well appropriate to projects that may become obsolete once completed, which is especially useful in software development. The key to an agile plan is to allow for changes to the product as it is being developed.The entire plan was decided when the requirements were determined during the planning phase, as well as how the development team divided all of the work on a daily basis.

Chapter 5

Body of the Project

5.1 Work Description

This project will be managed and controlled by admins and doctors. Users can access the system by entering their email address and password. Patients can request a doctor's appointment, and doctors can approve appointments and generate prescriptions. There will be an Admin dashboard where Admins/Doctors can view Patients, Appointments, and Doctors lists.

I've worked on both the front and back end. The front end is built with the JavaScript language's Reactjs framework, and the backend is built with the Nodejs Express framework.

5.2 System Analysis

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components. System analysis is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

5.2.1 Six Element Analysis

The six-element analysis is the method for learning about the stakeholders, non-computing hardware, computing hardware, software, database, and network required for a specific system process.

Process	Human	Non-Computing Hardware	Computing Hardware	Software	Database	Communication & Network
Sign Up	User (Doctor & Patient)	N/A	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: For registered data	Wifi or Mobile data for the internet connectivity
Sign In	User (Doctor & Patient)	N/A	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: For login data	Wifi or Mobile data for the internet connectivity
Apply for Appointment	User (Patient)	N/A	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: For Appointment Lists	Wifi or Mobile data for the internet connectivity
Create Prescription	User (Doctor)	N/A	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: For Prescription Lists	Wifi or Mobile data for the internet connectivity
View Prescription	User Check info and click to print	N/A	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: retrieves Prescription data	Wifi or Mobile data for the internet connectivity

Process	Human	Non-Computing Hardware	Computing Hardware	Software	Database	Communication & Network
Print Prescription	User fill up the forms	Printer	Laptop/ Desktop Computer, Keyboard and Mouse	VsCode, Postman, MongoDB Compass, Web Browser	MongoDB: retrieves Prescription data	Wifi or Mobile data for the internet connectivity

5.2.2 Feasibility Analysis

Feasibility Study in Software Engineering is a study to evaluate feasibility of proposed project or system. Feasibility study is one of stage among important four stages of Software Project Management Process. As name suggests feasibility study is the feasibility analysis or it is a measure of the software product in terms of how much beneficial product development will be for the organization in a practical point of view. Feasibility study is carried out based on many purposes to analyze whether software product will be right in terms of development, implantation, contribution of project to the organization etc.

Types of Feasibility Study :

The feasibility study mainly concentrates on below five mentioned areas. Among these Economic Feasibility Study is most important part of the feasibility analysis and Legal Feasibility Study is less considered feasibility analysis.

- **Technical Feasibility**

  In Technical Feasibility current resources both hardware software along with required technology are analyzed/assessed to develop project. This technical feasibility study gives report whether there exists correct required resources and technologies which will be used for project development. Along with this, feasibility study also analyzes technical skills and capabilities of technical team, existing

technology can be used or not, maintenance and up-gradation is easy or not for chosen technology etc.

➢ Operational Feasibility

In Operational Feasibility degree of providing service to requirements is analyzed along with how much easy product will be to operate and maintenance after deployment. Along with this other operational scopes are determining usability of product, Determining suggested solution by software development team is acceptable or not etc.

➢ Economic Feasibility

In Economic Feasibility study cost and benefit of the project is analyzed. Means under this feasibility study a detail analysis is carried out what will be cost of the project for development which includes all required cost for final development like hardware and software resource required, design and development cost and operational cost and so on. After that it is analyzed whether project will be beneficial in terms of finance for organization or not.

The proposed “Doctor’s Appointment & Prescription System” is economically feasible because - The system requires relatively fewer time factors. Instead of a slow and error-prone manual system, the system will provide a fast and efficient automated environment, saving both time and manpower. The system will have a graphical user interface, and it will require very little user training to learn. The system will provide services for viewing various information in order to make proper managerial decisions.

➢ Legal Feasibility

In Legal Feasibility study project is analyzed in legality point of view. This includes analyzing barriers of legal implementation of project, data protection acts or social media laws, project certificate, license, copyright etc. Overall it can be said that Legal Feasibility Study is study to know if proposed project conform legal and ethical requirements.

➢ **Schedule Feasibility**

In Schedule Feasibility Study mainly timelines/deadlines is analyzed for proposed project which includes how many times teams will take to complete final project which has a great impact on the organization as purpose of project may fail if it can't be completed on time.

5.3 Rich Picture

A Rich Picture is a way to explore, acknowledge and define a situation and express it through diagrams to create a preliminary mental model. A rich picture helps to open discussion and come to a broad, shared understanding of a situation.

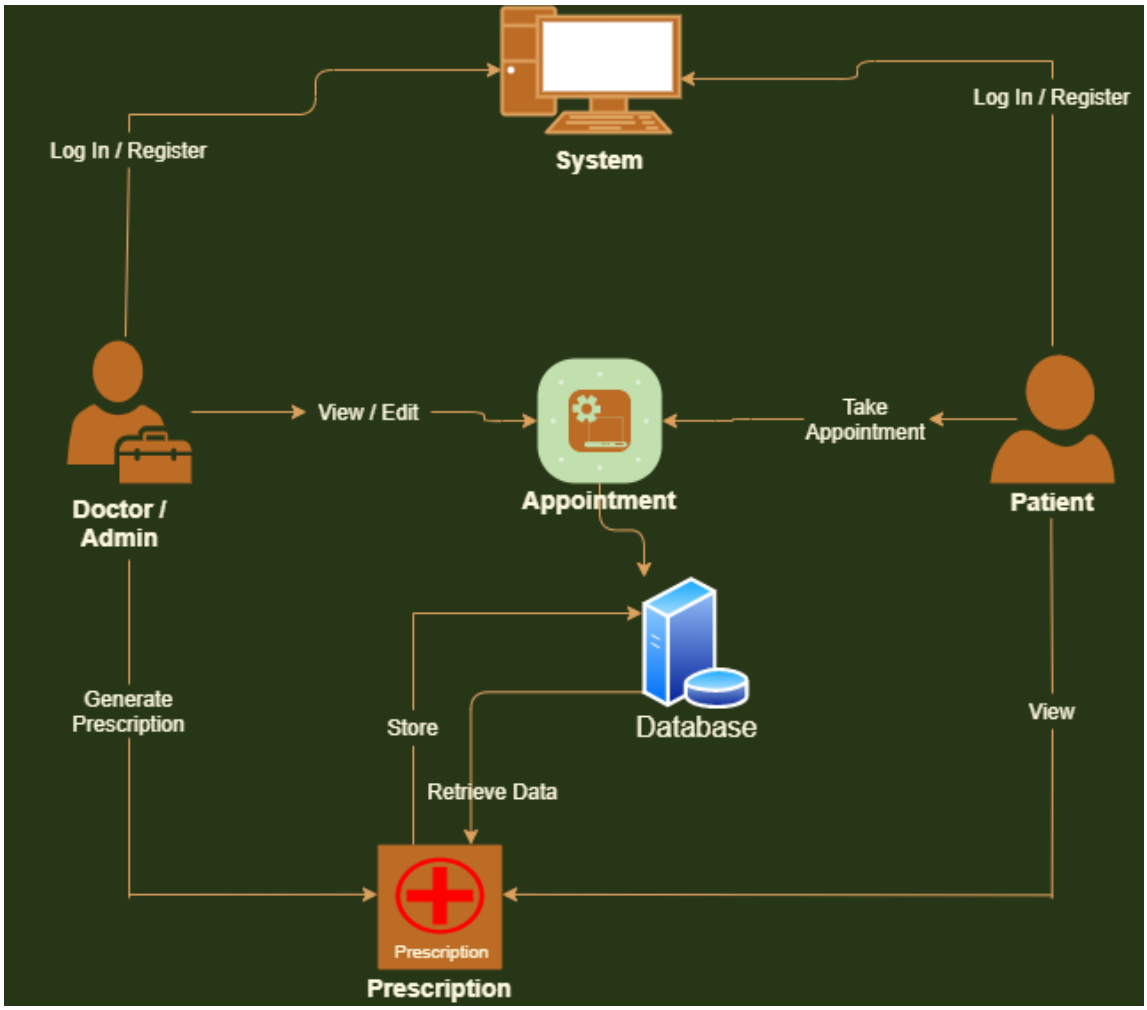


Figure 5.1 - Rich Picture

This figure illustrates the rich picture of “Doctor’s Appointment System.”

5.3.1 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.

Use Case Diagram

In the Unified Modeling Language (UML), a use case diagram can summarize the details of your system's users (also known as actors) and their interactions with the system. To build one, you'll use a set of specialized symbols and connectors.



Figure 5.2 - Use Case Diagram

Activity Diagram

Activity diagram is another important behavioral diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity.

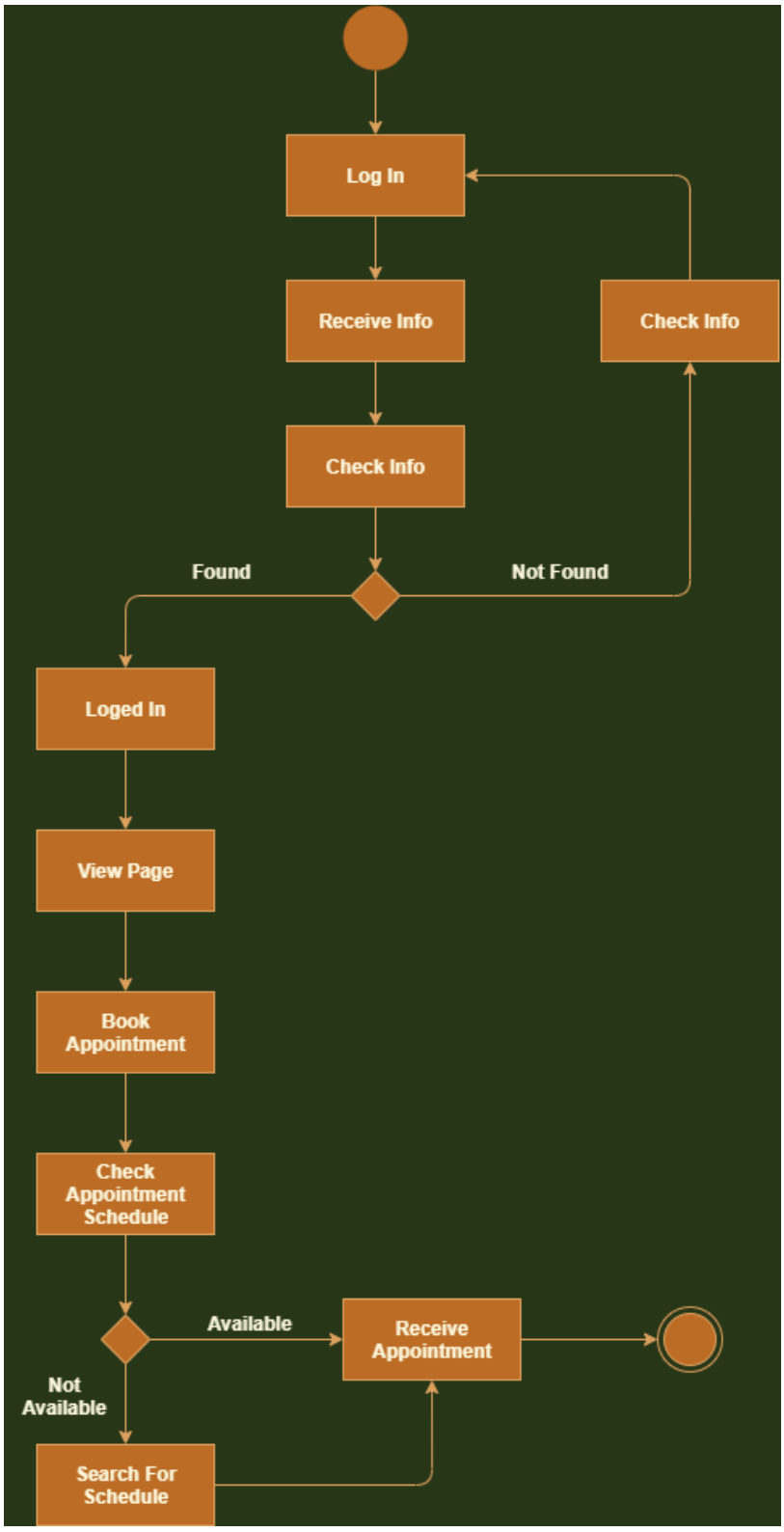


Figure 5.3 - Activity Diagram of Patient

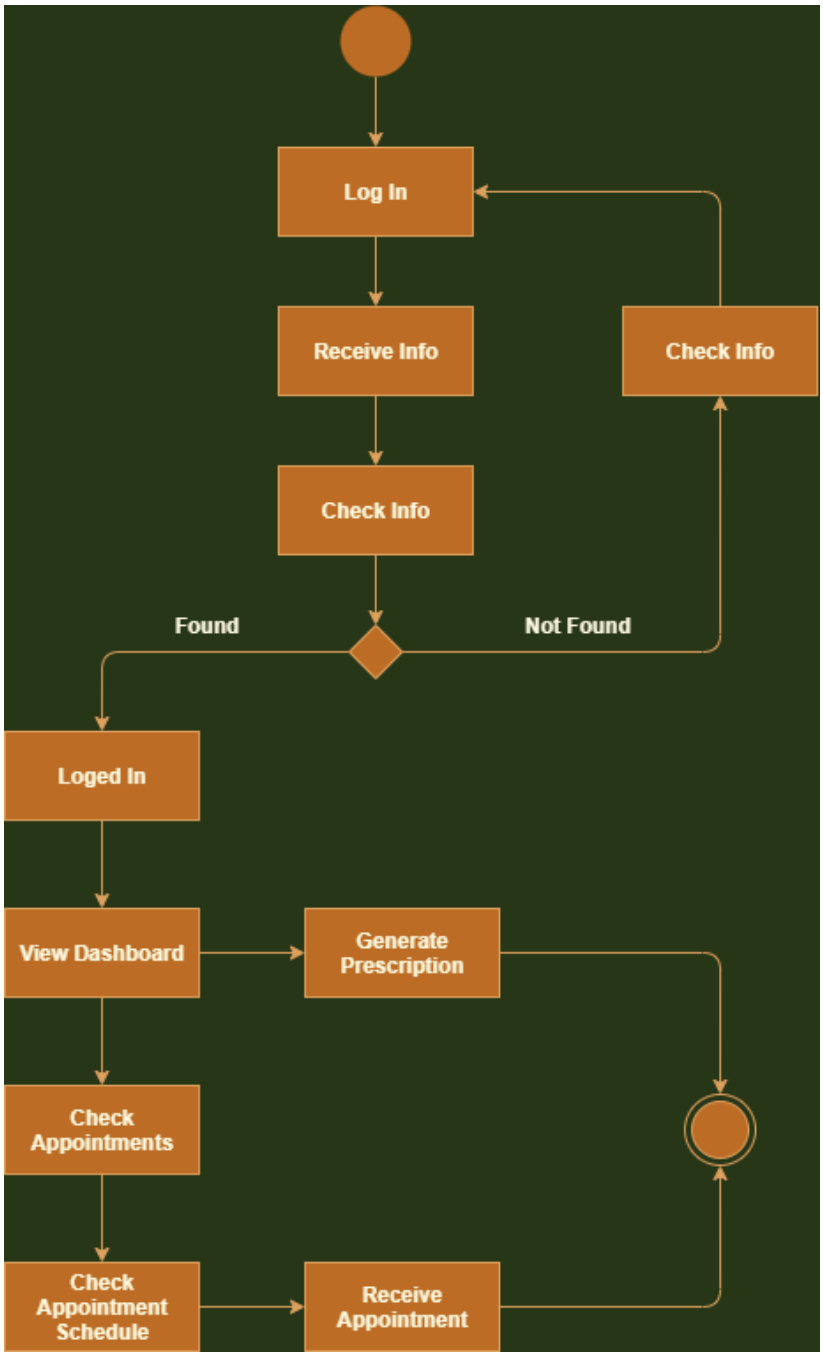


Figure 5.4 - Activity Diagram of Doctor

5.3.2 Functional and Non-Functional Requirements

Functional requirements are product features or functions that developers must implement to enable users to accomplish their tasks. On the other hand, 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. They are contrasted with functional requirements that define specific behavior or functions. The functional and non-functional requirements of this system are shown below.

Functional Requirements:

	Functional Requirement Description
FR 1	When the user enters information for registration and login, the application sends approval if the information is correct and redirects to the user dashboard per role.
FR 2	The system shall generate a unique username for all users.
FR 3	The system shall check a new user's email unique or not. And the system only accepts unique email from new users.
FR 4	The system shall send a recovery password email to users who forget their password.
FR 5	The system shall allow users to write or edit user bio, upload user profile pictures and complete their account settings.
FR 6	The system shall allow Patient users to Book appointments.
FR 7	The system shall display the search result as a user search query.
FR 8	The system shall display user Patient and Appointment Lists to Doctor .
FR 14	The system shall record all history to the database.
FR 17	The system shall store all browser cookies and search queries to give users a better user experience.
FR 20	The system shall send a confirmation email to the Patient user after the user confirms Appointment.

Nonfunctional Requirements:

Category	Nonfunctional Requirement
Usability	❖ The UI of this system is clean and simple. New users can get used to this software so fast. ❖ On any POST request (Registration, Login, Order) the database on receiving the data saves the information on the database and responds with a status of 200, else if there is a problem saving, it responds with a status of 400 or 404.
Performance	❖ The system will be responsive with mobile and any type of device.
Information	❖ Users can download prescriptions.
Control	❖ This system will maintain user privacy. ❖ This system will be secure.
Service	❖ There will be two types of users. Doctor & Patient. ❖ Users can use the system from anywhere in the world. ❖ Necessary system updates will come from time to time.
Reliability	❖ The system will be reliable and available for OS, device, computer, or mobile. ❖ System updates or any kind of testing will not affect the running system.

5.4 Product Features

Login and Registration: Like any other web application that contains user systems, login and registration are the most common features of any application. Patient Users and Doctor Users have to be registered and login to perform their operation.

Patient User: Patients can view their profile and Prescription generated by Doctors.

Appointment: Patient-users can access the Appointment panel to apply for an Appointment. Users will fill in the necessary information and submit it for getting an Appointment.

Doctor User: Doctors can view Patient's Lists, Appointment Lists and can generate prescriptions for Patients.

Prescription: Doctors will generate prescriptions after meeting with Patients.

Record of all information: The system will record all the data starting from user data, Appointment lists, prescription history etc.

5.4.1 Input

The following table shows the processes and the fields required for the inputs of the corresponding method.

Process	Fields (Types)
Sign Up (Doctor & Patient)	User Name – String Full Name – String Phone Number – String Email Address – String

	Birth Date– Date Gender– String Blood Group– String Address – String
Sign In	Email – String Password – String

Appointment	Patient User Name– String Appointment Date- String Appointment Time – String Patient illness history– String
Prescription	Patient Username – String Patient Full Name – String Phone Number – Number Birth Date – Date Gender– String Blood Group– String Patient illness history– String Patient Weight– String Patient BP– String Temperature– String Medicines Name– String Test Name– String Description– String

5.4.2 Output

Process	Output
Sign Up	On Success – Alert Message: "User Signup Successfully"

	On Failure – Error shown under the field's input
Sign In	On Success– Alert Message shown "Login is Successful" and redirect to dashboard For Doctor & Appointment for Patient. On Failure – Error shown under the field's input
Appointment	On Success – Alert Message shown "Appointment Successful" On Failure – Error shown under the field's input
Prescription	On Success – Alert Message shown "New Prescription Added Successfully" On Failure – Error shown under the field's input

5.4.3 Architecture

An SPA (Single-page application) is a web app implementation that loads only a single web document, and then updates the body content of that single document via JavaScript APIs such as XMLHttpRequest and Fetch when different content is to be shown.

React is a JavaScript library that develops user interfaces for applications. It serves as a stack for knowledge storage and acquiring knowledge about acquired data. React is a technology built on the MERN platform, which stands for MongoDB, Express.js, React, and Node.js. It facilitates the development of several mobiles and online applications and earns the moniker "open stack technology."The term 'library' used here differs from 'framework' because it's a collection of codes. All previously written codes are kept in these libraries for user access.

Front-End

JavaScript is a lightweight, interpreted programming language. It is designed for creating network-centric applications. It is complimentary to and integrated with Java. JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform. It has a lot of frameworks and libraries, one of which is Reactjs. React.js framework is an open-source JavaScript framework and library developed by Facebook. It's used for building interactive user interfaces and web applications quickly and efficiently.

Back-End

Node.js is an open-source server environment. Node.js is cross-platform and runs on Windows, Linux, Unix, and macOS. Node.js is a back-end JavaScript runtime environment. Node.js runs on the V8 JavaScript Engine and executes JavaScript code outside a web browser. For this application, the express framework of Nodejs was used. Express is a Node.js web application framework with minimal and flexible features for web and mobile applications. The reason to use express was that the application was API driven. Hence REST API's were created using express.

Database

MongoDB is an open-source document database and leading NoSQL database. MongoDB is a cross-platform, document oriented database that provides high performance, high availability, and easy scalability. MongoDB works on the concept of collection and document.The reason for choosing MongoDB as the database was mainly due to the abundance of resources and many built-in functions. Also, with no initial cost to maintain the database, it was the ideal database to choose.

Chapter 6

Result & Analysis

6.1 Results

Patient sign up - The patient must register to request an appointment.

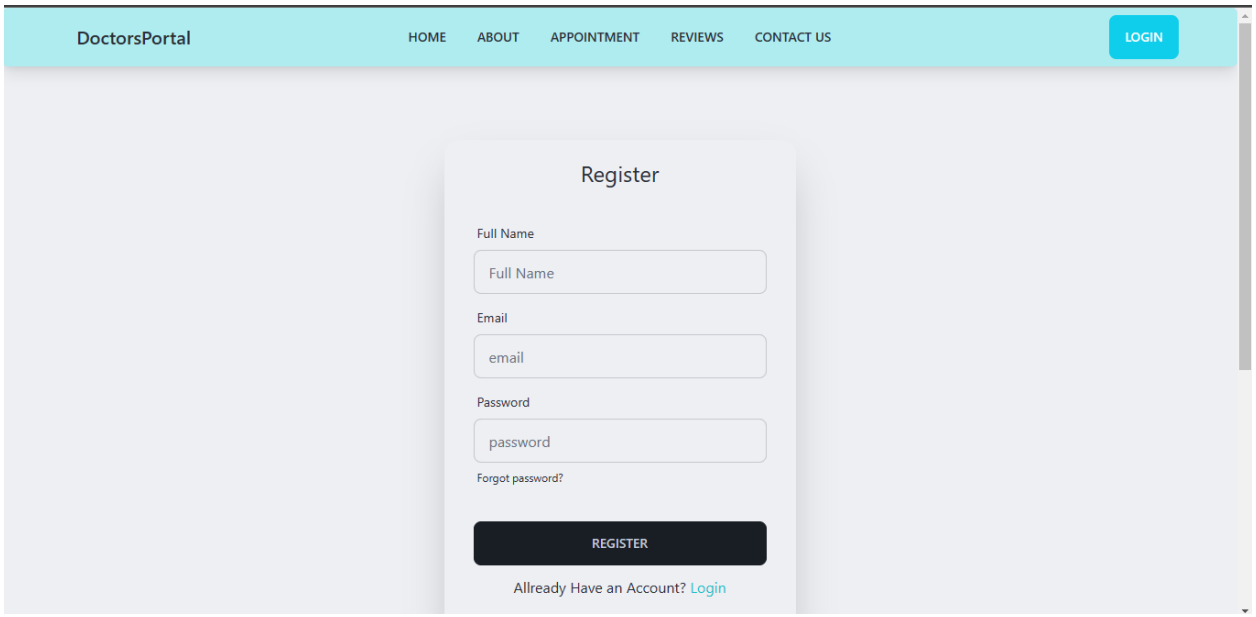


Figure 1: User Sign Up Page

User Login - After successfully registering, Patient & Doctor must be logged in to see their specific panel.

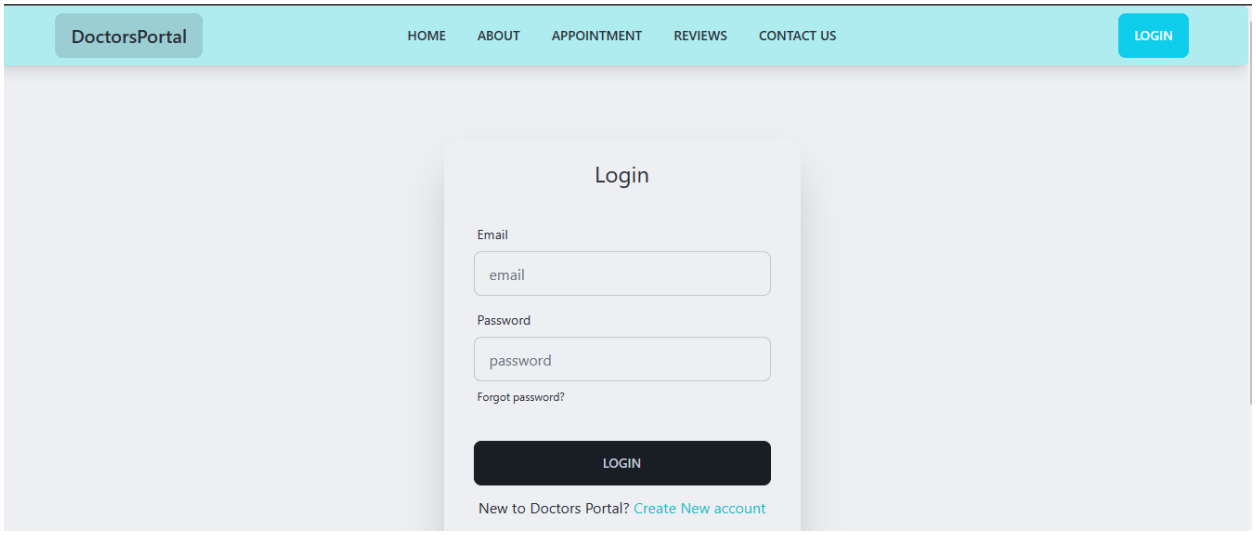


Figure 2: User Login Page

User Dashboard - After Successfully Login User can see their profile.

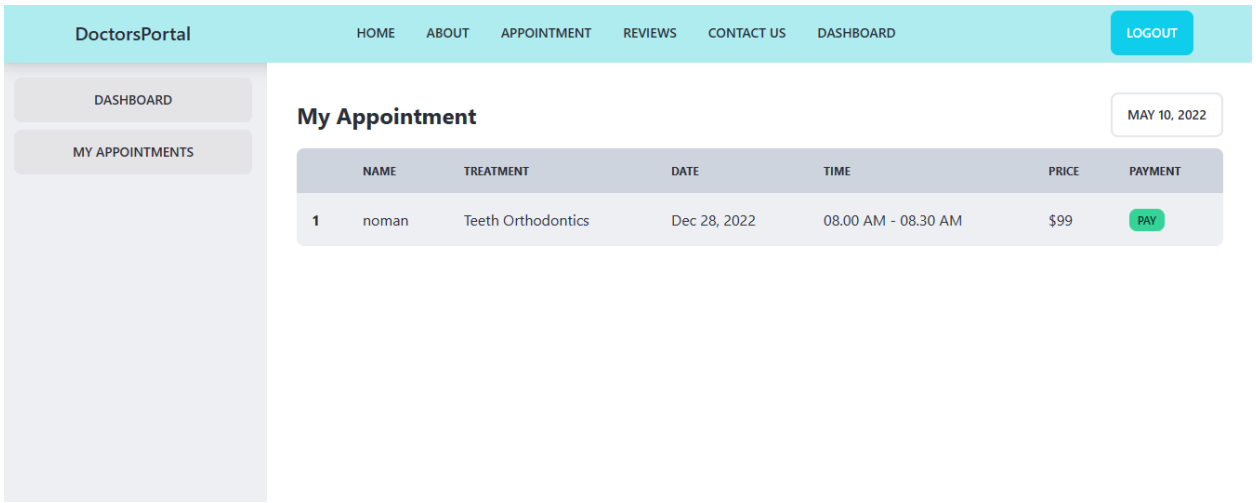


Figure 3: User Dashboard Page

Appointment - After Successfully Login Patient can Apply for the Appointment.

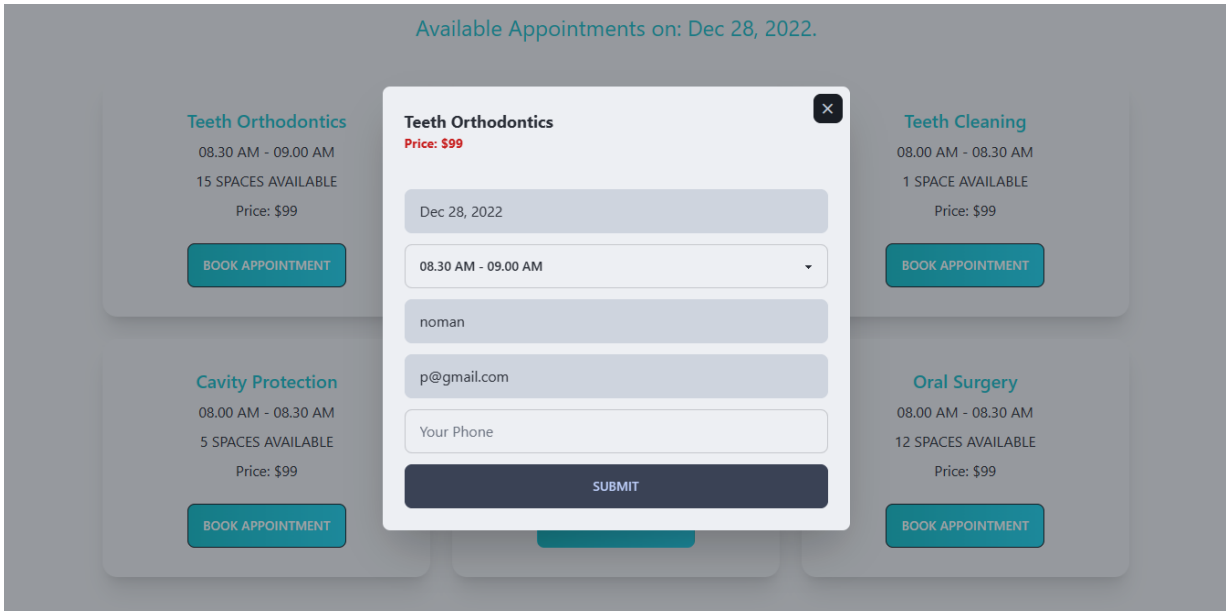


Figure 4: Appointment Page

Available Services - Patients can Apply for the Appointment to see the available services.

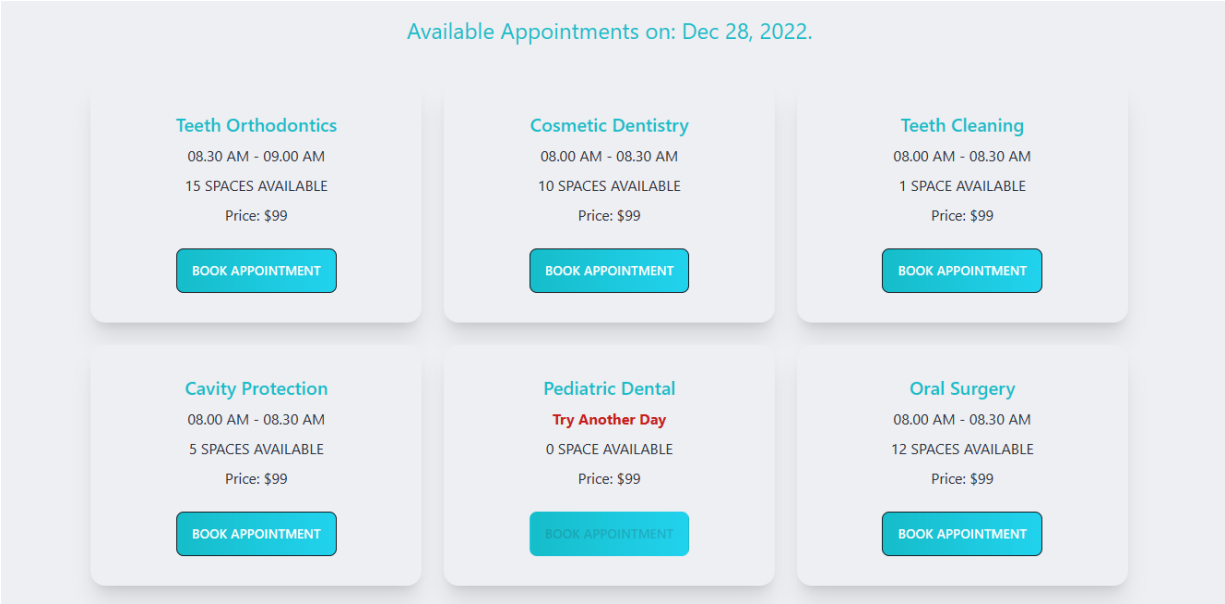


Figure 5: Services

Admin Dashboard - After Successfully Login, Admin can see the Panel.

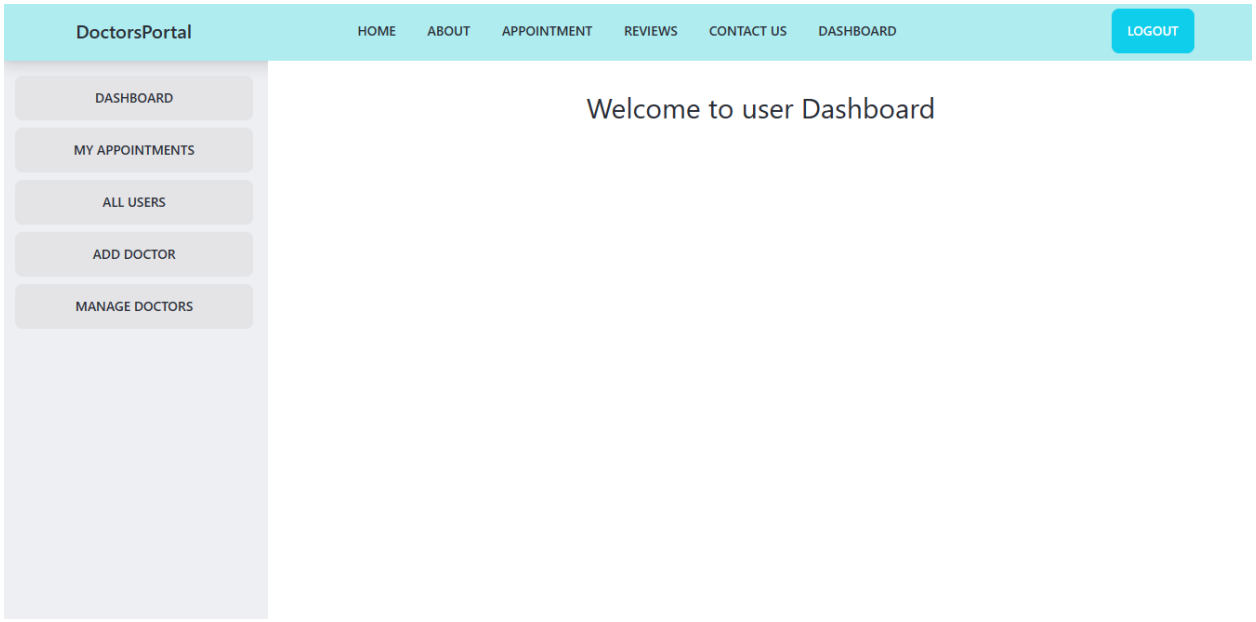


Figure 6: Admin Dashboard

Appointment List - Admin can see the Appointment List.

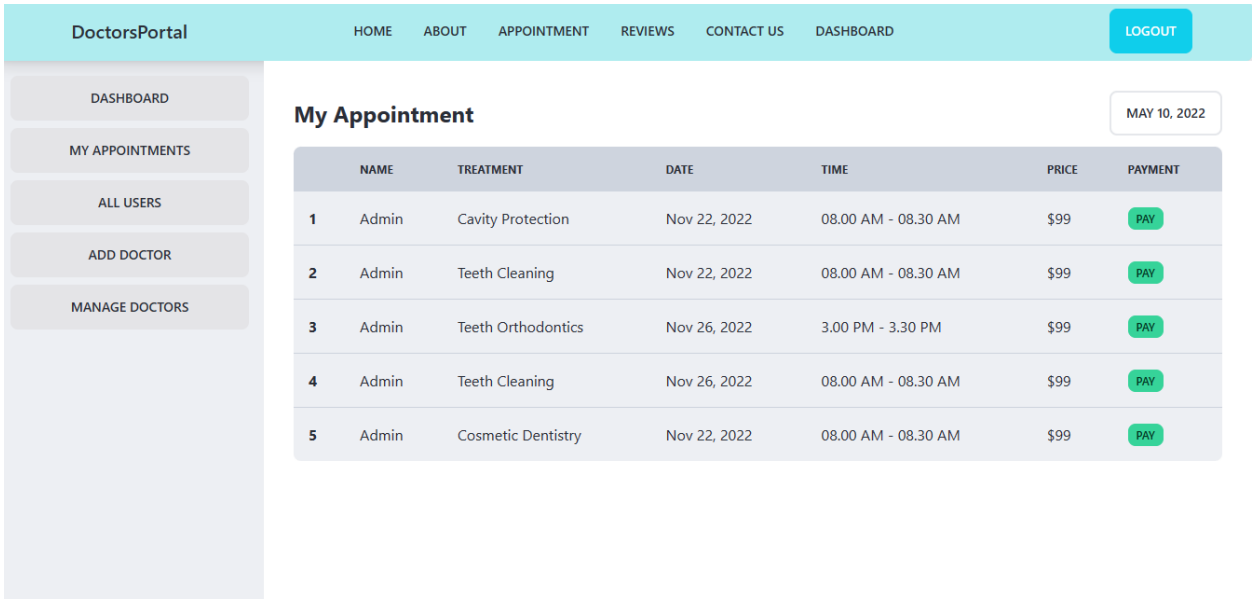


Figure 7: Appointment List

Doctor Registration - Admin can add a doctor according to their speciality.

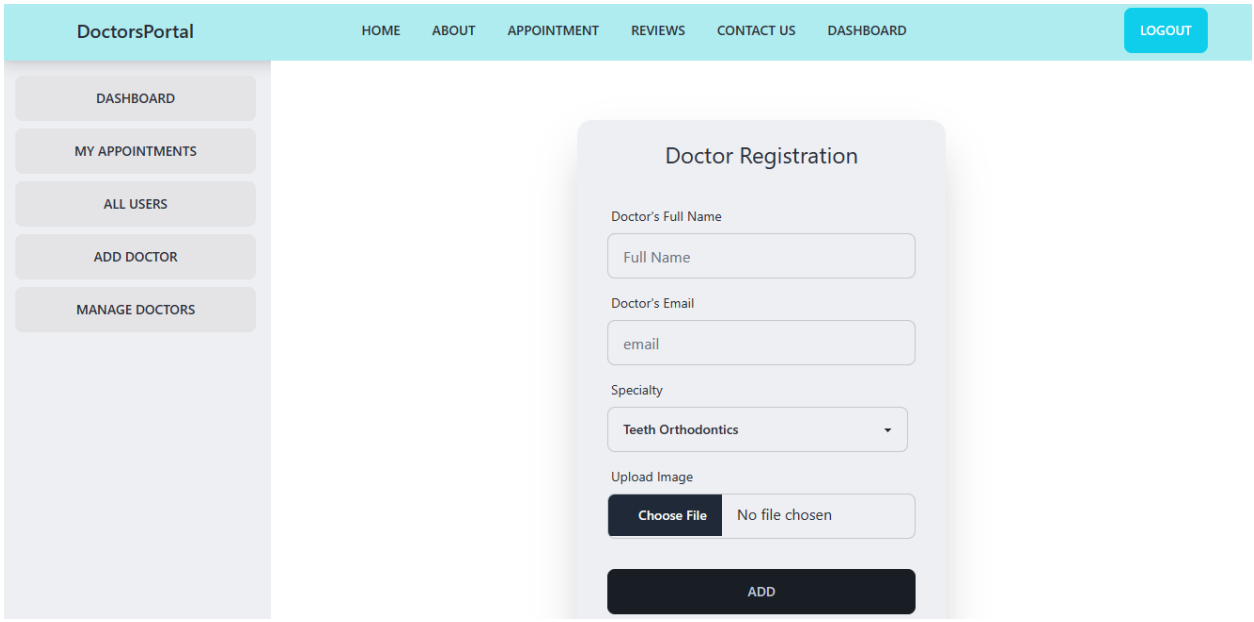


Figure 8: Doctor Registration

Analysis of Front-end and Back-end -

While developing the project, I tried to comply to these UI design standards while developing the system. User Interface is concerned with anticipating what users might need to do and ensuring that the interface contains simple features that are easy to access, understand, and use to help those actions. UI combines interaction design, graphic design, and information architecture. The most important requirement of a standard UI design is that the interface be kept simple. We should maintain consistency and use common UI elements, be systematic in page layout, strategically use color and texture, use typography to create hierarchy and clarity, and so on. The system's UI design is kept very minimal and simple, with no extra elements in the system other than what the user requires. The user and admin tables

and dashboards were created with a similar theme. The colors and fonts used are also minimal and easy on the eye.

The basic coding standards were followed while developing the system. This project was created using MongoDB, Express JS, React JS, and Node JS. Coding standards are the rules and principles that define the programming style, techniques, and methods of a programming language. The fundamental coding standards are appropriate naming conventions, separating files and folders, maintaining formatting and indentation, defining classes and functions, and documenting and commenting where necessary. The naming convention dictates how we should refer to our packages, classes, methods, variables, and so on. Because this type of large project contains thousands of lines of code, using standard indentation and formatting is critical. Anyone can get lost and have difficulty understanding the code if proper configuration, spacing, and indentation are not used.

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project

Project sustainability is a popular project management technique right now. Specific criteria and standards must be created from project identification to feasibility studies, design, funding, execution, and assessment in order for initiatives to be sustained. A sustainability study will establish a project's acceptability, viability, and exibility.

Before developing this project, the organization conducted extensive requirements analysis. There are a few more websites that they have

examined and determined what changes may be made. The firm will also collect input from system users, who may tell us what they like and dislike about the system, and we will make improvements based on the comments. I believe the initiative will be successful. People in remote regions will be able to utilize our technology as well. It will make their lives easier.

7.2 Social and Environmental Effects and Analysis

The Doctor Appointment System project is a system that would allow patients to consult with Doctors. Patients may simply utilize this program by taking appointment. I feel that the program will make people's lives simpler. When a person wishes to consult with a doctor, he or she can easily book an appointment. He/she has to wait for a long time to get a serial, and sometimes doctors aren't accessible at the hospital, so patients have to deal with a lot of complications. Still, everything in our system is done online. I feel that the system will benefit both society and the environment.

Chapter 8

Lesson Learned

8.1 Problems Faced During this Period

Throughout the internship, I met new problems and learnt how to tackle them.
I'd never worked in a professional environment before. I was never a person who worked from 8 a.m. to 4 p.m., so the new way of life was difficult for me. I find it difficult to cope with large amounts of work since I am not used to being under such duress. When I was conducting my internship, I did a couple things that I had never done before. When I was doing it, I was having trouble with a couple portions of the report. My biggest issue was the framework with which I was working. MERN Development (MongoDB, Express JS, React JS, Node JS). It was totally new for me. I had faced a lot

of difficulties understanding the work of it. At the very beginning, I was learning that by myself, and it wasn't very clear for me.

It was difficult to complete the project schedule and resource allocation properly. Some tasks were being completed later than expected due to the inability to work in an office setting. Maintaining the project plan effectively was more challenging than planning. The project I'm working on is a technique for the corporation to assess my abilities. As a result, I became overwhelmed and agitated at times. I battled a lot during the design and coding phases. This made me realize how important it was for me to improve my coding abilities, so I had to work really hard to meet the deadline.

8.2 Solution of those Problems

Despite the fact that there were many difficulties, I realized I had to solve my own. I had to Google numerous parts that I was unfamiliar with. My supervisor was quite helpful when I ran into problems with the codes. He initially provided me a comprehensive review and told me about Code Igniter. I was terrified and perplexed about doing my job in the allotted time, but by working hard, I was able to accomplish everything on time. I've learned that there will always be troubles in life. We simply need to find a solution to the situation and face it without fear.

Chapter 9

Future Work & Conclusion

9.1 Future Works

The company has ambitions for the project in the future. The primary goal of the organization is to connect their own payment gateway with the system. Currently, the company intends to create its own video calling platform for consultations between patients and doctors. For the time being, the patient's data will be manually entered into the system. The

business will subsequently bring a biosensor and connect it into the system so that data may be delivered to the system automatically utilizing the biosensor. This application is currently only available on the web. In the future, the business hopes to develop a mobile app for the application. Many design concerns remain, which will be addressed in another month of testing and correction.

9.2 Conclusion

First and foremost, I would like to thank IUB for the Internship course; I have learned a lot that I can apply in my professional future. I have gathered experience that I will put to use later in my life. I've picked up new skills and techniques. I've always wanted to be a web developer, and I feel I now have the necessary expertise.

Working on this project has made me realize a few things during the course of my internship. It has shown me how diverse and competitive the actual business world is. It has given me the sense that I can make a meaningful impact in the real world. As an undergraduate student, it is extremely difficult for any student to gain experience with real-world organizations.

Bibliography

[1] Arthur Hylton III and Suresh Sankaran arayanan "Application of Intelligent Agents in Hospital Appointment Scheduling System", International Journal of Computer Theory and Engineering, Vol. 4, August 2012, pp. 625-630.

[2] Deepti Ameta, Kalpana Mudaliar and Palak Patel "Medication Reminder And Healthcare – An Android Application", International Journal of Managing Public Sector Information and Communication Technologies (IJMPICT) Vol. 6, June 2015, pp. 39- 48.

[3] Yeo Symey, Suresh Sankaran arayanan, Siti Nurafifah binti Sait "Application of Smart Technologies for Mobile Patient Appointment System", International Journal of Advanced Trends in Computer Science and Engineering, august 2013.

[4] Jagannath Aghav, Smita Sonawane, and Himanshu Bhambhlani "Health Track: Health Monitoring and Prognosis System using Wearable Sensors", IEEE International Conference on Advances in Engineering & Technology Research 2014, pp. 1-5.

[5] YoeSyMey and Suresh Sankaranarayanan "Near Field Communication based Patient Appointment", InternationalConference on Cloud and Ubiquitous Computing and Emerging Technologies, 2013, pp.98-103.

[6] RashmiA.Nimbalkar and R.A. Fadnavis "Domain Specific Search of Nearest Hospital and Healthcare Management System", Recent Advances in Engineering and Computational Sciences (RAECS), 2014, pp.1-5.

[7} A. Luschi, A. Belardinelli, L. Marzi, F. Frosini, R. Miniati and E. Iadanza "Careggi Smart Hospital: a mobile app for patients, citizens and healthcare staff", IEEE-EMBS International Conference on Biomedical and Health informatics (BHI), 2014, pp.125-128.

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System Under Inventive Apps Ltd. By

MD. KAWSAR- UL- HAQUE BHUYAN

Student ID: **1722072**

Autumn, 2022

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.



(Signature of the Supervisor)

Mr. Sanzar Adnan Alam

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