An Undergraduate Internship/Project on Telemedicine

By

Ifaz Alam Chowdhury

Student ID: **1721464**

Summer, 2021

Supervisor:

Moumita Asad

Lecturer

Department of Computer Science & Engineering

Independent University, Bangladesh

September 4, 2021

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, Ifaz Alam Chowdhury (1721464), 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 Moumita Asad. I also attest to the fact that all of my work is authentic, as I discovered during my internship. All information sources used in this project and report have been properly acknowledged.

Signature	Date
Ifaz Alam Chowdhury	
Name	

Acknowledgement

First and foremost, I want to thank ALLAH, the Almighty, for providing me the strength to carry out my responsibilities as an intern and complete the report on time.

I am deeply indebted to my Faculty Advisor Moumita Asad, Lecturer, Independent University, Bangladesh for her whole-hearted supervision during my organizational attachment period. I am also grateful to Muhammad Pasha Biddut, as my organizational supervisor. It would have been very difficult to prepare this report up to this mark without their guidance. I would like to thank my Parents for always being there by my side whenever I was feeling down.

I would want to express my gratitude to Independent University Bangladesh, and also to all faculty and staff members who contributed significantly to my bachelor's degree in CSE. My deepest appreciation and admiration go to my professors and mentors who generously shared their expertise with me in order to teach and prepare me for future success.

Finally, I would have to thank my friends who also supported me during my tough times and express my gratitude to everyone involved.

Letter of Transmittal

September 4, 2021
Moumita Asad
Lecturer
Department of Computer Science & Engineering
School of Engineering & Computer Science
Independent University, Bangladesh.

Subject: Submission of Internship Report.

Dear Miss,
I am glad to submit my internship report on "Telemedicine" in accordance with your instructions in order to complete the CSE499 course requirement. I tried my best to incorporate all important information, justifications, things I learnt from the organization, and my contribution to the system in order to achieve the report helpful and thorough. Without your help, I would not have been able to finish this report, for which I am grateful. Working with Infotech Solutions BD for three months was an incredible experience and a fantastic learning opportunity for me. Also, preparing this report was a fantastic experience, and I will be accessible for any clarification needed.

Therefore, I sincerely hope and pray that you will accept and act upon my Internship Report.

Sincerely,

Ifaz Alam Chowdhury
ID: 1721464
E-mail: 1721464@iub.edu.bd

Evaluation Committee

.....

Signature

.....

Name

.....

Supervisor

.....

Signature

.....

Name

.....

Internal Examiner

.....

Signature

.....

Name

.....

External Examiner

.....

Signature

.....

Name

.....

Convener

Abstract

This report is based on my three-month work experience with InfoTech Solutions Bangladesh. InfoTech Solution BD is a software firm that began operations in 2013. I worked as an intern as a web developer in the company's current project. The project that I had to work under was Telemedicine. It is a system by which the patients can book appointment and consult with a doctor entirely online. I was given the module of Agent, the work of Agent is to transfer balance to the patients, to create account for patients if they are unable to to it by themselves.

This report is divided into 9 chapters, and each chapter is divided into few smaller sections. At the very beginning of the report I had to write about the Introduction of the project, the overview, objectives and scopes of my project. In the second chapter I had to write about how my Internship is related with my Undergrad studies and also if there any similar system out in the market which I am working on. In the third chapter I had written about how I am going to breakdown the works into smaller chunks, I have written about the time distribution given for each tasks, a Gantt chart where we can in which week what task is being done. In this chapter, I have also written about the estimated costing of the Project which is 4,45,850/- BDT. In chapter 4, I have written about the methodology that will be used in the Project, which is Agile.

The most Important chapter of the Report is Chapter 5. In this chapter I have written about the description of the work. System analysis was also done in this Chapter. The sections included in System analysis were Six Element Analysis, Feasibility Analysis and Problem Solution Analysis. I have also drawn Rich Picture of the System, UML diagrams and the Functional and Non-Functional requirements. I also wrote about what are the Inputs system will take and the expected output. The Architecture is MVC and it is a three-tier architecture. In chapter 6, I have attached UI and also have given a test table. Chapter 7 was about the sustainability of the Project, the social and environmental effects and the ethics. In chapter 8 I have written about what I have learnt throughout the Internship. And finally in the last chapter, I have mentioned the future works for the project and then have given a conclusion of my report.

Contents

List of Figures

List of Tables

Chapter 1

Introduction

An internship allows us to gain experience in the field of work that we wish to pursue. This not only gives us an advantage over other applicants when applying for jobs, but it also helps us prepare for what to expect in their area and boosts our confidence in work.

I am currently studying in Independent University, Bangladesh (IUB), and my Major is CSE. In my University, we have to complete a course which is called Internship Program (CSE499), the course is mandatory. I think that this course is very important for all the students as they get a chance to implement what they have learnt throughout the university life.

1.1 Overview/Background of the Work

The Project that I will be working under is Telemedicine. There are few modules in my project; I have been assigned to develop the module of Agent in our system.

In the current situation of Covid-19, people are forced to stay inside their home for their safety. There are many people who are not being able to visit doctors. They are afraid to go out as there are many covid-19 patients in Hospitals. There are many non-covid patients who might need to consult with a doctor urgently, but is also afraid to go to hospital because of the current situation.

Thinking about all these issues, we have decided to build a web based application by which patients can consult with their preferred doctor through online without any hassle. Patients just need to open an account and add balance in their account for an appointment with a doctor. Patients can check the visiting hour and visiting charge of the doctor then pay the visiting charge and select a suitable time and book appointment. By this was the patient doesn't need to go to a hospital or doctor's chamber. He/she can consult with the doctor entirely online. It saves a lot of time also for both patient and doctor as they both can 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 recharge balance in their account very easily.
- Agent can accept/reject patients balance request.
- Agent can request for balance from admin.
- People from all over the country can use the system.

1.3 Scopes

The works for the Agents are that they can accept/reject a Balance transfer request which is made by the Patient, they can transfer balance to patient using the patient's mobile number by which they have used during account sign up. Agent can request for money from the Admin. They can check the list of patients to whom they have transferred balance. They can check transactions made between two dates.

- **Agent Dashboard:** In this page the agent can check his available balance and also check pending balance request from the patient. There is an input field where the agent can input the patients number and recharge to the patients account.
- **Patient Balance Request Page:** This page shows the list of patients who have requested for balance and also the amount that they have requested.
- **Add Patient Page:** This is basically a Patient sign-up form inside the Agent module; there might be people who can't create an account. For those people the agent can create an account.
- **View My Client Page:** Agent can view the patients to whom they have transferred money. They can also check the patient details.
- **Request Balance Page:** If the agent don't have sufficient amount of money in his account, he can request for balance to the Admin. He can input the amount of balance that he wants.
- **Check statement Page:** In this page the user can input 2 dates and check all the transactions he made between those dates.

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

The courses that I did in my University are helping me a lot with my Internship project. I have learnt many things from my University and I am being able to apply those in my Internship now. Few of the courses that are closely related to my Internship Project are:

1. **Database Management (CSE303):** In this course I have learnt the things that are needed to be done when beginning a project. I learnt how to draw rich picture, how to write Six Element Analysis, Problem analysis and how to 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. SQL will be really useful when I will be working with the Database of my project.

2. **System Analysis and Design (CSE307):** This is a course where I have learnt about Functional and Non-Functional requirements in a System. I have learned about UML diagrams and how to draw them properly. I have also learned about SDLC which is very important when starting a new Project.

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

4. **Software Engineering (CSE451):** There were many topics that 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 in which we can test the whole system in an organized way and find out if there is any fault.

2.2 Related works

The people of Bangladesh are still not much familiar with telemedicine. After the situation of covid-19, many people are getting to know about telemedicine. There is not much telemedicine platform in Bangladesh.

Few of the notable telemedicine system in Bangladesh are:

1. **Praava Health:** Praava has been founded in 2016. They are also helping people to consult with 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 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 a patient visits the website for the first time, they might get confused as there are many contents in their website. It might be tough for few to navigate through the system.

Our system is different in a way that the users don't need to purchase a monthly package for booking appointment with a doctor; they can just add the balance in their account and book an appointment.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

A Work breakdown structure (WBS) is a strategy for finishing a multi-step project that is complicated. It's a strategy for breaking down large projects into smaller chunks and completing them more quickly and effectively. The goal of a work breakdown structure (WBS) is to make a huge project easier to manage. Breaking it down into smaller portions allows multiple team members to work on it simultaneously, resulting in increased team productivity.

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. It also makes the project well organized. We have divided our work into 5 process, they are: Requirement Analysis, Design, Development, Testing and Deployment.

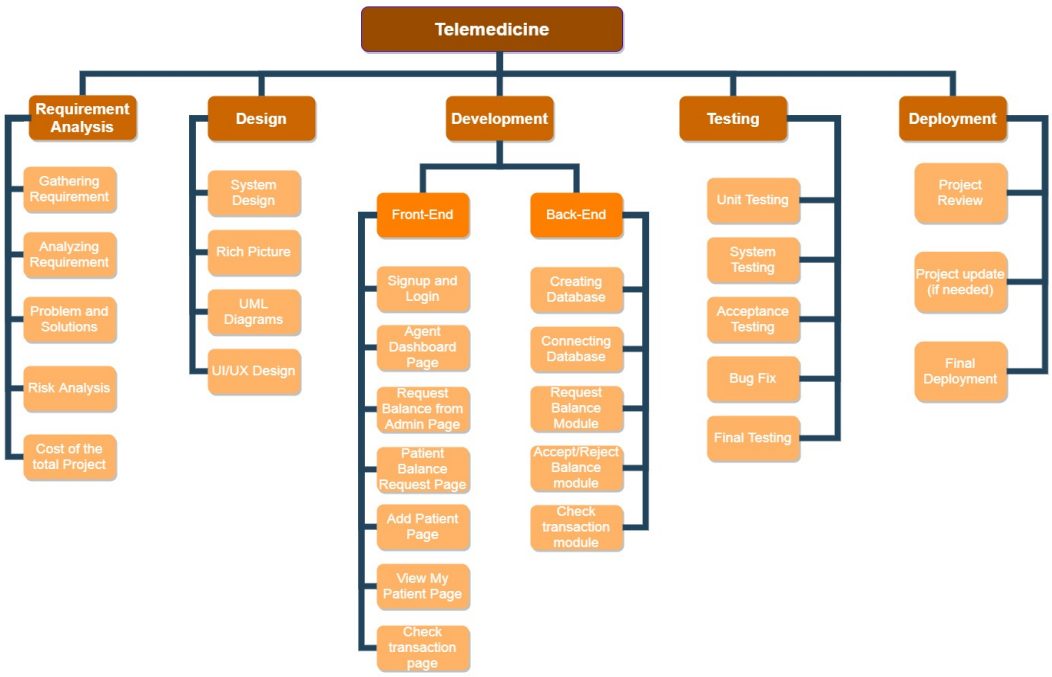

Figure 3.1: Work Breakdown Structure

3.2 Process/Activity wise Time Distribution

In my WBS, we have seen that there are five processes in the project. For each processes, there is a specific time given to complete it. When the project is divided into smaller part and given a certain time to complete it, the work will be done efficiently. If there is no time range given, the project might take a more time than required.

The Process/Activity wise time distribution of my project is given below:

Table 3.1: Process/Activity wise time distribution

Activity	Days
Requirement Analysis	10
Design	5
Development	30
Testing	10
Deployment	5
Total	**60**

In this table, we can see that Requirement Analysis will take about 10 working days to finish, it will take 5 working days to finish the design of the project, for the core part of the project, which is deployment, it will take around 30 working days to complete. For the testing and bug fixing of the project, it might take around 10 working days. And for the deployment we kept 5 days in hand.

In total we can see that we have 60 working days to complete the project. It will take approximately 3 months to complete the project.

3.3 Gantt Chart

A Gantt chart, which is widely used in project management, is one of the most popular and useful methods for displaying activities against time. A list of the activities may be found on the left side of the chart, and a suitable time scale can be found along the top.

We have also created a Gantt chart for our Project, so that it gets easier to plan and work accordingly.

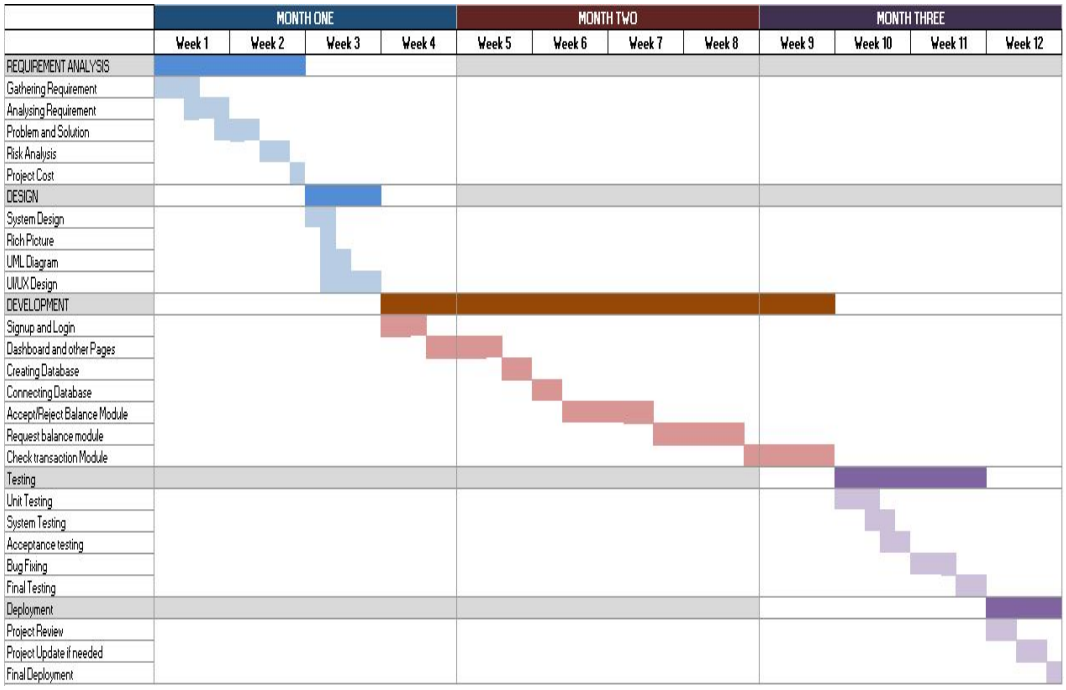

Figure 3.2: Gantt Chart

In the above Gantt chart, we can see the weekly progress along with the processes. In the first 2 weeks, requirement analysis is done; in the 3rd week design is done for the project. From week 4 to week 9 is the development phase of the project. Week 10 and 11 are for testing and the last week is for the deployment of the project.

3.4 Process/Activity wise Resource Allocation

The resource is an important factor in a project. If we have all the proper resources, it will be much easier for us to complete the project properly in a short period. Lack of resource will take a lot of time to complete a project. A table is given below where we can see the number of people involved in our project with their monthly salary:

Table 3.2: Number of team-members with their salary

Work Distribution	No. of team Members	Approx. Salary
Project Head (Senior full Stack Developer)	1	25,000/-
UI/UX Designer	1	15,000/-
Senior System Analyst	1	20,000/-
Business Analyst	1	20,000/-
Marketing Team	3	35,000/-
Trainee Full Stack Developer	5	25,000/-

Table 3.3: Domain and Hosting

Name	Purchasing Company	Description	Unit	Price in BDT
Hosting	Digital Ocean	128 GB SSD, 4GB RAM, 3 CORE CPU	1	25,000/Year
Domain	Whois.com	Name.com	1	850/-

3.5 Estimated Costing

The total estimated costing is an important factor. We can get an idea of how much money is needed to build the project. We can know how much money is to be spend on which part of the project. The main portions of the costing are the salary of the UI/UX developer, System analyst, Development team, business analyst and marketing team.

We have created an estimated costing that for our project, this will give us an idea of how much money is required to build the project.

Table 3.4: Estimated total costing for project

Work Distribution	Costing
UI/UX Development	45,000/-
System Analyst	60,000/-
Development team	1,50,000/-
Business Analyst	60,000
Marketing Team	1,05,000/-
Domain and Hosting	25,850/-
Total	**4,45,850/-**

The total estimated costing of my project is 4,45,850/= BDT. The salary of UI/UX designer is 45,000 taka in 3 months. System Analyst for 60,000 taka in 3 months. The development team which consist of 5 trainee developers and 1 senior developer have a total salary of 1,50,000 taka in 3 months. The 3 members of the marketing team have a salary of 1,05,000 taka, and for the domain and hosting the company have to spend 25,850 taka.

Table 3.5: Estimated monthly marketing budget

Description	**Cost/month in BDT**
Digital Marketing	25,000/-
Offline Marketing	15,000/-
Doctor and Agent Accusation	15,000/-
Total	**55,000/-**

Chapter 4

Methodology

The software development process is a method of breaking down software development work into phases to improve the design of the system, improve the project management. This is also known as Software Development Life Cycle (SDLC). The 7 phases of SDLC are: Planning, Analysis, Design, Development, Testing, Implementation, and Maintenance.

There are many SDLC methodologies, they are:

- Waterfall
- Lean
- Agile
- Iterative
- DevOps
- Spiral
- Prototyping

The SDLC methodology that we will be using in our Project is Agile.

The Agile methodology is a method of project management that divides a project into numerous phases. As the project is broken down into smaller phases, the work can be done faster and efficiently. All the features are not needed to be done at once; we can do them part by part. When we complete a task, we can get the feedback almost daily and quickly act on that feedback immediately. We can have a better control of the project in Agile. [1]

Chapter 5

Body of the Project

5.1 Work Description

The project that I will be working under is Telemedicine. Telemedicine is a system in which the patient will be able to conduct with a Doctor entirely online. A patient needs to create an account in the system to avail of the service. The patient must have a balance (money) in their account to book an appointment with a Doctor. There are THREE ways in which the patient can get balance in their account, 1st one is through Online, 2nd is using scratch card and 3rd is through Agents.

Sales Agents are like Bkash agents. They will have shops/booths throughout the country. They will provide balance to Patients. There are two ways of transferring balance; when the patient requests credit, they can accept the request by which the balance will be transferred to the patient's account, the agent can also reject the request of the patient. The other way of transferring balance is by using patient's mobile number. When the mobile number is typed, the system checks whether there is any patient registered with that number. If yes, the patient's details will be shown and there will be a field where we can enter the amount. If No, nothing will be displayed.

To transfer the balance to the patients by both the ways, the Sales Agent must have sufficient balance in his account. If the balance is not sufficient, he can request a proportion from the Admin.

The agents can also view the list of Patients to whom they have transferred balance. Agents can provide two dates and check all the transactions made between those two dates.

There might be patients who might not have access to a smartphone or don't know how to create an account. Those patients will come to the agent, and then the agent will create an account for those patients. The account will be created inside the agent module.

5.2 System Analysis

Systems analysis is the process by which a person (s) examines a system in order to assess, model, and choose a logical alternative for an information system.

5.2.1 Six Element Analysis

The six element analysis is a method where we can know about the stakeholders, non-computing hardware used, computing hardware used, the software used, the database and the network needed for a particular process in the system.

Table 5.1: Six Element Analysis

Process	**Human**	**Non-Computing Hardware**	**Computing Hardware**	**Software**	**Database**	**Network and Communication**
Accept Patient Balance Request	**Patient:** a) Request for balance from agent. **Agent:** a) Login to the system. b) Goes to Patient request page. c) Approves the balance request made by the patient.	**N/A**	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.

Send Balance using patients mobile number	**Agent:** a) Login to the system. b) Input the patient's mobile number to whom agent want's to transfer balance. c) If the number is valid, patient's information is displayed and a field is displayed where the agent can input the amount he wants to transfer. d) Click on submit button to transfer balance.	**Pen and paper:** If the system is down, agent can write down the number in a paper and later send it to the patient when the system will be running.	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.

Delete Patient Balance Request	**Patient:** a) Request for balance from agent. **Agent:** a) Login to the system. b) Goes to Patient request page. c) Deletes the balance request made by the patient.	**N/A**	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.
Request Balance from Admin	**Agent:** a) Login to system. b) Goes to request balance page. c) Enters the amount the agent needs. d) Click on submit button.	**N/A**	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.

Add new patient from Agent module	**Agent:** a) Login to system. b) Goes to add patient page. c) Enters all the required fields. d) Click on Confirm button.	**Pen and Paper:** If the system is down, agent can write down the details of the patient in a paper and later add the patient to the system.	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.
View patient (to whom they have transferred balance)	**Agent:** a) Login to system. b) Goes to view patient page. c) The list of patient shows up to whom the agent have transferred balance.	**N/A**	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.

Show transaction (between 2 given dates)	**Agent:** a) Login to system. b) Goes to my transaction page. c) Input 2 dates to check transaction made between those 2 dates. d) All the transactions are showed that are made between the 2 given dates.	**N/A**	**Computing Device:** A computing device is required to use the website.	**Web Browser:** A web browser is needed to access the website, without a web browser we cannot access any website.	**MySQL:** The Database used for telemedicine is MySQL.	**Internet:** Internet connection is required to access Telemedicine website.

5.2.2 Feasibility Analysis

A feasibility analysis is a process of assessing and analyzing a project or system that has been suggested. The goal of the study is to see if the idea is technically and financially feasible. A feasibility study also analyzes whether or not a project is financially viable. The basic purpose of a feasibility study is to achieve the scope, not to solve the problem. Feasibility Analysis is categorized as: Technical Feasibility, Operational Feasibility, Economic Feasibility, and Schedule Feasibility.

1. Technical Feasibility: The technical feasibility of this project is determined by the technical teams involved. Infotech Solutions BD is a Bangladeshi software firm with a staff of technical experts and system developers. They are highly qualified and have experience working on large projects. Since the company has a large number of resources. As a result, the development of this software is technically viable.

2. Operational Feasibility: The term "operational feasibility" refers to the software's ability to meet its requirements as well as how the solution affects the user's working environment. It takes a lot of effort to remember so many things. A significant amount of data must be kept up to date. Operating the system does not necessitate any particular training. As a result, we may conclude that this project is operationally feasible.

3. Economic Feasibility: This analysis usually includes a cost-benefit analysis of the project. The cost of developing the website is estimated in full, with all cost breakdowns included. The company's economic benefit from the website is then compared to this cost. As it is a Telemedicine platform, there are high chances that a lot of people will be using the system. So the system is Economically Feasible.

4. Schedule Feasibility: The time it takes to design and implement a solution is referred to as schedule feasibility. It calculates the length of time required to complete the project. This project must be completed within a certain amount of time. So, according to the estimates, this project is scheduled feasible.

5.2.3 Problem Solution Analysis

Throughout the development phase, I have faced few problems. For me the main and the biggest problem was CodeIgniter, as I was totally new to CI, I had no idea how it worked. At the very beginning of the Internship I had to self study alot about the framework. There were few things that were only specific to the framework, whenever I faced problem and my codes were not working, the supervisor fixed it. The codes were all okay but there were few things needed to be done because of the framework.

There were few minor problems also that I have faces such as incorrect placement of a button, incorrect placement of a input field. I took help from Supervisor and have fixed my minor problems.

5.3 System Design

5.3.1 Rich Picture

A rich picture is a Diagram where we can see the relation between stakeholders and the system. We can see all the processes that are being done in the system.

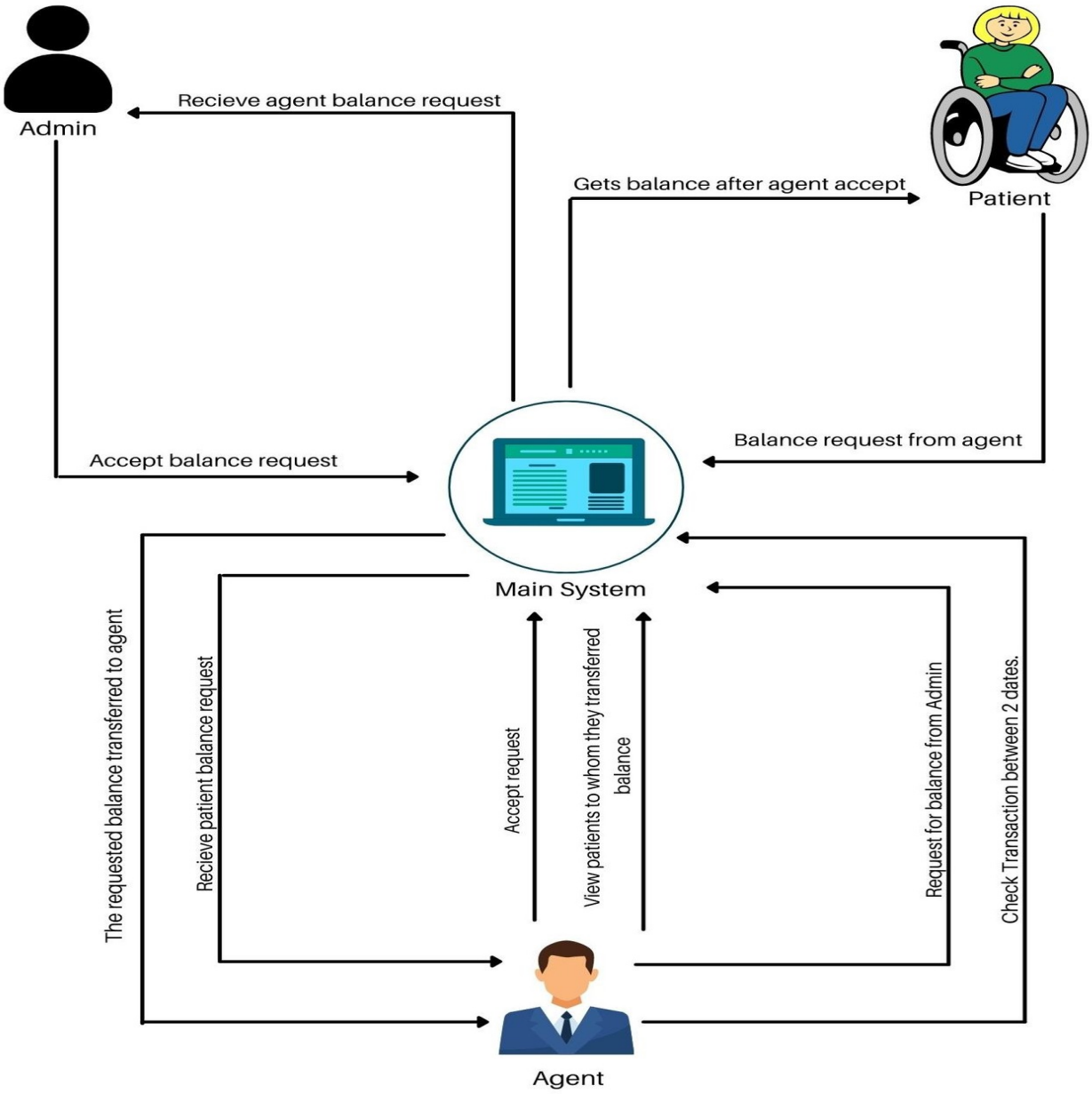

Figure 5.1: Rich Picture

5.3.2 UML Diagrams

A UML diagram is a diagram based on the UML (Unified Modeling Language) that is used to visually represent a system, as well as its primary players, roles, actions, objects, or classes, in order to better understand, edit, maintain, or document system information.

For this project I will draw 3 UML diagrams, they are Use Case Diagram, Activity Diagram and Entity Relationship Diagram.

Use Case Diagram: Use-case diagrams are a type of UML diagram that helps to represent a system's behavior and capture its needs.

The high-level functions and scope of a system are described using use-case diagrams. The interactions between the system and its actors are also depicted on these diagrams. Use-case diagrams show what the system performs and how the actors interact with it. Use-case diagram is the starting point for UML modelling.

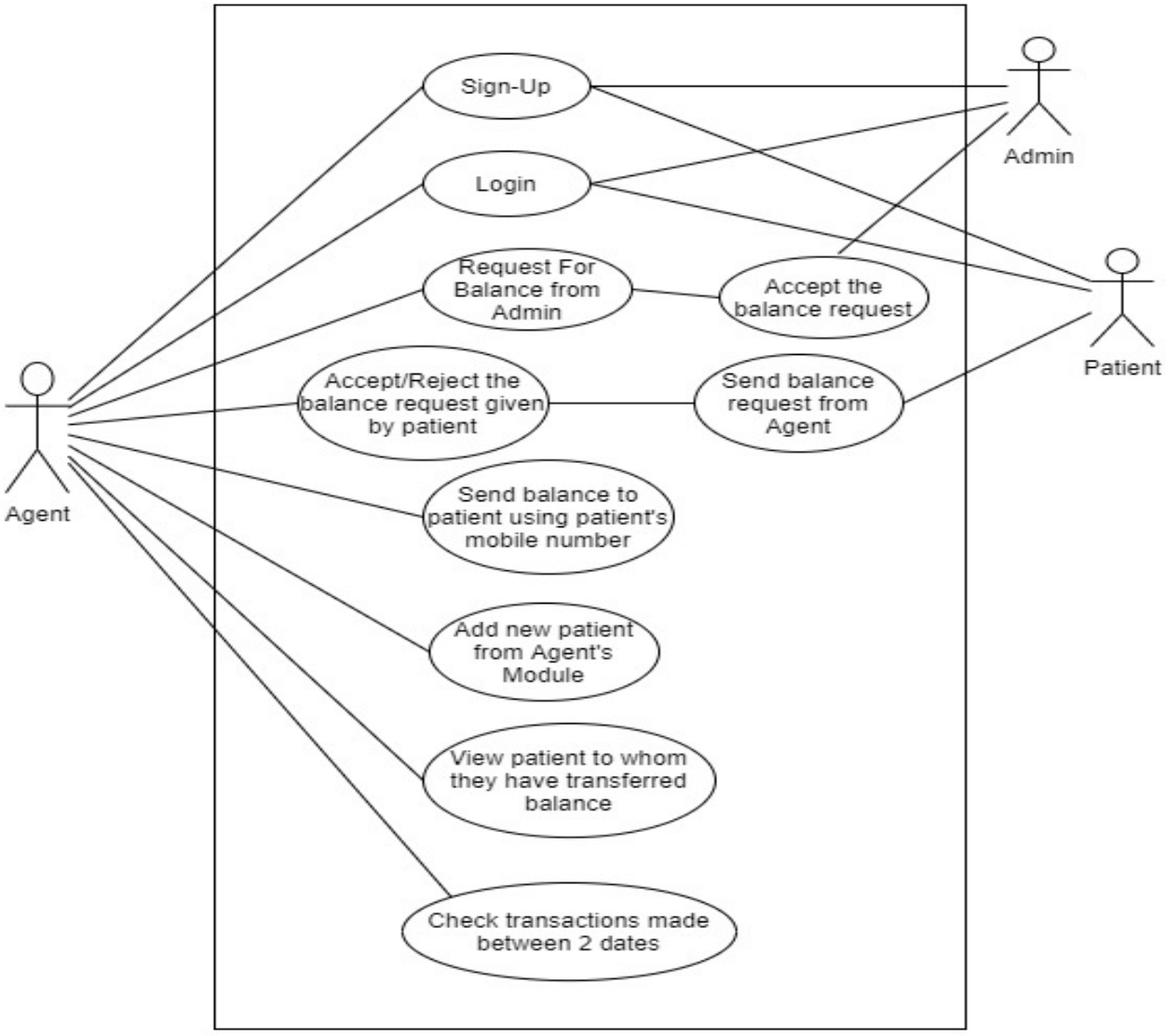

Figure 5.2: Use Case Diagram

Activity Diagram Another essential diagram in UML for describing the dynamic characteristics of the system is the activity diagram.

An activity diagram is a flowchart that depicts the movement of information from one action to the next. The action can be described as a system operation.

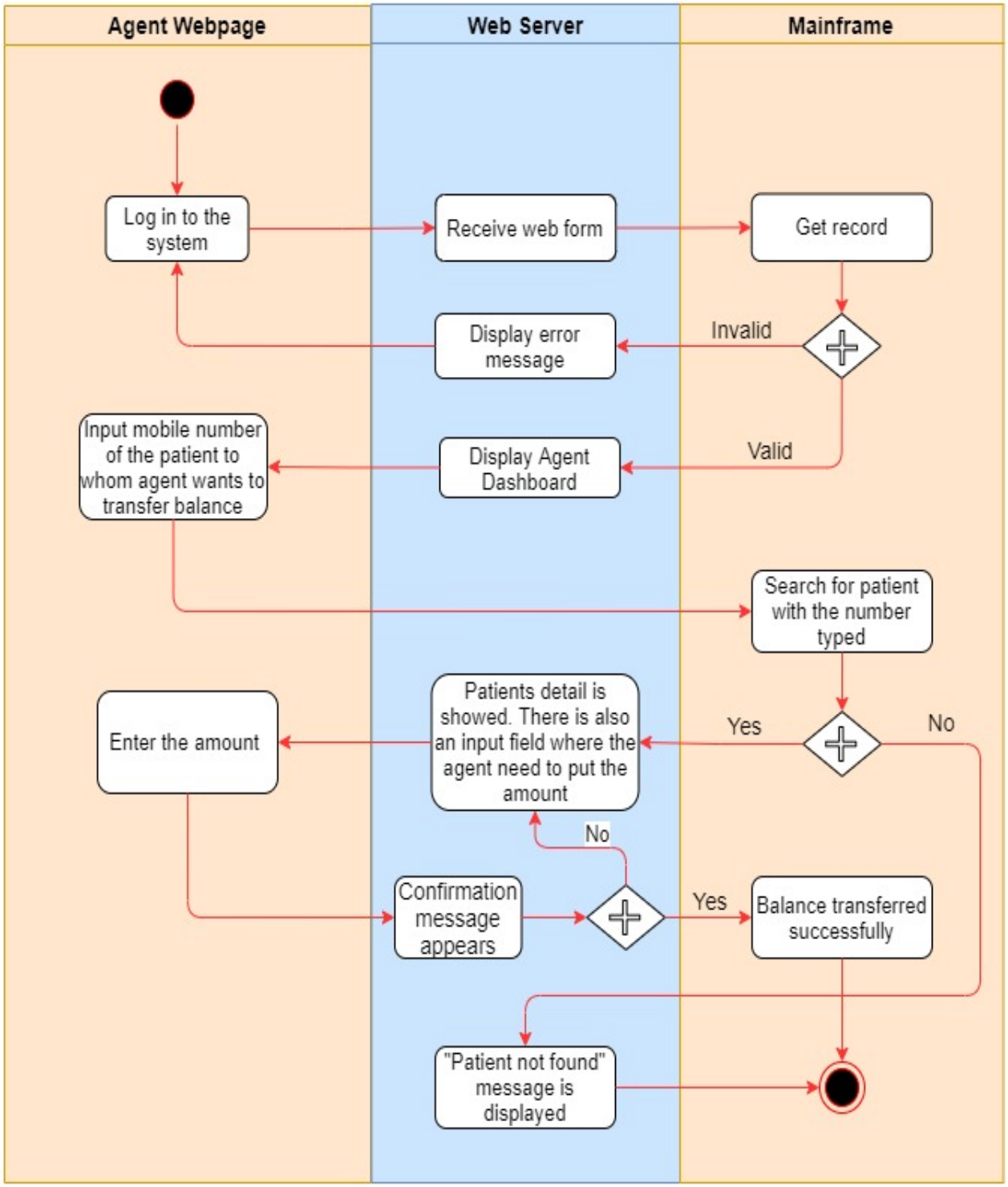

Figure 5.3: Activity Diagram for transferring balance using patients mobile number

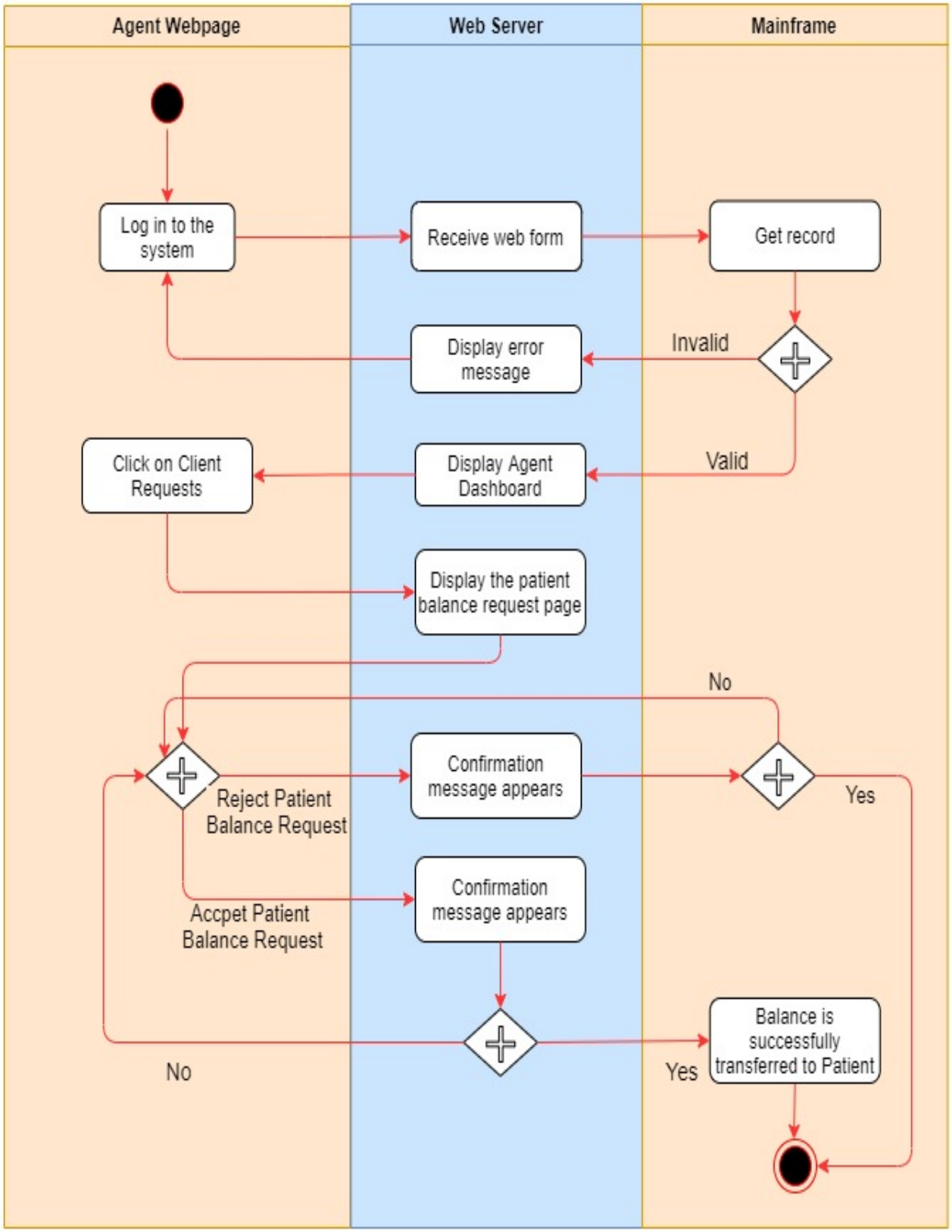

Figure 5.4: Activity Diagram for accepting/rejecting clients balance request

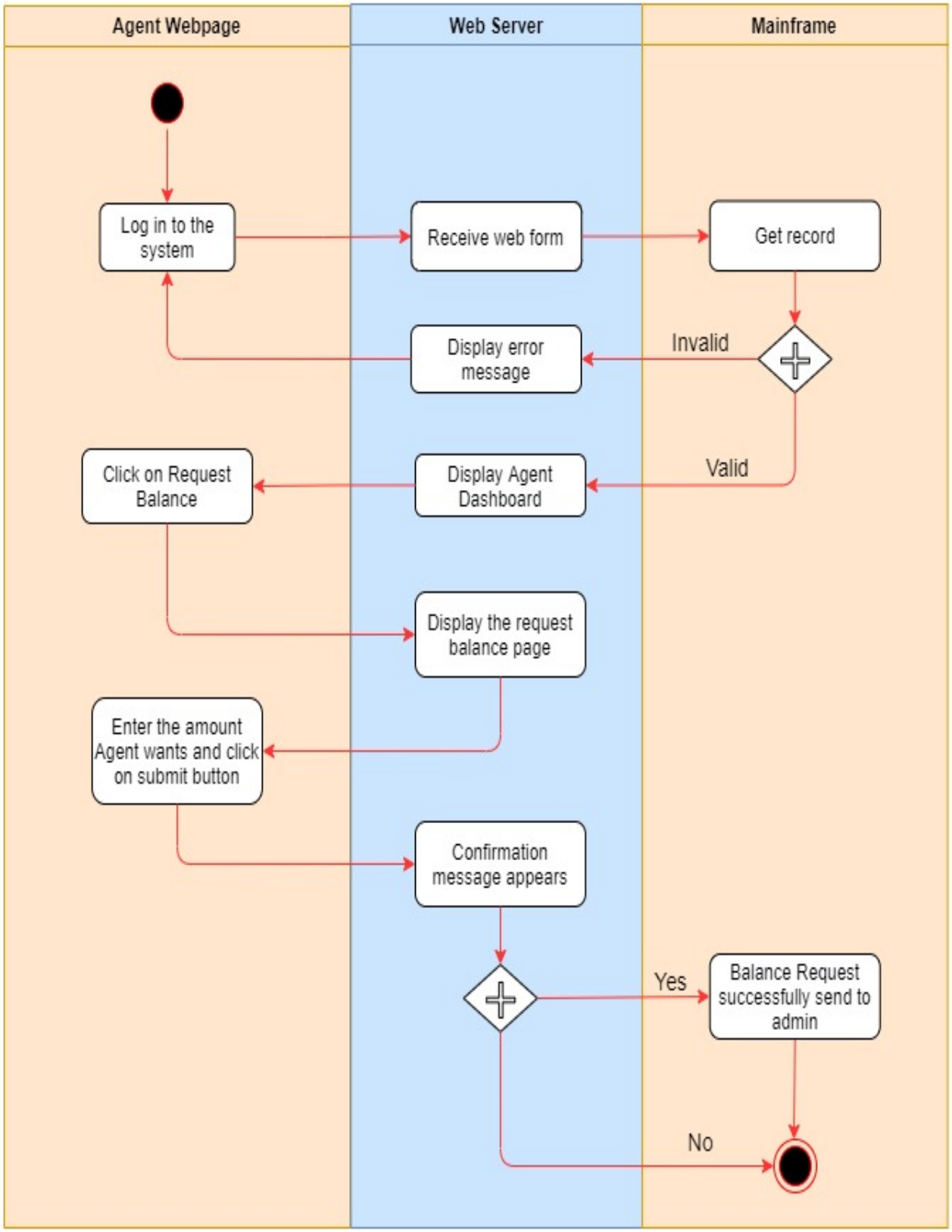

Figure 5.5: Activity Diagram for requesting balance from Admin

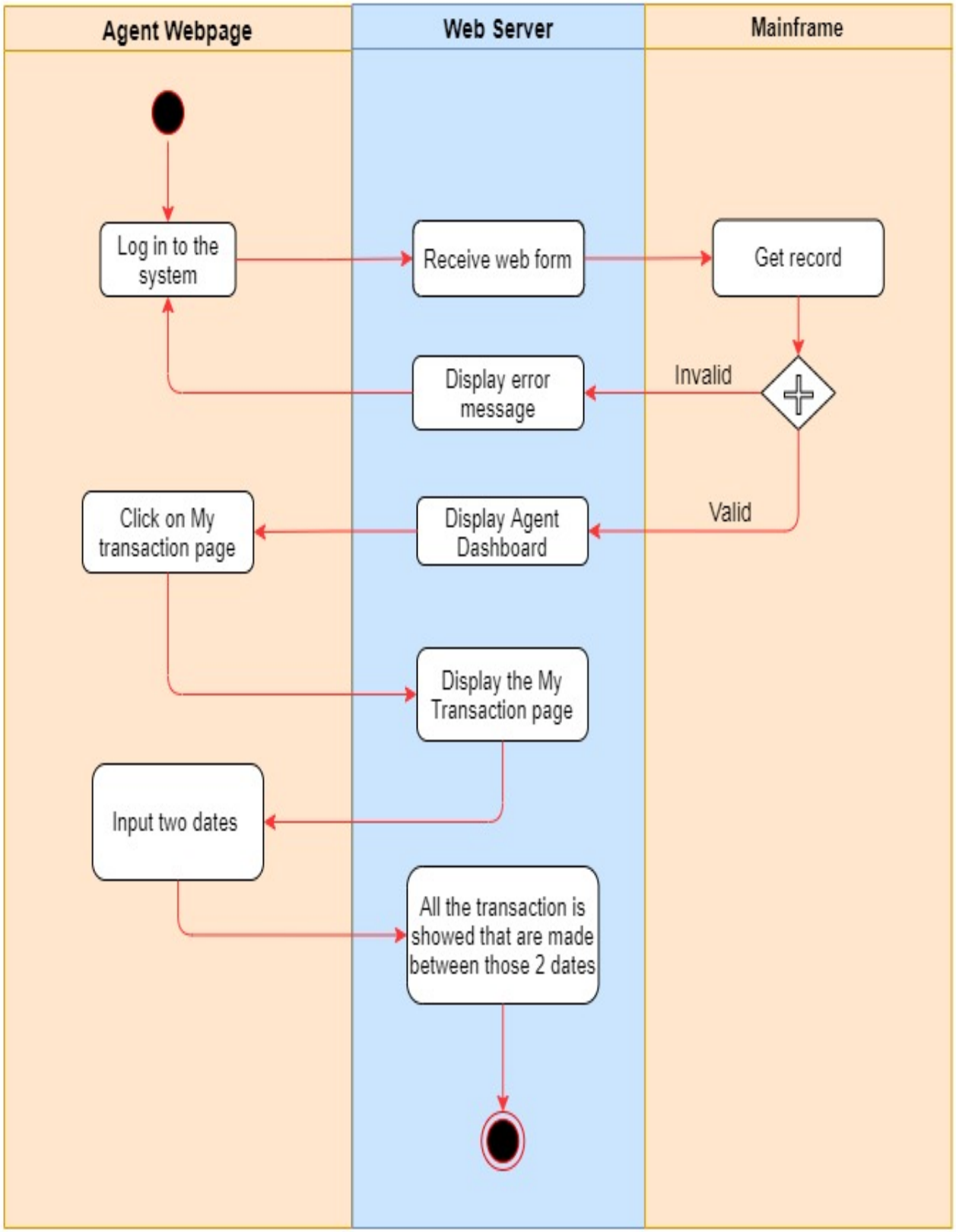

Figure 5.6: Activity Diagram to check transactions

Entity Relationship Diagram: The Entity Relationship Diagram, often known as the ERD, ER Diagram, or ER model, is a sort of database architecture structure diagram. The key entities within the system scope, as well as the inter-relationships among these entities, are visualized using different symbols and connectors in an ERD.

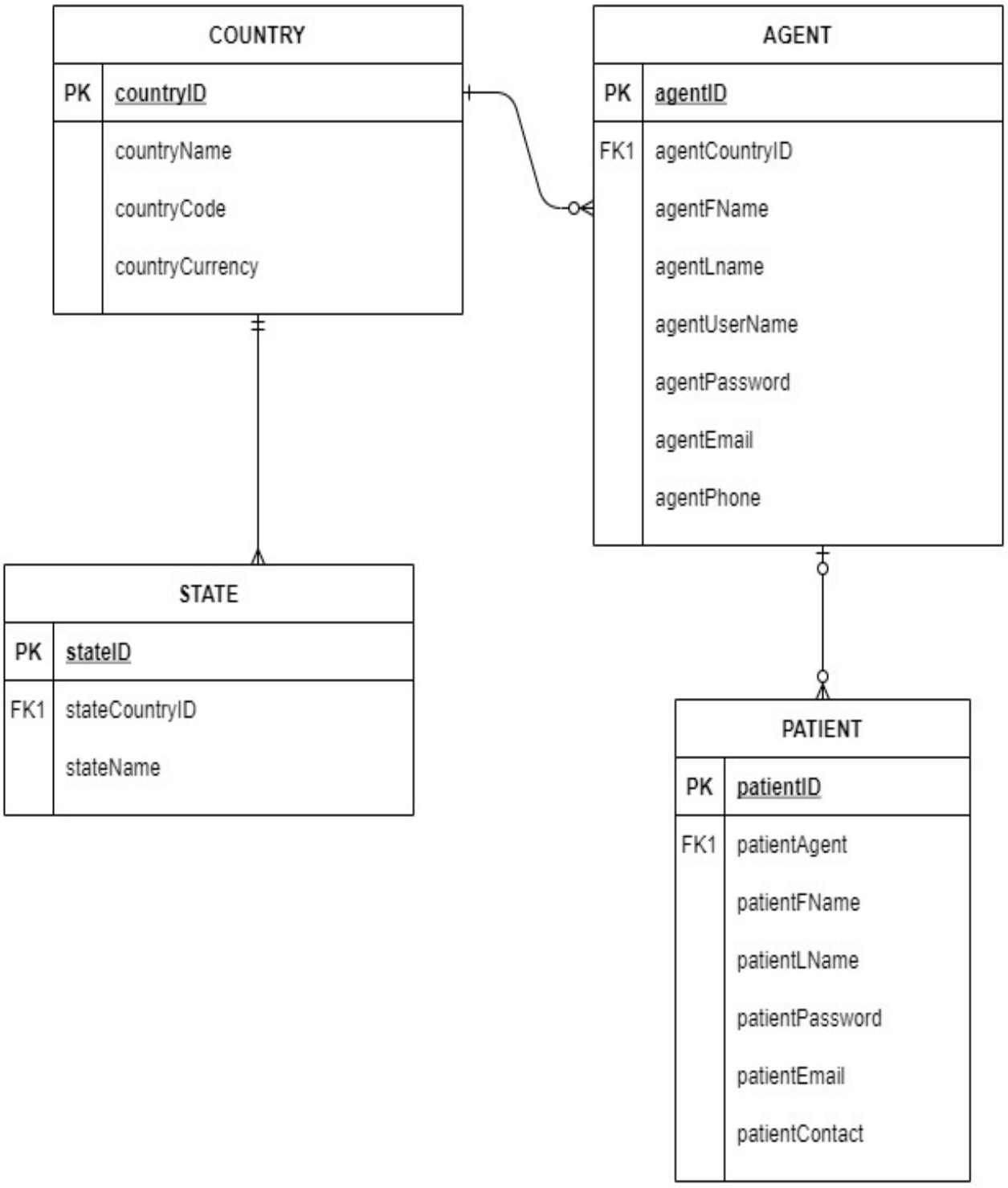

Figure 5.7: ERD

5.3.3 Functional and Non-Functional Requirements

Functional Requirement: A functional requirement is a function or feature that must be included in an information system. They are related to the technical functionality of the system. The technical functionality of the system are:

Table 5.2: Functional Requirement for Balance transfer using patients mobile number

Function: Transfer Balance Using Patients Mobile number		
Input: The mobile number of patient by which patient registered to the system.	**Process:** Log-in to the System and go to Agent Dashboard.	**Output:** Patient will get the Balance in his/her account.
Pre-condition: Agent must log-in to the system		
Post-condition: Successfully transferred Balance		

Table 5.3: Functional Requirement for accept/reject clients balance request

Function: Accept/Reject balance request from patient		
Input: N/A	**Process:** Log-in to the System and go to Client Request Page.	**Output:** Patient will get the Balance in his/her account.
Pre-condition: Agent must log-in to the system		
Post-condition: Successfully transferred Balance		

Table 5.4: Functional Requirement for request balance from Admin

Function: Request Balance from Admin		
Input: Enter the amount needed from the Admin.	**Process:** Log-in to the System and go to Request Balance Page.	**Output:** Request Balance successfully send to Admin.
Pre-condition: Agent must log-in to the system		
Post-condition: Balance Request send successfully to Admin		

Table 5.5: Functional Requirement to check transactions

Function: Check My Transaction		
Input: Enter 2 dates between which the agent wants to check the transaction	**Process:** Log-in to the System and go to My Transaction Page.	**Output:** All the transactions are showed between 2 given dates.
Pre-condition: Agent must log-in to the system		
Post-condition: Agent can see the transactions made		

Non-functional Requirement: The non-functional requirements are an extension to the functional requirement. The important non-functional requirements are:

1. Availability: The system should be always available online.

2. Response Time: The system should respond very fast.

3. Backup: System should regularly back up user's data.

4. User friendly Experience: All the interfaces of this system are easy to understand, clean and user friendly.

5. Security: Security is always a concern. The system should have higher security as it will contain user information.

6. Maintainability: The system should be easy to maintain.

7. Performance: Performance is a key factor. It defines how quickly the system will respond.

8. Scalability: The system should support multiple users working at a time.

5.4 Product Features

5.4.1 Input

• **Input field in Agent Dashboard Page:** In the Agent Dashboard page, there is an Input field where the agent can provide the Patient's mobile number and recharge the patient's account. The mobile number must be the one which the patient used when he/she signed up into the system.

• **Input field in Agent Dashboard after providing mobile number:** After providing with the mobile number and the details of the patient is showed. There will be and Input field where the Agent needs to enter the amount of money he wants to give to the patient.

• **Input field in My Transaction Page:** There are 2 Input fields in My transaction page. Both the Input fields are date picker. One Input field is 'From Date' and the other is 'To Date'. The mandatory Input field is 'To Date'.

5.4.2 Output

• **Output in Agent Dashboard Page:** When the correct mobile number is typed in the input field, the patient's information is showed in the dashboard of the Agent. There will also be an Input field where the Agent will enter the amount he wants to transfer. If the number is incorrect, a "Patient not found" message will appear.

• **Output in Agent Dashboard after providing mobile number:** When the agent input the amount in the input field and click on submit, a confirmation message appears. In the confirmation message there are 2 options, YES and NO. If agent clicks on Yes, the amount will be successfully transferred to the Patient, but the agent must have sufficient balance in his account in order to transfer balance to patient. If the agent clicks No, the money will not be transferred.

• **Output in My Transaction Page:** After providing the dates, the expected output will be the transactions made between those 2 dates. In case the Agent Provide only 'To Date', all the transaction will be showed from the beginning until the date provided in 'To Date'

5.4.3 Architecture

The architecture that we are using for this project is **MVC** architecture. MVC stands for Model, View and Controller. MVC Architecture's fundamental goal is to keep business logic and application data distinct from the user interface.

Model is Database operation such as fetch data or update data etc. View is end-user GUI through which user can interact with system, i.e., HTML, CSS. Controller contains Business logic and provides a link between model and view. MVC is a three-tier Architecture. [2]

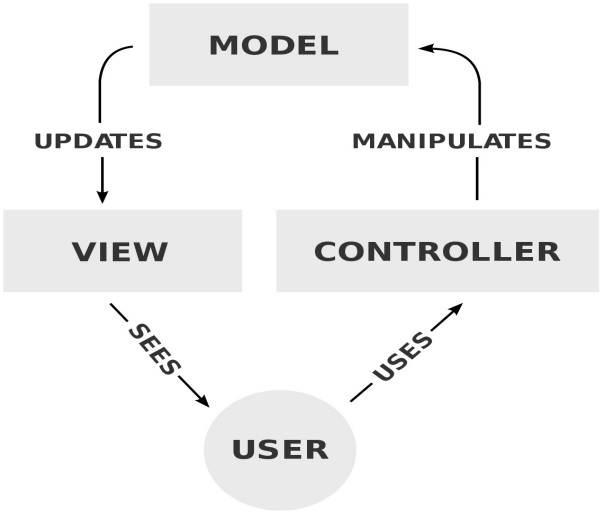

Figure 5.8: MVC Archicture

Chapter 6

Results & Analysis

6.1 Results

1. Agent Dashboard: This is the landing page of Agent. From this page the Agent can transfer balance to the patient using patient's mobile number.

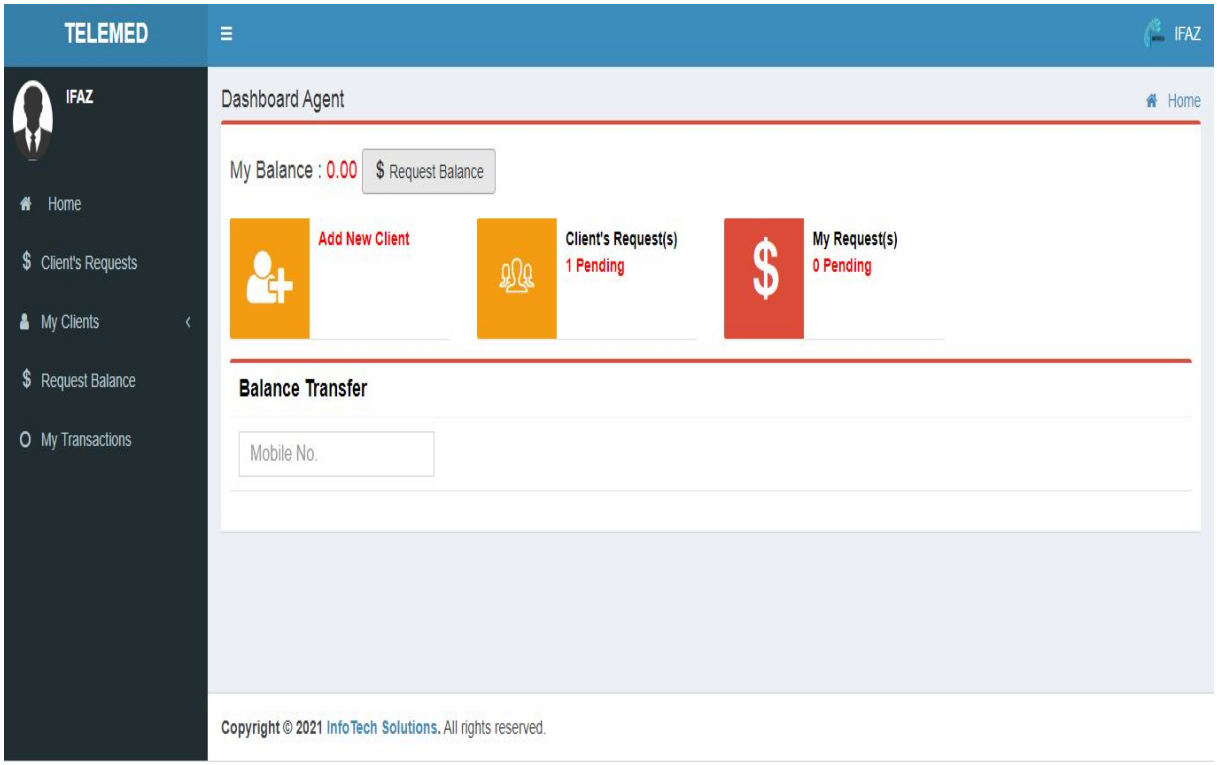

Figure 6.1: Agent Dashboard

2. Balance Request from client: In this page the agent can see the balance requests made by the patient.

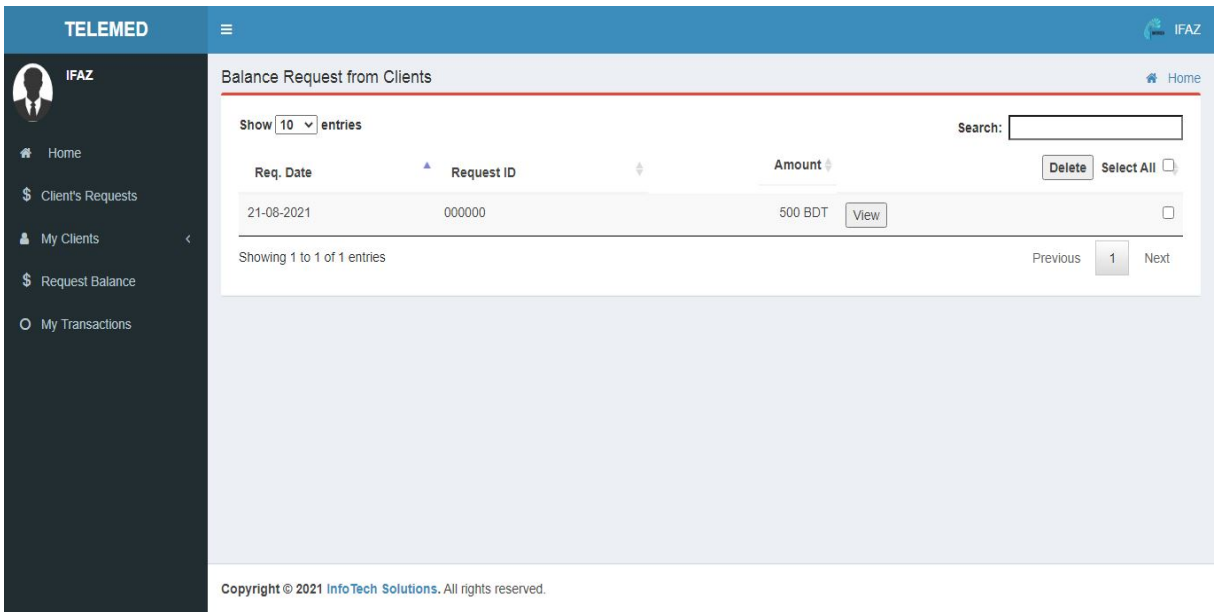

Figure 6.2: Balance request from client(Patient) page

3. Patient sign up within client module: If any client(patient) is not able to sign up by themselves. They can come to an agent and the agent can sign up an account for that client.

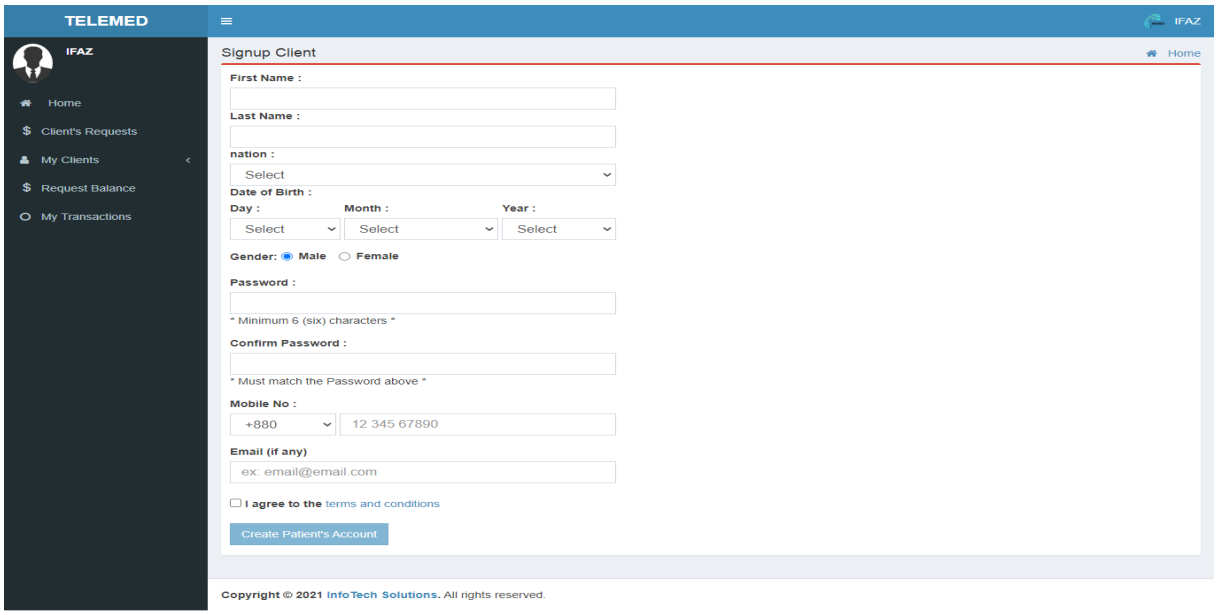

Figure 6.3: Patient Sign-up from Agent module page

4. My client page: The agents can view the list of patients he have transferred money to, and also the patients for whom he have created an account.

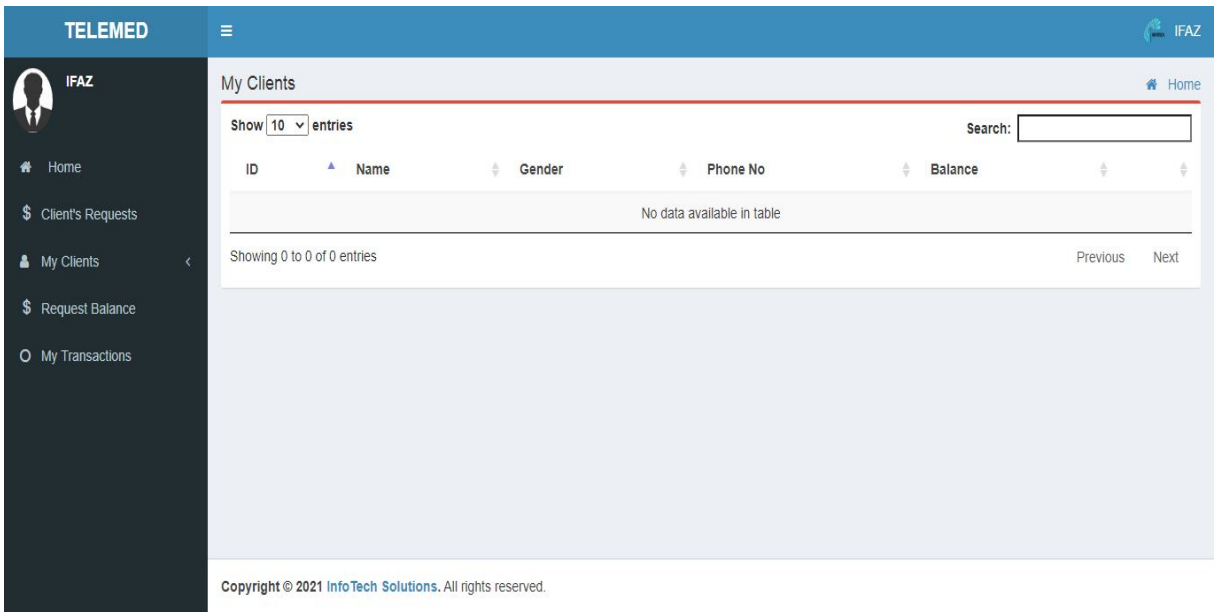

Figure 6.4: My Client page

5. Request Balance page: If the agent doesn't have sufficient balance, he will request for balance from Admin.

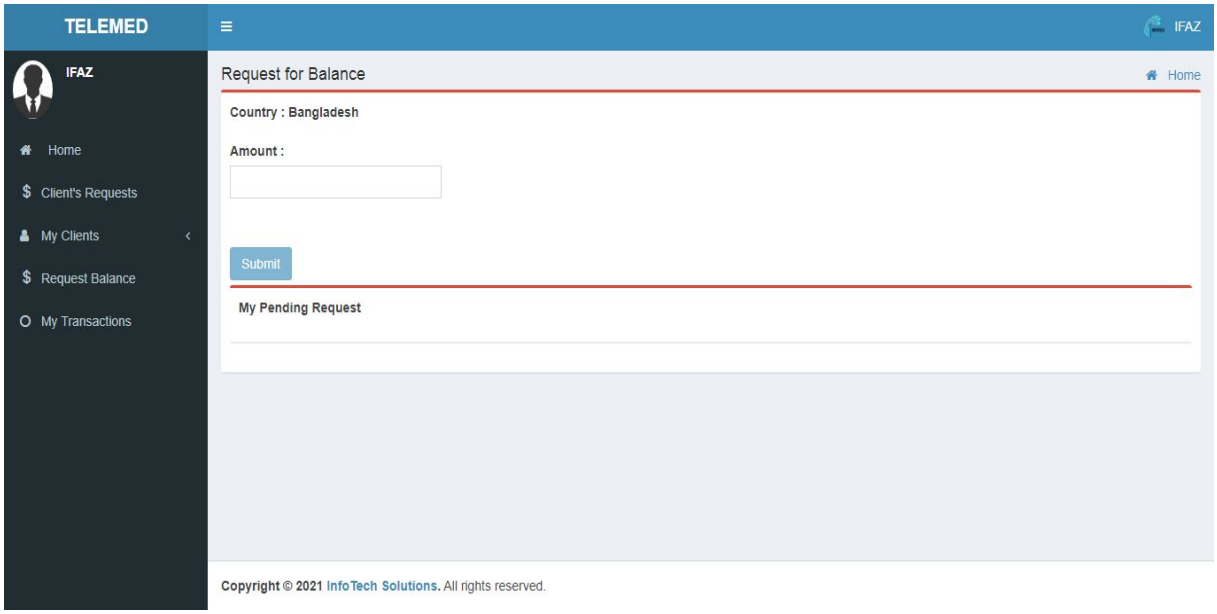

Figure 6.5: Request Balance From Admin page

6. My transaction page: The agent need to put 2 dates in which all the transactions will be showed made between those 2 dates.

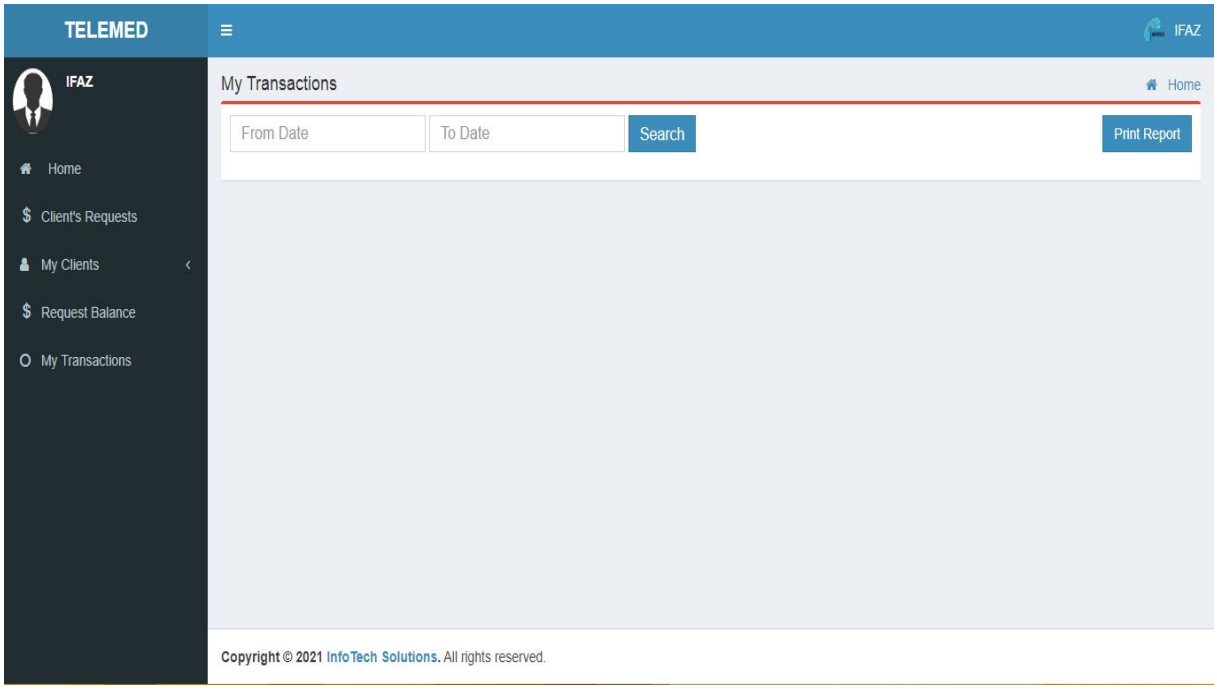

Figure 6.6: My Transaction page

6.2 Test Case

Software Testing is the process of establishing confidence that a program or system does what it is supposed to. Software Testing is one of very important software development phases. It is the major quality checking point for software on its production line.

I have done unit testing for my system to check whether all the functionality is working properly and to check if there are any issues to be fixed in the system. It is the most 'micro' scale of testing. Unit testing is done by Programmers (not by testers).

Table 6.1: Test Case

Test ID	**Test Case Name**	**Test steps with data**	**Expected result**	**Actual result**	**Data Used**	**Status (Pass/Fail)**
1	Test with correct mobile number of patient in Agent Dashboard page for Balance transfer with patients mobile number	a) Enter correct mobile number of the patient in the input field. b) Click on anywhere outside the input field.	Few details of the patient registered with the phone number will be displayed with an input field to enter the amount to be transferred.	A patients detail is displayed with an input field.	Correct mobile number.	Pass
2	Test with incorrect mobile number of patient in Agent Dashboard page for Balance transfer with patients mobile number.	a) Enter a number by which there is no user registered. b) Click on anywhere outside the input field.	"Patient Not found" message should be displayed.	"Patient not found" message is displayed.	Incorrect mobile number.	Pass

3	Test with no numbers at all in Agent Dashboard page for Balance transfer with patients mobile number.	a) Keep the input field empty.	"Enter mobile number" Error message should be displayed.	"Enter mobile number" Error message is displayed.	Empty field.	Pass
4	Test case to approve the Balance request from client.	a) Go to client request page. b) View the client balance request and click on approve button.	"Approved Successful" confirmation message should appear.	"Approved Successful" confirmation message appeared.	N/A	Pass
5	Test case to Reject the Balance request from client.	a) Go to client request page. b) View the client balance request and click on delete button.	"Deleted successfully" message should appear.	"Deleted successfully" message appeared.	N/A	Pass

6	Test with an amount of Balance in Request Balance page to get balance from Admin.	a) Go to request balance page. b) Enter an amount in the input field. c) Click on anywhere outside the input field. d) Click on 'Submit' button.	A confirmation dialogue box should appear with "Yes" and "No" buttons.	A confirmation dialogue box appears with "Yes" and "No" buttons.	I typed '1000' in the input field. It means 1000 taka.	Pass
7	Test with empty Balance in Request Balance page to get balance from Admin.	a) Go to request balance page b) Keep the input field empty.	"Enter an amount" message should be displayed, and the submit button will be disabled.	"Enter an amount" message displayed and the submit button is disabled.	Kept the input field empty.	Pass

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

Project sustainability is currently a widely used method to project management. From project identification to feasibility studies, design, funding, implementation, and evaluation, specific criteria and standards must be established for projects to be sustained. The acceptability, viability, and flexibility of a project will be determined through a sustainability analysis. [3]

In prior to developing this project, the company has done a lot of requirement analysis for the project. There are few other Telemed websites from which they have analyzed and found what improvements could be done. The company will also take feedback from the users of the system, the user can tell the good and the bad sides of the system and according to the feedback we can make changes in the system.

I believe that the project will sustain well. People from rural areas will also be able to use our system. It is going to make their life easy as Telemed is a system which will be always used by the people. This project will not be used in Bangladesh, but also by Malaysia, Saudi Arabia and UAE.

7.2 Social and Environmental Effects and Analysis

The project Telemed is a system by which patient will be able to consult with Doctors entirely online. I believe that the software will make the life of people easier. Whenever a person wants to consult with a doctor, he/she needs to go to the chamber physically and take appointment and wait for their serial, but in our system everything is done online. The person who wants to go visit a doctor doesn't need to step out of their home. There are many cases where a person can't go visit a doctor because they can't manage a free

time. It will be a lot easier for those peoples now as it will be entirely online. I believe that the system will have a positive social and environmental effect.

7.3 Addressing Ethics and Ethical Issues

When a system is being developed, one of the most important issues is the security of the system. Through the system, a lot of data will be continuously exchanged and as a developer we have to make sure that the data are well protected and the users can use the system without the fear of being hacked or getting their data leaked. All the security related work is done by the senior developer.

The company has taken many security measures for this system. All the employee working for this project has to work with the office laptop and not their personal ones, so that the codes are not being shared to anyone else. There are many modules of the system, and different employees are given different modules, so even if the employee gets to understand one module, he/she can't get any idea of how the other module is functioning. All the necessary documents, source codes are kept private by the company.

Chapter 8

Lesson Learned

8.1 Problems Faced During this Period

Throughout the Internship, I have faced new challenges and I also learned how to overcome those. For the current pandemic, getting an Internship was very difficult. I had to go to office knowing that I might get affected with covid. Even during the lockdown I had to go to office few times.

I never worked in a professional place before. I was never a 10am- 5pm routine person, so the new life style was a bit problematic for me. Sometimes I cannot cope-up with immense work as I wasn't used to this kind of pressure.

When I was doing my Internship report, there were few things that was new to me, which i haven't done before. I was facing problem if few parts of the report when i was doing it. The main problem for me was the framework that I was working with. The framework that I had to work with is Code Igniter (Framework of PHP). It was totally new for me. I had faces a lot of difficulties understanding the framework. At the very beginning I was learning that by myself and it was very confusing for me.

8.2 Solution of those Problems

Even though there were many problems, I knew that I had to overcome my problem. It was very tough for me to go to office daily and work from 10am-5pm. For the first 2 weeks when I used to come home from office, I didn't have any energy left. Eventually I got used to it and now I am completely fine working from 10am-5pm.

I had to google and find out few of the parts in the report that I was not familiar with. My supervisor helped me a lot when I faced any difficulties in the codes. At first he have given me a total overview and also taught me about Code Igniter. At first i was very scared and also confused whether i could finish my work within the given time, but slowly I figured out it's not as tough as I though. And i have completed my work within

the time period.

I have learnt that in life problems will always be there, we just need to figure out a solution for the problem and face them without any fear.

Chapter 9

Future Work & Conclusion

9.1 Future Works

The company has future plans for the project. The main plan of the company is to integrate a payment gateway of their own with the Telemed system. Currently, the video consultation between patient and doctor will be done using WhatsApp. But the company has plans to develop a video calling website of their own for the consultation between patient and doctor. For now, the data of the patient will be input manually to the system. The company will later bring biosensor and integrate it within the system so that the data can be automatically sent to the system using the biosensor.

9.2 Conclusion

At first I would like to give thanks to IUB for the Internship course, I have got to learn a lot which I can use in my professional career. I have gained experience that I can use later on in my life. I have learned new skills and techniques. I always wanted to be a web developer, and now I believe I have gained enough experience.

My Internship experience with Infotech Solutions BD was really good. I have learnt new skills which I believe will be really helpful for me in my professional career. I never had any job before and I was nervous if I could do my works properly. But after working I understood that it's not as difficult as I though it would be. There is a very good coordination between the developers, whenever i used to face problem, the others were there to help me out.

This might be the end of my Undergraduate life, but I know that the professional life had just begun.

Bibliography

[1] G. Kumar and P. K. Bhatia, "Impact of agile methodology on software development process," *International Journal of Computer Technology and Electronics Engineering (IJCTEE)*, vol. 2, no. 4, pp. 46–50, 2012.

[2] K. Arrhioui, S. Mbarki, O. Betari, S. Roubi, and M. Erramdani, "A model driven approach for modeling and generating php codeigniter based applications," *Transactions on Machine Learning and Artificial Intelligence*, vol. 5, no. 4, 2017.

[3] J. Morfaw, "Fundamentals of project sustainability," Project Management Institute, 2014.