Independent University, Bangladesh

An undergraduate internship report submitted by
Syed Mujammal Hossain

In consideration of the partial fulfillment of the requirements for the degree
of
BACHELOR OF SCIENCE
in
Computer Science and Engineering Department
of
Computer Science and Engineering
Summer 2021

Mobile Application Development of "Aide"

at

Orbs Lab

An undergraduate internship report submitted by

Syed Mujammal Hossain

has been approved on --/--/--.

Md. Fahad Monir

Internship Supervisor

Department of Computer Science and Engineering

School of Engineering & Computer Science

Independent University, Bangladesh

Attestation

I certify that this report is my own work, based on my personal work by me during my internship. And that I have acknowledged all material and sources used in this report.

I also certify that this report has not previously been submitted for assessment in any other unit and that I have not plagiarized the work of other students or persons.

However, following the internationally accepted academic guideline of using other's written work and/or software (in the form of code) in my university project is properly cited if used in any part of this work.

- - - - - - - - - - - - - - - - - - ----------

Signature: Date:

Name

Acknowledgements

First and foremost, I desire to express my deepest sense of gratitude to Almighty Allah, it is because of His mercy and blessing that I have come so far. It has been a great privilege to work for Orbs Lab as an Intern. I have received so much support and encouragement from the individuals of Orbs Lab who have years of experience in Software Development. I would like to thank the members of Orbs Lab for spending their valuable time and knowledge which was essential for the completion of this report.

I express my gratefulness to my internal supervisor, Md Fahad Monir, Lecturer, Department of Computer Science and Engineering, Independent University, Bangladesh (IUB) and my external supervisor Azharul Islam, Chief Technology Officer, Orbs Lab, for his invaluable instructions, continuous guidance, support and motivation during myinternship period and preparation of this report.

My gratitude also extends to all other employees of Orbs Lab who helped me learn so much in my own skill development process and made me fit right in the environment. Many Thanks to the co-developers of this project. For their time, effort, and expert skills. Special Thanks to Shahriar Hossain for designing and drawing the application's logo.

Finally, I proudly acknowledge that great sacrifices, good wishes, moral support, fruitful advice, inspirations and encouragements from my family members, relatives, and friends.

Syed Mujammal Hossain
.... September 2021

Letter of Transmittal

... th September 2021

Md. Fahad Monir

Lecturer,

Department of Computer Science and Engineering,Independent University, Bangladesh

Subject: Letter of Submission for Internship Report, Summer 2021

Dear Sir,

This is to inform that with due honor and respect, I, Syed Mujammal Hossain (ID: 1631186) from Internship Course of Summer 2021 Semester, Section 9, would like to submit my Internship report. This report is based on my internship program and the project I have worked on. My internship was conducted from 10th June 2021 to 15th September 2021 and it has been completed at Orbs Lab.

This report is based on my experience and the work I did at Orbs Lab during my internship program. The primary goal for my internship was to gain experience from working in the software engineering industry and familiarize myself with all the different technology related fields of the company, including research and development, documentation, software development and to get acquainted with software development processes and practices.

Over the period of my internship at Orbs Lab, I had to learn and adapt to the evolving technologies being used in different situations and requirements and to be able to apply them in real life projects.

I hope the following report can achieve your approval and is adequate.

Sincerely,

_____

Syed Mujammal Hossain
Email: smujammal@gmail.com

Evaluation Committee

Signature: .....

Name: .....

Supervisor: .....

Signature: .....

Name: .....

Internal Supervisor: .....

Signature: .....

Name: .....

External Supervisor: .....

Signature: .....

Name: .....

Convener: .....

Abstract

With the development of so many apps and addictive games out there in the mobile application market, people are spending more time on their phones than ever. While this does seem like a good way to spend the time; it does put the human health at high risk as their bodily movementshave declined, to top it off ever since the start of the Coronavirus pandemic, people are being asked to stay home which has brought in a bigger decline in bodily movements; some people do exercise at home to stay healthy but significant others have become lazy and have put their health at a greater risk.

To deal with such a situation, a certain group of developers at Orbs Lab; including myself, have decided to work on an application that provide virtual medical services at patient's need. It has been decided to call the application, “Aide!”. The background, scope, objectives, and other analytical points about this application will be discussed in detail in this report. Company profile of Orbs Lab will also be addressed.

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Chapter-1: Introduction

Introduction

Health care may be a basic need of each person. In Bangladesh the health care system is especially provided by the govt with little or no charge. But this comes with many complications. The huge number of patients makes it difficult for the govt hospitals to offer them with a quality life. As a result, thousands of private hospitals are established with a view to meet the growing need of the masses for a quality health care. But when one wish to require service from a hospital, he first tries to gather some info about that hospital. This info isn't only hard to seek out but also hard to know in some cases. Especially when people from rural areas come to urban areas for better health care service, they find it very hard to book appointment in hospital. Besides, when comparing several hospitals for finding better alternatives, it poses some complexities. The cost and quality for various services during a hospital are often used as a metric for comparison with other hospitals which isn't always possible. In this report, a mobile application to make health care more convenient for the masses is proposed. The reason for choosing android platform is that in Bangladesh, the cost of smart phone is reasonable and even poor people can afford to have one. Besides, smart phones are seen widespread, and all ages and class of people are using it without hassle. The application name is "Aide".

The application "Aide" will provide:

• Online cabin booking system

• Intelligent suggestion of hospitals supported cost and quality

• Information about facilities of hospitals and their locations.

• Information about the doctor's chamber during a city, how to consult with the doctor

• Assistance to the user to form an emergency involve for an ambulance

• Alert system to require medicines during a fixed time. The application will alert the user for taking medicine in proper time.

1.1 Overview/Background of the work

With the development of so many Apps and addictive games out there in the mobile app market, people are spending more time on their phones than ever. While this does seem like a good way to spend the time; it does put the human health at high risk as their bodily movements are reduced. To make matters worse ever since the start of the Coronavirus pandemic, people are being asked to stay home which has brought in a bigger decline in bodily movement since their daily activity outside has come to a halt. While some people are conscious about their health and do adequate exercise to stay healthy, significant others have become lazy and have put their health at a greater risk. Even if they are not spending time on their mobile phone, they are still spending a lot of time doing something while sitting or lying down as they don't have any reason to move around in their homes. The project "Aide" is a virtual medical service application for

people. Because now a days people facing problems to consult with doctors for this covid-19 pandemic situation. This application helps them to consult with doctors via video call or audio call and buy medicine online from medicine shops. Also, for those people who lives in rural areas and comes town for their treatment. They can easily book an appointment before they come. So, they can meet their doctors. The Aide application will require the user to create an account first for registration via their mobile number on their account. There are also options for registration by signing with user's Facebook ID & google account. The user can select the calendar according to their need for upcoming appointment. After selecting the appointment date & time the application will notify them. There is shop menu where user can by medicines. In health menu where user can appoint their doctor and set the date & time for it. There are many different sections of doctors on this application on health menu. User can select at their need.

1.2 Problem Statement

The project is about virtual medical service web application. This idea comes from our chief executive officer Mr. Devashish Das Dulon and he named this project is "Aide".

The main purpose of the project is virtual medical services for people. Because now a days people facing problems to consult with doctors for this covid-19 pandemic. This application helps them to consult with doctors via video call or audio call and buy medicine online from medicine shops. Also, for those people who lives in rural areas and comes town for their treatment. They can easily book an appointment before they come. So, they can meet their doctors. This project "aide" will be developed by combining several technologies (Node.js, HTML5, JavaScript, CSS, MongoDB etc.).

1.3 Objectives

- **Instant Communication:** Patients can schedule an appointment and even get prescription updates. Patients can consult with a doctor from the comfort of their home.
- **Remote Monitoring:** This app "Aide" monitoring their user's blood sugar levels and heart rate.
- **Important Alerts and Notifications:** It can help all relevant users. Doctors can receive new patient alerts and reminders of upcoming appointments.
- **Online Medicine Shop:** People can buy medicine by using this app and they get home delivery on time.
- **Online Booking:** People can book online an appointment with their preferable doctor by using this app.
- **Minimize time & cost:** Patients can consult with their doctors via video/audio call by using this app "Aide". Because, they don't have to travel for one place to another place. It's saved their money from extra expense.

1.4 Scoop of the work

In this system, this application is also able to keep patient, doctors and medicine shop's details like appointment, audio/video call services, medicine buy/sales details which makes this system a complete package. This report is also focused on web development with new technologies.

- Splash Screen
- Signup screen
- Verification screen
- Home Screen of Aide
- Doctor's List, Details
- Booking Appointment
- Doctor's list & Address & Contact Information
- Video/Audio Call Option
- Notifications Page
- Medicine Shop Store Page
- Product Page, Cart Page

1.5: Company Profile

OrbsLab

ABOUT US

Let's Deal With The Aspects of Professionals

In late 2016 and early 2017 a group of students came together to help each other in various personal projects, later they came together as a team to became OrbsLab.

CONTACT US

Our Expertise

To succeed as a team is to hold all of the members accountable for their expertise.

1.5.1: Background of the Company:

Orbs Lab is a software consulting company based in Sylhet, Bangladesh. It was founded in the year of 2015. Orbs Lab is comprised of a small team of software craftsmen who learn, collaborate, and innovate together. They host regular live events (workshops, meetups & talks) that are geared towards sharing with the local community. Orbs Lab is all about the dream to provide the best web solutions and create a unique user experience. Each completed project makes us more hungry, hungry for designs, more and at least some more twinkles.

1.5.2: Mission, Vision and Values:

The company was set up with the intention to produce high quality software products by training software engineers who can contribute locally and internationally. To engage local developer communities and encourage a culture of knowledge skill transfer. Orbs Lab offers mentorship and internship programs besides hosting regular workshops and tech sessions.

1.5.3: Company Departments:

Orbs Lab maintains a flat organizational structure. Teams and responsibilities are generally formed and assigned around the nature and requirements of specific projects.

1.5.4: Product and Services:

Web Application Development: Full stack JavaScript web application development and hosting
Mobile Application Development: Hybrid mobile application development for Android/iOS
Event Hosting: Organize events to share with the local community.

1.5.5: Operation Details:

The nature of work conducted at Orbs Lab is research and development focused, using both cutting-edge and proven technologies as required for a given project. The Orbs Lab team works on a range of projects which include developing voting technologies for the Bangladesh government, considerate video-audio conferencing apps, 3D reconstruction medical software, complex web and mobile applications, and mobile-based games.

1.5.6: Clients of the Company:

1) Khazana Mithai
2) GP Accelerator
3) DreamWeaver
4) Nagad
5) Turtle Venture
6) Transfer Tech Academy
7) Pathao
8) The Examinar
9) Amaya

10) Learning 101
11) Better Stories
12) Camera House

1.5.7: Address and Contact Information:

Address: House-12, Road-03,
Kharpara, Mirabazar.
Sylhet, Bangladesh.
Contact: https://www.orbslab.org
Email: hello@orbslab.org

Chapter 2: Literature Review

2.1 Project relation to Undergraduate Courses

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

● **CSE 203 Data Structure:**

In computer science, a data structure is a data organization, management, and storage format that enables efficient access and modification. More precisely, a data structure is a collection of data values, the relationships among them, and the functions or operations that can be applied to the data, i.e., it is an algebraic structure about data. Data structures serve as the basis for abstract data types (ADT). The ADT defines the logical form of the data type. The data structure implements the physical form of the data type.
Different types of data structures are suited to different kinds of applications, and some are highly specialized to specific tasks. For example, relational databases commonly use B-tree indexes for data retrieval, while compiler implementations usually use hash tables to look up identifiers.
This course was about teaching how to handle and manipulate complex arrays, objects, classes, array of objects, objects of array, nested arrays, nested objects, etc. As "Aide" involves many complex data structures, the skills gained from this course made handling them much easier.

● **CSE 213 Object-Oriented Programming:**

Object Oriented programming (OOP) is a programming paradigm that relies on the concept of classes and objects. It is used to structure a software program into simple, reusable pieces of code blueprints (usually called classes), which are used to create individual instances of objects. This course is a deep dive into classes and its objects of programming. It also taught how to write modular programs which made codes less repetitive and more reusable. It helped to design "Aide" code in a modular format. Also, as the application grew bigger, this practice helped avoid writing new modules from scratch by using parts of old modules and adding new functions to them.

● **CSE 303 Database Management:**

Database management refers to the actions a business takes to manipulate and control data to meet necessary conditions throughout the entire data lifecycle. Database management has become more important as the volume of business data has grown. Rapid data growth creates a wide variety of negative conditions, including poor application performance and compliance risk, to name a few. Database management comprises several proactive techniques to prevent the deleterious effects of data growth.

This was the first course which taught how to design and plan a project. It covered popular planning and strategy practices such as System Development Life Cycle, Rich Picture,

Requirement Analysis, Entity Relationship Diagram, Business Process Model and Notation Diagram and many more. These techniques helped in the development planning and strategy of "Aide!" and, they helped in writing this report.

● **CSE 309: Web Applications and Internet:**

A Web application (Web app) is an application program that is stored on a remote server and delivered over the Internet through a browser interface. Web services are Web apps by definition and many, although not all, websites contain Web apps. According to Web.
This is the course where the development of web applications was taught. It covered very important technologies that are highly in demand in the industry, such as HTML, CSS, JavaScript, jQuery, View Engines (Handlebars and embedded JavaScript), Node.js, Express.js, MongoDB. The tools and technologies learned from this course immensely contributed to the development of "Aide" as it is a mobile application built with similar web technologies and it has a backend server which had to be deployed to the cloud server as well.

CSE 464 Mobile Application Development:

Mobile app development is the act or process by which a mobile app is developed for mobile devices, such as personal digital assistants, enterprise digital assistants or mobile phones. These software applications are designed to run on mobile devices, such as a smartphone or tablet computer. These applications can be pre-installed on phones during manufacturing platforms, or delivered as web applications using server-side or client-side processing (e.g., JavaScript) to provide an "application-like" experience within a Web browser. Application software developers also must consider a long array of screen sizes, hardware specifications, and configurations because of intense competition in mobile software and changes within each of the platforms. Mobile app development has been steadily growing, in revenues and jobs created. A 2013 analyst report estimates there are 529,000 direct app economy jobs within the EU then 28 members (including the UK), 60 percent of which are mobile app developers.
This is the course where the development of mobile applications was taught. Become a mobile app developer with proficiency in all aspects of mobile applications from design to building and publishing apps for iOS and Android via this app development course. It covered very important technologies that are highly in demand in the industry. The tools and technologies learned from this course immensely contributed to the development of "Aide" as it is a mobile application.

2.2 Related works

MyCare App

Figure 2.1: UI screenshots of My Care App

My Care is an online application which can provide healthcare without the headaches of a doctor's place or hospital. When you need the answers now, the best doctors in your area are there to help. Get the best medical opinion from a superior specialist when you need it. This application and "Aide!" both can provide virtual medical services.

DOORMEDS App

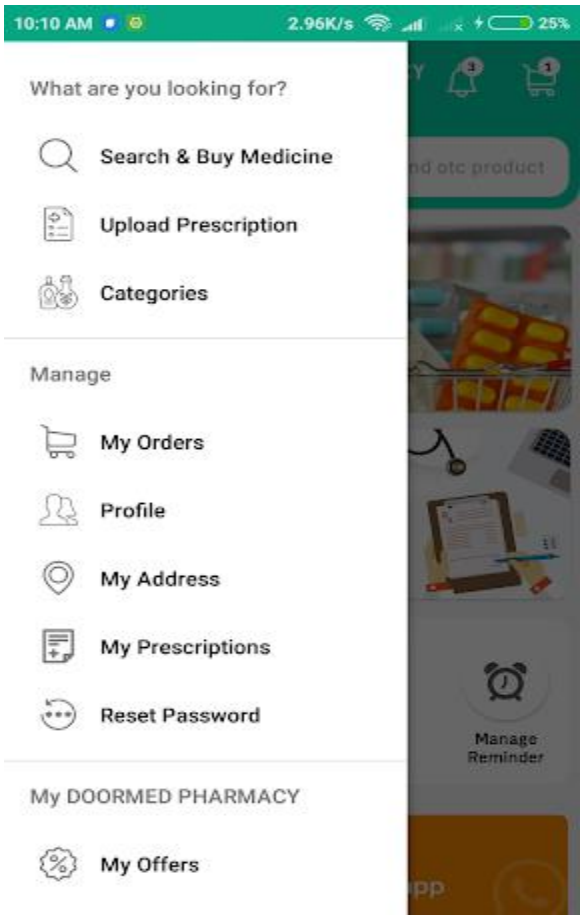


Figure 2.2: UI screenshots of Door Meds App

This application is an online platform where people can buy their medicine. And this system provides home delivery to people. This application and "Aide!" both provide online medicine shops and home delivery service.

E-Patient App

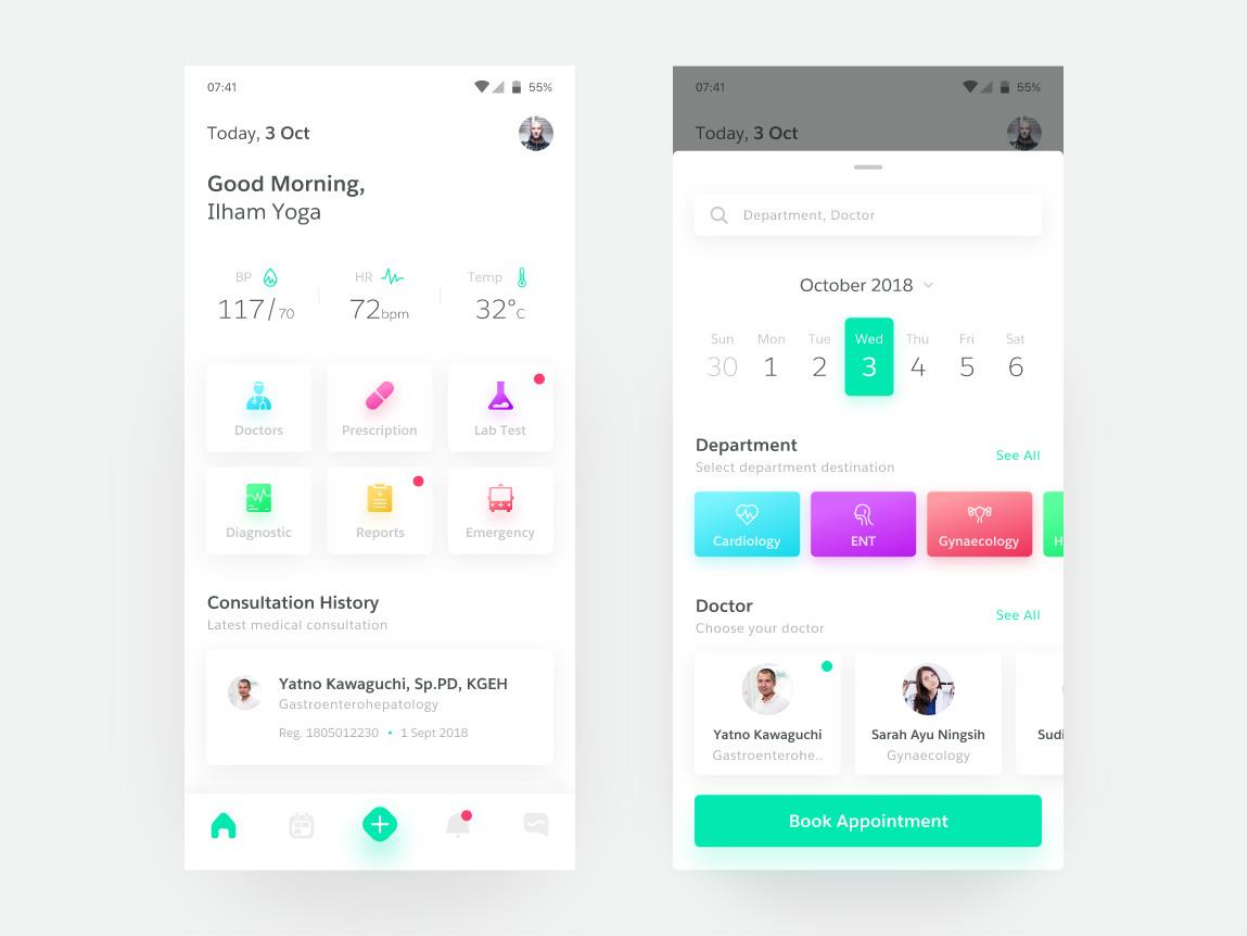


Figure 2.3: UI screenshots of E-Patient App

This Application and "Aide" both track their patient data and remind them about their patient upcoming appointment with their doctors.

Chapter 3: Methodology

3.1 Software Development Methodology

In software engineering or computer programming, a software development process is the process of dividing software development work into distinct phases to improve design, product management and project management. It is also known as a system development life cycle (SDLC). We can characterize SDLC as a framework or structure that describes the activities performed at each stage of a System Development Project. So, it has some basic stages to be followed during the development phase.

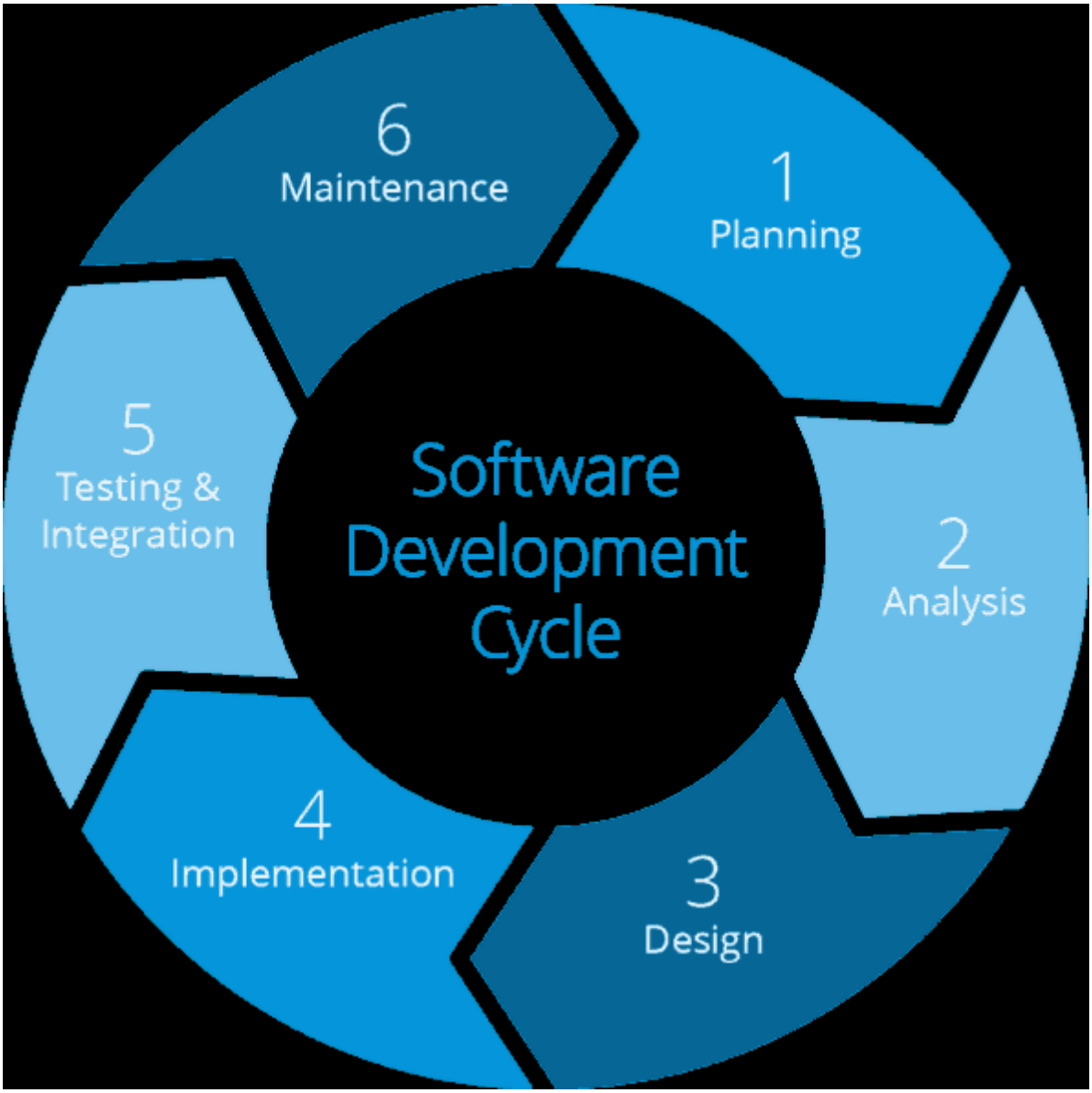


Figure 3.1: Software Development Life Cycle (SDLC)

The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by the project team to develop or maintain an application. Fundamentally, programming or framework advancement approach is a system that is utilized to structure, plan, and control the way toward building up a data framework.
There are several system development methodologies or models that are used in developments; among them, some of the most used are given below:

● Waterfall Model

● Prototyping

● Agile Development

● Spiral Model

● Rapid Application Development

● V-Model

● Incremental

● Evolutionary Model

3.2 Agile Methodology

The developers of Orbs Lab follow the most current methods of system development methodologies, that is the Agile method. The Agile methodology is a way to manage a project by breaking it up into several phases. It involves constant collaboration with stakeholders and continuous improvement at every stage. Once the work begins, teams' cycle through a process of planning, executing, and evaluating. Continuous collaboration is vital, both with team members and project stakeholders.

The Agile Manifesto of Software Development put forth a groundbreaking mindset on delivering value and collaborating with customers when it was created in 2001. Agile's four main values are:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation

- Responding to change over following a plan

Figure 3.2: Agile Development Methodology

3.2.1 Why Agile Development Methodology for this project?

As we are developing this as a mobile application, for this project to be developed, the methodology that will be used is the System Structured Analysis and Design Methodology. Agile development methodology is one of the most effective approaches to all the software development businesses, it ensures a proper channel of communication, which helps both the clients and App Developers execute the desired mobile application or infect any software. Any application installed on a smartphone, a game or a social networking application requires many factors to be in place for its proper functioning. The factors which need to be in place are:

- Idea of the application
- Design
- Development
- Execution
- And Testing

3.2.2 Agile Implementation

Agile implementation is a form of project management that works in small increments and well suited to projects that could become irrelevant once delivered, especially useful in software development. The key to the agile plan is that it provides flexibility for changes to the product as it continues to be developed.

3.3 Extreme Programming (XP) Methodology

For methods, the developers of Orbs Lab follow the most current methods of system development methodologies, that is the Agile method. To be more specific, we follow the Extreme Programming (XP) method which is an agile software development framework that aims to produce higher quality software, and higher quality of life for the development team. XP is the most specific of the agile frameworks regarding appropriate engineering practices for software development. The teams are expected to be self-organized, hence Extreme Programming provides specific core practices where each practice is simple and self-complete & combination of practices produces more complex and emergent behavior.
The five values of XP are communication, simplicity, feedback, courage, and respect:

● **Communication:** XP stresses the significance of the proper sort of correspondence through group gatherings, team meetings and conversations.

● **Simplicity:** do only necessary things such as keep the design of the system as simple as possible so that it is easier to maintain, support, and revise.

● **Feedback:** Through constant feedback about their previous efforts, teams can identify areas for improvement and revise their practices. It also supports simple design.

● **Courage:** raise issues that are hampering workflow, stop doing something that does not work and try something else, accept and act on unpleasant feedback, etc.

● **Respect:** members of the team need to respect each other to communicate with each other, provide and accept feedback and to work together to identify simple designs and solutions.

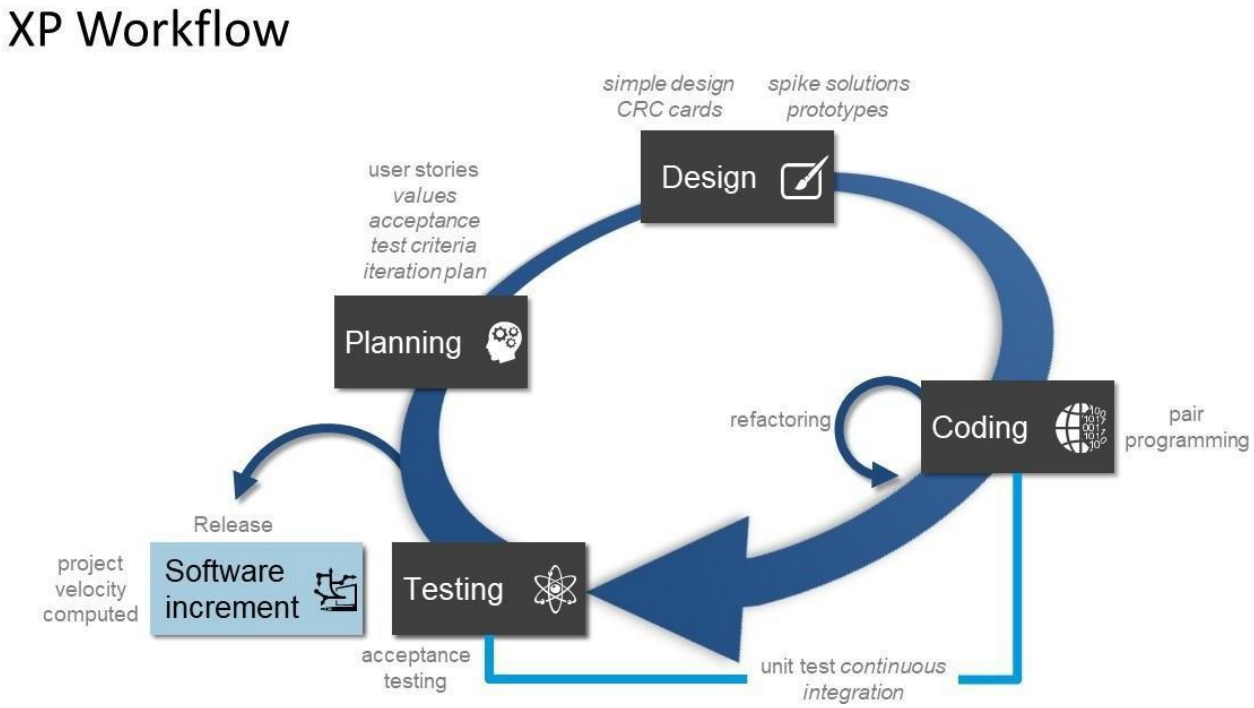


Figure 3.3: Extreme programming Methodology

3.3.1 Extreme Programming Advantages

Extreme Programming solves the following problems often faced in the software development projects:

● **Slipped Schedule:** ensure timely deliveries.

● **Cancelled projects:** focus on continuous customer involvement ensures transparency with the customer and immediate resolution of any issues.

● **Costs incurred in changes:** extensive and ongoing testing makes sure the changes do not break the existing functionality. A running working system always ensures sufficient time for accommodating changes such that the current operations are not affected.

● **Production and post-delivery defects:** emphasis is on the unit tests to detect and fix the defects early.

● **Misunderstanding the business and/or domain:** making the customer a part of the team ensures constant communication and clarifications.

● **Business changes:** changes are inevitable and are accommodated at any point of time.

● **Staff turnover:** intensive team collaboration ensures enthusiasm and good will. Cohesion of multi-disciplines fosters the team spirit.

3.4 Mobile Application Development

Mobile application development is the process of creating software applications that run on a mobile device, and a typical mobile application utilizes a network connection to work with remote computing resources. Hence, the mobile development process involves creating installable software bundles (code, binaries, assets, etc.), implementing backend services such as data access with an API, and testing the application on target devices.
There are two dominant platforms in the modern smartphone market. One is the iOS platform from Apple Inc. The iOS platform is the operating system that powers Apple's popular line of iPhone smartphones. The second is Android from Google. The Android operating system is used not only by Google devices but also by many other OEMs to build their own smartphones and other smart devices.
There are four major development approaches when building mobile applications:

● **Native Mobile Applications:** written in the programming language and frameworks provided by the platform owner and running directly on the operating system of the device such as iOS and Android.

● **Cross-Platform Native Mobile Applications:** written in a variety of different programming languages and frameworks, but they are compiled into a native application running directly on the operating system of the device.

● **Hybrid Mobile Applications:** built with standard web technologies - such as JavaScript, CSS, and HTML5 - and they are bundled as app installation packages. Contrary to the native apps, hybrid apps work on a 'web container' which provides a browser runtime and a bridge for native device APIs via Apache Cordova.

● **Progressive Web Applications:** web applications that utilize a set of browser capabilities - such as working offline, running a background process, and adding a link to the device home screen - to provide an 'app like' user experience.

3.5 Back-end Development

Back-end Development refers to the server-side of development. It is the term used for the behind-the-scenes activities that happen when performing any action on a website or a mobile application. Backend development focuses on databases, scripting, and the architecture of web and mobile applications. Code written in the back end helps to communicate the database information to the browser or the mobile app.
Back-end Development involves:

● **Web Development Languages:** involves a series of server-side programming languages like Java, JavaScript, Python, Ruby, .Net, etc.

● **Database:** use of various Database Management System (DBMS) technology is another important part of backend development. MySQL, MongoDB, Oracle, SQLServer, Redis are widely used for this purpose.

● **Server:** a computer or computer program which manages access to a centralized resource or service in a network. Current most popular servers are Apache, Nginx, IIS servers and Microsoft IIS. Typically, Linux is used in administering servers.

● **Application Programming Interface (API):** a set of protocols, routines, functions and/or commands that are used to develop software or facilitate interaction between distinct systems. APIs are available for both desktop and mobile use and are typically useful for programming GUI (graphic user interface) components, as well as allowing a software program to request and accommodate services from another program.

3.6 Development Tools Used

In the development of the mobile application, "Aide" several modern application development tools were used.

3.6.1 VS Code:

Figure 3.4: VS Code Logo

Visual Studio Code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++ It is based on the Electron framework, which is used to develop Node.js Web applications that run on the Blink layout engine. Visual Studio Code employs the same editor component (codenamed "Monaco") used in Azure DevOps (formerly called Visual Studio Online and Visual Studio Team Services).

Instead of a project system, it allows users to open one or more directories, which can then be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language. It supports several programming languages and a set of features that differs per language. Unwanted files and folders can be excluded from the project tree via the settings. Many Visual Studio Code features are not exposed through menus or the user interface but can be accessed via the command palette.

Visual Studio Code can be extended via extensions, available through a central repository. This includes additions to the editor and language support. A notable feature is the ability to create extensions that add support for new languages, themes, and debuggers, perform static code analysis, and add code linters using the Language Server Protocol.

Visual Studio Code includes multiple extensions for FTP, allowing the software to be used as a free alternative for web development. Code can be synced between the editor and the server, without downloading any extra software.

Visual Studio Code allows users to set the code page in which the active document is saved, the newline character, and the programming language of the active document. This allows it to be used on any platform, in any locale, and for any given programming language.

Language support

Visual Studio Code includes basic support for most common programming languages. This basic support includes syntax highlighting, bracket matching, code folding, and configurable snippets. Visual Studio Code also ships with IntelliSense for JavaScript, TypeScript, JSON, CSS, and HTML, as well as debugging support for Node.js.

Data collection

Visual Studio Code collects usage data and sends it to Microsoft, although this can be disabled. In addition, because of the open-source nature of the application, the telemetry code is accessible to the public, who can see exactly what is collected.

Version control

Source control is a built-in feature of Visual Studio Code.

3.6.2 Node.js:

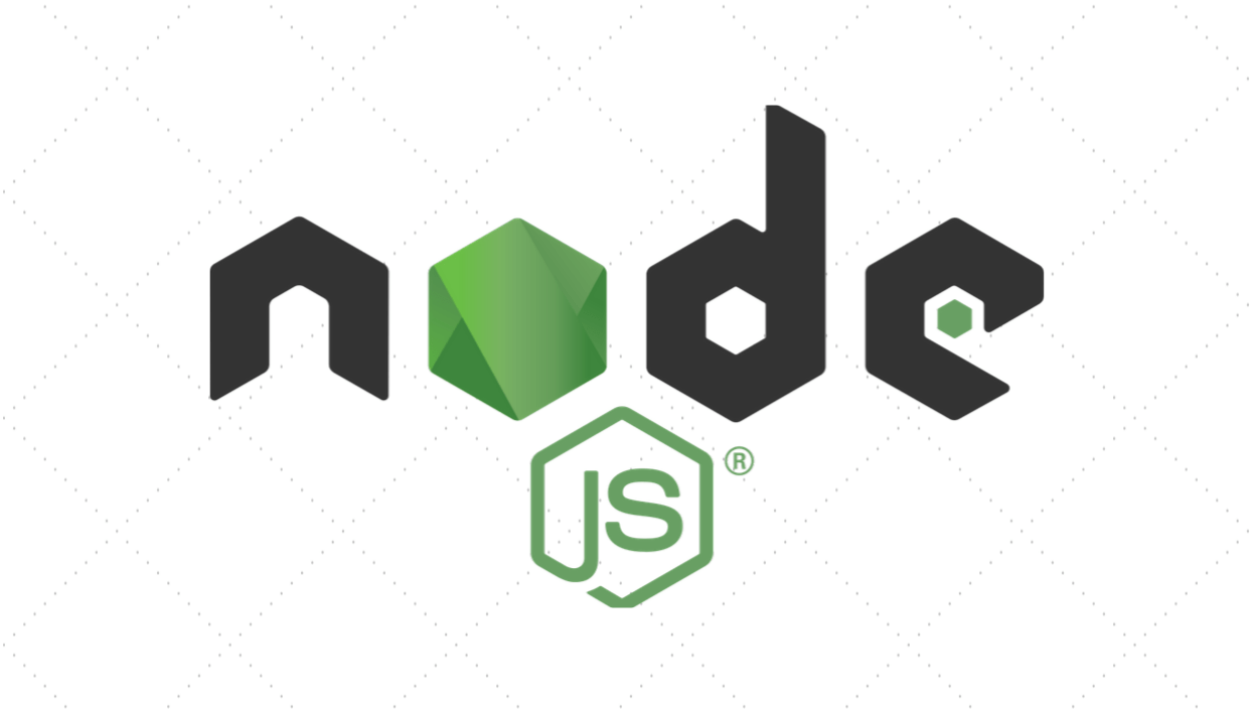


Figure 3.5: Node.js logo

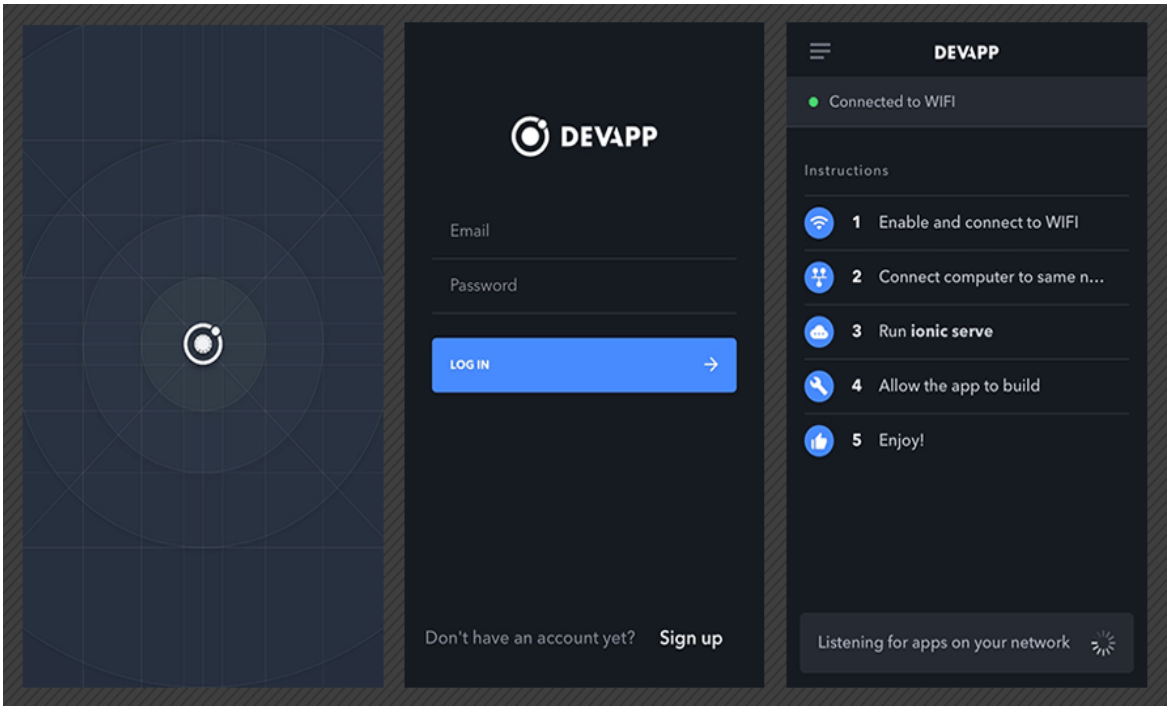
Node.js (Node) is an open source development platform for executing JavaScript code server-side. Node is useful for developing applications that require a persistent connection from the browser to the server and is often used for real-time applications such as chat, news feeds andweb push notifications.

Node.js is intended to run on a dedicated HTTP server and to employ a single thread with one process at a time. Node.js applications are event-based and run asynchronously. Code built onthe Node platform does not follow the traditional model of receive, process, send, wait, receive.Instead, Node processes incoming requests in a constant event stack and sends small requests one after the other without waiting for responses.

This is a shift away from mainstream models that run larger, more complex processes and runseveral threads concurrently, with each thread waiting for its appropriate response before moving on.

3.6.3 Ionic DevApp:

Figure 3.6: DevApp Logo



The Ionic DevApp was a free app used to run your Ionic app directly on your iOS or Android device.

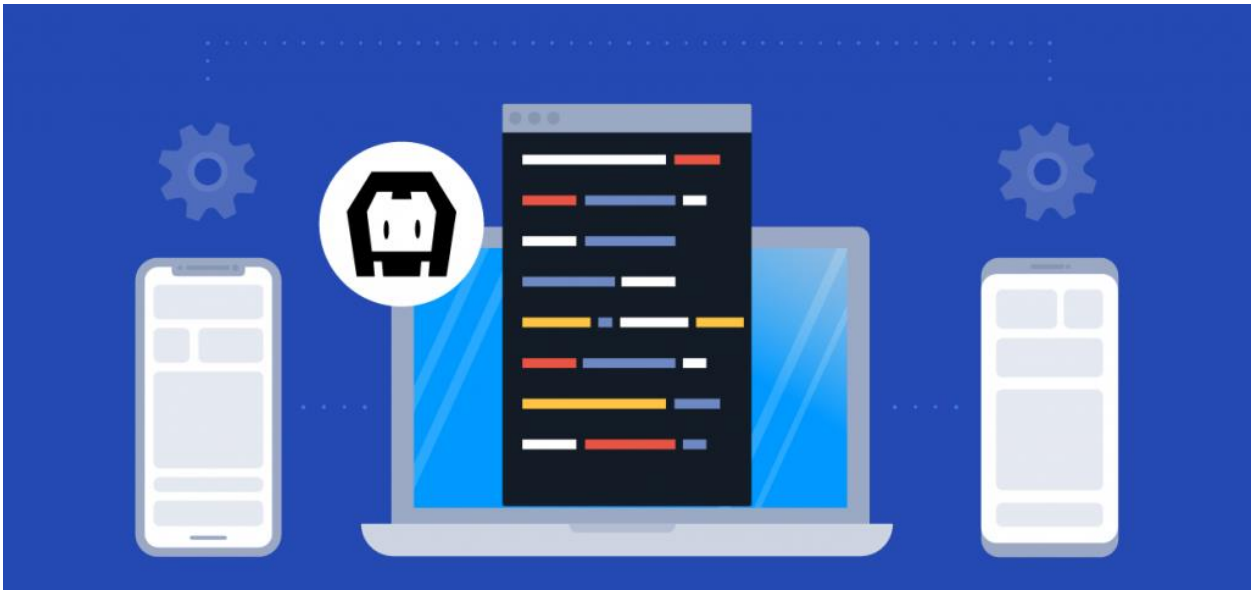
One of the key mantras of Capacitor is that developers should embrace native tools like Android Studio and Xcode when building their app. While using native tooling may initially seem daunting, we think this is the right approach, because it makes it easy to follow existing Native iOS/Android guides, get help on Stack Overflow, and have full control over your project. The

reality is that DevApp only got in the way of building an app, delaying developers from seeing their app run on a simulator or phone.

In practice, native tooling is quite easy to use: see our iOS and Android documentation for details on how to build native apps using Cordova or Capacitor.

3.6.4 Apache Cordova:

Figure 3.7: Apache Cordova Logo



Apache Cordova (formerly PhoneGap) is a mobile application development framework created by Nitobi. Adobe Systems purchased Nitobi in 2011, rebranded it as PhoneGap, and later released an open-source version of the software called Apache Cordova. Apache Cordova enables software programmers to build hybrid web applications for mobile devices using CSS3, HTML5, and JavaScript, instead of relying on platform-specific APIs like those in Android, iOS, or Windows Phone. It enables wrapping up of CSS, HTML, and JavaScript

code depending upon the platform of the device. It extends the features of HTML and JavaScript to work with the device.

Apache Cordova can be extended with native plug-ins, allowing developers to add more functionalities that can be called from JavaScript, making it communicate directly between the native layer and the HTML5 page. These plugins allow access to the device's accelerometer, camera, compass, file system, microphone, and more.

3.6.5 MongoDB Compass:

Figure 3.8: MongoDB Compass Logo

The GUI for MongoDB. Visually explore your data. Run ad hoc queries in seconds. Interact with your data with full CRUD functionality. View and optimize your query performance. Available on Linux, Mac, or Windows. Compass empowers you to make smarter decisions about indexing, document validation, and more.

Visualize and explore: Visualize, understand, and work with your data through an intuitive GUI.

Insert, modify, and delete: Modify your data with a powerful visual editing tool.

Debug and optimize: Understand performance issues with visual explain plans, view utilization, and manage your indices.

3.6.6 Git:

Figure 3.9: Git Logo

Git is a free, open-source distributed version control system. It is used for tracking changes in source code during software development. It is designed for coordinating work among programmers, but it can be used to track changes in any set of files. Its goals include speed, data integrity, and support for distributed, non-linear workflows

Version control is a system that records changes to a file, or set of files, over time so that specific versions can be recalled later.

3.7 Other Non-Development Tools Used

Other than development tools, other essential tools were also used by us, the development team of "Aide". These tools helped ease communication, keep track of workflow, repository hosting, etc.

3.7.1 Trello:

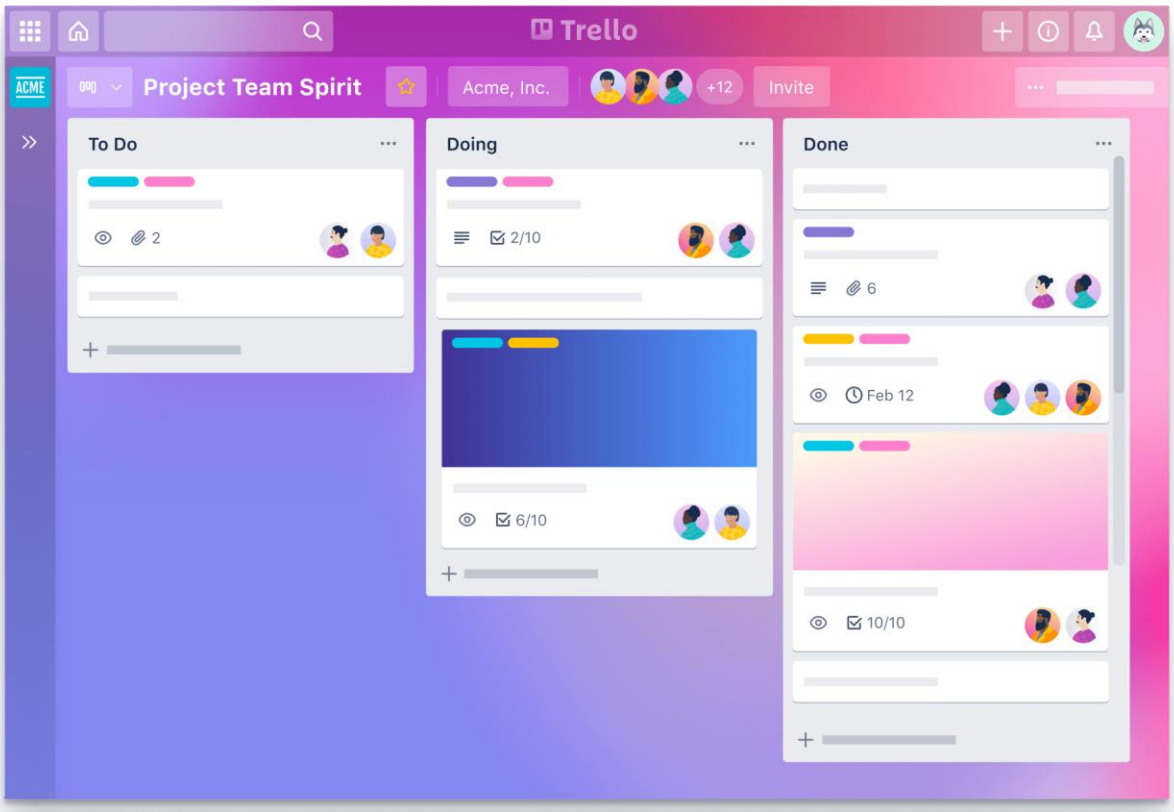


Figure 3.10: Trello Task Management Board

Trello board helped us keep track of our workflow. It helped us know what needs to be done next, which task is being handled by whom, which tasks are in progress and which tasks are completed.

Chapter 4: Project Management and Financing

4.1 Work breakdown Structure

The WBS is a method for getting a complex, multi-step project done. It is a way to divide and conquer large projects, so things are done faster and more efficiently. Work breakdown structure (WBS) is a hierarchical tree structure that outlines a project and breaks it down into smaller portions. The goal of a WBS is to make a large project more manageable. Breaking it down into smaller chunks means work can be done simultaneously by different team members which leads to better team productivity. Below is the WBS of "Aide".

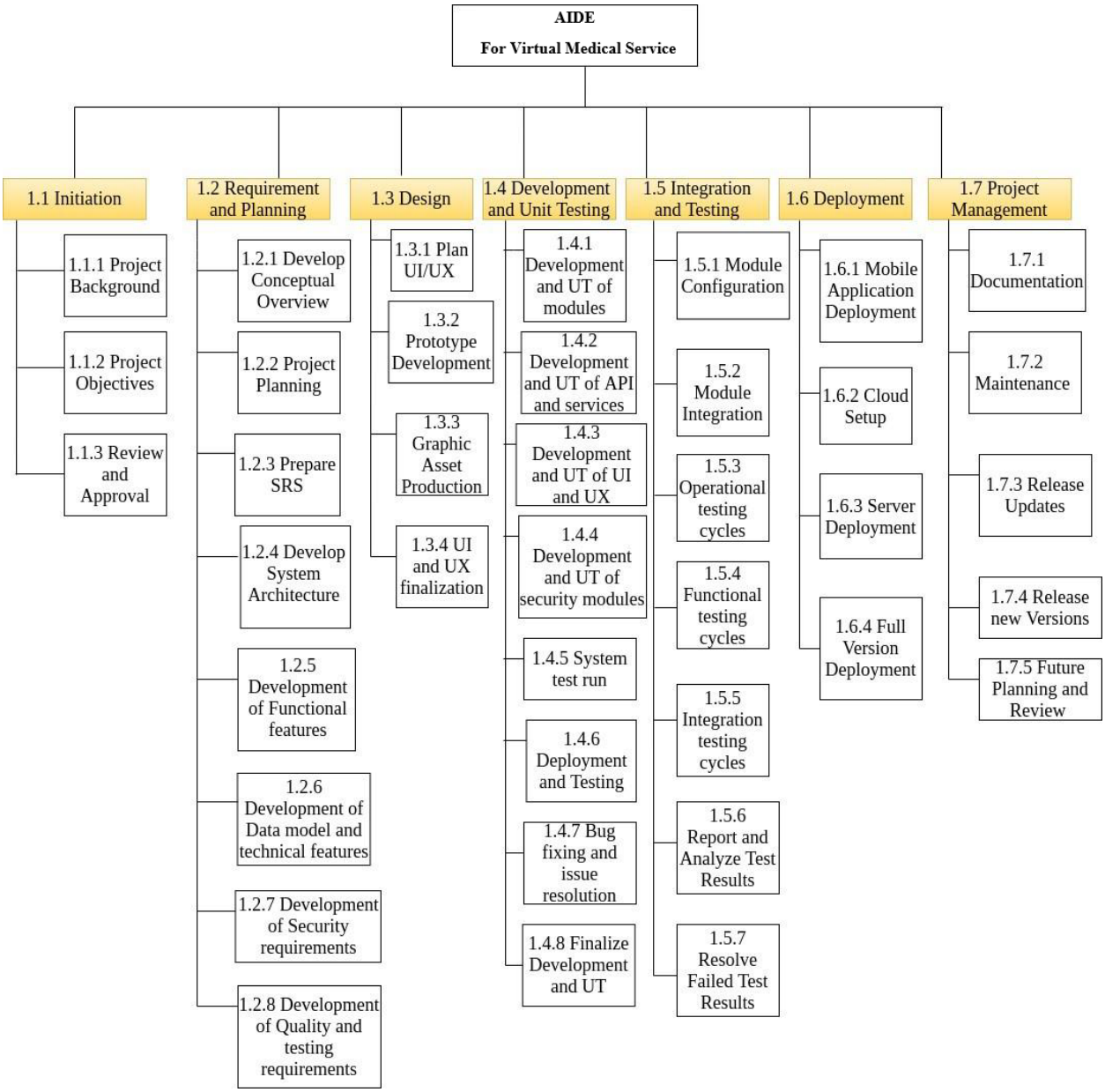


Figure 4.1: Work breakdown Structure of "Aide"

4.2 Time Distribution Table

Work Breakdown Structure is collected where all the activities are included. We attempted to total these works in a time outline. Along working with a group extend, overseeing the time and working nearby with group individuals time planning. This entire work is isolated among the venture group. To preserve this workflow conveyance time is assessed is nearly 9 days for the project.

Serial	Activity	Days	Work Percentage
1	Project Manager	7	10%
2	UI/X Designer	7	10%
3	Front End Developer	26	30%
4	Back End Developer	31	30%
5	Testing Process	10	5%
6	Result and Analysis	7	5%
7	Deployment	5	10%
	Total	93	100%

Table 4.1: Time Distribution Table

4.3 Gantt chart

A Gantt chart has been produced to help plan and schedule project tasks. It helped assess how long the project should take, determine the resources needed and plan the order in which tasks will be completed. It also helped in managing the dependencies between tasks.
The Gantt chart was also useful for monitoring the project's progress once it has started. It helped in having a clearer vision of what should have been achieved by a certain time frame and when the project fell behind schedule; appropriate actions were taken to bring it back to course. Below is the produced Gant chart for "Aide".

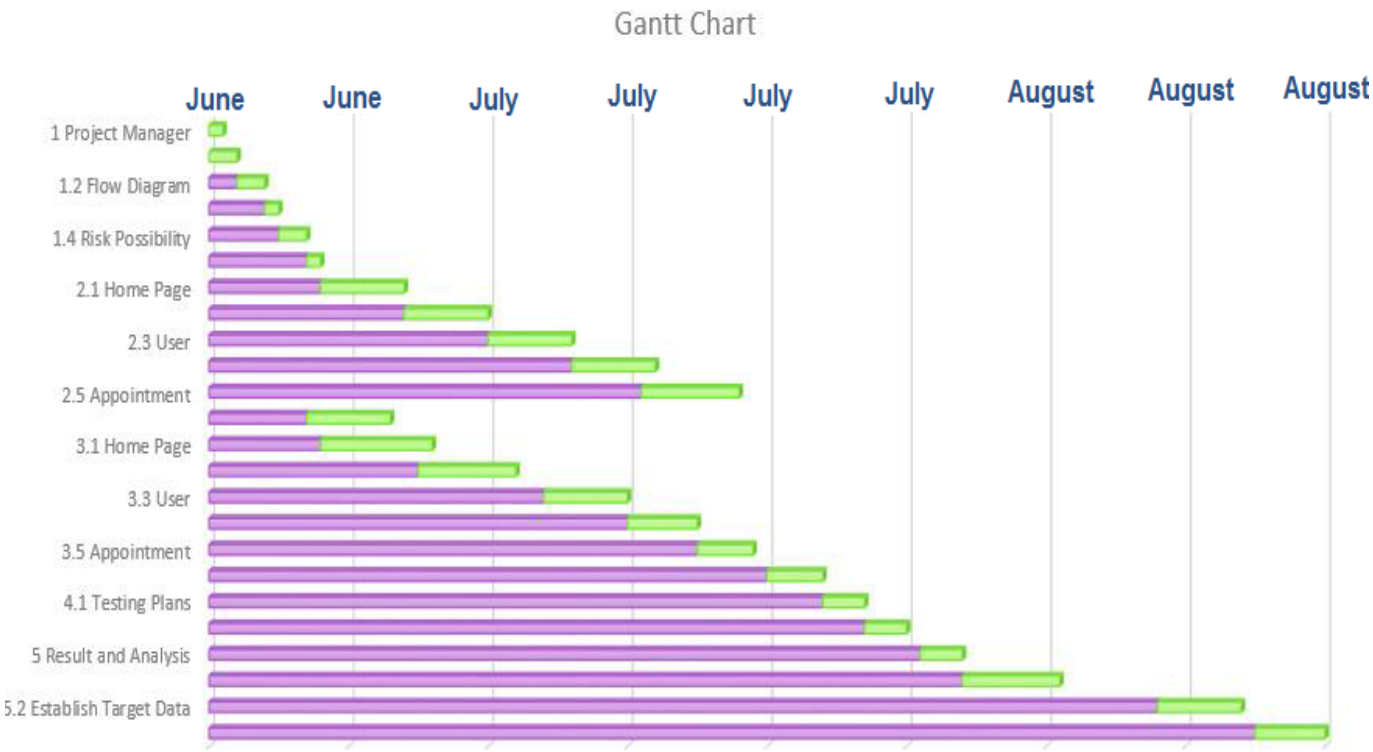


Figure 4.2: Gantt Chart of "Aide"

4.4 Process/Activity wise Resource Allocation

This project "Aide" is used by mainly the users who need virtual medical services from doctors through the system. Hence behind the scenes is all the resources I and my team were working to make this a reality. So, it was very important for us to allocate every resource needed for the project to fit in its position. Our primary resource of the project are our developers, then comes everything else needed for the development to the process, Computers, server, telemedicine equipment's and even chair/table are considered as resources here.

▪ **Initiating:** This is the first step of the Development, where a few orders were proposed by several hospital and medicine company for online appointment and buy online medicine System and we, the development team planned for a generic product.

▪ **Requirement Analysis:** A Small team had worked on the predictions of what the requirement is for the Mobile app application will be. For example: Computer specifications required, members needed, Features & etc.

▪ **Planning:** The planning phase is when all the team members were involved and brainstormed on how we are going to set goals and the approaches we are going to take to develop the Application.

▪ **Design:** The designing phase is where we designed the features, users, and functionality of the system to a few mainstream diagrams to show us the bigger picture of the whole scenario.

▪ **Implementation:** This is where the development started every team member were assigned to their part of the development. Every week there were goals to reach, however due to the Global pandemic COVID-19 our development process was slow as in the beginning of development the employees worked from home. So, it slowed down our process bit by bit. And of course, in usual development there are always new implementations which are required to make.

▪ **Testing:** Testing was done simultaneously as we proceeded to develop the Application because we could predict that the implementation phase was taking longer than usual. The errors were being fixed as we were also developing new features in the Application.

▪ **Deployment:** The software deployment was delayed but as the software development was in house, so not much problem was faced. We aimed for a development in good quality software rather than meeting deadlines.

4.5 Estimated Cost

The starting Evaluated Costing was around nearly 101,000 BDT. This is the approximate cost of the project. It can be expanded on the changes in the software and keeps up fetched.

Serial	Activity	Days	Costing
1	Project Manager	7	15,000 BDT
2	UI/X Designer	7	25,000 BDT
3	Front End Developer	26	15,000 BDT
4	Back End Developer	31	15,000 BDT
5	Testing Process	10	13,500 BDT
6	Result and Analysis	7	8,500 BDT
7	Deployment	5	9,000 BDT
	Total	93	101,000 BDT

Table 4.2: Estimation Cost of the Project

Chapter-5: Project Body

5.1: Description of the Project

The Application Aide starts with the User turning on the application on their device while being connected to the internet. Then the User needs to register for using this app. User must register by using his cell phone. Aide app user can also register by his Google account & Facebook account. After completing the registration User will get the home screen. Now Aide User can select what they need. User will find the doctor menu, medicine shop menu, appointment list, timer menu. Now user will decide whether they want to use.

On Doctor's menu user will get the doctor's information & details & appointment schedule. Doctor's menu User will get every section of doctor. User can select whom appointment they need.

Next menu is medicine Shop Menu where user will get & find their necessary medicine. Along with Brand, Store name & Price tag. After selecting there will be gateway method of payment and options for cash on delivery or online payment.

Next menu is Profile menu User can edit their details.

On Home screen there is a center menu for tracking appointment dates of the users. There they will be able to track their upcoming appointment dates with doctors. User will get notifications regularly with their desired time mentioned through the "Aide" application. This is a virtual medical service application for people. Because now a days people facing problems to consult with doctors for this covid-19 pandemic situation. This application helps them to consult with doctors via video call or audio call and buy medicine online from medicine shops. Also, for those people who lives in rural areas and comes town for their treatment. They can easily book an appointment before they come. So, they can meet their doctors.

5.2: Systems 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 goal of studying a system or its parts to identify its targets. 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. Analysis specifies what the system should do. This chapter contains parts of System Analysis that will help understand the project better.

5.3: Six Element Analysis

Process	System Roles					
	Human	**Non computing hardware**	**Computing hardware**	**Software**	**Database**	**Comm. & Network**
View Splash Screen	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN
Sign Up and Login Screen	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN
Home Screen	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN
View Doctor's List	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN
Appointment menu	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN
View Shop Store And Cart List	User	N/A	Functional smartphone / tab/ Web	Any version of Android or iOS	MongoDB Compass	WAN

Table 5.1: Six Elements Analysis of "Aide"

5.4: Feasibility Analysis

Feasibility Study is a study to evaluate viability of an offer project. Feasibility study is the viability analysis, or it is a measure of the software product in terms of how much useful 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 products will be right in terms of development, implantation, contribution of project to the organization, etc.

Main parts of Feasibility Study:

● **Technical Feasibility:** In Technical Feasibility, current resources; both hardware and software along with required technology are analyzed/assessed to develop the project. This technical viability study gives a report whether there exists right required resources and technologies which will be used for system development. Along with this, viability study also analyzes technical skills and capabilities of technical team, existing technology can be used or not, maintenance and update is easy or not for chosen technology, etc.

"Aide" is built using Node.js, Ionic, Apache Cordova and MongoDB. These are the technologies that are very popular in the modern industry, and everyone involved in the making of this project had the skills to work with at least one of the technologies mentioned. Hence, it can be concluded that the project is Technically Feasible.

● **Operational Feasibility:** In Operational Feasibility degree of offering service to requirements is analyzed along with how easy the product will be to operate and maintain after deployment. Along with these, other operational scopes are determining usability of the product and determining whether a recommend solution by the software development team is acceptable or not etc.

"Aide" is made for virtual medical service. Even if a user is confused on how to use the application, they can simply refer to the "About Aide on Website" section to have a much clearer idea of how the application operates; and so, the project can be determined as Operationally Feasible.

● **Economic Feasibility:** In Economic Feasibility study cost and benefit of the project is analyzed; a detailed analysis of what will be the cost of the project for development which includes all needed cost for final development software resource required, design and development cost, operational cost, etc. After that it is analyzed whether the project will be beneficial in terms of finance for organization or not.
In the development of "Aide", the services that needed being paid were Google Fit App, Cloud Server and application launching to Google Play Store. Since the cost of these services had to be paid yearly, it can be easily covered from the estimated revenue gained from advertisements and paid subscriptions. Thus, in conclusion, it can be said that the project is Economically Feasible.

5.5: Problem Solution Analysis

Problems: It is critical to have contactless communication channels during a crisis such as COVID-19. An implementation of a solid plan can help reap the benefits of real-time data. Now a days people facing problems to consult with doctors for this covid-19 pandemic. Without knowing about any doctor's information patients come from different places for their treatment to meet the doctors. But many times, they failed to meet with their desired doctors. There are many problems like this:

- **Problem to go outside:** For this covid-19 situation patients can't go outside. So, they can't meet with doctors directly. Cannot take any medicine for their treatment without any doctor's consultant.
- **Problem to buys medicine from shop:** At this time, it becomes tough for people to go outside to buy medicines.
- **Problem to instant communication:** Patients don't know about their doctor's appointment and for this reasons patient return home without meet their doctors.
- **Problem for timing:** Now a days it's too difficult for people to move one to another place for see their doctors.
- **Problem for cost:** For poor or lower middle-class family it's too hard to travel so far for see their doctors and many times they failed to meet their doctors. So, they stay in hotel for meet their doctor for many days. It's their another additional problem to stay in hotel.
- **Problem for monitoring:** Many patients forgot about their next appointment with doctors.

Solutions: the problems that have been analyzed can be solved using the Aide application by:

- **Solution to the problem for going outside:** At this time of covid-19, moving somewhere, or travelling anywhere is one of the big problem of people. Aide app have the Ecommerce menu which is Shop or Store from their user can buy their products through online delivery.
- **Solution to the problem for buying medicine:** At this time of covid-19, moving somewhere, or travelling anywhere is one of the big problem of people. Through this app people can buy medicine online from home. Aide allows quick delivery of medications from the medicine shop.
- **Solution for communication:** Patients can schedule an appointment and even get prescription updates. They can communicate with a doctor from the comfort of their

home. Just think the power of this kind of communication at times when there is a complete lockdown.

- **Solution for time managing:** This virtual medical service application "Aide" offers same day online care access to patients. Patients can consult with their doctors from home. They can set their appointment with doctors, and they can meet their desired doctor at the mentioned time they booked for appointment. So, it's saved their time.

- **Solution for cost reduction:** Patients can consult with their doctors via video/audio call from this "app Aide". So, they don't have to travel for one place to another place. It's saved their money from extra expense.
- **Solution for monitoring:** This Aide app monitoring patient blood sugar levels and heart rate. When the readings reach a certain threshold, this app would trigger an alert to patient's physician.

5.6: Effects and Constraints Analysis

A constraint is a restriction on the degree of freedom a company can have in providing a solution. Constraints are constructively global requirements, such as limited development resources or a decision by senior management that restricts the way the development team develop a system. Constraints can be economic, technical, or environmental and pertain to project resources, schedule, target environment, or to the system itself. Some of the constraints and its effects are described below:

Constraint 1: Budget
Effect: This constraint has critical effect on for how long the project can continue to be developed before reaching a conclusion to deadline and employees were changed due to COVID-19 situations as some were infected and been replaced with higher rate.

Constraint 2: Time
Effect: Budget and time both constraints are interrelated to each other. Time strictly depends on the budget of the company for the project. The project was given a time of 4 months but due to coronavirus pandemic and lockdown, the development was delayed.

5.7: System Design

System design is deriving a solution which satisfies software or system's requirements. We can define software design as translating requirements into software components and interactions among them. Any design may be modelled as a directed graph made up of entities with ascribe which participate in relationships. Design represents the system, how it will work and how it can be assessed for quality. Design is the way to translate client's requirements into a system or software product accurately. Software architecture provides an abstract representation of the overall structure of software. This chapter contains numerous design level diagrams to have a clearer understanding of the system and flow of data.

5.8: Architecture of the System

Software architecture is what defines and structures a solution that meets technical and operational requirements. Software architectures prefer to ascribe involving a series of decisions, such as security, performance, and manageability. It describes the organization and interaction of software components. There are many types of architectures that are used among them. We are using the client server architecture for our "Aide" for virtual medical service application system.

5.9: Client server architecture

Client server architecture is one kind of distributed system architecture. Distributed systems are where the system or software runs on a loosely integrated group of cooperating processors linked by a network. It means a set of separate devices that are capable of autonomous operation, linked by a network. Client server architecture is the application that is modelled as a set of services that are provided by servers and a set of clients that use these services. In this network where many clients (remote processors) request and receive service from a centralized server. User devices offer an interface to allow the user to request services of the server and to display the results the server returns. Servers wait for requests to make an appearance from user and then respond to them.

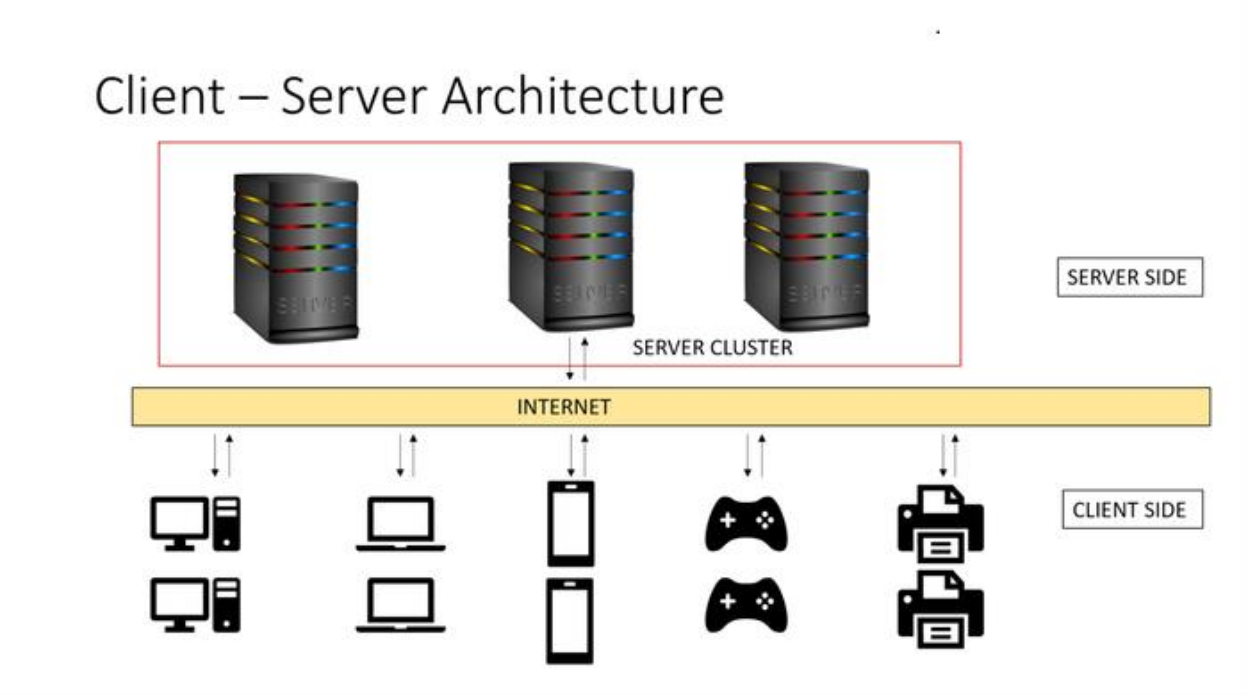


Figure 5.1: Client Server Architecture

In Aide, each mobile application will have access to the server (if it is connected to the internet). When a user creates an account or do registration, it sends a request to the server and updates the server. When user(s) confirm the contact number or confirmed google account or Facebook account, the device sends a request to the server for ensuring the verification, saved the data to the database. For having the centralization of control is the main reason to choose the client server architecture approach. Another reason is that this architecture is easily scalable, with an increase in the number of clients, capacity of server can be increased as well.

5.10: Entity Relationship Diagram (ERD)

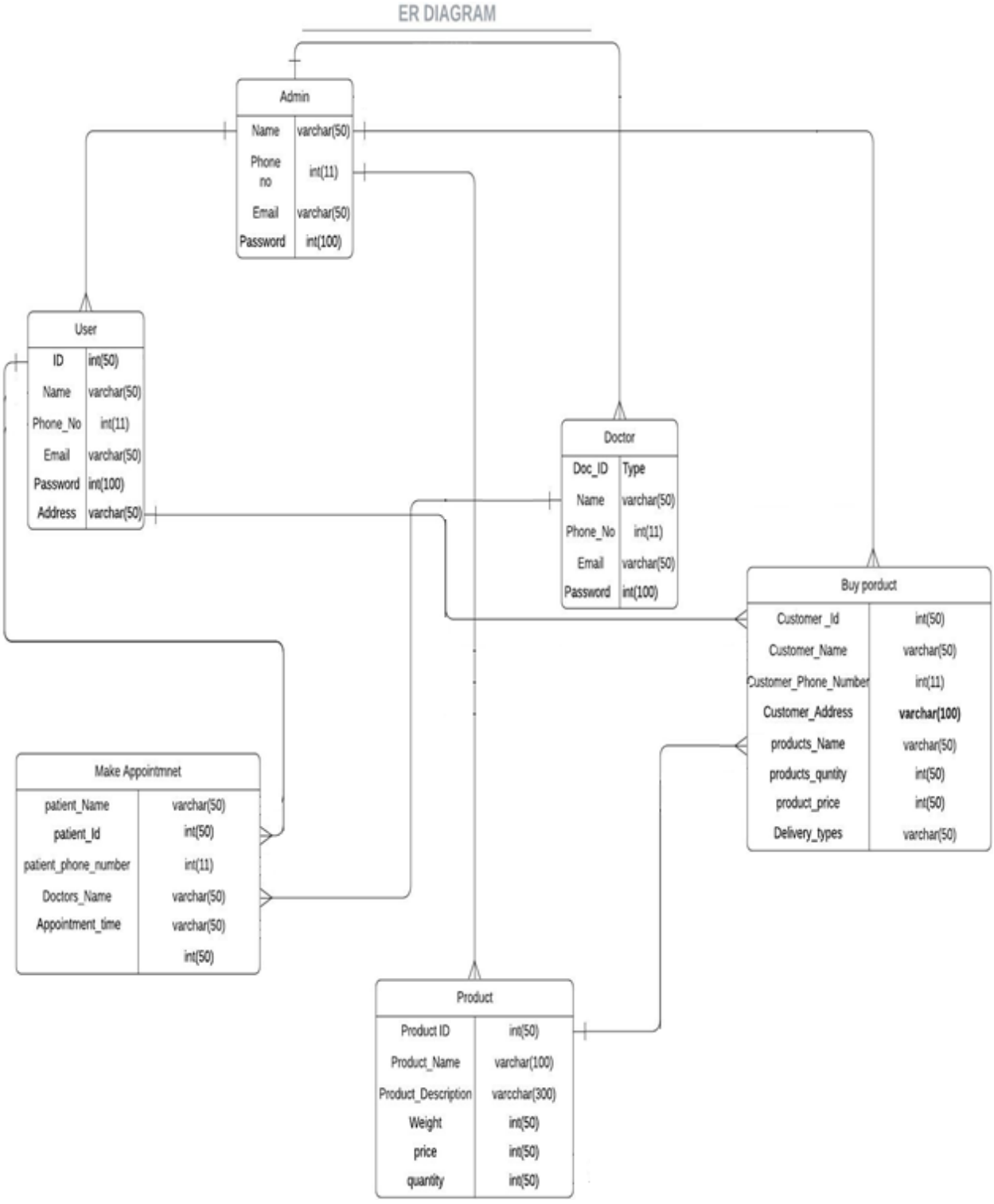


Figure 5.2: Entity Relationship Diagram of "Aide"

5.11: Use Case Diagram

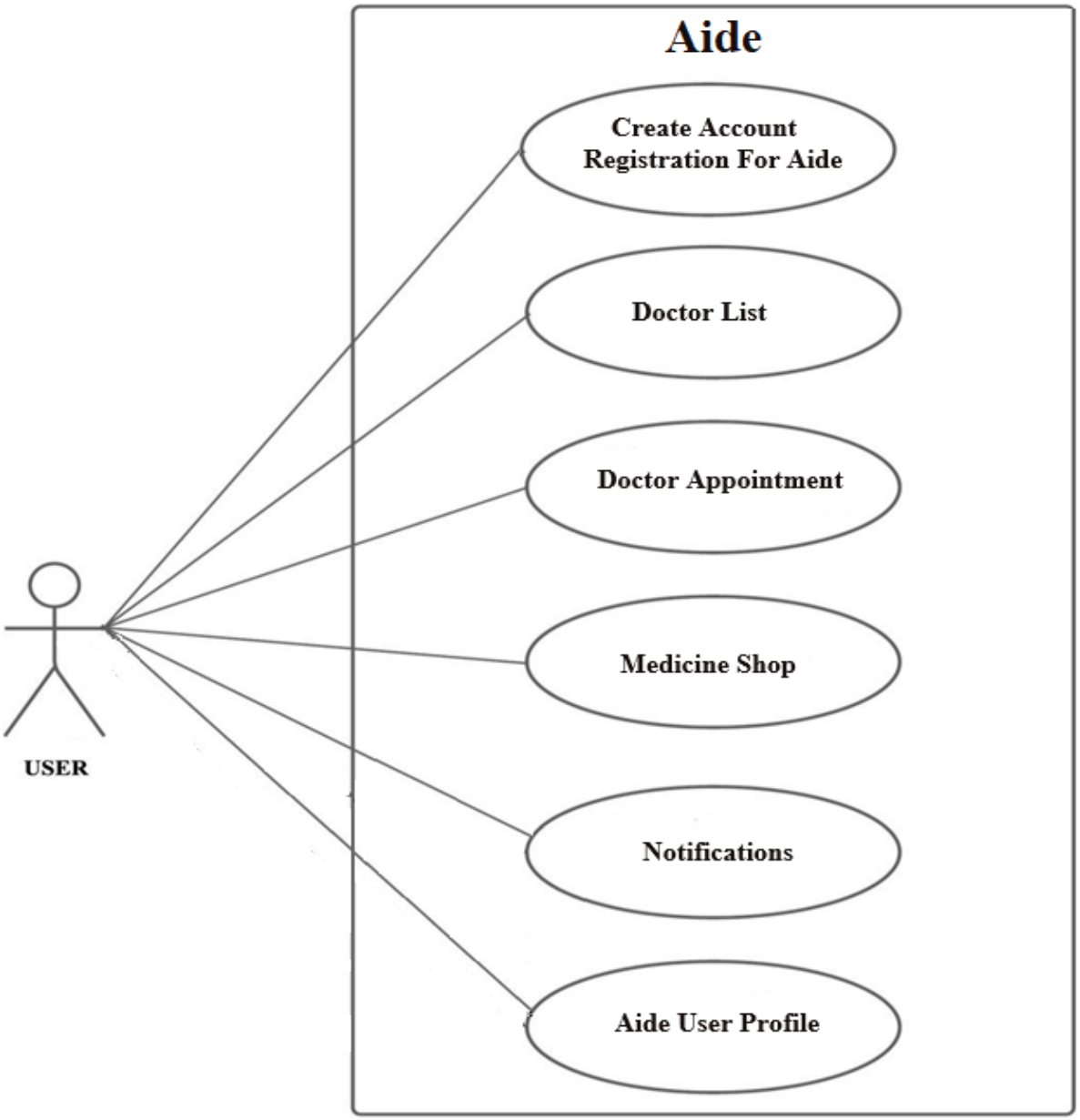


Figure 5.3: Use Case Diagram of Aide

5.12: Rich Picture

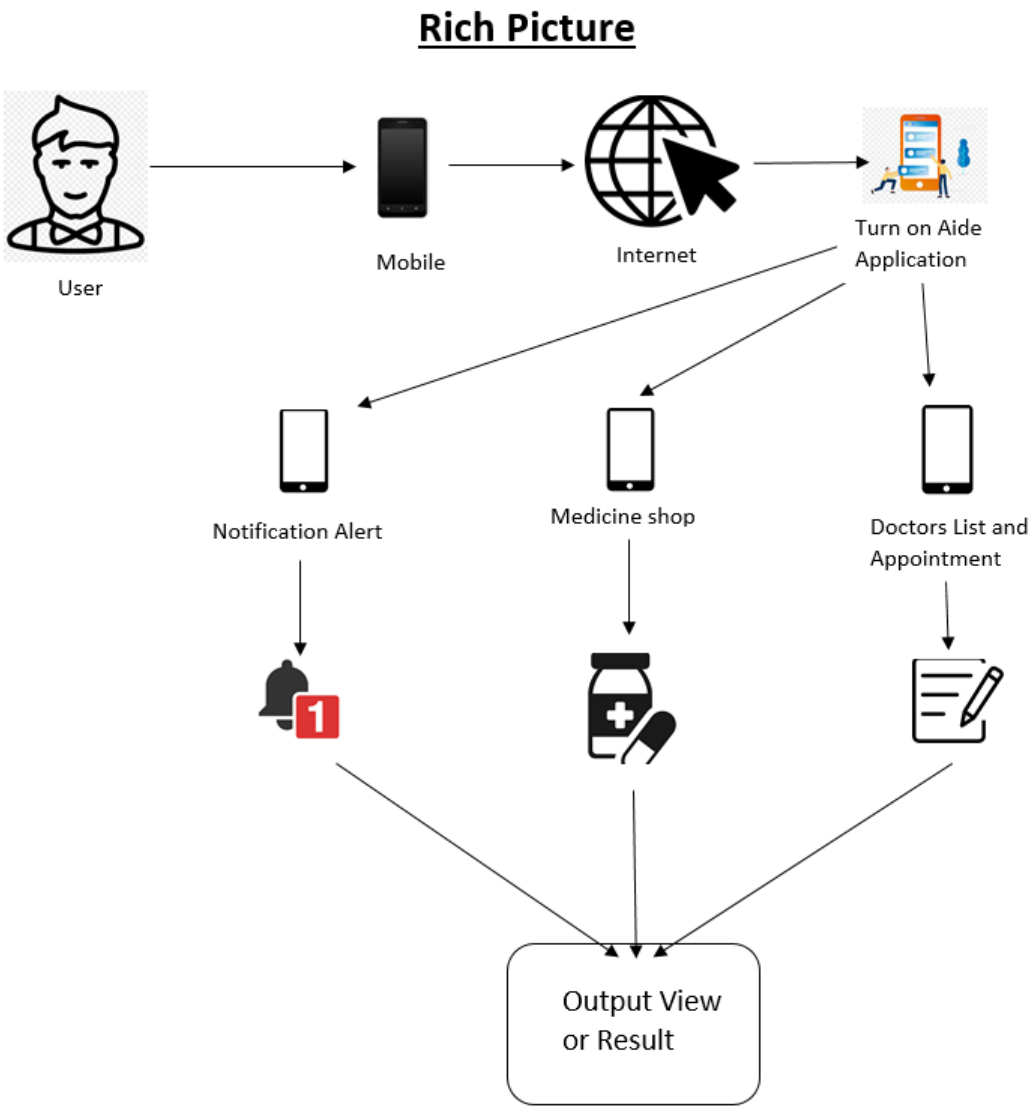


Figure 5.4: Rich Picture for "Aide"

The Rich Picture illustrates how the mobile application works. The process begins with User turning on the application on their device while being connected to the internet. Then the User decides how which option they want to select. User will get notify dates & updates. User will find Doctor's menu where they can check the details of the doctor and take appointment of doctor. User will find Medicine Shop menu where they can select and buy their medicines & necessary products.

5.13 UML (Unified Modelling Language) 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, to better understand, alter, maintain, or document information about the system.
Software development is a complex process. It is more complicated than writing a usual program. Therefore, it isn't possible to straight develop the code. First, it is essential to design the project. UML helps to model the system. Later, the codevelopers can write the code according
to the designed UML diagrams. There are various UML diagrams. Some common diagrams are as follows.

5.13.1: Activity Diagram

Activity diagram is primarily a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system. The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using many kinds of elements such as fork, join, etc.

Activity Diagram for Admin:

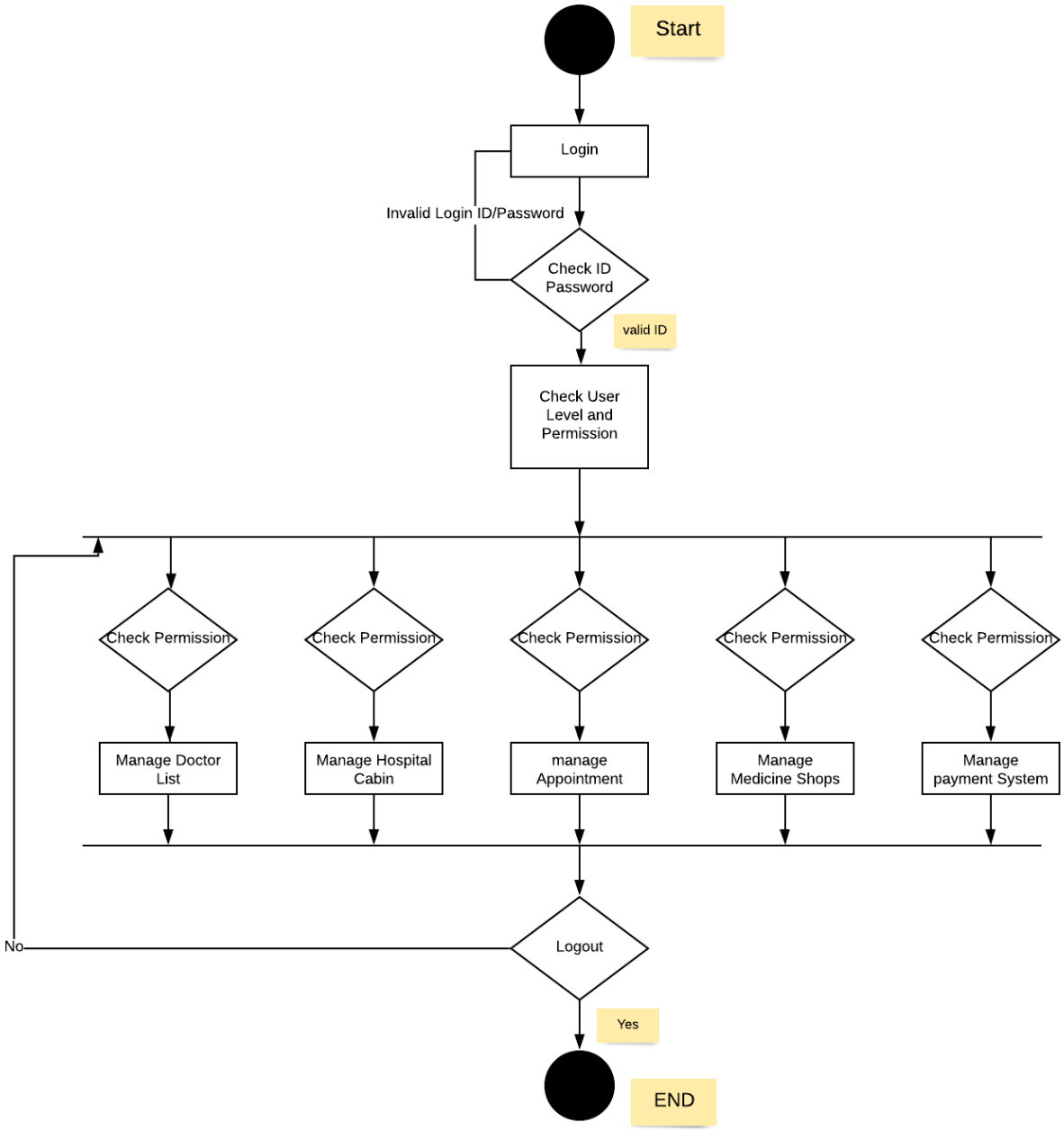


Figure 5.5: Activity Diagram for Admin

Activity Diagram for User:

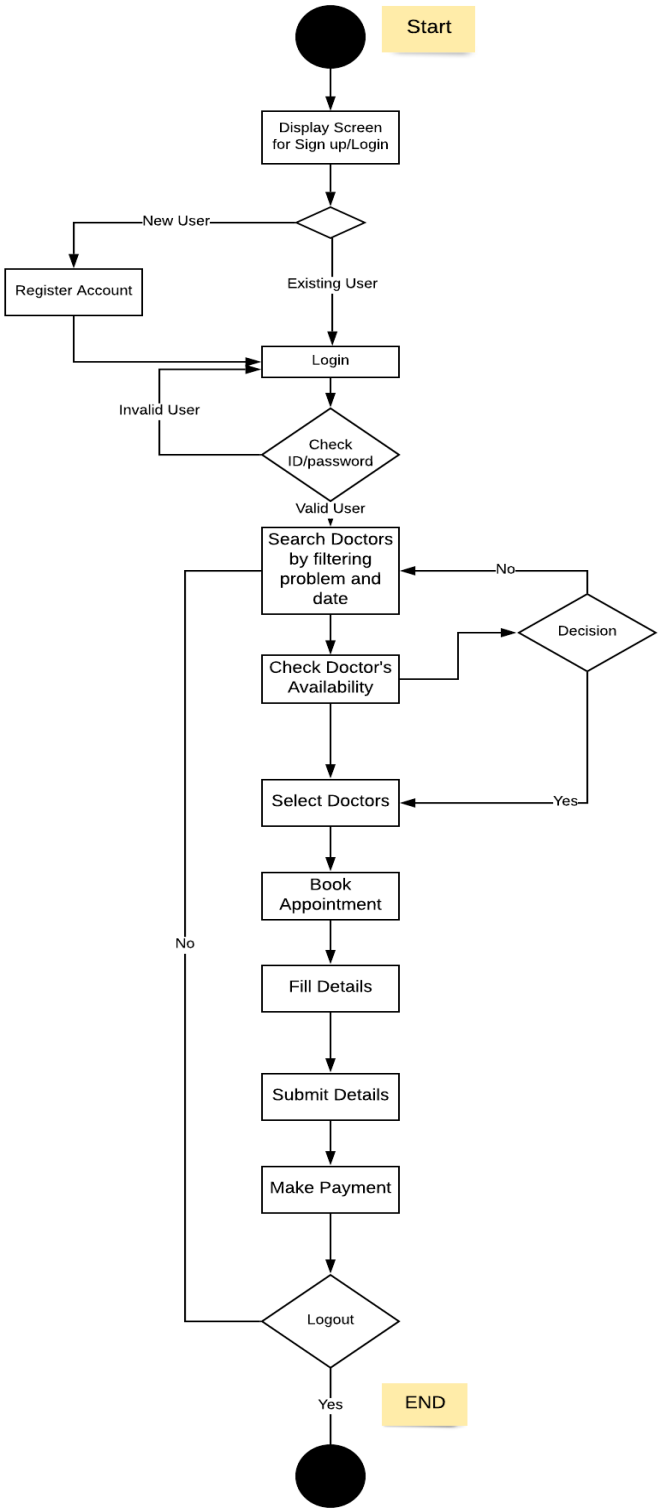


Figure 5.6: Activity Diagram for User

5.14: Requirements

The software requirements are descriptions of features and functionalities of the target system. Requirements bring the expectations of users from the software product. The requirements can be obvious or hidden, known, or unknown, expected, or unexpected from the client's point of view.
Requirements can be divided into two types: functional and non-functional requirements.

5.14.1: Functional Requirements

A functional requirement is a feature that must be included in an info system to satisfy the business need and be acceptable to the users. A functional requirement defines what an application and its components are and what these components are supposed to accomplish. The following functional requirements were gathered with our decided requirements gathering methods. The inputs, processes and output are discussed below:

Function: Must be compatible with all types of Android and iOS devices		
Input: N/A	**Process:** Application must be developed in a common development environment	**Output:** Application can be accessible from all sorts of devices
Precondition: User must have a working Android or IOS mobile device with internet Connection		
Post-condition: Everyone can use this application		

Table 5.2: Functional Requirement 1: Compatibility

Function: Navigate from One Screen to Another

Input: Select View to Navigate to	**Process:** Set up Screen Navigation	**Output:** Navigate to desired Screen
Precondition: The application is turned on		
Post-condition: Screen navigated to, will be displayed and further Navigations are possible		

Table 5.3: Functional Requirement 2: Navigation

Function: Create an account to use the application		
Input: User contact number and choose password	**Process:** Call API to server to create an account from provided data	**Output:** Account Created and will be navigated to Home Screen
Precondition: User in Create Account or Registration Screen the device must be connected to the internet		
Post condition: User will get a success message and will be navigated to Aide Home Screen		

Table 5.4: Functional Requirement 3: Create an Account

Function: Create your dates of Appointment from book appointment		
Input: Username and choose dates	**Process:** Stored on the database from provided data	**Output:** Appointment date created, confirmed message will be shown after created and provide notifications for the desired days.
Precondition: User in Create App Screen and device must be connected to the internet		
Post condition: User will get a success message and will be given notifications.		

Table 5.5: Functional Requirement 4: Create your dates of appointment from book appointment

Function: View dates of Appointment from book appointment		
Input: Click to Period Tracker	**Process:** Call API to server to fetch the data created	**Output:** View all the dates provided by the user
Precondition: Using Book appointment device must be connected to the internet		
Post condition: User will be able to view the all the dates created in a list format		

Table 5.6: Functional Requirement 5: View dates of Appointment from book appointment

Function: Doctor's Appointment		
Input: Navigate to Doctor's Screen and select Doctor from Doctor's List	**Process:** Call API to server to add Doctor's appointment on theselected date	**Output:** Appointment date created, confirmed message will be shown after created and provide notification one day before the date.
Precondition: User in doctor's appointment and device must be connected to the internet		
Post condition: User will be Navigated to selected Doctor's appointment		

Table 5.7: Functional Requirement 6: Doctor's Appointment

Function: View Doctor's Appointment List		
Input: Navigate to Doctor's Appointment List	**Process:** Call API to server to fetch the data created	**Output:** View all the data provided by the user

Precondition: User in Doctor's Appointment Screen device must be connected to the internet
Post condition: User will be Navigated to selected Health Screen

Table 5.8: Functional Requirement 7: View Doctor's AppointmentList

Function: Hospital cabin Appointment		
Input: Navigate to Doctor's Screen and select Doctor from Doctor's List	**Process:** Call API to server to add hospital cabin appointment on the selected date	**Output:** Appointment date created, confirmed message will be shown after created and provide notification one day before the date.
Precondition: User in Health screen and device must be connected to the internet		
Post condition: User will be Navigated to selected hospital cabin appointment		

Table 5.9: Functional Requirement 8: Hospital cabin Appointment

Function: View Hospital cabin Appointment List		
Input: Navigate to Doctor's Appointment List	**Process:** Call API to server to fetch the data created	**Output:** View all the data provided by the user
Precondition: User in Hospital's Appointment Screen device must be connected to the internet		
Post condition: User will be Navigated to selected hospital cabin appointment list		

Table 5.10: Functional Requirement 9: View Hospital cabin appointment list

Function: Shop List		
Input: Select Shop to buy products from store	**Process:** Call API to server to fetch the data of shop	**Output:** View all the products of the device
Precondition: User in Shop screen and device must be connected to the internet		
Post condition: User will be Navigated to selected Shop Screen		

Table 5.11: Functional Requirement 12: Shop List

Function: Product Cart List		
Input: Select shop then buy products which added to the Cart	**Process:** Call API to server to show the cart list of the product added by the user	**Output:** Product with delivery time and payment method
Precondition: User in Product Cart List and device must be connected to the internet		
Post condition: User will be Navigated to selected Product Cart Screen		

Table 5.12: Functional Requirement 13: Product Cart List

5.14.2: Non-Functional Requirements

Another type of requirement is non-functional requirements. A non-functional requirement is a description of the features, characteristics, and attributes of the system as well as any constraints that may limit the boundaries of the proposed solution. Non-functional requirementsare briefly described below:

- **Performance**: Represents the performance of the system which is required to exhibit and to meet the needs of users. Performance describes the acceptable throughput rate and acceptable response time. This application should provide a smooth experience forthe user and should have no input lag if the device has a certain minimumhardware specification.
- **Information:** Represents the information that is pertinent to the users in terms of content, timeliness, accuracy, and format. Information is about the necessary inputs and outputs and how it will be managed, types of the required data to be stored, how currently the information will be saved into the system, how the interfaces of external systems will work, etc.
- **Security & Control:** Security and administrations are always a concern for any system.All information on the server side and client side is secured. Only the application administrators and developers have access to core code of the application to be able todirectly manipulate any sort of information. In this project, node.js have been used for backend technology, which have various layers of security, where security requirements for this system have been taken care of. Control requirements represent the domain in which the system must operate, as well as the type and degree of security that must be provided. Access to the system must be managed with the privacy requirements.
- **Efficiency:** Represents the system's ability to produce outputs with minimal waste. We have tried to eliminate duplicate steps in the processes and to use the resources in an efficient way. Keeping our code non repetitive by using reusable code and componentsis how we achieved efficiency.
- **Service:** represent needs to make the system reliable, flexible, and expandable.It is deals with:
    - Who will use the system and where they are located?
    - How many types of users will be in this system?
    - The appropriate human factors.
    - What training materials will be included in the system
    - Reliability/availability requirements
    - How the system will be distributed

- What types of documentation is required?

- **Extensibility and Maintainability Requirements:** There is one standard User interface designed for the look and feel of the application. The application can be expanded to accommodate many further modules without making any changes to any existing modules. The application is created in such a way that the developers can easily maintain both the server and client sides.

Chapter 6: Results & Analysis

As mentioned earlier, for the development of this project, Ionic has been used to build the mobile application and Node.js were used for the backend development. React Native is used because it runs natively on mobile devices hence it runs faster and uses lesser space. The main reason for the use of Node.js is because they are lightweight, support routing, sessions and caching and most importantly integrate MongoDB database which is used in this project.
This chapter contains screenshots of the mobile application so it can be seen about how the actual application looks like:

● **Aide Sign-Up Screen & Sign-In Screen:** User will have the option to Sign up for the application to use it. Must provide their contact number for create account.

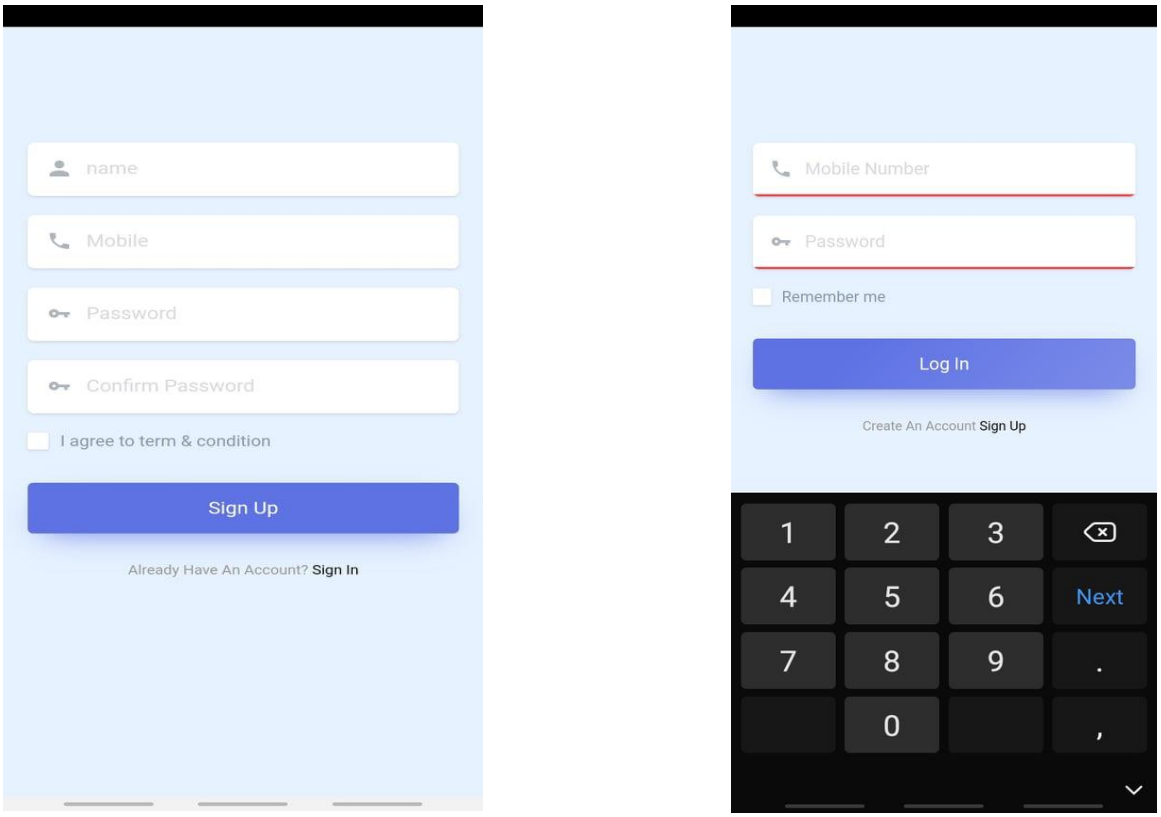


Figure 6.1: Aide Sign-Up Screen & Sign-In Screen

● **Home Screen:** After successfully created the account for Aide. The User will see the main of Aide or Home Screen of the application.

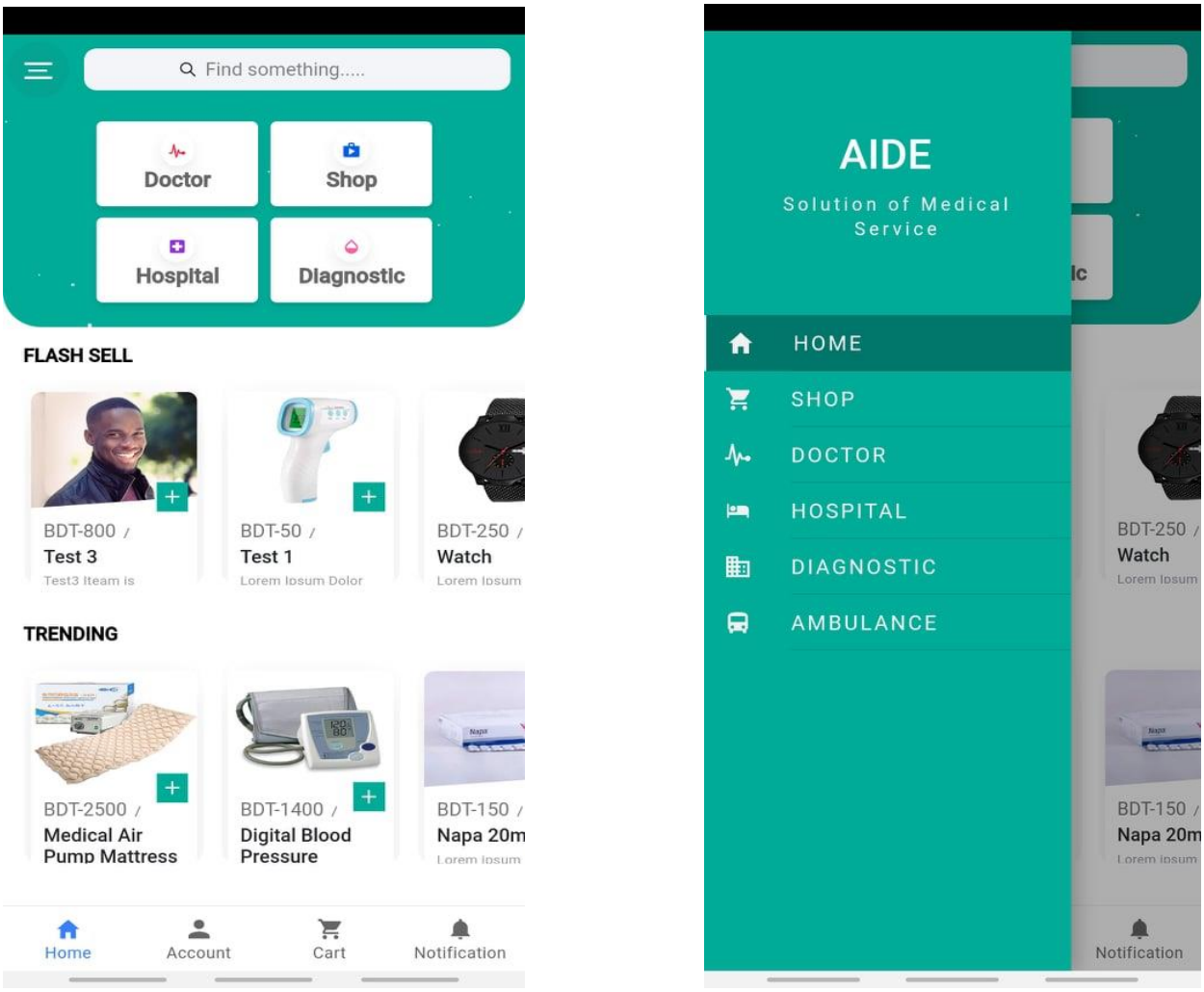


Figure 6.2: View of Home Screen

● **Doctor's Details Screen:** User will be able to see the details of the Doctor before taking appointment.

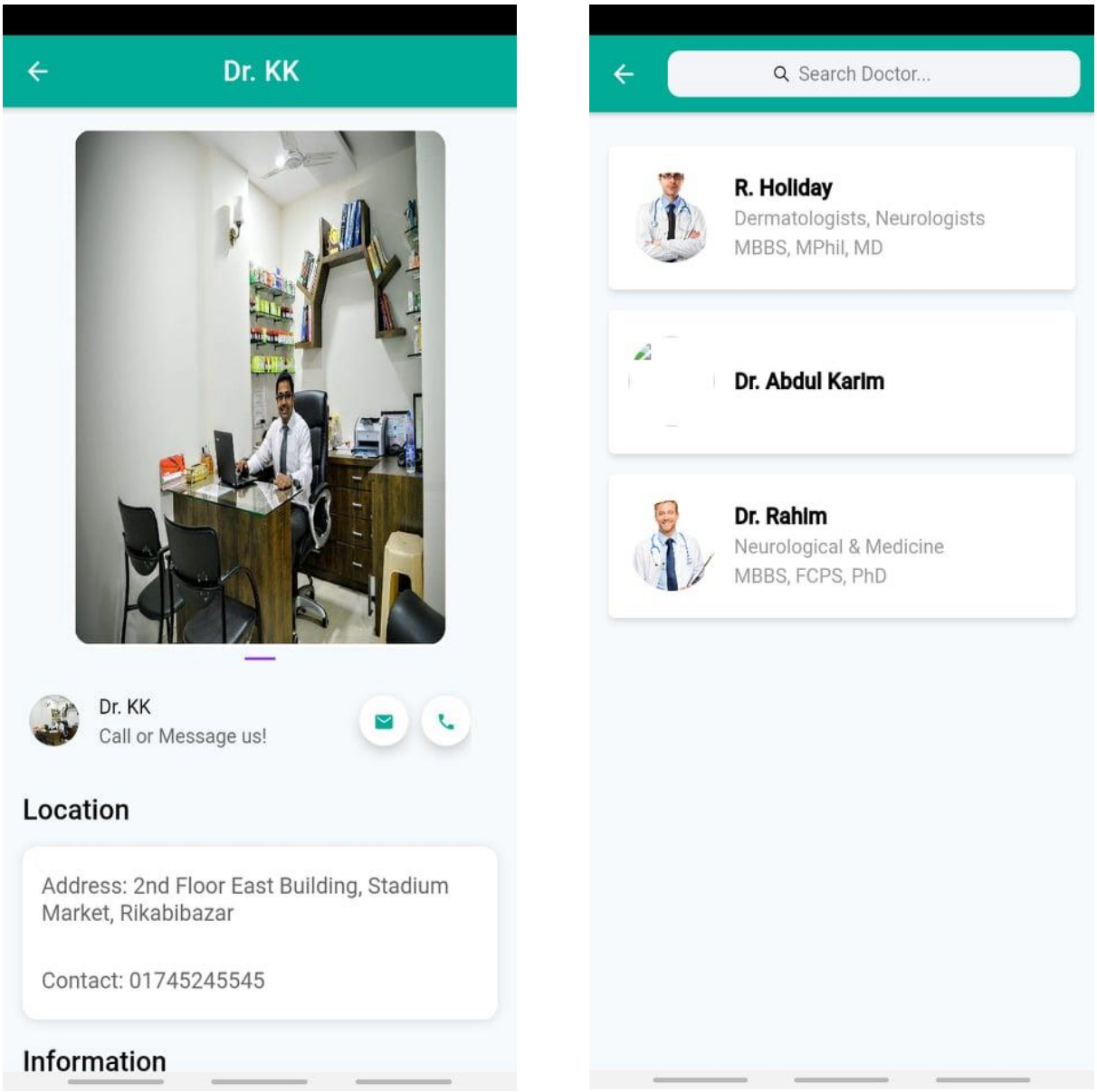


Figure 6.3: Screen View of Doctor's Details

● **Appointment Booking:** User need to give their Name and Contact number for taking appointment from their doctor. After taking appointment from doctor on given time & user's preferred time, they will get a page to call for knowing their serial number of the appointment.

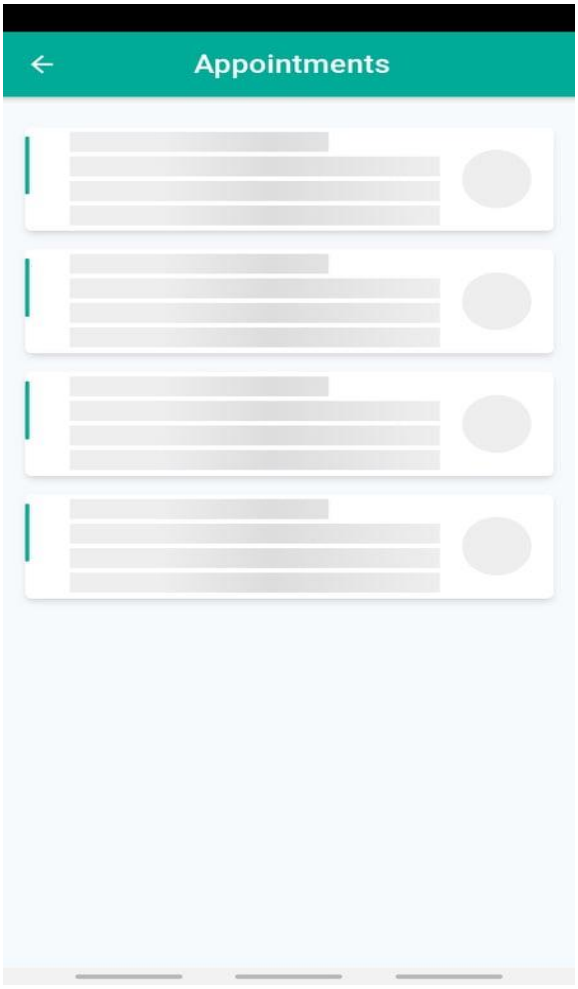


Figure 6.4: Screen View of Appointment Booking

● **Shop Page & Cart Page:** Users will find their desired products from shop and can purchase. After purchasing products user will be able to see their ordered products on Cart page.

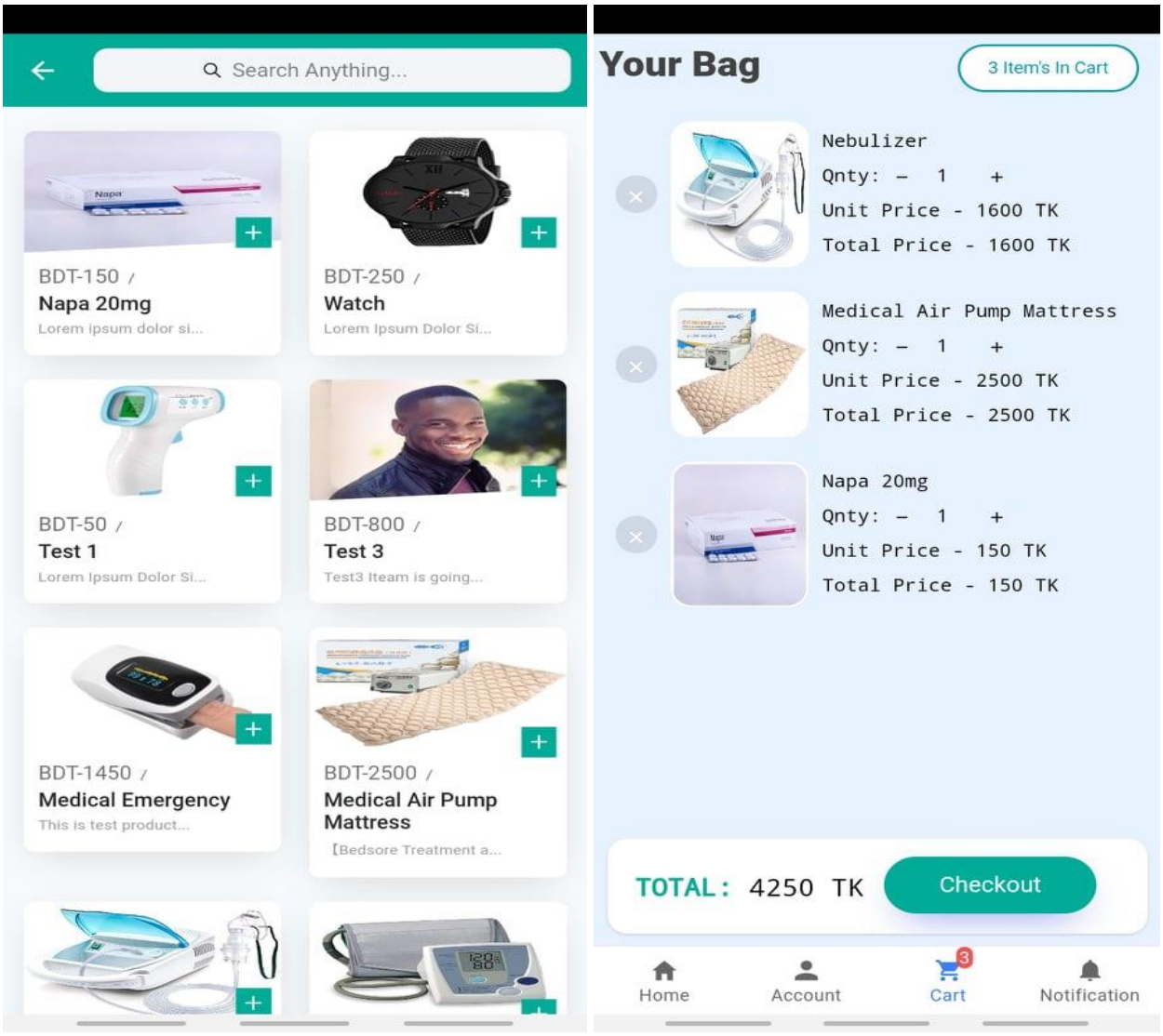


Figure 6.5: Screen View of Shop Page & Cart Page

● **Order Place:** After choosing their desired products user will place their shipping address then they choose their payment option and confirm it.

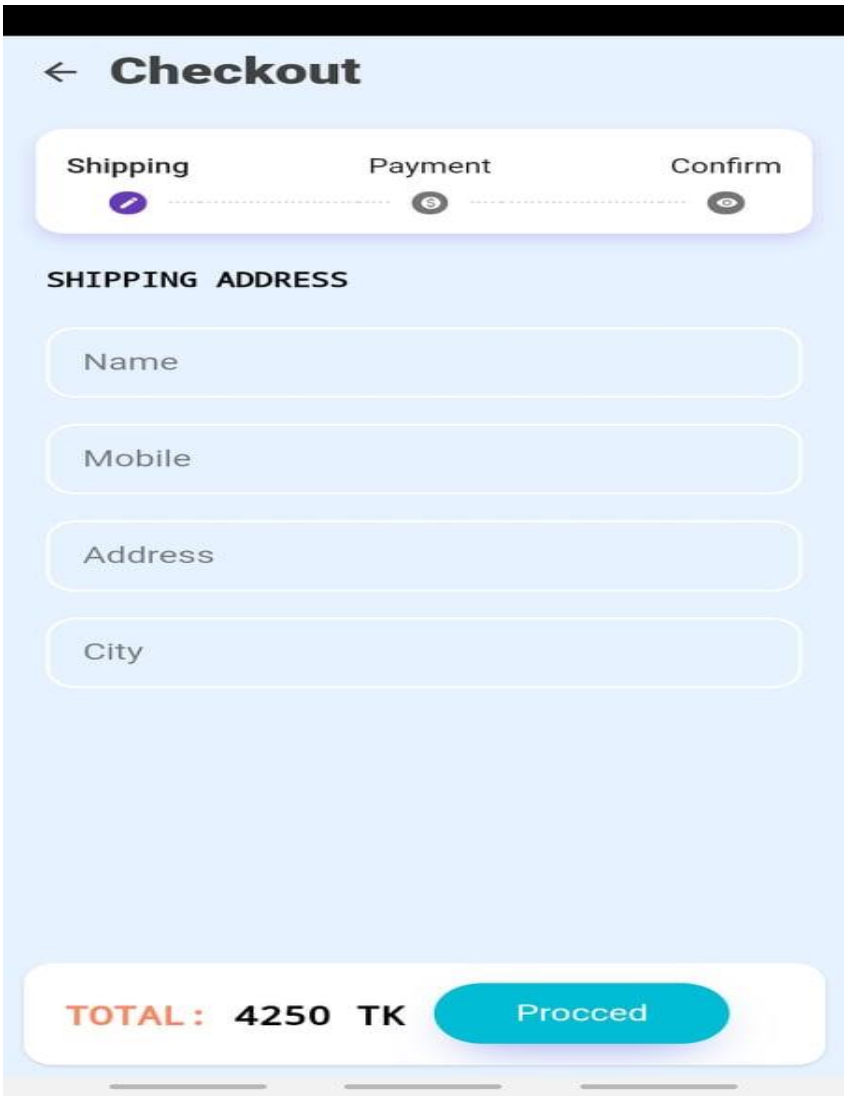


Figure 6.6: Screen View of Order placement & payment Page

● **Hospital, Diagnostic Center Appointment & Ambulance Booking:** User need to give their Name and Contact number for taking appointment from hospital or diagnostic center or ambulance booking. After taking appointment from hospital or diagnostic center or ambulance booking on given time & user's preferred time, they will get a page to call for knowing their serial number of the appointment or time for ambulance arrival.

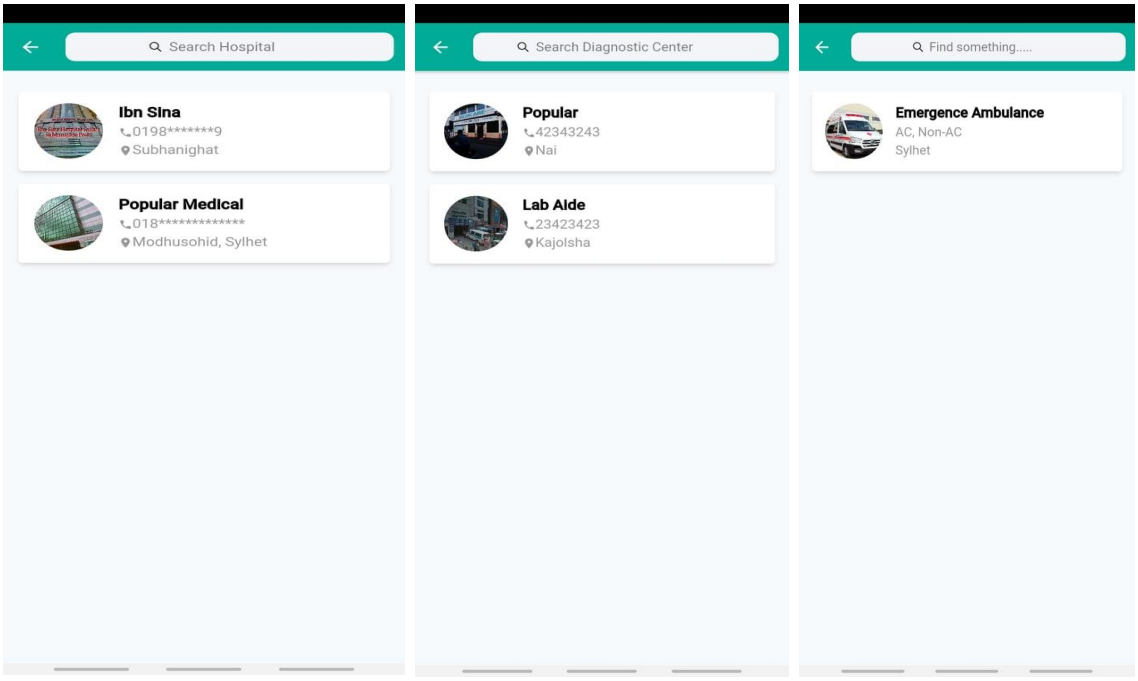


Figure 6.7: Screen View of Hospital, Diagnostic center Appointment & Ambulance booking

● **Notification:** User will get notification with a message on every tab but here all the notifications will be stored and can be able to see the updates here.

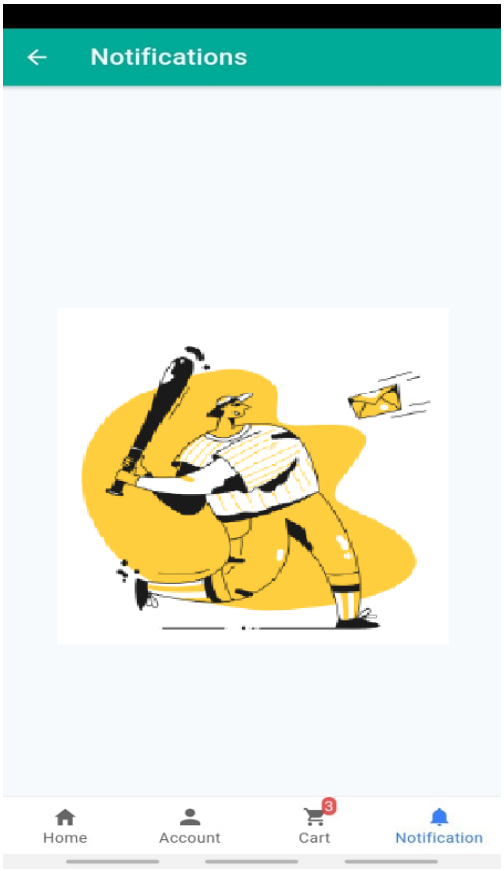


Figure 6.8: Screen View of Notification Page

● **Profile Menu:** In Profile menu user will be able to add/change their Profile Picture, can change their password, can change their address.

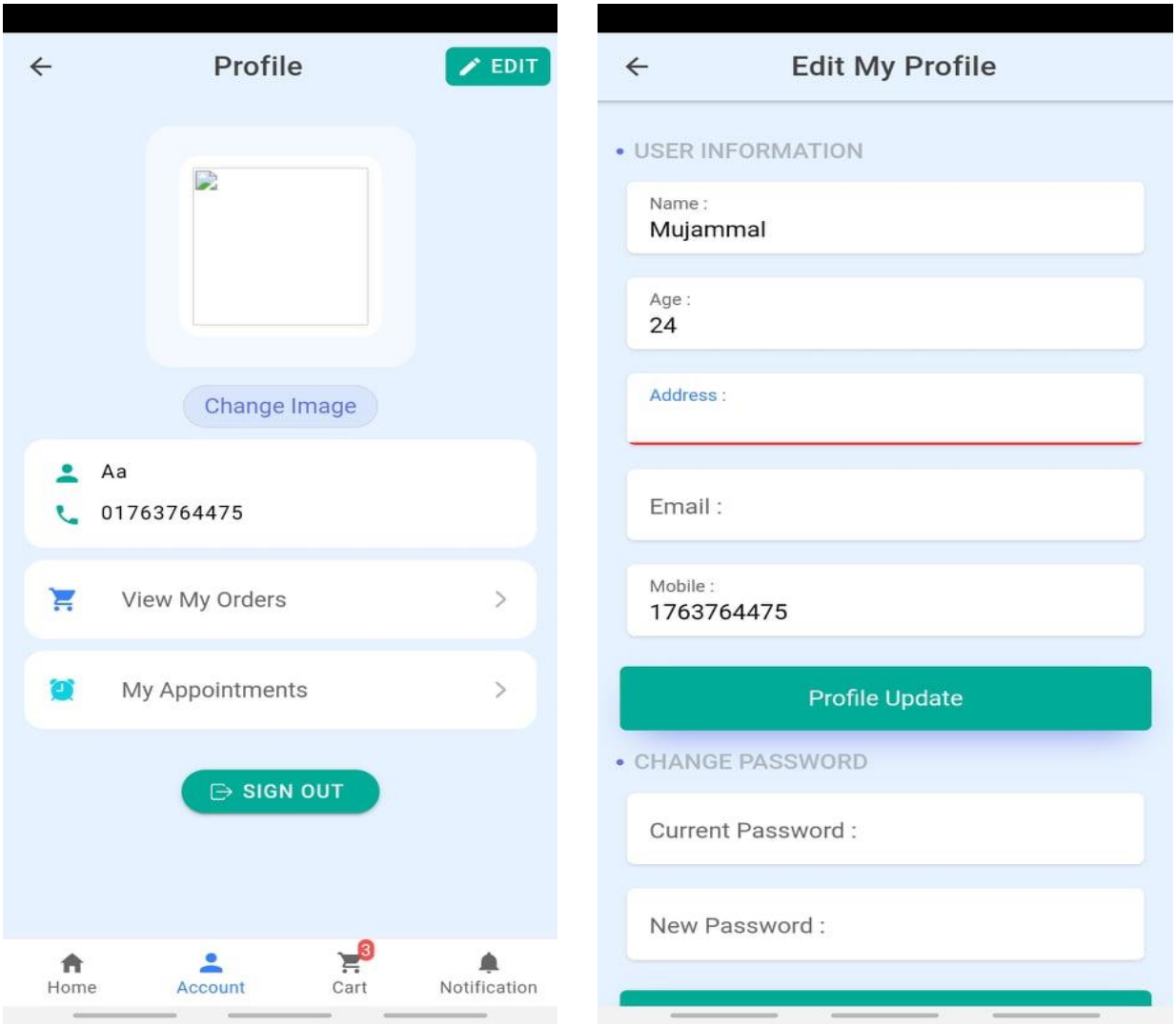


Figure 6.9: Screen View of Profile Menu

6.1 Overview

The overall project work started acquiring the requirement gathering. As it was a demanding system for people around the country, we focused to build it as a generic product and customize as per user friendly furthermore. Hence, we the developer team had meeting with CEO about understanding the product we were trying to build. Later we had to conduct survey to make clear idea of the functionalities where university students and job holders participated. Also, the developer team discussed about the User Interface (UI) of the product according to possible client needs.

6.2 Results from surveys and interviews

From the meeting we had with the CEO, it was made clear about how the product is going to be a source of revenue. And from the survey we took, the functionalities of the system were being identified clearly. Simple questions about what the user expect from such a system was asked. Without knowing those from the users of the system, requirements gathering could be incomplete and system might have flaws.

6.3 Testing Result

Yet, the application is not fully developed. Several functionalities are being added regarding the requirements. So, many more test cases may be included later. Developer team worked on problems that have introduced earlier. We have not deployed the application yet. After completing all test case and debugging, a beta version would be released.

Due to the outbreak of COVID-19, several team members of the developer team were off duty and hence it was becoming tough to finish the development properly and lots of work were undone.

After the testing phase completion, our team will make a user manual though the system is much user-friendly.

Chapter 7: Project as Engineering Problem Analysis

7.1: Sustainability of the Project

Sustainability of the product refers to its ability to be maintained and updated. In the modern world, every application being released needs to be maintained and continuously updated for its user base.
A product can be sustainable in three main categories:

● **Community Sustainability:** It means how much and how actively the users will support the project. Support comes in many forms such as downloading and installing the application, using the application, subscribing to paid services, giving rating and feedback, referring to other people, etc.
After the release of "Aide" in the application market, it is believed that it will have a strong user base since it is a unique idea of exercising in a playful and competitive way. As the user base grows so will the community and hence it can be said that it is Sustainable in terms of Community.

● **Financial Sustainability:** This refers to how the application's running cost will be maintained after it has been released and whether it will generate enough revenue as acceptable profit. An application's running cost includes - server cost, database storage cost, third party api cost, etc. When "Aide" will get a full-fledged release into the application market, it will have advertisements to generate revenue and a paid monthly subscription will be offered to the users to remove all advertisements from the application for a month. This method of revenue generation is believed to be able to cover the costs to be able to keep the application running after release. Thus, the project can be determined as Financially Sustainable.

● **Organizational Sustainability:** It relates to how the organization will continue to operate after the release of the application. After the release of an application, usually the organization maintains the application via its current team, an extended team or by a fresh new team. Also, organizations update their project by adding newer features to it and organization may pivot to other projects, expand the teams, create new teams, etc.
"Aide" has many more future planned features to be worked on and released. Since it is a unique application for people who need any kind of medical service, the project will be maintained and updated after its release as well. Taking core features from "Aide" and adding more ideas and features to it, another new project may also be planned and worked on. In conclusion, it can be said that the project is Organizationally Sustainable for the country.

7.2: Social and Environmental Effects and Analysis

Smartphones are popular among people for the applications they provide to users. Smartphones make communications with people quite easier. People enjoy a ton of advantages in various sorts of their daily work. Some advantages smartphones provide better means of communication, learning options to users, great exposure to the newest things, ways to personality development, simple ways to access applications, ideas to succeed in business, platforms to grow their applications and more.
The aim of "Aide" in the this country of smartphones is to simply for people who need any kind of medical service, so they will remain fit and healthy.

Social Effect:
Aide aims to keep people healthier and fit by providing them virtual medical service through this application. Promoting virtual medical services for people in our workplaces and our extended supply chain. The aim is to implement policies and processes that people trust, with an emphasis on addressing the harmful social and cultural norms and behaviors that can leave people at risk. This is an ethical obligation, and that we know it's essential if our business is to take care of the trust and reputation we aspire to. By using Aide application user can easily buy medicines without any hesitation to go outside and buying the products from the shops. User can easily book appointment using Aide. Doctor's help suggestion and counselling can be grabbed easily and feel free from any problems.

Environmental effect:
Using "Aide" regularly will make people more active and confident. Active people become more eager to do more physical tasks. These physical tasks include taking care of their own home environment like picking up litter from the floor, taking out the trash, dusting, cleaning, washing, organizing things, etc. Although this is not the main goal of the application "Aide", but this buildup of subconscious behavior is believed to be a good thing and hence it results in having a positive impact on their environment and it will be.

7.3: Ethics and Ethical issues

In the world of smartphones with so much data collection, hacking, cybercrime, etc, there are rules and ethics that need to be followed when working on creating and releasing an application. The developers of this application Aide believed that the application does not breach any code of conduct of application release and development since they all have been taken into serious concern. Some of them are:

● **Collecting only relevant User data:** The Aide App does collect user data, but those are strictly stored & maintained and used only relevant for this application. The only data that is being collected are the user's steps and distance covered for a certain period and their unique device identified code; other than these no other data is neither collected nor stored.

● **Not Sharing or Selling any User data:** Even though the data collected may not be of any privacy concern for most users, the application does not let any service, any application or any third party have access to the data collected.

● **Data Storage Security:** Only the lead developer and the owner of "Aide" have access to the server and the database. Since they are hosted in the cloud and can only be accessed via lead developer's and the owner's login credentials, the data stored can be deemed as safe and secure.

● **No use of Profanity:** The project has been developed with no slangs, swear words, offensive language, etc. The language and tone in the application is clean, clear and to the point.

● **No Discrimination Policy:** Other than concerns for age, "Aide" does not discriminate of any kind based on race, sexuality, gender, religious beliefs, color, language, political or other opinion, national or social origin, property, birth, or other status.

● **Proper use of third-party Services and API:** "Aide" does not violate any rules of the third-party services or the APIs that have been used in its development.

● **Clear Promotion:** "Aide" only intends for Patient's Safety and Security and Patient's health. Other than what has been mentioned, "Aide" has no intention of promoting anything or anybody else.

● **Clean Advertisement:** The advertisements that will be running in "Aide" will only be the ones that are clean and clear which will have no negative impact on its users. Advertisements that will be filtered and will never be run on "Aide" are the ones that contain violence, nudity, blood and gore, injury, disturbance, etc.

Chapter 8: Future Work and Conclusion

8.1 Challenges Faced

During my internship program, I have faced lots of challenges while working on this Project. The main ones are:

● **Understanding the Requirement:** It was quite difficult to understand what was really required; often I would do things that were not asked to be done and miss out on the actual requirement. It was recurring at the beginning but as time went on and I started to have better understanding the problem was minimized.

● **Adapting to New Technologies:** Since this was the first time, I have ever worked on a mobile application I had to learn and adapt to new technologies. Although acquiring the skill set was possible it became hard to apply them in real life situations.

● **Keeping up to Speed: A**fter learning new technologies and putting them to use was a slow process for me initially as it was the first time, I have ever used it. Hence, it was quite difficult to meet weekly deadlines, and this slowed down the overall pace at which the application was developing.

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

8.2 Future Work

This project, "**Aide** for virtual medical service" is still in its development phase and there many more planned features that are to be added soon. Some of them are:

➔ Create '999' option for calling direct nearest Police Station.
➔ Share application links to invite others to join.
➔ Sign up and Sign in feature via face detection or barcode.
➔ Log in via other services such as Google or Facebook, LinkedIn, Instagram.
➔ Get notifications and connection of other social media such as LinkedIn, Instagram, Twitter.
➔ Animations, Logos, Icons and Advertisements.
➔ Develop for iOS and Android, Linux, Mac, Google Fuchsia, Windows.
➔ Show user statistics.

8.3 Conclusion

During Internship I worked on a mobile application called “Aide”. In this application Orbs Lab looked after people’s medical needs and it is the main target and priority. This application is important for people’s any kind of medical needs. Just using this application user can access and get many features at their need in one hand only.
Working in Orbs Lab as an intern has been an amazing experience. I have learned a lot about developing different kinds of applications and about development styles. Working with cutting-edge technology like Apache Cordova, MongoDB Compass, Ionic Devapp, Node.js is among the major takeaways from the Internship Program. Through this program I have been exposed to a developer's working life. Throughout my internship, I could understand more about the definition of a software engineer and programmer, and this helped prepare myself to become a more responsible and innovative developer in future. During my project, I cooperated with my mentors and seniors to solve the challenges faced. Moreover, the project indirectly helped me to learn independently, discipline myself, be patient, take initiative and the ability to solve problems. Besides, my communication skills have also strengthened as I had to give regular updates and was engaged in many pair programming sessions. As I had to face many problems, solving them developed my programming skills which made me sharper in my skills. This internship opportunity has paved the way to investigate the development environment and marketplace. I would like to appreciate once again everyone who has made my life as an intern such a great experience.

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