# AN ANDROID APPLICATION AND WEB SOLUTION FOR DOCTOR INFORMATION AND LOCATION SERVICE

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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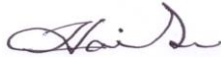
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# APPROVAL

This project, titled "An android application and web solution for doctor information and location service," was submitted to the Department of Computer Science and Engineering, Daffodil International University, by Farhana Rahman Id: 181-15-1836, Zahidul Islam Rupom Id: 181-15-1774, and Sonia Akter Keya Id: 181-15-1770. It was accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved the presentation took place on January 18, 2022.

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# DECLARATION

This project was done under the guidance of **Ohidujjaman, Sr. Lecturer** of Daffodil International University Department of Computer Science and Engineering. We further ensure that no parts of this project have been submitted to university for a degree.
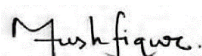
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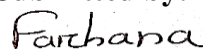Daffodil International University

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Eventually, we must regard and appreciate our parent's unwavering support and patience.

# ABSTRACT

A mobile application that provides doctor's information on the go is really valuable and lifesaving. Especially in the current situation of covid-19, every patient needs immediate medical attention. For those people who are travelling to a different city, those who live in rural areas and don't know much about doctors and medical facilities of that area, when they get sick they face real hassle to find a doctor. And also day to day new doctors start new chambers', doctors get shifted from one hospital to another, and get transferred from one city to another. Many of the people even from the same area don't get informed about these changes immediately. To solve and ease these troubles we're developing an android application which will provide information about nearby doctors to its users. Like doctors chamber location map, doctors qualification, visiting hours, contact information etc. we're in the era of Information technology where majority of the people have smartphones or at least have access to a smartphone. Even in the villages where electricity has not reached yet they're already using smartphones by charging them with solar panels. We're developing it for the general people and for the interest of everyone. Every time any update about any doctor will reach everyone and that is way faster than ever. For future development we've also planned a direct appointment system and patient medical history management system with this application.

**Keywords:** Doctor finder, Doctor location, Medical emergency, Medical application, Medical service, Android application, Doctor locator.

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# CHAPTER 1
# Introduction

## 1. Introduction

Our "Quick Doctor Locator App" is an android app. Any Android smartphone user can install it and search any nearby doctor's chambers with a location map and their contact information. This will help users to find and communicate with doctors in critical situations as well as in any situation. They will also get many other details about doctors from this app. Like their visiting hours, qualifications and specialties etc. As we already have seen medical service availability in pandemic gets very hard even in normal situation it's a hassle to reach a doctor. This is because we don't know how many doctors and which doctor is available in our surrounding area, we also don't know their contact information. To ease up this situation we have made an android application which will provide doctors location map and contact information to users. So that users can find any nearby doctors chamber and contact him directly for appointments.

## 1.1 Objective

Medical information is necessary for everyone and anyone. Goal of this application is to give users the ability to search doctors available in an area and get their information, making it easier for them to reach their preferred doctors in time. We want this application to reach every corner of our country providing medical support from urban areas to rural population.

## 1.2 Motivation

We have observed how people suffer failing to get any medical help in time. The ongoing covid-19 pandemic has made us realize how vulnerable we are and how help less we can get in moments. This is our approach towards improving the medication system and it facilitates people to receive very fast medical help in convenience. Not many people know contact information or the location of all of the doctors available to him. This application will solve this problem to a greater extent.

## 1.3 Features

Some features of our projects are:

1. We will an android application.
2. To Support this app we will also build a web application to collect doctor's information.
3. This web application will act as a data server and will provide information service to its subscribing applications.
4. Our android app will collect data from this web app.
5. In this android app users will be given a search option for doctors.
6. Upon searching they will get a map showing all of the nearby doctors available to him.
7. This app will also show doctors qualification, visiting hour and contact information for appointments.

## 1.4 Anticipated Outcome

1. Android app that provides doctor's information to users.
2. A location map and contact details about nearby doctors.
3. This app must support maximum android devices.
4. A web application that collects data.
5. Web applications that provides processed data globally.
6. Users will be able to find doctors very fast and hassle free.

## 1.5 Statement of the Problem

When someone is in a different city and sick, or is in a medical emergency it's a hassle to find doctors in that area. Also there's no particular way that a person gets updated information about medical professionals in his area. This application is the first step to resolve it.

## 1.6 Feasibility of the Project

From cost benefit analysis we have found the costliest part would be the data collection and getting regular updates but that cost is very low in comparison to saving life and

fighting against a pandemic and also later on this can be minimized to a negligible amount by providing an data update platform to doctors. From technical and operational feasibility perspective this is a very simple application and has very few things to come in the way of building it and running it but one major thing to impact its operation is the network issue but that also can be mitigated easily. In summary we can safely say this project is well founded for a long run without much hurdle.

## 1.7 Design of the Report

Layout of our project is shown below (fig: 1.7). In the first chapter we have introduced our project and briefly described its functionality in introduction, Objective, Motivation, Features, Expected outcome Problem Statement and project feasibility. In chapter two we have discussed about background of our project and shown its comparable structure in chapter Introduction, Related Works, Challenges and Summary. In the third chapter we have shown requirement analysis part of our project in chapter introduction, architecture of proposed system, Flowchart, use case, er diagram and dataflow diagram. And in the fourth we have given the specification of design for our project e.g. Programming languages, development platforms, databases, libraries, API's and frameworks in the contrast of android application and web application. In the fifth chapter we have shown our project in working condition. In the sixth and final chapter we discussed the future plan and conclusion for our project.
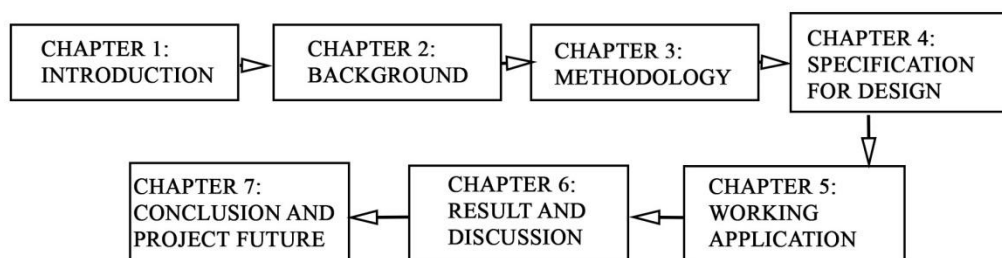
Fig: 1.7 Report Layouts

# CHAPTER 2
# BACKGROUND

## 2. Introduction for Background

With increasing population medical facilities are also growing day by day, awareness of people is also increasing but these improvements are not as effective as they can be, because not many people are getting updated information. We don't have many reliable sources to provide such information to the general public. Yes we have social sites like Facebook, we have Google maps to provide directions to a location but they also don't always provide adequate and reliable information. And it's very hard and troublesome to get any usable information from them. This is where our application and its related services come into play. We will collect updated information about doctors and will also provide adequate and reliable information service to users.

## 2.1 Works that Completed

Doctor Finder,Mr.Doc and ZocDoc are some apps that have similar functionality as ours but all of them are for regional use and have mandatory registration processes which results negatively in critical situations.  They do give addresses but don't have a map option. We have developed our app with simplicity in mind and with map because the majority of our populations are expert mobile users.

## 2.2 Comparison

Other similar applications are available in wide verity in functionality. But all of they have 3 negatives discussed earlier they're bulky, regional and tedious. But the positives are they all have an appointment system which is a great feature by itself, which we still lack. We have tested startup time and battery drainage of smartphone between these apps and ours and as no surprise our app came on top. And partially that is because we've very limited functionality as of theirs. But even with full featured version of our app should result better because of our goal of "no mandatory authentication". This feature alone should put us in leap ahead.

## 2.3 Challenges

**Poor Network:** Our application requires network connection, and many of the times we encounter network issues. To ensure good service any network issue will be challenging for us. We may use local cache in future to supply data even without a working network situation.

**Data Reliability:** Another challenge would be providing updated data and validating correct data. To solve this issue we may provide a webpage to doctors so that they can update their information and they'll do it in their own interest of getting patients even after changing location or schedules. But still we have to monitor data on a regular basis to verify information validity.

## 2.4 Summary

There are many similar application but not available to everyone and none of them are available for Bangladesh. Our application is built to be used by everyone. From researching on this field we realized this could be major improvement for our country in terms of medical ground. For the future we have a plan to give users the ability to make appointments without any registration process.

# CHAPTER 3
# METHODOLOGY

## 3. Introduction

We've used "Agile" approach in our project. Agile is flexible, it easily handles complex and variable requirements in software development project. Using the Agile approach, teams develop short sprints, each of which includes a defined duration and list of deliverables which has to be completed to reach a specific goal. Bellow we have discussed the agile implementation of our project. We have two different part of this project. First part is the android application that help its user to find and contact doctor and $2^{nd}$ part is a web application that used to store doctors information and relay it to the android application as a data server. We use android studio and java for the $1^{st}$ part and visual studio, C#, MVC for the web application.

## 3.1 The Agile Methodology

In our project we set our sprints in 6 steps.

1. Requirement analysis
2. Design
3. Develop
4. Test
5. Deploy and
6. Review.

In first Sprint we tried to build a prototype that satisfies our basic functionality that we found from our requirement analysis. And after reviewing our prototype we want to proceed to our next sprint of beta version development.

## 3.2 Analysis of Requirement

Requirement analysis is a process to gather information about a project and find out the expectation of the user and structure them into a plan to build an application. Main goal of our application is to give correct information about doctors and deliver it fast. From interviewing randomly chosen smartphone users, doctors and hospitals we have gathered substantial amount of information about the problem of visiting doctors, why

it's there, what would help people and probable alternative solutions. After defining our projects goal we designed our project as bellow.

## 3.3 The Design

We have designed our project with a goal of simplicity and full functionality with help of UML diagrams. Design tells the developers what to do, where to do, when to do. In the following manner we've shown how our entire project may work. First the proposed model, it's the over view of our entire project. This is what shows how the system is laid out. Then the Flow chart, it shows how our system searches an area for doctors in increments. A use-case diagram shows the functionality of every entity. Basically tells the developer who will do what. Data flow diagram shows how data flows from one entity to another. It's in two levels. One is context DFD which shows the overall data transaction and the second one is level-0 DFD which shows the data transaction in between components.

## 3.3.1 Proposed System Architecture

This is our proposed model (Fig: 3.1). It's a client server model where clients in our case it's the user connects to a server then places a request then server responds by replying him with his required information.



Fig: 3.1 Layouts

Here mobile users will use this app to search for doctors. Our data server will fetch and filter required data and give it to the mobile application and the application will present the data to users where our data collection agent will store information about doctors to our data server. ERD, the entity relation diagram shows how database will be designed and how entities or the tables in relational database will be connected to each other.

## 3.2.2 Flow Chart

This is the flow chart of our area based incremental searching algorithm (Fig: 3.2). A search result that shows too much result can make user confused and a map can become unreadable and also it can degrade overall performance significantly. So we wrote this algorithm to search incrementally with area to skip unnecessary results.
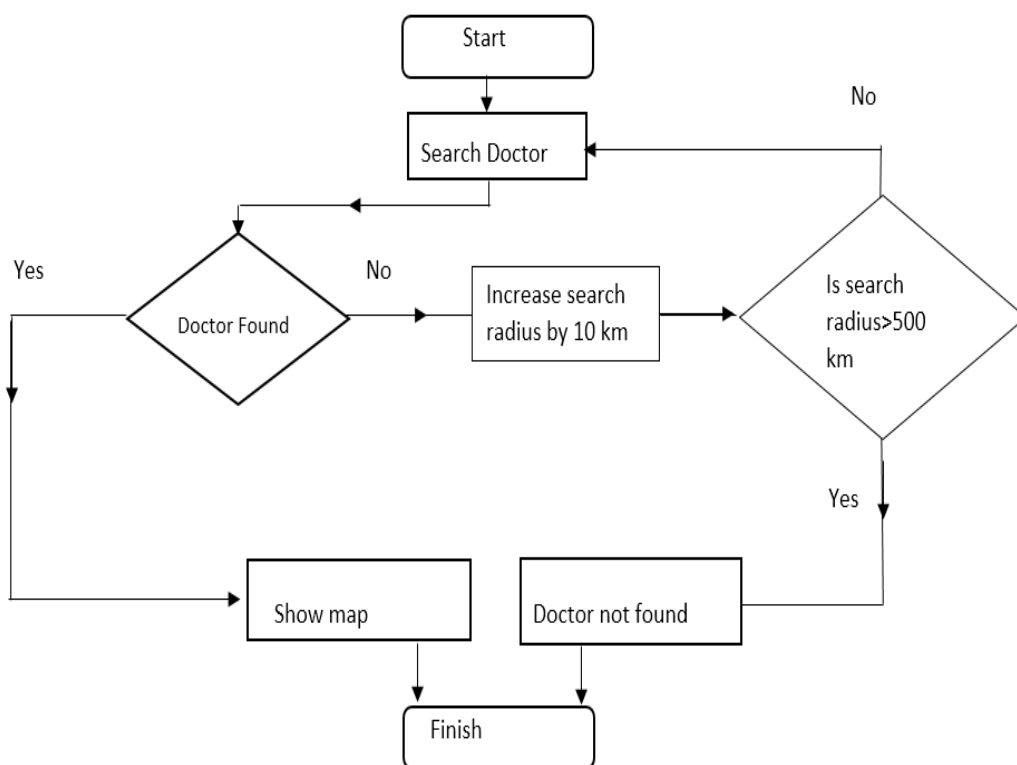


Fig: 3.2 Flow-Chart

Users will search doctor with specific criteria and his location, then our server will search for any doctor in that area with a default radius, if no doctor is available then it will gradually increase the search radius by 10km up to total 500km range if we find

any doctor we will show it with a map and if we don't find anyone then we will notify the user that no doctor is available.

### 3.2.3 Use of Case Diagram

Use-Case diagram tells us the activity or the functionality of entities or as known as Actors. We have shown how users will communicate with servers and how data collection agent and admin will manage data.

**Use Case Details:**

Actors: User, Admin, Data Collection Agent.

Action: Search Doctor, Show Result, Collect Data, Validate Data.



Fig: 3.3 Use of case diagram

In the first use-case (Fig: 3.3) users will search doctors which will be responded by the server with map and information about doctors. In the second use-case data collection agents will store doctor's information in the server and an admin will verify and validate that information.

## 3.2.4 DFD-Context

This is our context data flow diagram. This diagram (Fig: 3.4), it shows how data flows between top level components.
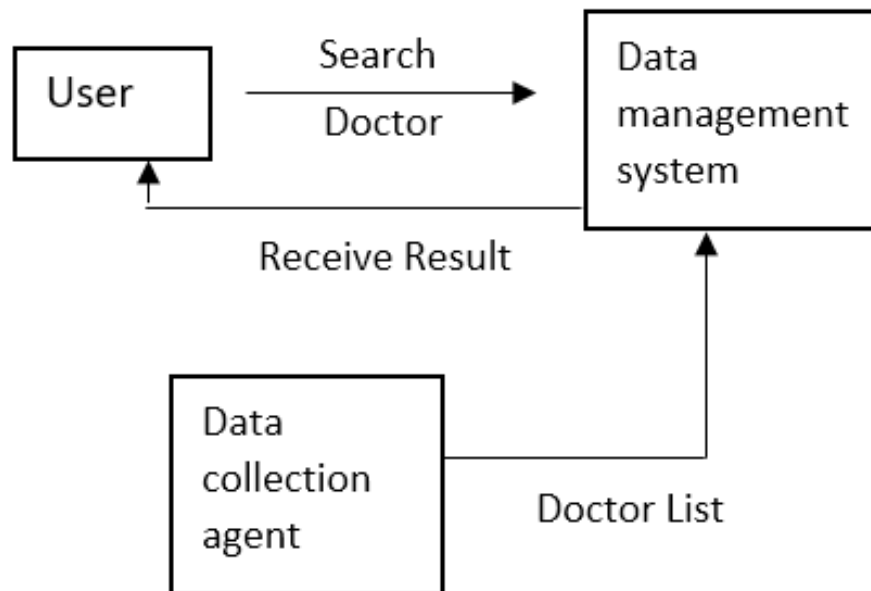


Fig: 3.4 DFD-Context

Here user searches doctor by giving some basic information and receives results from our data management system or data server. Our data collection agent provides data to our data management system. Doctors list which contains doctor's information is the data that will flow from one end to another.

## 3.2.5 DFD Level-0

This is our level-0 data flow data flow diagram (Fig: 3.5). Here we've shown the broken down version of our context diagram. Data flow between smaller components.
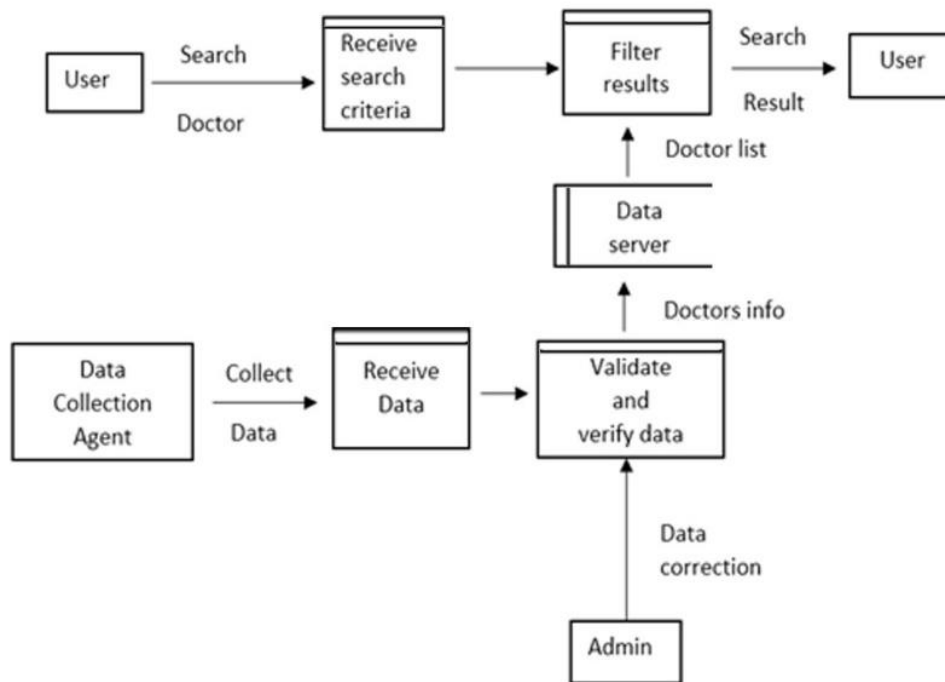


Fig: 3.5 DFD-L0

Here user searchers doctor by providing a criteria with in which doctor have to be search for. Data server will filter results with those criteria and provide a doctors list as a result to user. Data collection agents will collect doctors data to our data server and those data will be verified by and admin for correction and he'll correct any incorrect data that has been sent by our data collection agents.

## 3.2.6 ER Diagram

This is our entity relation diagram (Fig: 3.6). It shows how entities of our project are connected in our database.
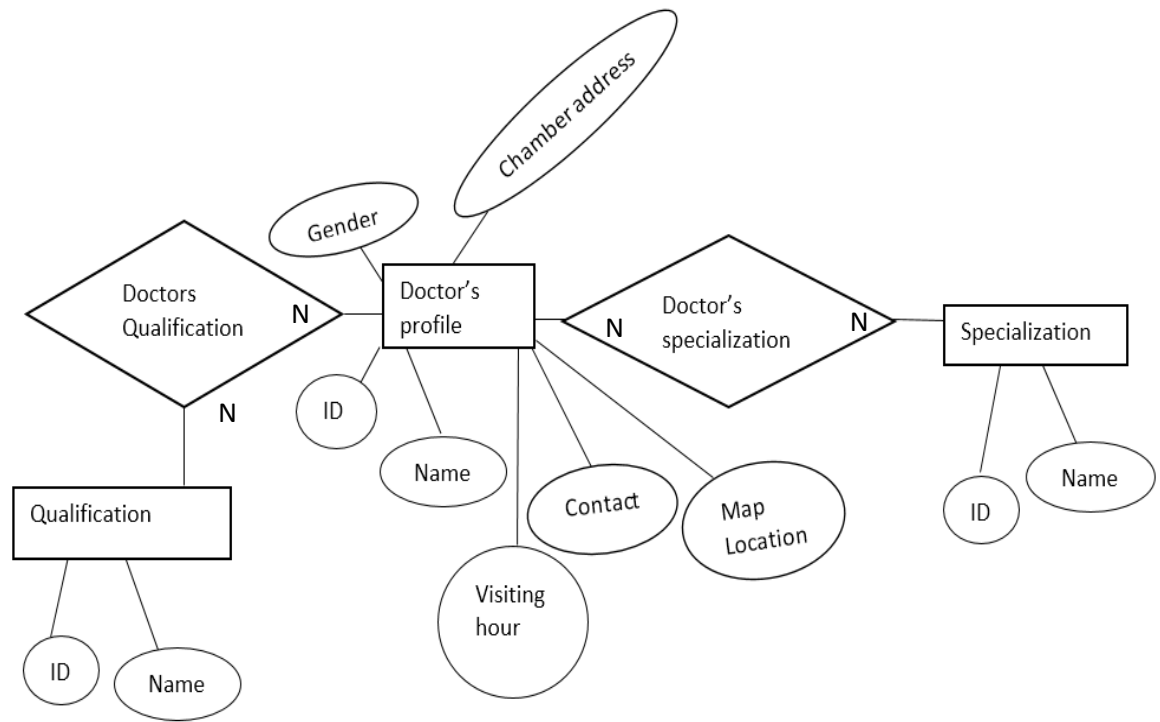


Fig: 3.6 ER-Diagram

Here we have three entities Doctors Profile, Qualifications and specialization. They have their own attributes. A doctor can have many qualifications and many specializations. Also many doctors have same qualification and specializations that is why doctor's profile has many to many relations with qualifications and specialization.

# CHAPTER 4
## Specification for Design

## 4. Introduction

In design specification we note what we used and where we used is to develop our system. From the design part we already know we have a client-server model. And we built the client part and the server part differently. The client part is the android application part development and the server part is the web application development part respectively.

## 4.1 Application for Android Development

To develop android application we have broken our tools into three different categories. They are programing languages, development platform and library/API/framework. Details are given bellow.

## 4.1.1 Programming Language

**JAVA:** Java is one of the mostly used and popular programing languages. It's a high-level object oriented programing language and it's the default language for building android application and that is why we used it to develop our android application.

## 4.1.2 Platform for Development

**Android studio:** Android Studio is an android application development platform designed and own by Google and Jetbrains. To ensure Google's support and ease of use we have chosen Android Studio to develop our android application.

## 4.1.3 Library, API and Framework

For support we used these additional libraries they are Volley, G-son and Google Maps.

**Volley:** Volley is the default library in android studio and it's used to handle and send web requests from android application to severs. We used it to establish communication between our users and servers.

**G-Son:** It's and data conversion tool-kit. It's used to convert JSON data to JAVA object and vice-versa. We used it to handle and convert data sent to and received from our server.

**Google Maps:** This is Google's Map SDK (Software development kit). It facilitates user by giving programmable functionality to Google maps it's a widely used mapping application by developed Google. We used it to program Google map and show doctors location to users.

## 4.3 Web Application development/ Data Server

This is our server development part. We have broken down this part in four parts and they are- front end also known as the user interface, framework, programing language and back-end also known as database. They're described below.

## 4.2.1 Front End

We used Microsoft's .net MVC for this project so HTML, CSS and JavaScript becomes mandatory for designing the front-end.

**HTML**

Hypertext Markup Language is the full form of HTML. To create online web page HTML is widely used. Html documents are sent from a web server or local storage to a web browser. The web browser then reads the HTML codes and displays the design layout that corresponds.

## CSS

Cascading Style Sheets is the full form of CSS. CSS is a language for specifying HTML components on a computer screen. In HTML code, CSS may be referred to in three different ways. Internal, External, and Inline, for example. External style sheets are saved in the CSS file. CSS allows you to perform a lot of things at once since it can control numerous pages. We may create our web sites using CSS to meet our needs and desires.

## JavaScript

JavaScript is a computer language that is based on text. It may be used for both client and server sites. It aids in the creation of interactive and dynamic web sites. HTML provides structure, CSS provides design, and JavaScript provides interactive components to web pages, all of which aid in user engagement.

## 4.2.2 Framework

We have used two frameworks to develop our server web application. For web development we used ASP.NET MVC and to work with database with object relational model we used entity framework. They're described as follows.

**ASP.NET MVC:** This is a web development framework developed and owned by Microsoft. And by default its shipped in the Visual Studio an application development platform.

**Entity Framework (ORM):** Entity framework is an Object–relational mapping framework used for managing database using objects as entities. It's also developed and owned my Microsoft and shipped by default with Visual Studio.

## 4.2.3 Programing language

**C#:** We used C# for our server-side programing. It's a High-level programing language like Java and widely used in Microsoft products. It is developed and owned by Microsoft.

## 4.2.4 Back End

**Microsoft SqlServer 2014:** It's a database system for corporate implementation. It's robust, versatile and scalable in magnitudes. It is owned by Microsoft. We're using it as our database management system.

## 4.3 Requirements for Implementation

In this section we have recommended the minimum requirements of resources to run our system flawlessly. The recommendations are as follows-

1. A domain having access to our webserver.

2. A windows server2012 based web server having MS SqlServer2014 database server engine.

3. Server having additional minimum 1GB space excluding space required by the OS and other applications.

4. Working network connection.

5. Data collection agent requires a computer, network connection and any modern browser.

6. For Users: Android user smartphone with an api level over api 27 and working network connection.

# CHAPTER 5
# WORKING APPLICATION

## 5. Android App

This is the default page of our android application (Fig: 5.0). It contains one dropdown, one search button and a map showing users location.
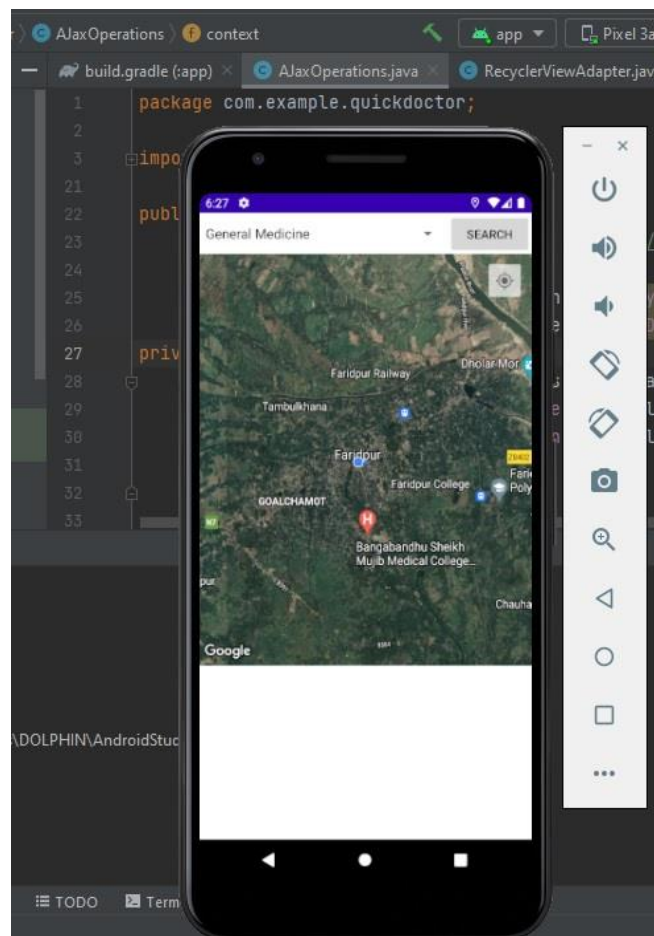
**Main View**



Fig: 5 Application Start/Main View

When a user opens the application he'll this view by default. Then he'll select his preferred type of doctor and will continue by pressing the search button.

This is the result view of our android app (Fig: 5.1). It contains location markings and a list of doctors from search result.

# Result View
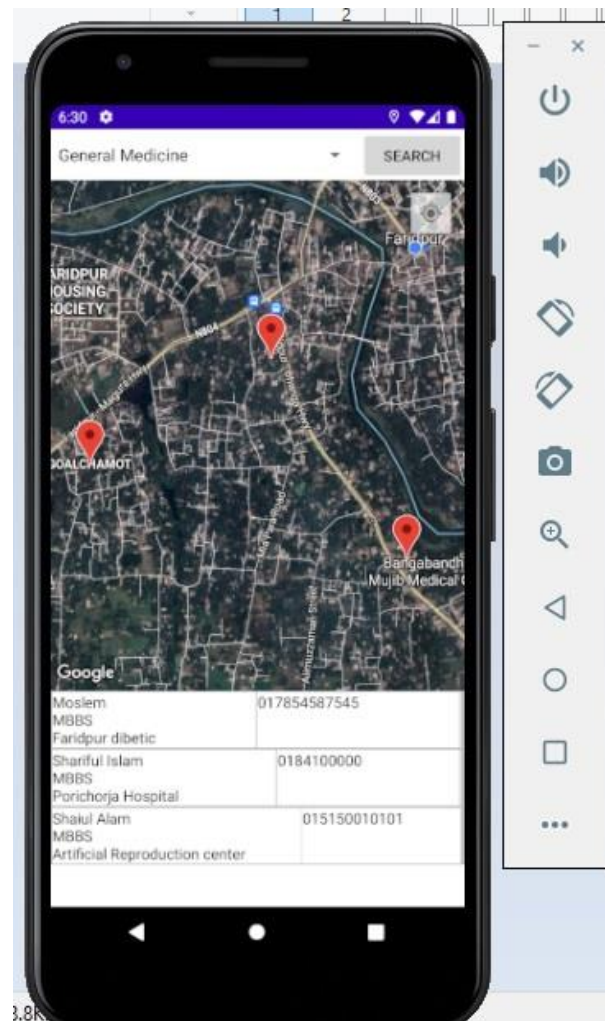


Fig: 5.1 Result view

After pressing the search button of this view will show the location and map of available doctors in close proximity. And in bottom of the view there'll be a list of those doctors showing their qualifications and contact information.

This is the doctor selection view (Fig: 5.2). After selecting doctor's location this view will show up. It contains doctor's title and a direction button.
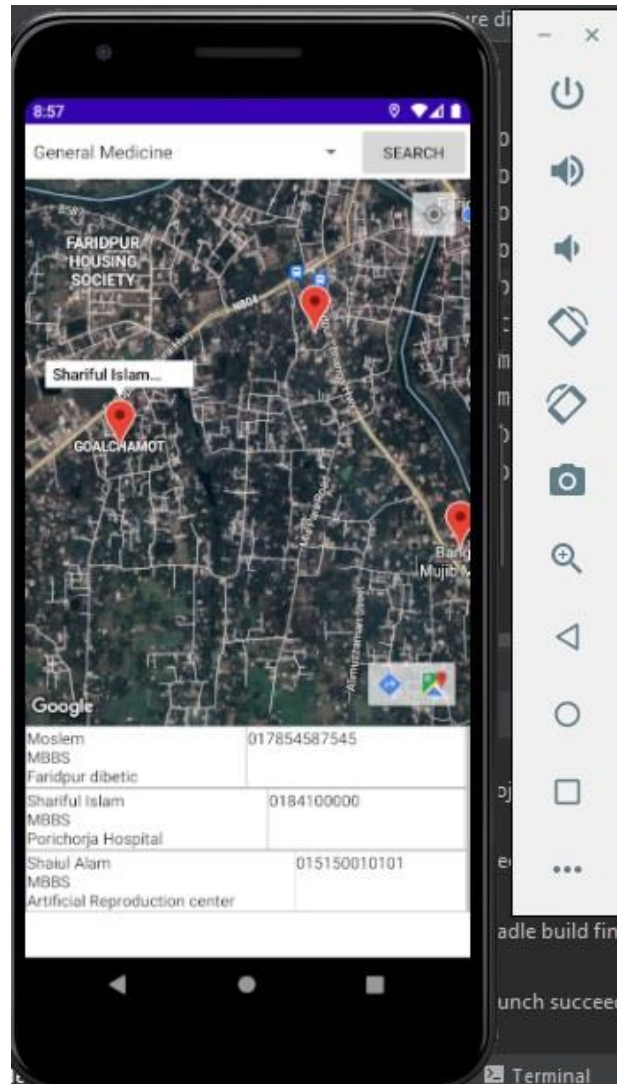
**Selection view**



Fig: 5.2 Selection view

Now by selecting any doctor in the map user will see a blue button in the maps right bottom corner and clicking it will open Google maps app and show the direction to that location. Example is given below.

This is the direction view in Google maps (Fig: 5.3). It contains a path, duration and destination marking in a map.
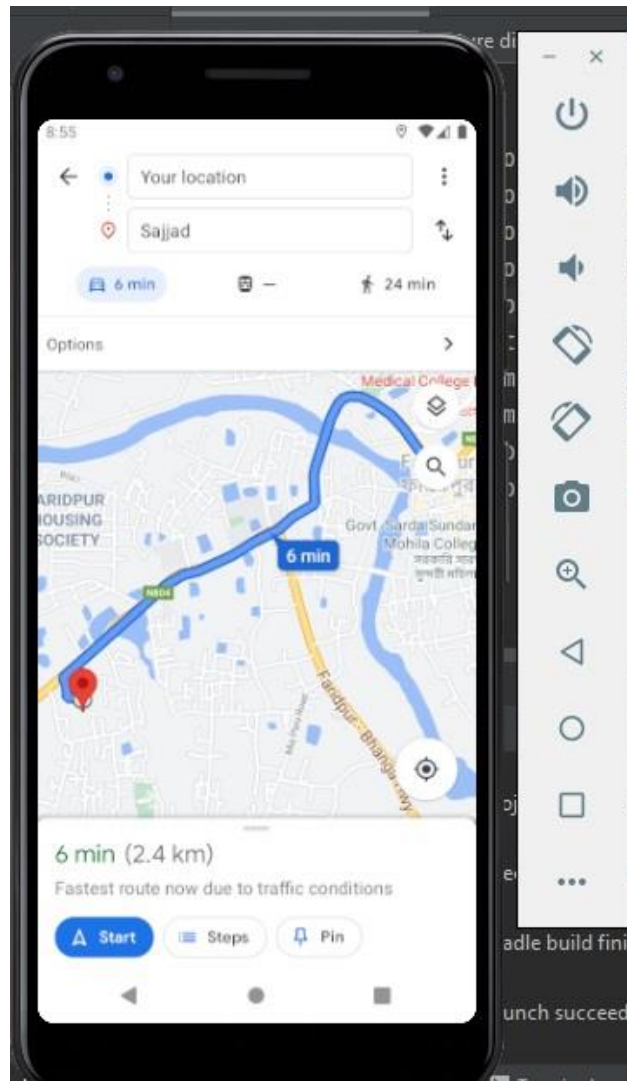
**Direction View**



Fig: 5.3 Direction view

This view shows the directional path to the selected doctor. It also shows estimated time to reach destination, the distance between user and destination, and also provides an option that can be activated by pressing start for real-time voice command guide-line for navigation.

## 5.1 Web Application

This is the settings view of our web application (Fig: 5.4). It contains a list of doctor's specialization and a list of doctor's qualification. This page will have more setting options as the project adds new features.
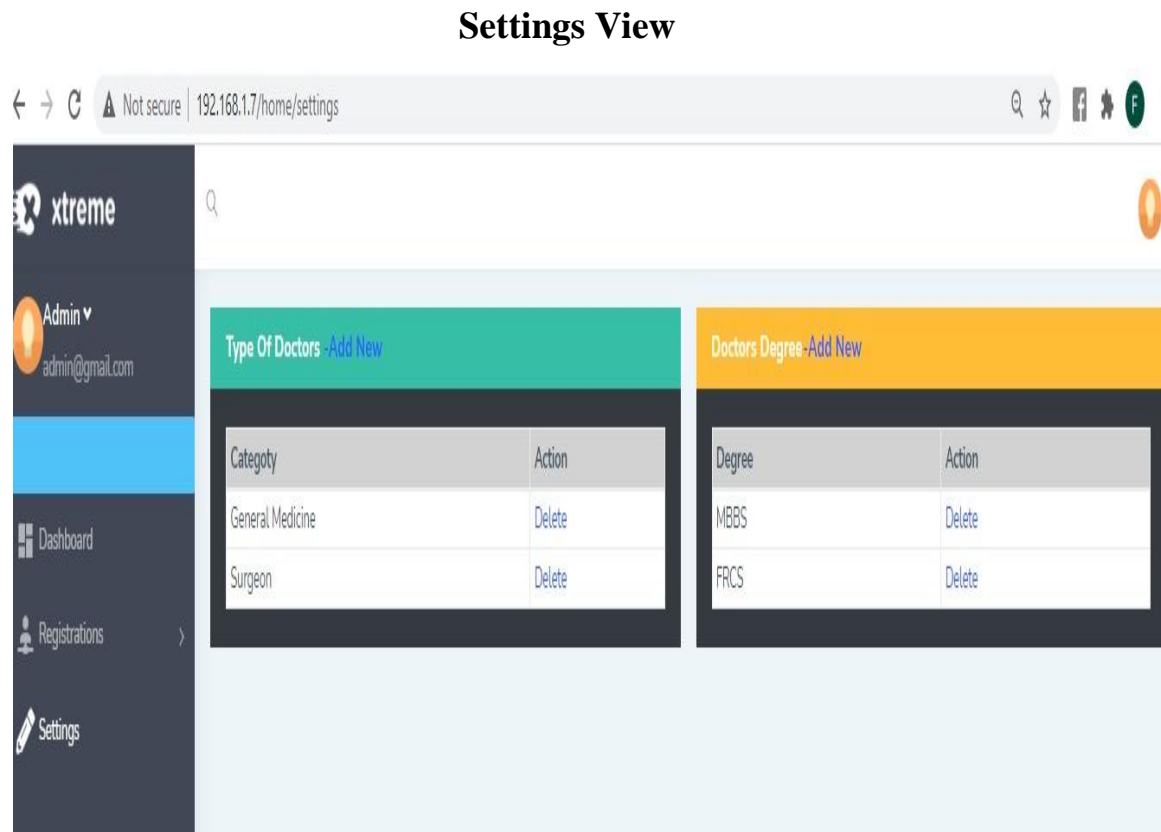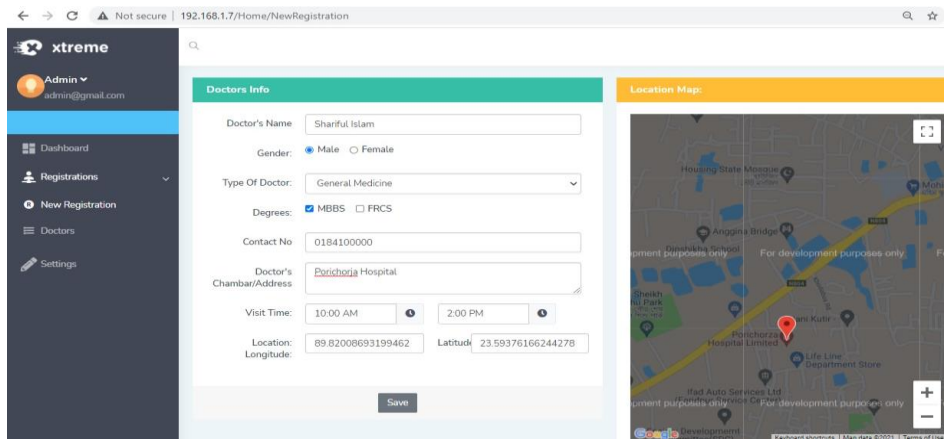
**Settings View**



Fig: 5.4 Settings View

This is where we will insert all the available qualifications and specialization list for doctors. We can edit or delete and qualification or specialization from here. After setting it up we'll be able to add new doctors.

In new registration page (Fig: 5.5) there are eight entry fields and a map. Entry fields are doctor's name, gender, doctor's type, qualification, contact number, address, and visiting hours. And the map is to give location of doctor's chamber.

## New Registration Page



Fig: 5.5 Page for Doctor Registration

In this page (Fig: 5.6) we'll insert all the doctors' information like address, location map, contact no etc. which will be shown to users android app.

This page contains list of registered doctors and their information. There is a search option to filter the list.

## Doctors List Page



Fig: 5.6 Doctors List Page

In this page will be able to see the entire doctors list and make any change as required.

# CHAPTER 6
# RESULT AND DISCUSSION

## 6. Result

After implementing our project it showed all search results correctly. To verify searched results we have compared the location information in search result with real location information. We found that the accuracy of the results were +/- 10 meter average. Then we tested how fast a user can get a doctors information with our app and by calling someone he knows. It took about 3sec for our app to give him searched results and 15sec navigate and to give him direction to that doctor a total of 18sec, where by calling someone in minimum it took 15 second even to call someone from phonebook. And with this approach it took minimum 1.5min to give a direction to doctor's chamber. To ensure good user experience we installed our app to 15 random smartphone users. They all thought it was very simple but very effective app. With saying that, they also recommended having a built in appointment system would give a more full featured functionality.

## 6.1 Discussion

This was our first prototype of our project. After seeing the real world use of it and so many positive results we must improve its workability to match its scope. The negative we have found is the regular updates of doctor's information. It's a manual and hectic work. We have to automate it in next update. The battery drainage of smartphones while using this app was very minimal from the beginning but to ensure its optimum implementation we have killed all background process and cleared all resources that was initiated and allocated by our app while it was running. We still have many functionality that we must work on. Like the direct appointment system but for this prototype we're very satisfied with the results.

# CHAPTER 7
## CONCLUTION AND PROJECT FUTURE

## 7. Project Future

In future, we have a plan to store patient's medical history. That will enable patients to visit doctors without reports and other medical documents. We also have a plan to give directory and map downloading abilities to users so that they can find doctors even offline and there is also a plan to develop an online appointment system in it to ease up the whole procedure further. In future we want to add medical history storage and online appointment system with this app. We also want to give a map download option for users to use it offline.

## 7.1 Conclusion

With this application we attempted to help general people in medical grounds and make their life easier. One of the major applications of this project is to serve in every situation. We have already seen our medical system getting crippled being overwhelmed by the covid19. Many applications for medical facilities have shown great results. With this application users can search doctors in his area contact with them and visit them. This will save a lot of time and trouble. And it is very simple to use and any user from young to elders can use it. This project could be a major contributor in such events.

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