Independent University, Bangladesh

An undergraduate internship report submitted by

Jamiu Ahad Turjo

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

Autumn 2020

Mobile Application Development of "Driver In Need" at Giga Tech

An undergraduate internship report submitted by

Jamiu Ahad Turjo

Has been approved on --/--/--.

Ajmiri Sabrina Khan

Internship Supervisor & Lecturer

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.

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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 Giga Tech as an Intern. I have received so much support and encouragement from the individuals of Giga Tech who have years of experience in Software Development. I would like to thank the members of Giga Tech for spending their valuable time and knowledge which was essential for the completion of this report.

I express my gratefulness to my internal supervisor, Ajmiri Sabrina Khan, Lecturer, Department of Computer Science and Engineering, Independent University, Bangladesh (IUB) and my external supervisor Faisal Ahamed Khan, Senior Developer, Giga Tech, for his invaluable instructions, continuous guidance, support and motivation during my internship period and preparation of this report.

My gratitude also extends to all other employees of Giga Tech who helped me learn so much in my own skill development process and made me fit right in the environment. Finally, I proudly acknowledge the great sacrifices, good wishes, moral support, fruitful advice, inspirations and encouragements from my family members, relatives and friends.

Jamiu Ahad Turjo

May, 2021

Letter of Transmittal

28th May2021

Ajmiri Sabrina Khan,

Department of Computer Science and Engineering,

Independent University, Bangladesh

Subject: Letter of Submission for Internship Report, autumn 2020

Dear Madam,

This is to inform that with due honor and respect, I, Jamiu Ahad Turjo (ID: 1610229) from Internship Course of Autumn 2020 Semester, Section 12, 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 3rd January 2021 to 3rd March 2021 and it has been completed at Giga Tech

This report is based on my experience and the work I did at Giga Tech 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 Giga Tech, 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,

Jamiu Ahad Turjo

Email: jamiuahad778@gmail.com

Evaluation Committee

Signature: .....

Name: .....

Supervisor: .....

Signature: .....

Name: .....

Internal Supervisor: .....

Signature: .....

Name: .....

External Supervisor: .....

Signature: .....

Name: .....

Convener: .....

Abstract

With the help of technology life has become much easier than it was ever before. Well this statement is not entirely true. If we talk about our daily life problems, for instance, hiring a driver. You must have to know a “guy” who knows a “guy” who might give you his service. This brings along with its own edginess. Whether the driver is good enough? Or not, is he experienced enough? And what not! Not only that, lets presume you own a car and it’s self-driven, but for a day or so due to busy schedule it has become a challenging task to drive your own car and go from point A to B. What to do then? No one would drive you around if you don’t hire them for a month!

To deal with such problems I have decided to build a web app at Giga Tech taking help from senior web developers where you as a client can effortlessly hire a driver for a month or for couple of days. You have to go through no hassle of knowing a “guy” who knows a “guy” in order to hire a driver and you can judge their skills by given ratings by other clients like you. The background, scope, objectives and other analytical points about this application will be discussed in detail in this report. Company Profile of Giga Tech will also be addressed.

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Chapter 1: Introduction

Background

With the help of technology life has become much easier than it was ever before. Well this statement is not entirely true. If we talk about our daily life problems, for instance, hiring a driver. You must have to know a “guy” who knows a “guy” who might give you his service. This brings along with its own edginess. Whether the driver is good enough? Or not, is he experienced enough? and what not ! Not only that, lets presume you own a car and it’s self-driven, but for a day or so due to busy schedule it has become a challenging task to drive your own car and go from point A to B. What to do then ? No one would drive you around if you don’t hire them for a month!

To deal with such problems I have decided to build a web app at Giga Tech taking help from senior web developers where you as a client can effortlessly hire a driver for a month or for couple of days. You have to go through no hassle of knowing a “guy” who knows a “guy” in order to hire a driver and you can judge their skills by given ratings by other clients like you.

Driver In Need app requires a registration from both client and driver side. Client has to provide with his/her address, phone number, email id, car license number etc. Driver has to go through the same, he has to provide his license number, which will later be verified for authenticity from BRTC after the project goes to the big scale. Both Drivers and Clients NID number will be needed while registration for safety purpose for both end. In app functionality is very much straightforward. Client can choose from two type of service, “Daily” and “Monthly”. Where he will get Drivers according to the service he choose. Likewise Driver can seek for job here. They have to choose which service they would like to provide. In monthly service a fixed amount of money should be paid by the client and in daily service the deal should be negotiable up to certain margin.

Objectives

- **Help users get drivers easily:** This web app lets you hire driver smoothly with no hassle of interviewing before hiring a driver.
- **Help drivers get job easily:** From the Driver's end seeking for job became easier, they have to just set the service type and the web app will fetch him jobs of his/her interest.
- **Introducing "Daily Driver" service:** This will be the brand new service. You can hire driver based on your needs.
- **Hire best driver from a pool:** From this web app, you will be provided with a pool of driver, where you can select them based on their client review.
- **Report driver for bad experience:** If the client is not satisfied with driver's skill or behavior he/she can report it to the admin so that necessary measures can be taken.

Scope of the Project

Features available to the user after the development of this web app

- Login page
- Driver Signup page
- Client Signup page
- Admin Login page
- Client's landing page
- Client's profile page
- Driver's landing page
- Driver's Profile page
- Admin's landing page

Company profile

Figure 1.1: Company's Logo

GIGA TECH is a R&D based futuristic company of BEXIMCO group

Background of the Company:

Beximco, the largest private sector group in Bangladesh founded in the 1970's. Giga Tech, a B2B venture of Beximco Group, enables transformation in the public and private sector in everyday doing business through our R&D, solution design, software, device and service. Our goal is to enable the continuous advancement of our clients' business through enabling innovation, efficiency, security and robustness in their organizations through sustainable design, advanced technology and effective solution. To address a specialized sector and domain, we collaborate with relevant specialized institutions, companies, and Academia, both globally and locally.

Mission, Vision and Values:

Giga Tech aims to become established as a 'Global Company from Bangladesh' by the year 2023. Introducing state-of-the-art proprietary solutions & technologies 'by Bangladesh, from Bangladesh' is how we want to position Giga Tech on the Global platform.
We aim to provide optimized solution to our clients through our system integration expertise & co-developed products and solutions in partnership with globally reputed companies and academia. Covering the full sphere of the IT needs of both Public and Private sector clients is our ultimate objective and we are focusing on addressing the clients' needs.

Company Departments:

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

Product and Services:

- Financial Sector
- Health Sector
- Industrial Automation
- Research and Development
- Digitization and Archiving

Operation Details:

The nature of work conducted at Giga Tech is research and development focused, using both cutting-edge and proven technologies as required for a given project. The Giga Tech team works on a range of projects which include developing EKYC & Identity Verification for private bank, Medical Devices, R&D and Innovation, complex web and mobile applications.

Clients of the Company:

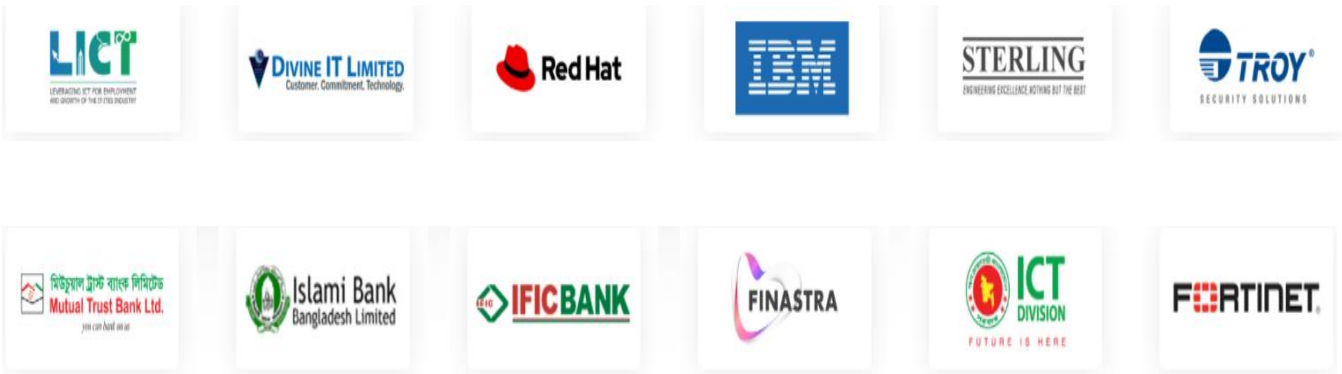

Figure 1.2: Company's Client

Address and Contact Information:

Corporate Office:

SAM Tower (Level 7)

House No. 4, Road No 22, Gulshan-1

Dhaka-1212, Bangladesh

Project Office

AJ tower, 4 Sonargaon Link Road

Karwan Bazar, Dhaka 1215

Bangladesh

Chapter 2: Literature Review

Project relation to Undergraduate Courses

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

● **CSE 203 Data Structure:** this course was about teaching how to handle and manipulate complex arrays, objects, classes, array of objects, objects of array, nested arrays, nested objects, etc. As "Driver In Need" involves many complex data structures, the skills gained from this course made handling them much easier.

● **CSE 213 Object-Oriented Programming:** this course is a deep dive into classes and its objects of programming. It also taught how to write modular programs which made codes less repetitive and more reusable. It helped to design "Driver In Need" code in a modular format. Also, as the application grew bigger, this practice helped avoid writing new modules from scratch by using parts of old modules and adding new functions to them.

● **CSE 303: Database Management:** this was the first course which taught how to design and plan a project. It covered popular planning and strategy practices such as System Development Life Cycle, Rich Picture, Requirement Analysis, Entity Relationship Diagram, Business Process Model and Notation Diagram and many more. These techniques helped in the development planning and strategy of "Driver In Need" and also they helped in writing this report.

● **CSE 309: Web Applications and Internet:** this is the course where the development of web applications was taught. It covered very important technologies that are highly in demand in the industry, such as HTML, CSS, 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 "Driver In Need".

Related Works

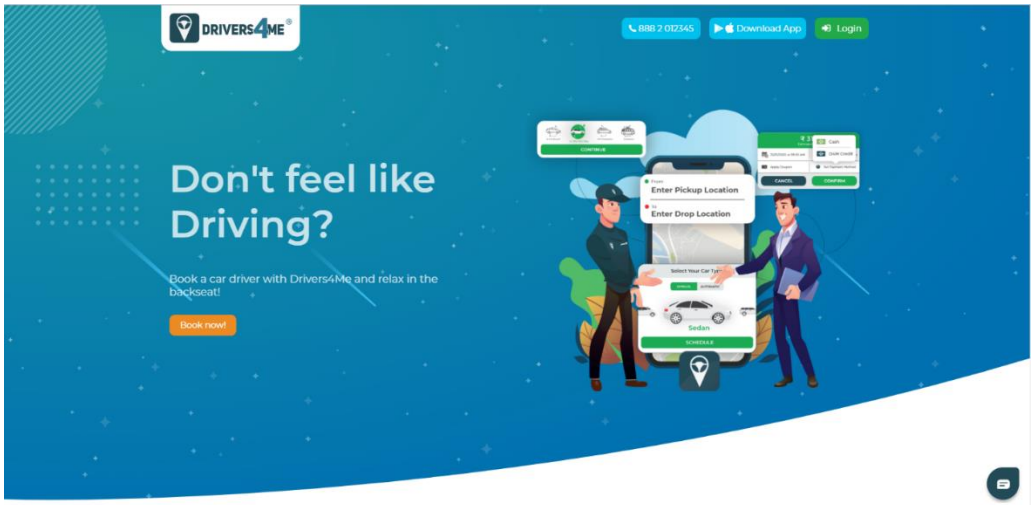

Figure 2.1: Screenshot of "Drivers4Me"

"Drivers4Me" is a web/mobile app which is similar to "Driver In Need" in terms of hiring driver. This app and "Driver In Need" both web app focus on user safety by providing with skillful and sincere drivers.

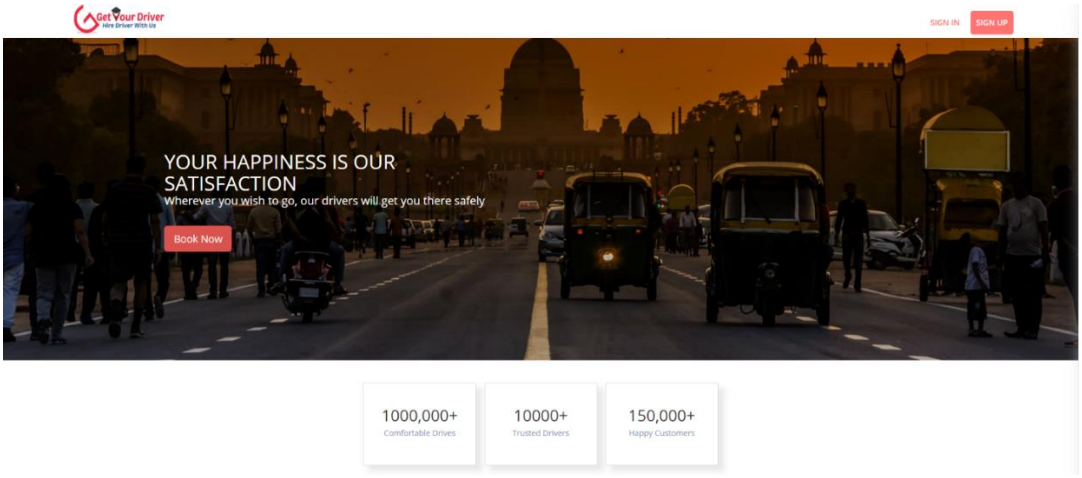

Figure 2.2: Screenshot of "Get Your Driver"

"Get Your Driver" is also a similar application like "Driver In Need". It is made in India. There are certain similarities between two applications, both has the option to choose monthly driver from the app.

Chapter 3: Project Management and Financing

Work breakdown Structure

Breaking work into smaller tasks is a common productivity technique used to make the work more manageable and approachable. For projects, the Work Breakdown Structure (WBS) is the tool that utilizes this technique and is one of the most important project management documents. It single handedly integrates scope, cost and schedule baselines ensuring that project plans are in alignment.

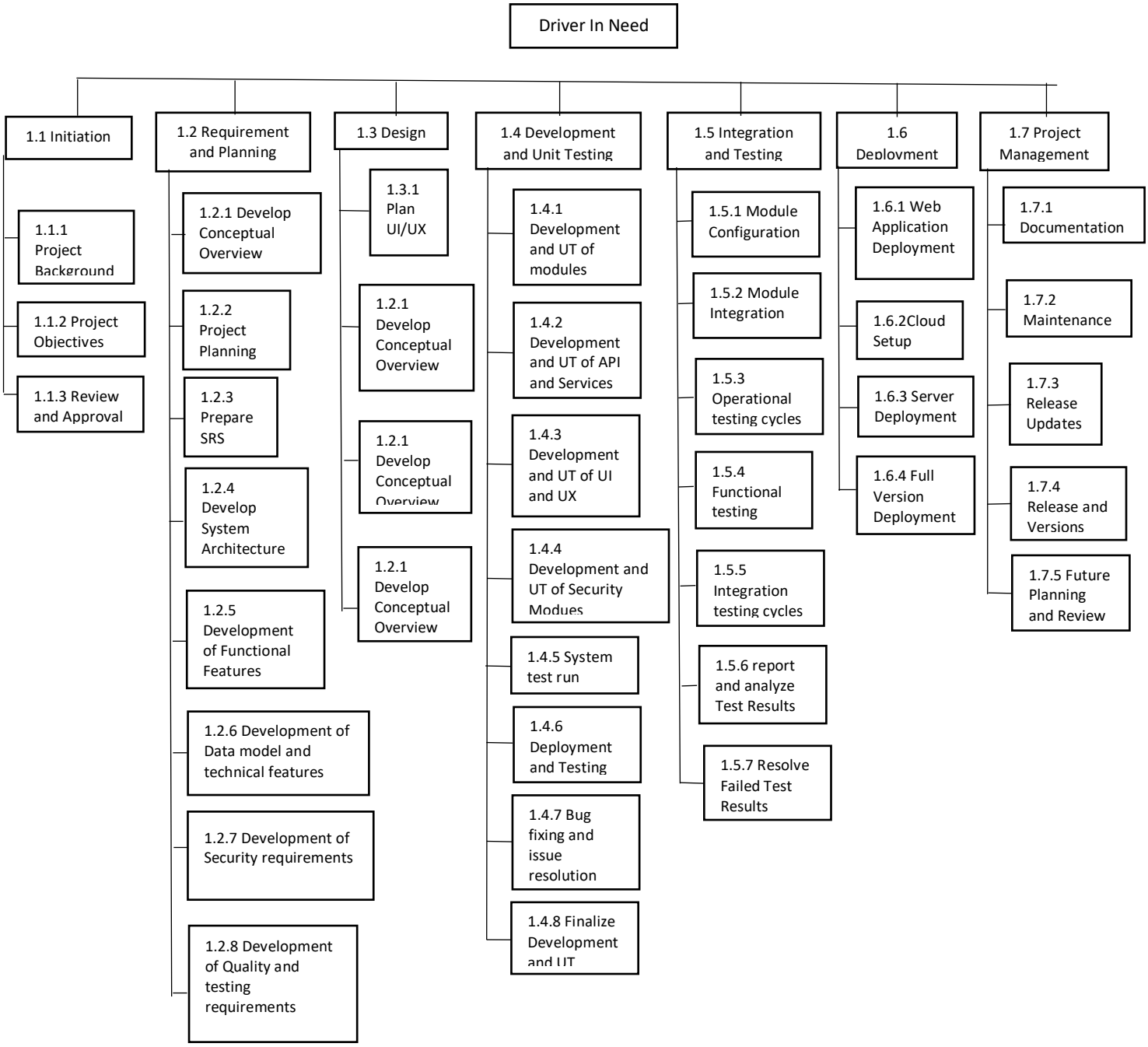

Figure 3.1: Work breakdown structure of "Driver In Need"

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/UX Designer	7	10%
3	Front End Developer	28	30%
4	Back End Developer	33	30%
5	Testing Process	10	5%
6	Result and Analysis	7	5%
7	Deployment	5	10%
	Total	97	100%

Table 3.1: Time Distribution Table

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 "Driver In Need".

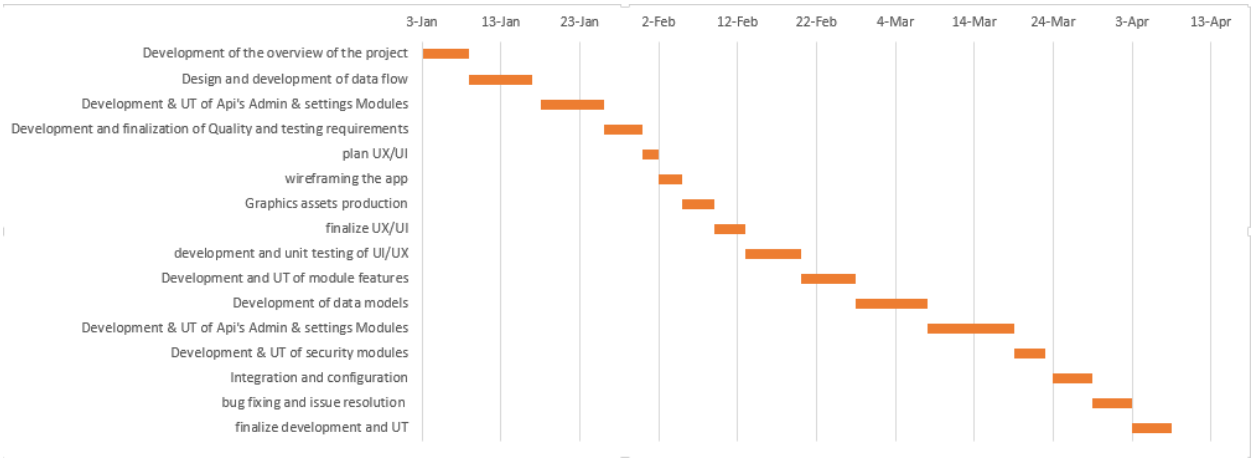

Figure 3.2: Gantt chart of "Driver In Need"

Estimated Cost

The starting Evaluated Costing was around nearly 100,000 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/UX Designer	7	25,000 BDT
3	Front End Developer	28	15,000 BDT
4	Back End Developer	29	15,000 BDT
5	Testing Process	10	12,000 BDT
6	Result and Analysis	7	8,000 BDT
7	Deployment	5	10,000 BDT
	Total	93	100,000 BDT

Table 3.2: Estimation Cost of the Project

Chapter 4: Methodology

Software Development Methodology

Development methodologies is a battle between dogmatism and pragmatism. Dogmatism is people who just have a zeal – they say that this way is the way, if you deviate from this way, all is lost. Pragmatism, pulling together what works in the moment.

There are definite benefits to both. The people who are more dogmatic versus pragmatic, I believe produce a better level of insight into the system; because they're really spending a lot of time focusing on their tool and what it can do and how to optimize it. They produce a better raw product. Pragmatists can look at all of these raw products and say, I'll take that bit from there and that bit from there and can be more effective when it comes to changing requirements and changing projects.

Figure 4.1: Software Development Life Cycle

Software development methodology is a process or series of processes used in software development. Again, quite broad but that it is things like a design phase, a development phase. It is ways of thinking about things like waterfall being a non iterative kind of process. Generally it takes the form of defined phases. It is designed to describe the how of the life cycle of a piece of software.

It is also codified communication. So you're actually setting a set of norms between a group of people that say this is how you're going to work and this is how you're going to pass information between each of you in certain ways; whether that is documentation, whether that is discussion, whether that is drawings on paper.

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
- Spiral Model
- Rapid Application Development
- V-Model
- Incremental
- Evolutionary Model

Agile Scrum Methodology

For methods, developers in Giga Tech follow agile scrum methodology that relies on incremental development. Each iteration consists of two- to four-week sprints, where each sprint's goal is to build the most important features first and come out with a potentially deliverable product. More features are built into the product in subsequent sprints and are adjusted based on stakeholder and customer feedback between sprints.

Whereas other project management methods emphasize building an entire product in one iteration from start to finish, agile scrum methodology focuses on delivering several iterations of a product to provide stakeholders with the highest business value in the least amount of time.

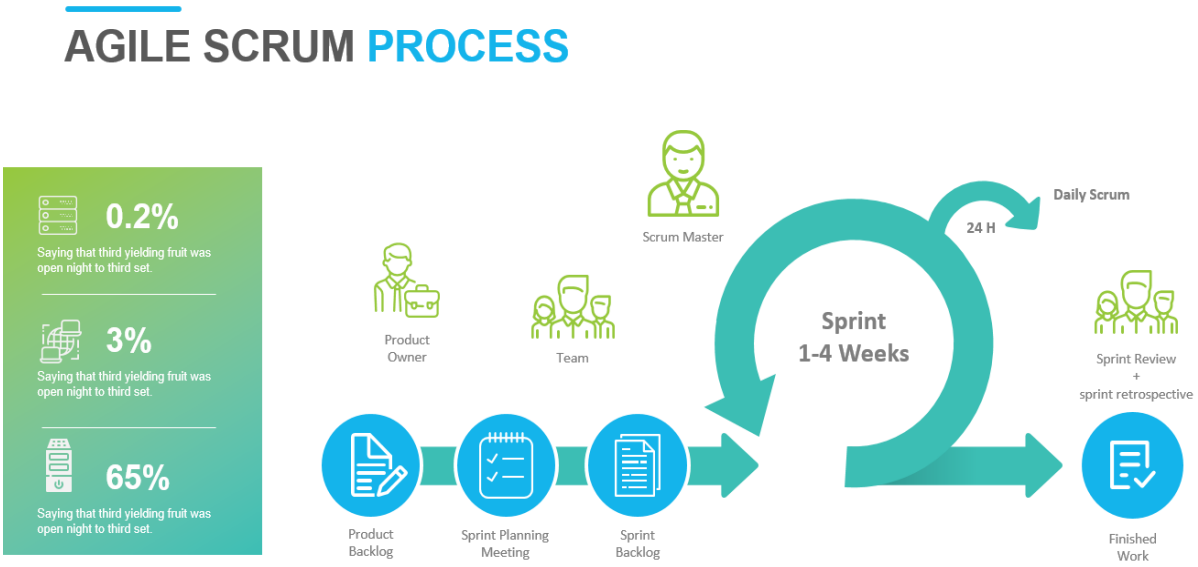

Figure 4.2: Software Development Life Cycle

Agile scrum methodology has several benefits. First, it encourages products to be built faster, since each set of goals must be completed within each sprint's time frame. It also requires frequent planning and goal setting, which helps the scrum team focus on the current sprint's objectives and increase productivity.

The benefits of Agile Scrum Methodology

Here are some of the collective benefits of agile scrum methodology:

- Flexibility and adaptability
- Creativity and Innovation
- Lower costs
- Quality improvement
- Organizational synergy
- Employee satisfaction
- Customer satisfaction

The greatest benefit of agile scrum methodology is its flexibility. With the sprint-based model, the scrum team typically receives feedback from stakeholders after each sprint. If there are any problems or changes, the scrum team can easily and quickly adjust product goals during future sprints to provide more valuable iterations. This way, stakeholders are happier because they get exactly what they want after being involved every step of the way.

Web Application

A web application (or web app) is application software that runs on a web server, unlike computer-based software programs that are run locally on the operating system (OS) of the device. Web applications are accessed by the user through a web browser with an active network connection. These applications are programmed using a client–server modeled structure—the user ("*client*") is provided *services* through an *off-site server* that is hosted by a third-party. Examples of commonly-used web applications include: web-mail, online retail sales, online banking, and online auctions.

Web application are fundamentally quite different. The difference lies in the way we interact with each of them: -websites are defined by their output – we read the news, marketing information, FAQs on websites and web applications are defined by their input- we create, read, update and delete data within a web application.

Web Application Development

Web application development will typically have a short development life-cycle lead by a small development team. Front-end development for web applications is accomplished through client-side programming. Client refers to a computer application such as a web browser. Client-side programming will typically utilize HTML, CSS and JavaScript. HTML programming will instruct a browser how to display the on-screen content of web pages, while CSS keeps displayed information in the correct format. JavaScript will run JavaScript code on a web page, making some of the content interactive.

Server-side programming powers the client-side programming and is used to create the scripts that web applications use. Scripts can be written in multiple scripting languages such as Ruby, Java and Python. Server-side scripting will create a custom interface for the end-user and will hide the source code that makes up the interface. A database such as MySQL or MongoDB can be used to store data in web application development.

Back-end Development

Back-end web development, also called server-side development, alludes to the behind-the-scenes activities that take place when an action is performed on a website. This action could be logging in to one's account or purchasing a watch from an online store. So a backend developer trains his/her sights in databases, scripting and the architecture of websites, The code written by such a back-end developer helps in passing on the database information to the browser.

Goals in back-end development:

- Accessing the data requested by users
- Combining and transforming the data
- Returning the data

Development Tools Used

In the development of this web application, several modern application development tools were used.

Figure 4.3: Angular

Angular is a platform and framework for building single-page client applications using HTML and TypeScript. Angular is written in TypeScript. It implements core and optional functionality as a set of TypeScript libraries that you import into your apps. The architecture of an Angular application relies on certain fundamental concepts. The basic building blocks of the Angular framework are Angular components that are organized into NgModules. NgModules collect related code into functional sets; an Angular app is defined by a set of NgModules. An app always has at least a root module that enables bootstrapping, and typically has many more feature modules.

Figure 4.4: Node JS

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 and web 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 on the 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 run several threads concurrently, with each thread waiting for its appropriate response before moving on.

Figure 4.5: Flask

Flask is a web framework. This means flask provides you with tools, libraries and technologies that allow you to build a web application. This web application can be some web pages, a blog, a wiki or go as big as a web-based calendar application or a commercial website.

Flask is part of the categories of the micro-framework. Micro-framework are normally framework with little to no dependencies to external libraries. This has pros and cons. Pros would be that the framework is light, there are little dependency to update and watch for security bugs, cons is that some time you will have to do more work by yourself or increase yourself the list of dependencies by adding plugins. In the case of Flask, its dependencies are:

- Werkzeug a WSGI utility library
- Jinja2 which is its template engine

Figure 4.6: Sqlite3

SQLite is a relational database management system (RDBMS) contained in a C library. In contrast to many other database management systems, SQLite is not a client–server database engine. Rather, it is embedded into the end program.

SQLite generally follows PostgreSQL syntax. SQLite uses a dynamically and weakly typed SQL syntax that does not guarantee the domain integrity. This means that one can, for example, insert a string into a column defined as an integer. SQLite will attempt to convert data between formats where appropriate, the string "123" into an integer in this case, but does not guarantee such conversions and will store the data as-is if such a conversion is not possible.

SQLite is a popular choice as embedded database software for local/client storage in application software such as web browsers. It is arguably the most widely deployed database engine, as it is used today by several widespread browsers, operating systems, and embedded systems (such as mobile phones), among others. SQLite has bindings to many programming languages.

Figure 4.7: Git

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.

Chapter 5: Project Body

Description of the Project

This application starts with user turning on the web app in PC or mobile. There are two types of user, Client and Driver. Both client and driver need to register to use the service. Client shall provide his/her details including car license number and NID number for safety and later can add profile picture after signing into account through settings.
Likewise driver have to register using necessary details including license number. Later on he can add profile picture after signing into account through settings.

In client menu the user can choose from two different service, Daily and Monthly. After clicking at any service there will pop a list of drivers from each category. User can also select their area from where they want a driver. This will help them get a driver close to their residence.

In driver menu the user can look for job. All the available job details will be shown at driver page. In both driver and client's page after a service is selected by a client, the service details is shown in both page till the service is over. Both driver and client can get to change their address phone number or car license number (in case the client changes car) in their respective account settings page.

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 purpose of studying a system or its parts in order to identify its objectives. It is a problem-solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose. Analysis specifies what the system should do. This chapter contains parts of System Analysis that will help understand the project better

Six Element Analysis

	System Roles					
process	Human	Non Computing Hardware	Computing hardware	Software	Database	Comm. & Network
View landing page	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Login Signup	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Add photo	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Edit info	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Take a service	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Calculate fare	N/A	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
Take a job	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
View driver list	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN
View job list	User	N/A	Computer Mobile	Browser	Flask Sqlite3	WAN

Table 5.1: Six Element Analysis

Feasibility Analysis

A feasibility study is an analysis that takes all of a project's relevant factors into account—including economic, technical, legal, and scheduling considerations—to ascertain the likelihood of completing the project successfully. Project managers use feasibility studies to discern the pros and cons of undertaking a project before they invest a lot of time and money into it.

● **Technical Feasibility:** Technical feasibility evaluates the technical complexity of the expert system and often involves determining whether the expert system can be implemented with state-of-the-art techniques and tools. In the case of expert systems, an important aspect of technical feasibility is determining the shell in which the system will be developed. The shell used to develop an expert system can be an important determinant to its quality and makes it vital to the system's success.

"Driver in need" is built using angular and flask framework. These are the technologies that are very popular in the modern industry ad 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:** Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development. "Driver In Need" is made to make life easy which clearly won't make itself complicated to the user, it is very simple to operate and all the content of the web-app is self-explanatory.

● **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 required cost for final development like hardware and 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.

Problem Solution Analysis

Problems: looking out for driver is a hassle itself, from taking interviews to test your driver by letting him drive. Which sometimes lead your car in getting minor scratches. Not only this, it is a bit challenging to find a trust worthy driver. There are more problems regarding this driver selection process which are given below.

- **Incapability of finding driver:** In many home this is a common problem. It is quite impossible to find driver without having any sort of physical networking. What usually happens is you need to know some local person to get in touch of a driver.
- **Incapability of finding trustworthy driver:** As written in previous point, you need to know someone local to get in touch to a driver. That opens a scope of getting a dishonest driver who might end up being your life threat or to your property.
- **Unable to find driver for single day:** There come often times when we need a driver for single day or couple of days. Since no such driver provides that kind of service which led this issue to be untouched for several years.
- **Testing driver may cause damage to car:** This incident in much common when you test a driver before hiring them. Some inexperienced drivers do come to interview for a job by faking there years of experience and later on damages car while giving a test.

Solution: The above problems have been analyzed and can be solved by the use of this app:

- **Solution for finding driver easily:** By this app finding both, daily and monthly, drivers will become much easier. Since it will find driver near your location so you don't have to worry about drivers wherever you shift to.
- **Solution for finding trust worthy driver:** In this app drivers nid number will be cross checked and police verification will be done in order to let a driver provide service through this app
- **Solution for finding driver for hourly service:** In this app hourly rate are set by drivers with in a range, So user can look from a list of hourly driver and can hire anyone of them.
- **Solution for testing :** In "Driver In Need" driver's license number will be taken and it will be checked in BTRC for validation of the license, this will also bring the driving experience of the driver so there will be no chance of driver's faking their driving experience.

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 attributes 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.

Architecture of the System

A system architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. A system architecture can consist of system components and the sub-systems developed, that will work together to implement the overall system. There have been efforts to formalize languages to describe system architecture, collectively these are called architecture description languages. We are using the client server architecture for our "Driver In Need" for driver hiring system.

Client server architecture

Client-server architecture, architecture of a computer network in which many clients (remote processors) request and receive service from a centralized server. Client computers provide an interface to allow a computer user to request services of the server and to display the results the server returns. Servers wait for requests to arrive from clients and then respond to them. Ideally, a server provides a standardized transparent interface to clients so that clients need not be aware of the specifics of the system that is providing the service. Clients are often situated at workstations or on personal computers, while servers are located elsewhere on the network, usually on more powerful machines. This computing model is especially effective when clients and the server each have distinct tasks that they routinely perform.

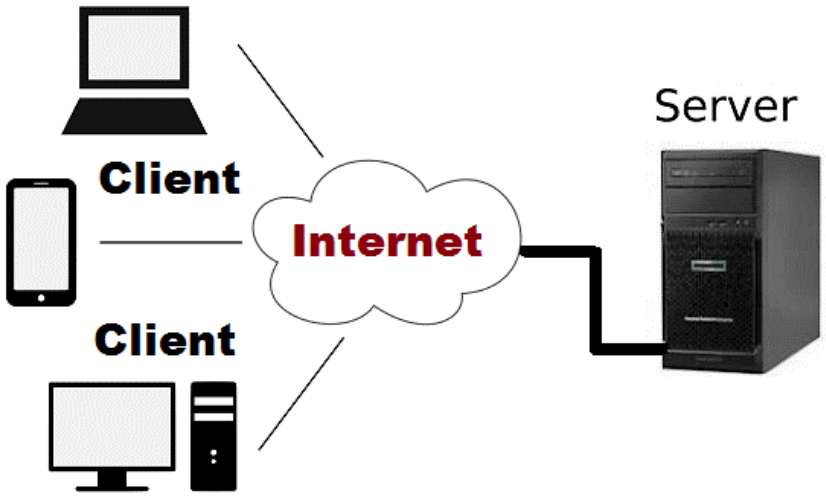

Figure 5.1: Client Server Architecture

This web app can get and post information to the server. When an user creates an account, it sends a request to the server and updates the server with user's necessary details. Users can later on change their information by the aid of API. 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.

Entity Relationship Diagram (ERD)

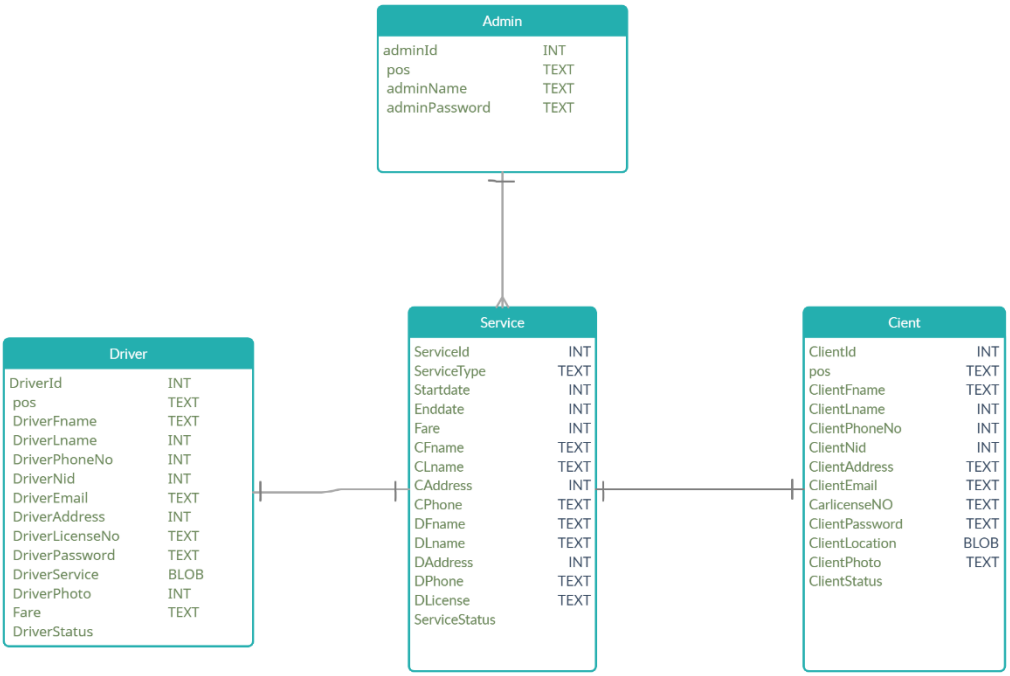

Figure 5.2: Entity Relationship Diagram of "Driver In Need"

Use Case Diagram

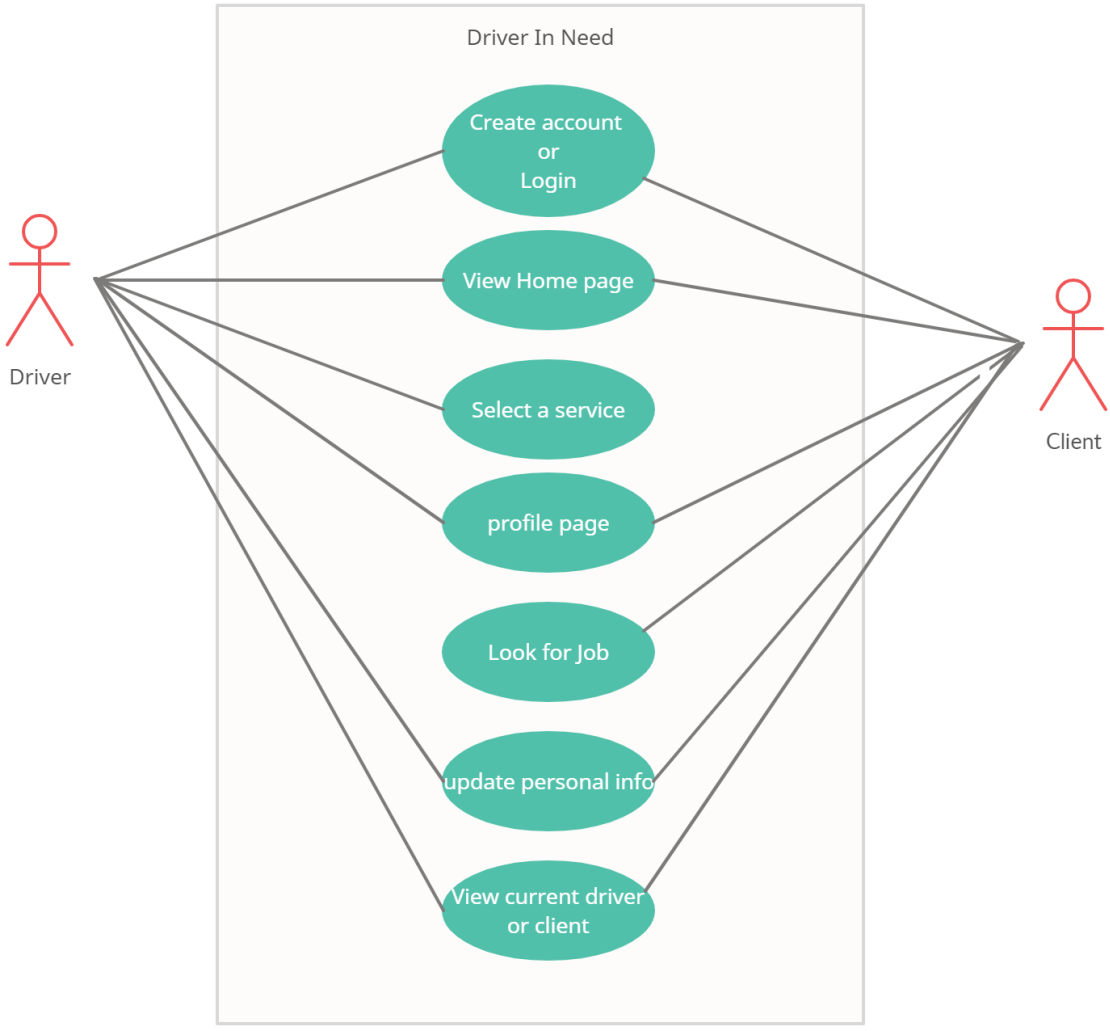

Figure 5.3: Use Case Diagram of "Driver In Need"

Rich Picture

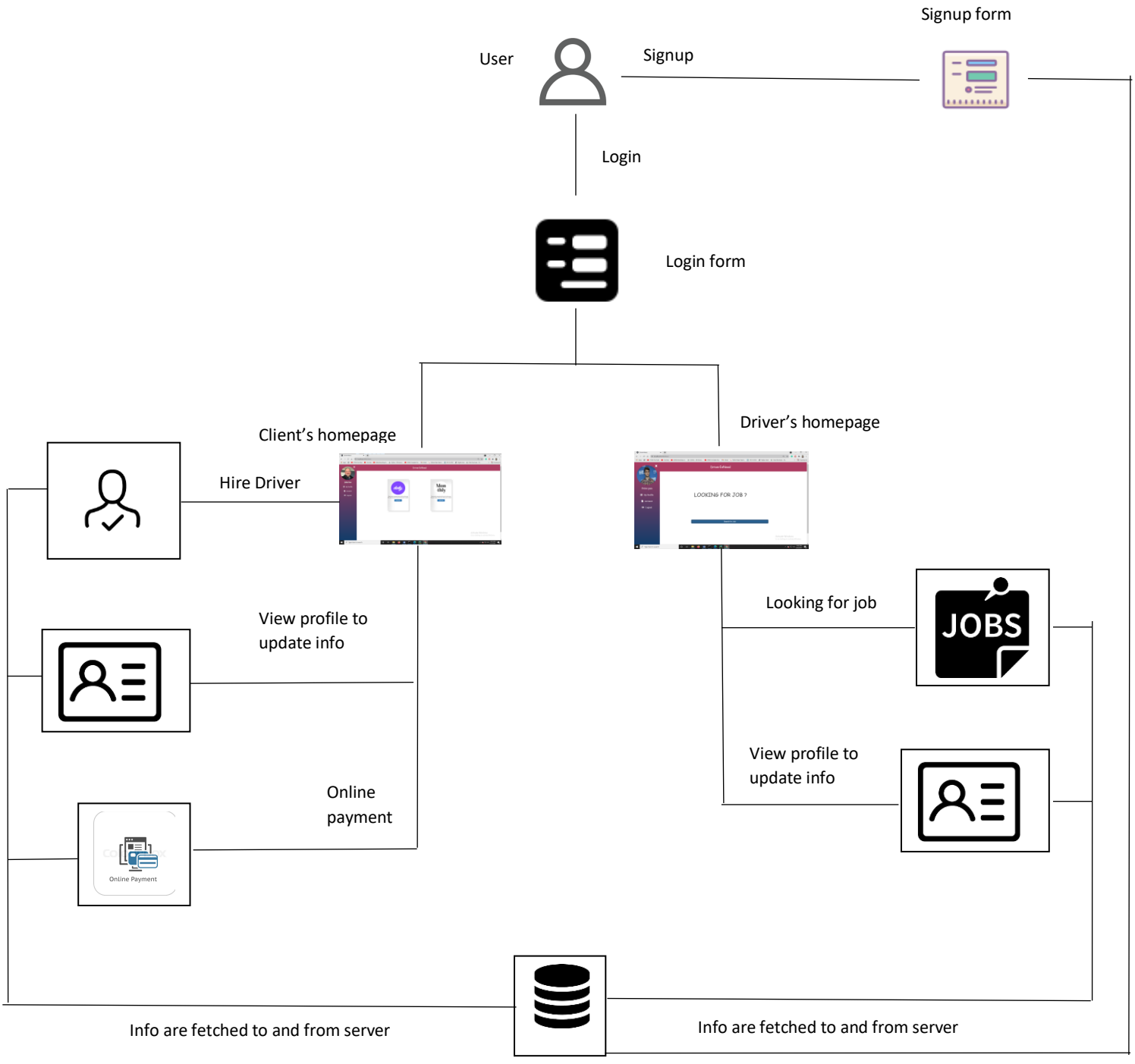

Figure 5.4: Rich Picture of "Driver In Need"

Requirements

The software requirements are descriptions of features and functionalities of the target system. Requirements convey 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.

Functional Requirements

A functional requirement is a function or feature that must be included in an information system in order 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 Browser		
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 mobile or computer device with internet Connection		
Post-condition: Everyone can use this application		

Table 5.2: Compatibility

Function: Create an account to use service		
Input: User contact number and 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 Home Screen		

Table 5.3: Account creation

Function: Select service type		
Input: user clicks on service type that is required	**Process**: api fetches driver's data according to user's requirement	**Output:** Available driver's data is shown
Precondition: user must have an account		
Post-condition: after selection service details is displayed		

Table 5.4: select service type

Function: update certain data		
Input: user can update certain data like address, email, phone number, car license number.	**Process:** api is called to make a put request which changes existing data	**Output:** updated data is displayed in user's profile page
Precondition: user need to provide necessary information		
Post-condition: user will be provided with updated info		

Table 5.5: Updating Data

Function: upload profile picture.		
Input: user upload a picture	**Process:** api is called to make a put request which changes photo	**Output:** updated photo is displayed.
Precondition: Stable internet connection		
Post-condition: user will be shown with updated photo		

Table 5.6 *:* upload profile picture

Function: find a job		
Input: select find a job button	**Process:** api is called and available drivers are fetched	**Output:** drivers are shown with client's that requires the same kind of service.
Precondition: driver need to have an account		
Post-condition: driver will be shown with job list		

Table 5.7: find a job

Function: driver change service type		
Input: new service type selected	**Process:** Selected service type is updated in driver table	**Output:** driver will get
Precondition: user need to have an account		
Post-condition: user will be navigated to user's home screen		

Table 5.8: driver change service type

Function: update fare		
Input: driver inputs his fare	**Process:** api is called to store driver's fare	**Output**: driver fare is displayed
Precondition: user need to have an account		
Post-condition: user will be navigated to user's home screen		

Table 5.9: update fare

Function: Admin Login		
Input: admin enters id and password	**Process:** Api takes id and password to match in database	**Output**: admin is logged in
Precondition: admin needs to be part of the system.		
Post-condition: admin navigated to its landing page.		

Table 5.10: Admin Login

Function: delete client		
Input: click client delete button	**Process:** Client id is passed through api and deleted from database	**Output**: clinet deleted successfully
Precondition: admin needs to be part of the system.		
Post-condition: admin navigated to its landing page.		

Table 5.11: delete client

Function: delete driver		
Input: click driver delete button	**Process:** Driver id is passed through api and deleted from database.	**Output**: driver deleted successfully
Precondition: admin needs to be part of the system.		
Post-condition: admin navigated to its landing page.		

Table 5.12: delete driver

Non-Functional Requirements

Another type of requirement is non-functional requirements. A nonfunctional 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 requirements are 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 for the user and also should have no input lag as long as the device has a certain minimum hardware 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 to directly manipulate any sort of information. In this project, node.js and express.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 environment in which the system must operate, as well as the type and degree of security that must be provided. Access to the system or information must be controlled 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 components is how we achieved efficiency.

● **Service:** represent needs in order 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 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

As mentioned earlier for the development of this project, Angular framework has been used to make the front end and flask framework has been used for developing the backend. The main reason for the use of Flask is, it is a micro framework, routing URL is easy and quick and it has higher compatibility with latest technologies. For lightweight framework like this lightweight database is also needed that's why SQLite is used for the database.

This chapter contains the screenshots of the web app "Driver In Need".

Login Screen: user provides phone number and password to log in their respective account

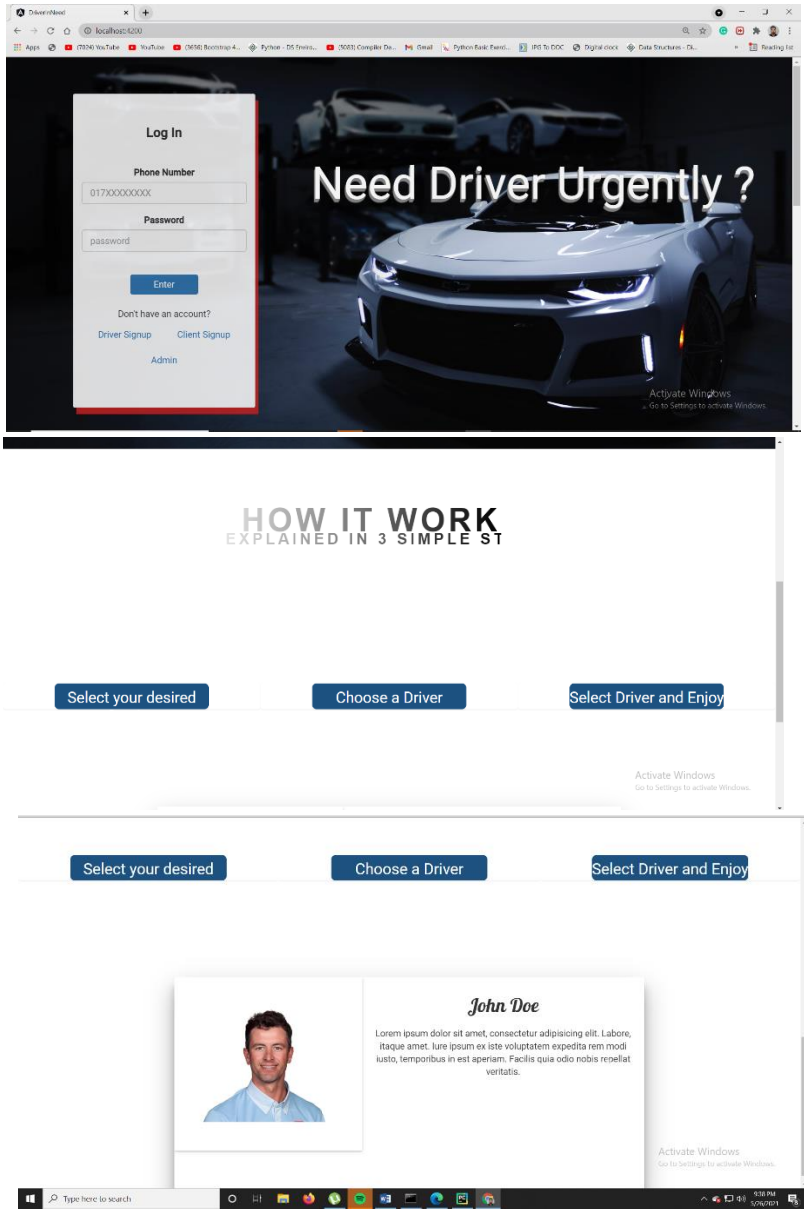

Figure 6.1: Landing page

Admin Login Screen: admin provides with ID and password to login to the system.

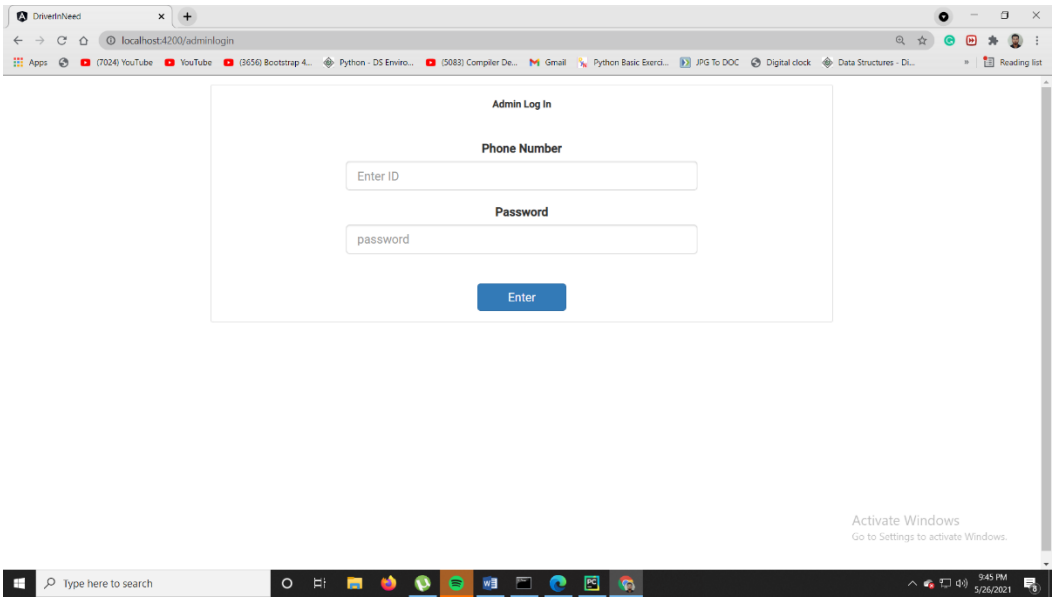

Figure 6.2: Admin login page

Driver Sign up page: Driver provides necessary information to sign up as a driver. Driver have to select here the sort of service he/she is going to provide.

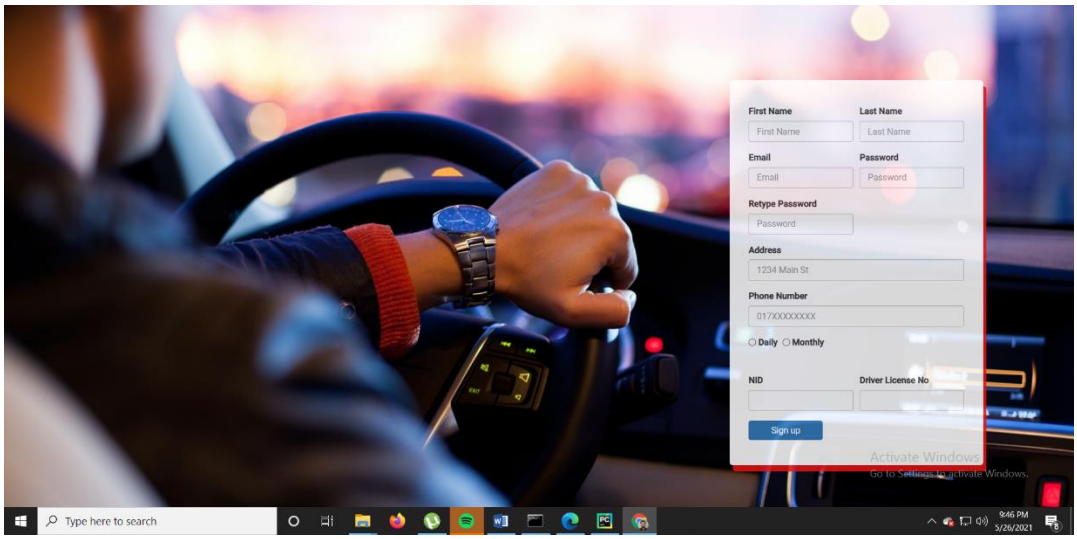

Figure 6.3: Driver signup page

Client sign up page: client have to provide necessary information in order to be enlisted as an user.

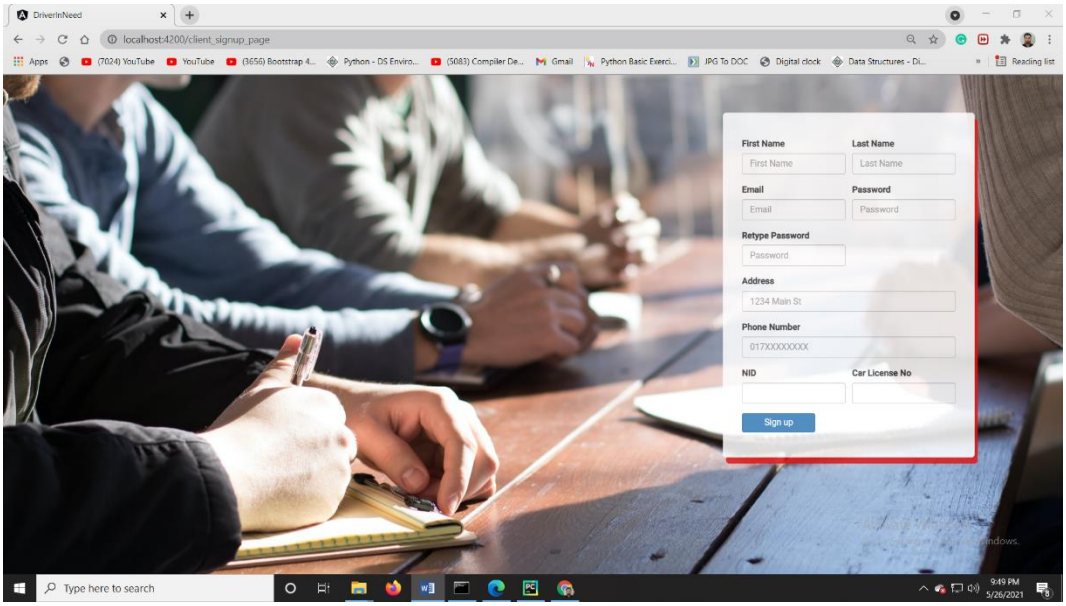

Figure 6.4: Client signup page

Driver's home page: This is drivers landing page, driver can see his current service here. As well as look for a job after clicking "search for job" button.

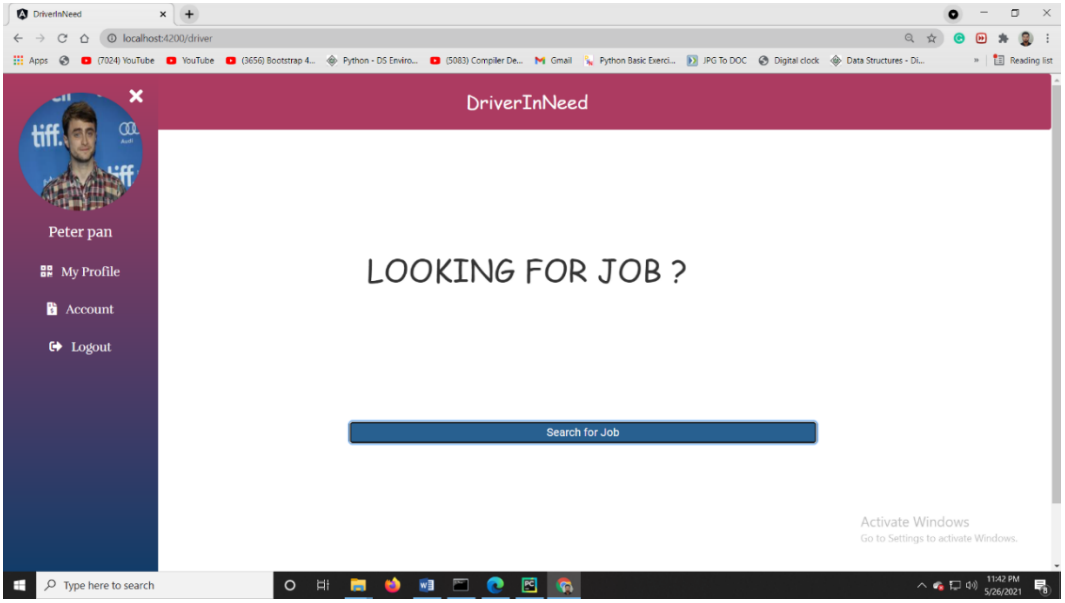

Figure 6.5: Driver's landing page

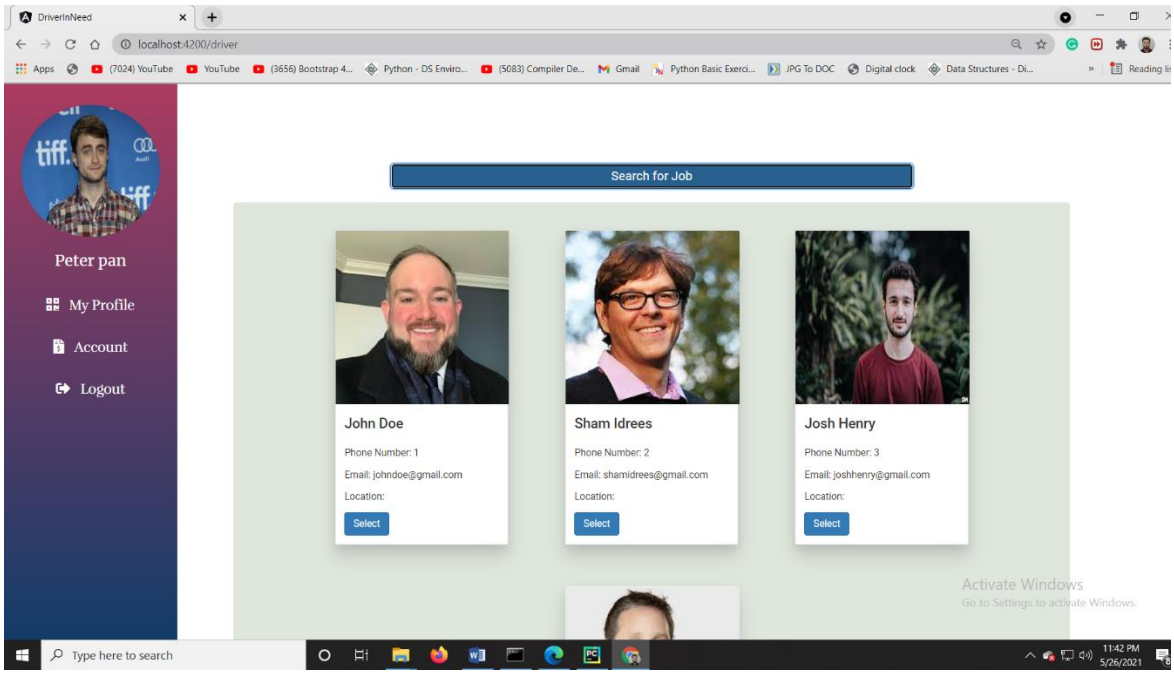

Figure 6.6: Search for job

Driver's profile page: This is drivers profile. From here driver can change his photo, address email etc.

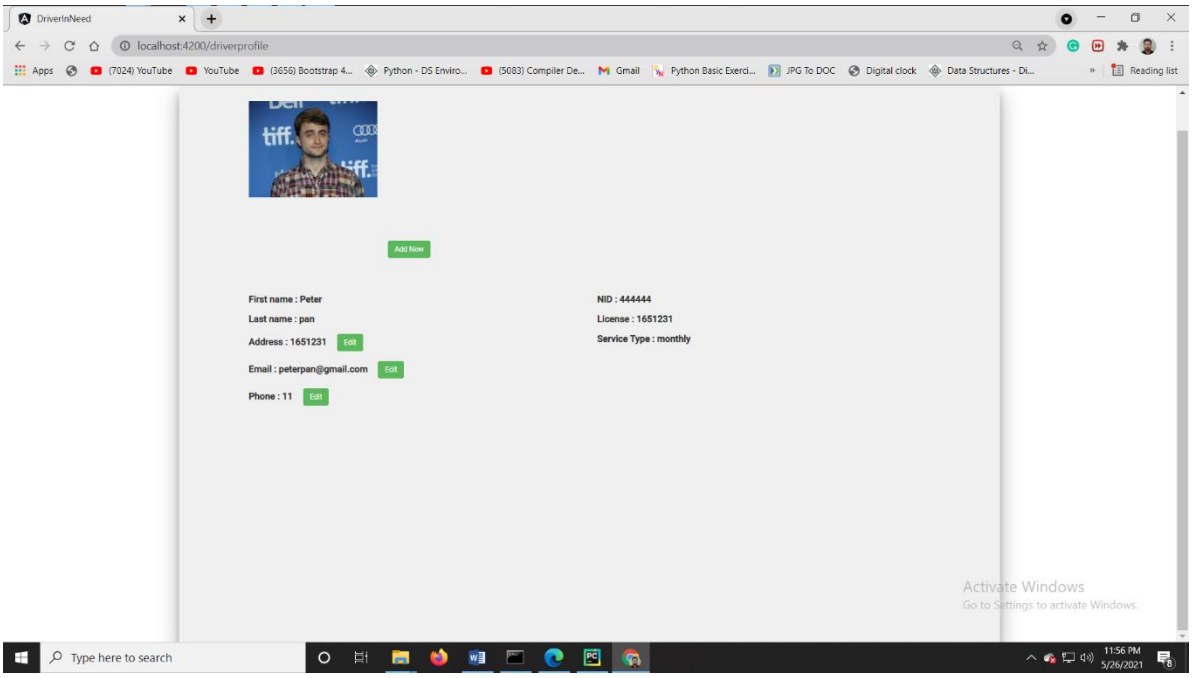

Figure 6.7: Driver's profile page

Client's Home page: This is client's home page here client can choose his/her preferred service. Current service info will also be displayed in here.

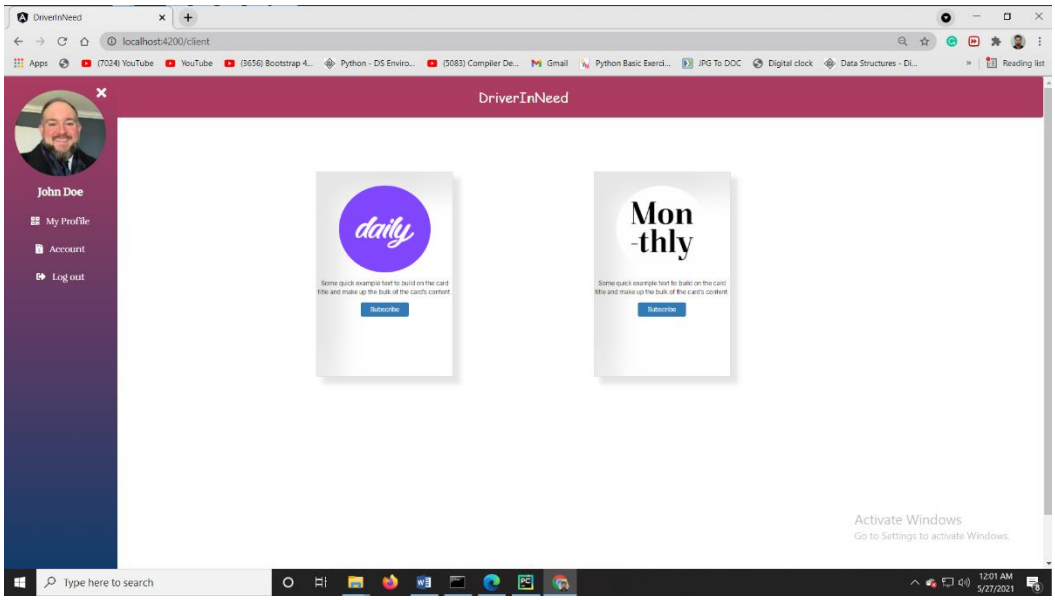

Figure 6.8: Client's Home page

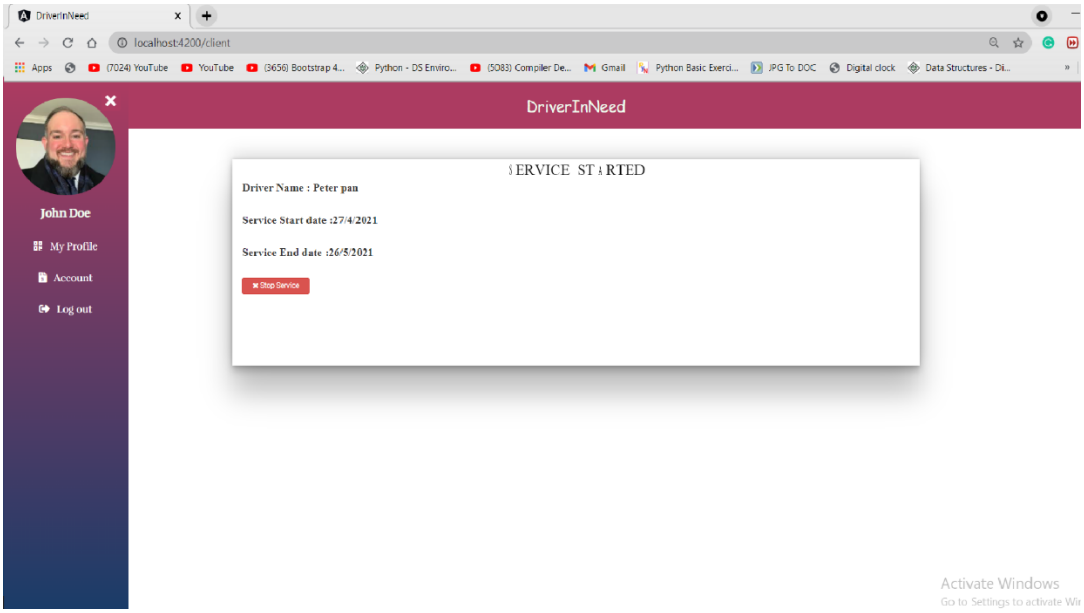

Figure 6.9: Client's page after selecting a service

Client's profile page: This is clients profile page. From here client can change photo, address, phone number etc.

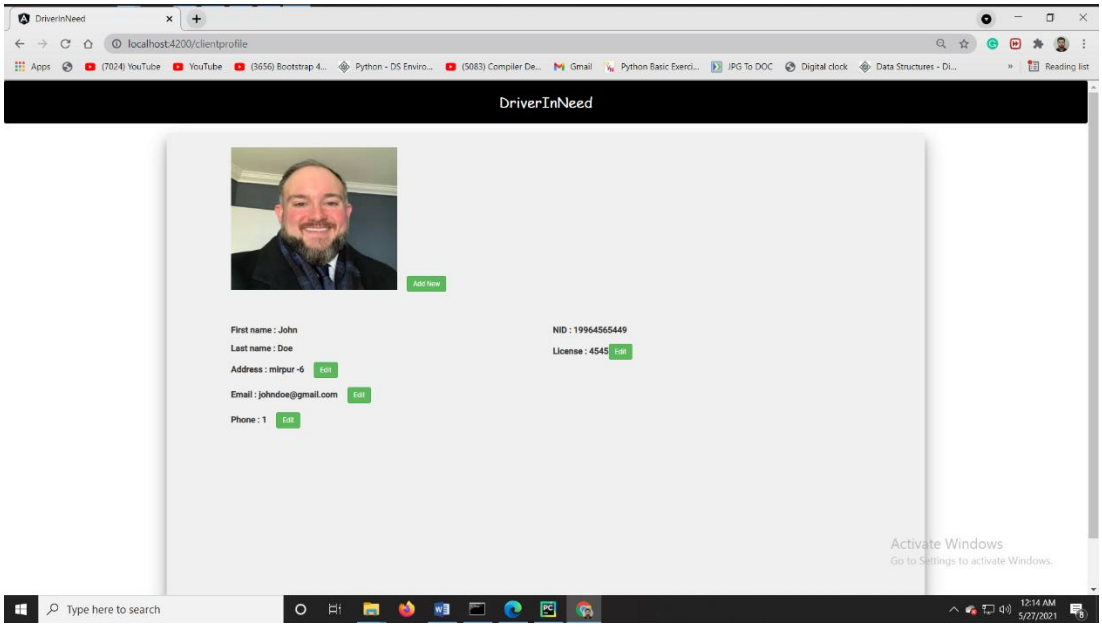

Figure 6.10: Client Profile

Chapter 7: Engineering problem analysis

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 deployment of "Driver In Need" in the application market, it is believed that it will have strong user base since it is a unique idea about helping car owners to get suitable driver effortlessly and it solves one such problem, of hiring driver for hourly basis, which was never addressed before.

- **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 "Driver In Need" will get a full-fledged release into the application market, it will have advertisements to generate revenue and certain amount of commission will be collected from the client on hiring of each driver.

- **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.
  "Driver In Need" has many more future planned features to be worked on and released. Since it is a unique application, the project will be maintained and updated after its release as well. Taking core features from "Driver In Need" 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.

Social and Environmental Effects and Analysis

Social Effect : This app aims to bring both driver and car owner into a same platform. Normally there is no such community where both drivers and owners are intertwined. So finding drivers or drivers looking for a job has become quite a tough task. By the aid of this app it will ease the task and convert this hiring process into a service, so that both driver and owners can get their job done smoothly without taking a break from their daily hustle just to take an interview face to face.

Environmental Effect : From the driver's end, using this app will keep driver's occupied till they ask for a break for themselves. There are lot of jobless people, with a skill of driving car, roaming around the city for a contractual monthly job. On the other hand there are thousands of car owners who face this need of driver for few hours or days. This app fulfills the gap that persist in this case. People with driving skill will get a daily job rather than a monthly based contract, which couldn't be found often times, and owners with self-driven car will get rid of this uncommon problem. By so this puts an end to unemployment and makes lives of car owner much easier.

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 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:** This 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 users address, phone number, and NID card number for security purpose. other than these no other data is neither collected nor stored.

● **Not Sharing or selling any User data:** Even though the data collected is very much sensitive, 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 "Driver In Need" have access to the server and the database. Since they are hosted in the cloud and can only be accessed via lead developers 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:** This application 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:** "Driver In Need" does not violate any rules of the third-party services or the APIs that have been used in its development.

● **Clear Promotion:** "Driver In Need" only tends to make a platform between driver and car owner. Other than what has been mentioned, "Driver In Need" has no intention of promoting anything or anybody else.

● **Clean Advertisement:** The advertisements that will be running in "Driver In Need" 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 "Driver In Need" are the ones that contain violence, nudity, blood and gore, injury, disturbance, etc.

Chapter 8: Lesson Learned

Challenges Faced

During the internship program there were a lot of challenges that I had to overcome. The main ones are:

- **Worldwide pandemic of COVID19 :**
  This was the hardest challenge that had to be tackled as the office had to be closed down and everyone had to work remotely, this led to the possibility of a lack of communication. Thankfully, there were regular meetings that had to be attended, pair programming, issue reporting, to avoid the possibility of a lack of communication.
- **Adapting to the team :**
  As this was my first time working in a work environment that everyone contributed to as a collaboration, it was hard to get used to everyone.
- **Adapting to new technologies :**
  This was my first time getting to know about frameworks and work with it. There was a steep learning curve to this process, but I overcame the process through dedication and hard work.
- **Identifying and Fixing Bugs :**
  Resolving bugs was an issue as some of the bugs were very hard to find, even after the identification of bugs it would take a lot of time to resolve it.

Chapter 9: Future Work and Conclusion

Conclusion

It was a wonderful experience working with Giga Tech family as an intern. During the internship period I have learnt and applied a great deal. I was introduced to new cutting-edge technologies like Angular, Flask, Node.js and Express.js. I have learned a lot about developing different kinds of application also about various development styles. I was pushed to adapt to changes rapidly and come up with logical solutions. During my project, I cooperated with my mentors and seniors to solve the challenges faced. Despite their workload, my supervisors were always there to answer my queries and help me settle nicely. 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.

Future Work

This project, “Driver In Need” is still in its development phase and there many more planned features that are to be added in the near future. Some of them are:

- Sign up and Sign in feature via Facebook or Google.
- Animations, Logos, Icons and Advertisements.
- Adding more classification in drivers.
- Digital transaction
- Live chatting system with driver.