

**DIUrside: Enhancing Campus Transportation
through Ride Sharing.**

BY

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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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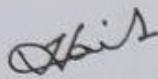
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22 JANUARY 2024

APPROVAL

This Project titled “**DIUride: Enhancing Campus Transportation through Ride Sharing.**”, submitted by Md. Jahidul Islam Maruf to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 22-01-2024.

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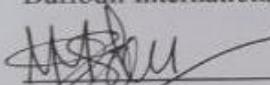
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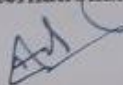
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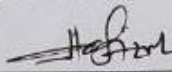
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DECLARATION

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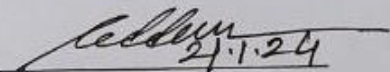
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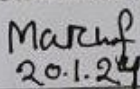
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ABSTRACT

The DIUride is a smartphone software specifically designed to meet the transportation needs of Daffodil International University students, offering them a quick and efficient ride-sharing alternative. The main objective is to engage students who have bikes and want to share rides. And those who want a hassle free journey with the benefit of ride share. This mobile application offers a user-friendly interface, facilitating DIU students in effortlessly booking rides within the university's transportation network. Commencing with an engaging splash screen, it seamlessly navigates users to a secure login page for accessing their accounts. Students can login as a rider or as a passenger. A rider can offer a ride along with the details of the route. Passengers can pick the ride to their location from the ride list and go together. Since the rider is bringing another person with him while heading to his destination, he will share the journey for considerably less money. And travelers may have a seamless and easy ride. The rider can earn some money with this ride sharing app. And finally this system will boost the relationship between student in the campus and save their valuable time.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Introducing DIUride, an innovative mobile app exclusively designed for Daffodil International University (DIU) students commuting from distant locations to the university. Many students who travel from distant places to the campus have limited options for transportation, usually relying on the university bus service or other local means. Despite the university's decent bus service, it can't accommodate all students due to the high numbers. It's common for students to miss the bus at times. Introducing Ride sharing App could help alleviate this issue. Several students use bikes to get to the university. If they share rides, it could solve many of these problems. Utilizing technological advancements, DIUride presents a user-friendly interface, enabling students to easily share rides through their smartphones. my main aim with this app is to connect students who own bikes with those in need of a ride. This allows a student with a bike to offer a ride to another student heading in the same direction, providing a low-cost travel option for the passenger and benefiting the rider financially. This application simplifies the travel process, allowing students to securely and promptly reach their destination within the university premises. Additionally, encouraging shared rides between students helps build better relationships among peers.

1.2 Motivation

A primary motivation behind this project is to eliminate the inconveniences linked with university transportation. If students miss the bus, they can avoid the hassle of finding alternative routes. This saves both money and time for students. With a couple of click on their mobile, they can swiftly access the mobile app, select their desired ride, and securely travel to their destination in a mere question of time. This efficient method not only saves their valuable time but also enables them to schedule their journeys ahead, ensuring punctual and hassle-free commuting. Additionally, the DIUride aims to elevate convenience for DIU students, eliminating the need for physical tickets or concerns about transportation. Using this app, students can effortlessly book available ride offers via their mobile phone, removing the necessity regarding tangible tickets. This not only

alleviates the burden on students but also encourages a sustainable and environmentally friendly approach. Shifting to a digital platform aligns with my goal to support DIU's dedication to environmental conservation and foster an eco-friendlier campus. Additionally, another motivation is ensuring that passengers have access to all ride details. Once a ride is booked, both the rider and passenger can track the ride location and their distance through a map. The aim of providing this level of transparency is to empower students, enabling make well-versed decisions and optimize travel experience by avoiding unnecessary wait times. Incorporating current time data is meant to increase the dependability and effectiveness of the transport service, ensuring timely arrivals at destinations. Moreover, security and privacy were paramount during the DIUride System's development. Robust security measures were implemented to safeguard sensitive information, fostering trust and confidence among students. Ultimately, the motivation behind the DIUride is to significantly improve the commuting experience for DIU students.

1.3 Objective

My core objective is to revolutionise the transport experience for DIU students by eradicating the reliance on local transportation options and the inconvenience of waiting for the bus. Students may save time and reduce the hassle of using traditional transport by using the DIUride, which allows them to easily schedule a ride offer using a smartphone app. The student can book the available ride and get a quick transportation solution with less money. The primary goal of my digital platform is to streamline transportation, enabling students to plan ahead and avoid unnecessary delays. My objective is to furnish accurate and current information, empowering students to make well-informed travel choices. By integrating up to date, DIUride endeavor to enhance the dependability and timeliness of transportation services, minimizing wait time and refining the overall travel experience for students at DIU. My priority is to offer an intuitive interface, ensuring accessibility for students of varying technological proficiencies. Upholding students' privacy and security is paramount, and I'm dedicated to implementing robust measures to safeguard sensitive data. My aim is to cultivate belief and self-assurance among DIU students in utilizing the DIUride platform. Ultimately, these objectives are geared toward

optimizing travel experiences in the DIU campus, enabling them to concentrate on their studies and relish a hassle-free ride.

1.4 Expected Outcome

A key anticipated result of this project is a decrease in waiting times and fuel consumption, thereby leading to cost savings. The implementation of a digital transportation platform allows students to effortlessly book rides through their smartphones, aiming to significantly reduce the time spent waiting for transportation services. Students who commuting to university by bike have the opportunity to earn money through this system, leading to substantial savings on their fuel expenses. The alleviation of pressure on the bus service also facilitates the more effective utilization of resources, ensuring smoother operations within DIU's bus service and reducing congestion at bus counters. The DIUride aims to offer an intuitive and easily navigable interface, designed to suit students with various levels of technological expertise. Students can enjoy a smooth and convenient experience, booking rides anytime and anywhere, eliminating the need for physical passes or concerns about having spare change available. They will also have access to correct and updated travel data, including timetables and availability. This feature allows them to efficiently plan their trips, reducing waiting periods and granting them to improve their transporting experience. By achieving these objectives, the system aims to enhance satisfaction and efficiency in transport in the university campus, enabling students to concentrate on their academic endeavors and enjoy a smooth and convenient journey.

1.5 Project Management and Finance

The management of the DIUride project involves numerous essential responsibilities. At first, a proficient project plan, comprising professional in mobile development, UX design, and system integration will be established. This will identify project goal, design a complete project plan, and assign responsibilities and accountabilities to guarantee seamless collaboration and appropriate completion. The project will undergo comprehensive gathering and analysis of requirements to precisely describe the functionality of DIUride. This entails engaging investors plus students, professors, and staff to recognize their needs and desires. Derived from these, a complete system

architecture plan will be established, detailing technological integration points, specifications, and security measures. Allocating resources and ensuring the project's economic viability depend heavily on financial planning. Careful monitoring and control of the budget will ensure adherence to budgetary restrictions while attaining project goals. Robust project management procedures and excellent financial planning will support the smooth implementation of the DIUride, keeping the project moving forward, produces the intended goals, and keeps within the assigned budget. Additionally, this tactic makes it easier to recognise and address any dangers or challenges., building a solid basis for the effective launch of the DIUride.

1.6 Report Layer

Chapter 1: Introduction

The DIUride System introduction contains its basic idea, motivation, aims, description of the platform, and projected outcomes.

Chapter 2: Background

Investigating the background of the DIUride covers introductory information, a survey of related studies, and the identification of encountered issues and problems.

Chapter 3: Requirements

Centering on the precise prerequisites and criteria for the effective construction of the DIUride System, drawing out complete system requirements.

Chapter 4: Design Specifications

Elaboration of the detailed design features of the DIUride System, comprising architecture details, interfaces, and crucial design components.

Chapter 5: Implementation and Testing

Involves the phase dedicated to establishing and testing the DIUride, focusing on the various testing approaches used and the development process.

Chapter 6: Impact Analysis

Examining the wider implications and advantages of the DIUride on environment, society and sustainability.

Chapter 7: Future Scope and Conclusion

Offering a glance into the future possibilities and winding up the report by brief the discoveries and successes of the project.

CHAPTER 2

BACKGROUND

2.1 Preliminaries and Terminologies

To comprehend the DIUride thoroughly, it's necessary to create the foundation and identify key terms associated to the project. This part works as a cornerstone for succeeding chapters, enabling a logical and straightforward explanation regarding the system's different elements. The DIUride revolves around the Daffodil International University as its principal environment. DIU, a respected educational institution, provides bus services to assist student movement inside the school premises. The main aim of the DIUride is to ease the burden on current bus facilities by giving a suitable and effective platform to share rides using their smartphones. Through this platform, students can utilize a dedicated mobile software tailored exclusively for DIU students. This app empowers them to effortlessly reserve rides, access live updates, and stay informed about available ride offers.

The important terms related to the DIUride are:

1. DIUride: The exclusive mobile app tailored for DIU students to facilitate bike ride sharing.
2. Mobile Application: Software specifically created for mobile devices like smartphones, allowing access to the DIUride for ride sharing and booking purposes.
3. User Interface: The application's interactive and graphic design, ensuring a student-friendly experience and straightforward navigation.
4. Integration: The procedure of linking the DIUride with DIU's student who has bike enables seamless connection among the application and the student.

2.2 Related Works

Two comparable applications to the DIUride project include the 'Uber' and 'Pathao' platforms.

- a. Uber is a popular international ride-sharing service available in Bangladesh. It runs using a smartphone app, allowing customers to request rides, follow the whereabouts of their driver, and pay for their travels online. Uber provides an alternative

transportation option in major cities like Dhaka and Chittagong, offering convenient and on-demand rides to users [1].

b. Pathao is a Bangladeshi transportation and logistics company that offers various services through its mobile app. Initially starting as a ride-sharing service similar to Uber, Pathao has expanded its offerings to include not only rides but also food delivery, courier services, and more. Besides transportation, Pathao also provides food delivery services, where users can order food from restaurants and have it delivered to their location [2]. Where customer can place orders for food from various restaurants and have it delivered to their preferred location. Additionally, they offer courier services for sending parcels or documents from one place to another within the city [3].

2.3 Comparative Analysis

Target Audience Focus: DIUride exclusively caters to the specific needs of DIU students, ensuring a tailored and focused service compared to Uber and Pathao's broader audience approach.

Lower Cost: The cost of travel on the DIUride platform tends to be lower compared to other platforms because both the rider and passenger are students heading towards the same destination. This shared journey among students enables cost-effective travel compared to other platforms.

Service Scope: DIUride specializes in addressing campus travel needs, providing a dedicated and reliable transportation solution within the university premises, offering a more focused service than Uber and Pathao's diverse service range.

Geographical Reach: While Uber and Pathao cover multiple cities in Bangladesh, DIUride's localized focus ensures a more concentrated and efficient service specifically within the DIU campus and immediate vicinity.

Specialized Focus: DIUride's specialized focus on student ride-sharing within the university area ensures a more targeted and student-centric service compared to the multifaceted services provided by Uber and Pathao.

2.4 Scope of the problem

Students often miss the bus. Sometimes there is no bus schedule when you need to go. Moreover, going to other ways is very costly and takes more time. The current situation

results in delays, frustration and time wasted might otherwise be used for academic pursuits. The DIUride aims to address this challenge by introducing a digital platform for ride-sharing, providing swift and efficient transportation. Another concern is the absence of direct transportation options to the university, aside from the varsity bus service. You need to change two or more vehicle for come here. Traveling with bike is efficient. And my goal is to connect the passenger with the bike rider. The recent changes in our varsity bus service system require students to register and pay at the semester's start for bus travel. This arrangement limits access for students who attend less frequently or have occasional university visits due to other commitments. My project aims to address this issue by offering an alternative transportation solution. In the other hand rising oil prices have significantly increased the cost for bikers. Ride-sharing offers an opportunity for them to offset these expenses by sharing the cost with fellow passengers. Since the rider is a fellow student, there's no need to be concerned about security issues. Uber and Pathao are popular ride-sharing platforms in Bangladesh, yet their services may not be extensively available within our campus area. In such a scenario, the DIUride app can emerge as a more suitable and accessible choice for our university community.

2.5 Challenges

- **Adoption Rate:** Encouraging students to adopt and regularly use the DIUride app might be a challenge initially, requiring effective marketing and awareness campaigns.
- **Technical Issues:** Ensuring a seamless and bug-free app experience for users, including app crashes, connectivity issues, or compatibility problems across various devices.
- **Safety and Security:** Addressing concerns about the safety of rides and ensuring the security of personal information of both riders and passengers within the app.
- **Campus Coverage:** Ensuring comprehensive coverage within the campus premises and addressing potential limitations in remote or less accessible areas.
- **User Trust and Reliability:** Building trust among users about the reliability of the service, including timely arrivals, accurate information, and a smooth overall experience.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

The successive operations and interactions inside the app to enable the ride-sharing process are depicted in the Business Process Modelling (BPM) diagram for DIUride. The splash screen that appears at the start of the diagram acts as an introduction to the program. Thereafter, it splits into two routes: one for users who are already logged in and another for those who are not. The BPM diagram illustrates the sequence, initiating with the registration page for users who haven't logged in. After successful login, the process navigates to the interface where a rider can offer a ride, awaiting confirmation from the passenger. Once confirmed, the rider proceeds to pick up the passenger, commencing the ride-share. And as a passenger the BPM diagram shows that passenger go to the ride list and find an available ride then book the ride and wait for rider.

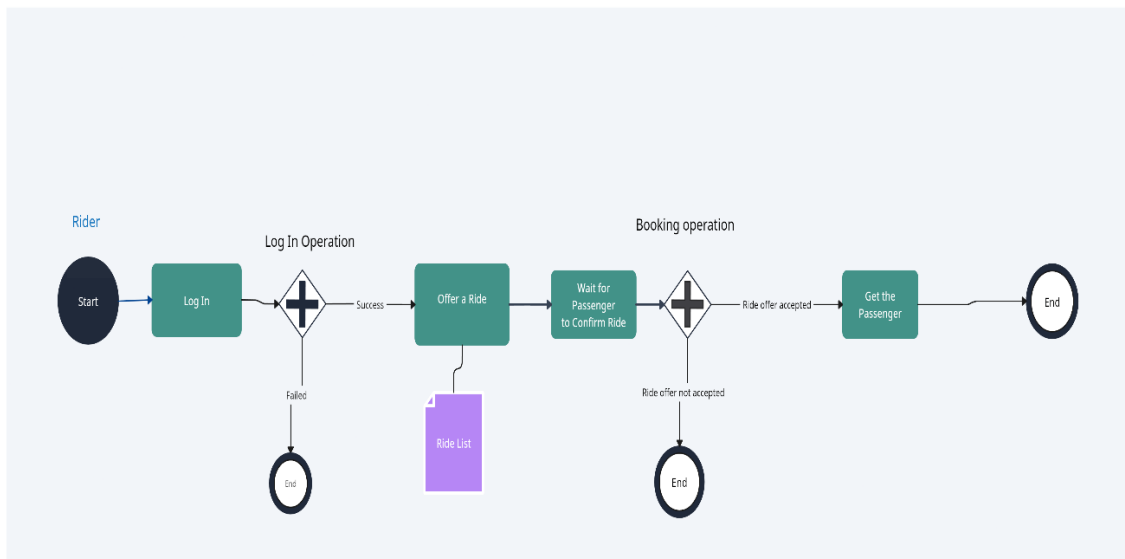


Figure 3.1.1: Business Process Modelling of DIUride for Rider

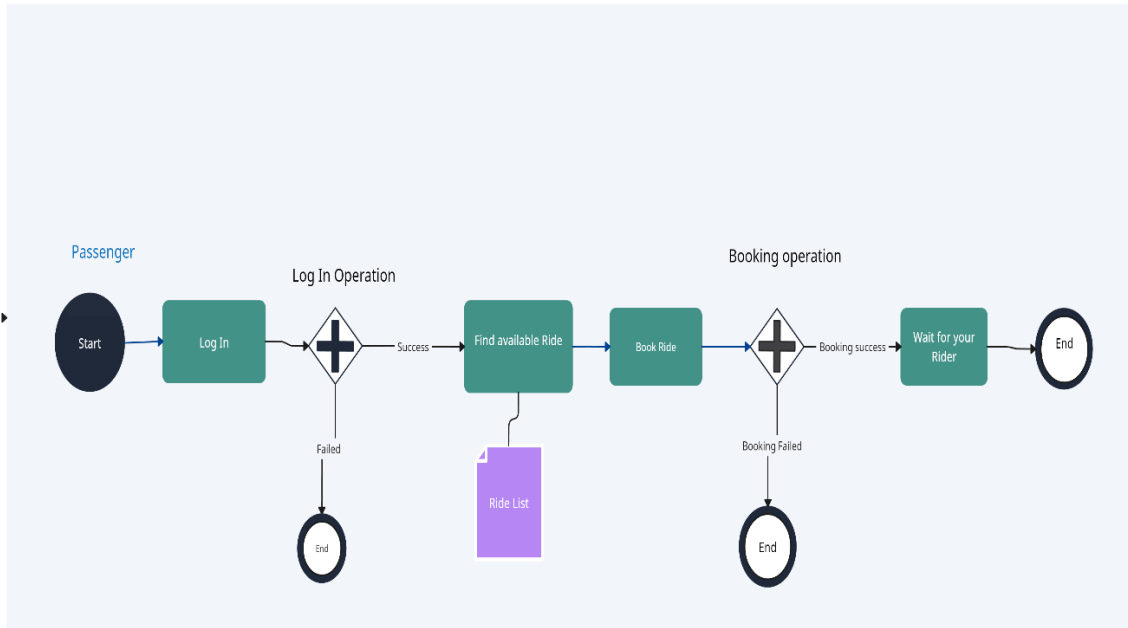


Figure 3.1.2: Business Process Modelling of DIUride for Passenger

3.2 Requirement Collections and Analyzing

Requirement collection and analysis play a pivotal role in the development of a Ride share app. This stage entails the collection and assessment of data concerning the requirements and desires of potential users, alongside the business objectives of the application.

Here are some steps that can be taken to collect and analyze requirements for a Ride share app:

Identify the target audience: Determine the target audience. In that case all DIU student who use transport system are the audience for DIUride. Gather data on the target audience's requirements and preferences using techniques including focus groups, user interviews, and surveys.

Gather user requirements: Interviews, questionnaires, and workshops are used to involve a variety of stakeholders in the requirement gathering process for this project, including DIU students, administrative personnel, and transportation officials. Their contributions aid in determining the essential attributes and capabilities anticipated from the ride-sharing platform.

Analyze user requirements: Determine recurring themes and patterns in the data that has been gathered, then rank the most important needs.

Define the app's business goals: Define the business objectives of the application, which could encompass revenue generation or cost-saving initiatives

Identify functional and non-functional requirements: Determine the features and resources that the app should have in addition to any non-functional needs, such performance and security.

Create a requirements document: Make an understandable record of the requirements that have been gathered and examined. This should include information in a concise format about the target audience, business objectives, and both functional and non-functional needs.

Following these guidelines makes it possible to gather and analyse needs for a ride sharing app in a comprehensive manner. Throughout the development stage, this knowledge acts as a compass.

3.3 Use Case Modelling and Description

Use Case diagram provides an overview of how the system operates and illustrates the interactions between various roles and their respective tasks. It shows the main actors involved in the ride booking process. In the DIUride System, the primary actors are the "Student" and the "Admin." The "Student" represents DIU students who use the app for ride sharing purposes, either offering or booking rides. On the other side, the "Admin" serves as the system administrator responsible for managing the app's functionalities and settings. "Login" use case involves the process wherein a student can access the application using their credentials. For new users, the "Sign-Up" use case enables the creation of a new account. When Log In process user has to select passenger or rider type. "Edit Profile" use case represent the process where user can edit their profile information. Passenger can view available ride offer through "Find Available Rider " use case. Rider offer a ride for passenger through "Offer Ride" use case. Also user can cancel ride ,call the rider or passenger.

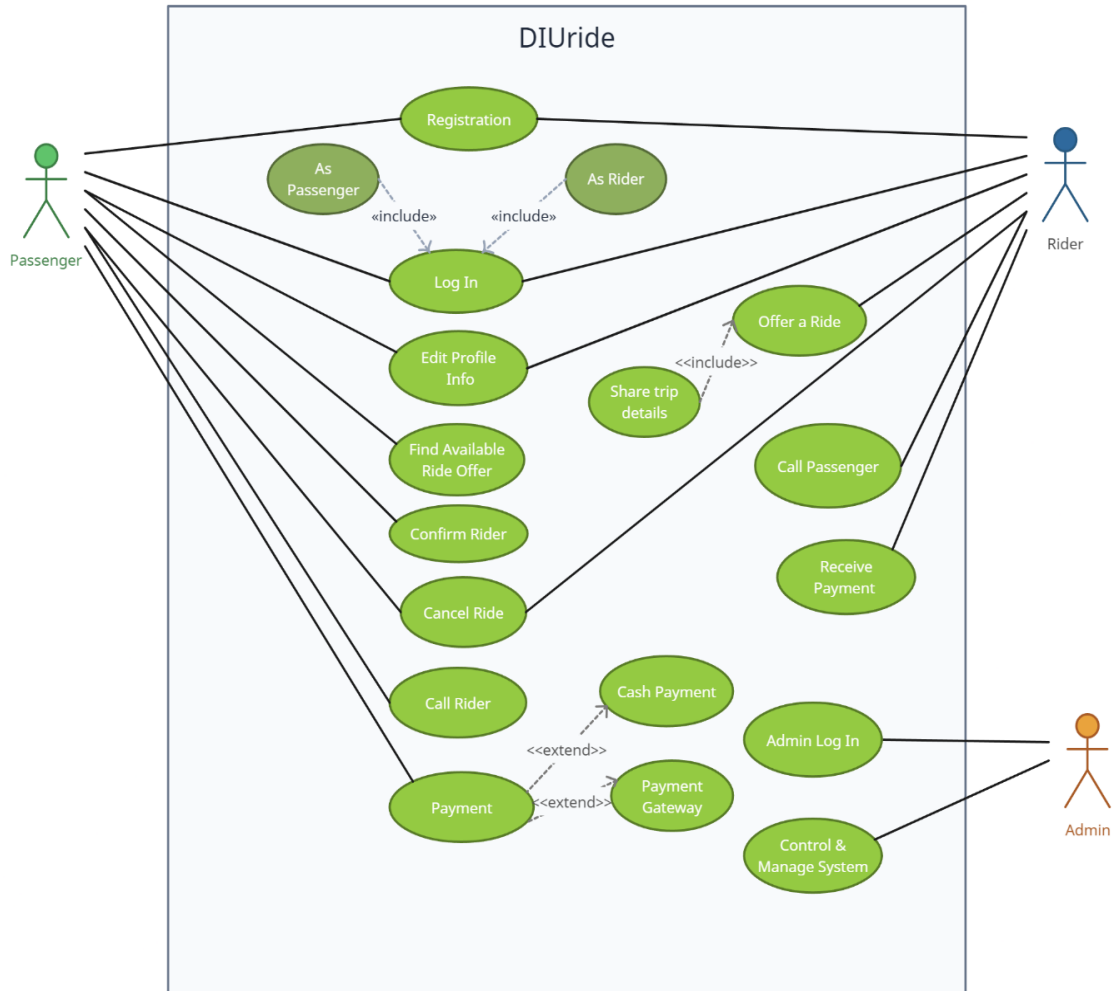


Figure 3.3: Use Case Modelling for DIUride

3.4 Logical Data Model

The LDM defines the database table and their relationships in a way that is understandable by both technical and non-technical stakeholders. In this work the entities are "User", "User Location", "Ride List", "On Going Ride", "Passenger", "Rider", "Rider Notification". In that LDM relation between entities are showed. The Logical Data Model provides a clear and comprehensive view of the data elements, their relationships.

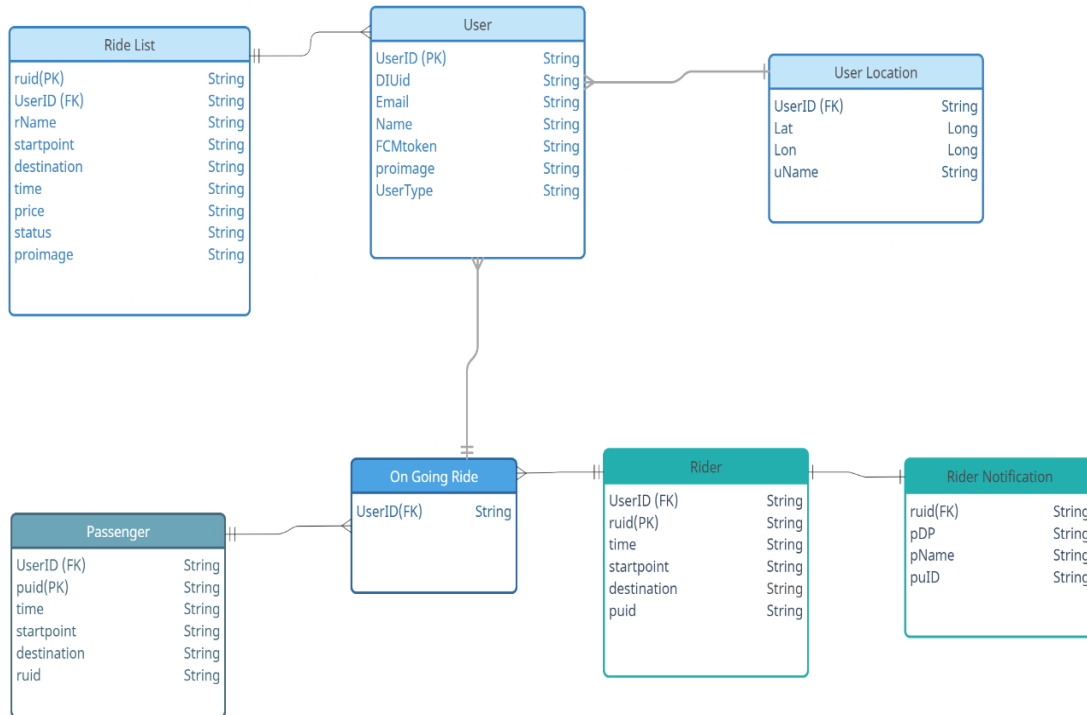


Figure 3.4: LDM for DIUride app

3.5 Design Requirement

User Interface (UI): Provide an easy-to-use interface that is accessible to all students, making it simple to book rides, create profiles, and monitor rides in real time.

Mapping Integration: Incorporate mapping functionality to provide passengers and riders with real-time location tracking, guaranteeing dependable and effective navigation to the intended place.

User Profile Management: Set up an efficient system that enables users to quickly create, amend, and manage their profiles, including the information required for identity and verification.

Notification System: Include a notification function to give consumers up-to-date information on transportation offers, confirmations, and status updates, facilitating efficient user communication.

Features for Accessibility: Make sure the software complies with accessibility guidelines and offers the functionalities that are essential for individuals with impairments to utilize.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The graphical interface of DIUride, developed with XML language on the Android Studio platform, prioritises offering a straightforward and visually pleasing user experience. Android Studio offers a full set of tools and widgets specialised to creating native Android applications, assuring both aesthetics and better performance. The goal is to offer a fluid and user-friendly experience for the university student participating with the ride-sharing system. It uses current design tools principles like material design to produce a visually uniform and easy-to-use interface. Graphical interfaces are a very significant component of an application. Through this, the interest of the users can be retained. The user doesn't really know how the functionality behind the app works and judges an app by looking at the front end, so how much attention an app will get from the user depends on the front-end. Users are guided through every stage of the ride-sharing process by the interface design, which places an emphasis on simple and straightforward user processes. The design makes sure that the interface is simple to use and straightforward from the moment a user logs in or signs up for the project to when they book or give a trip. The front-end solution for the DIUride focuses on developing a visually appealing, intuitive, and user-friendly interface employing the XML language. By implementing design principles, this implementation hopes to offer a seamless ride sharing experience for DIU students, delivering rapid navigation and a better user experience.

4.1.1 Front-End Design for Splash Screen and Welcome Screen

This is the DIUride's landing screen. This application's screen delivers a seamless and visually beautiful changeover from the program start to the main interface, allowing for a polished and intriguing experience. And then the welcome screen shows.

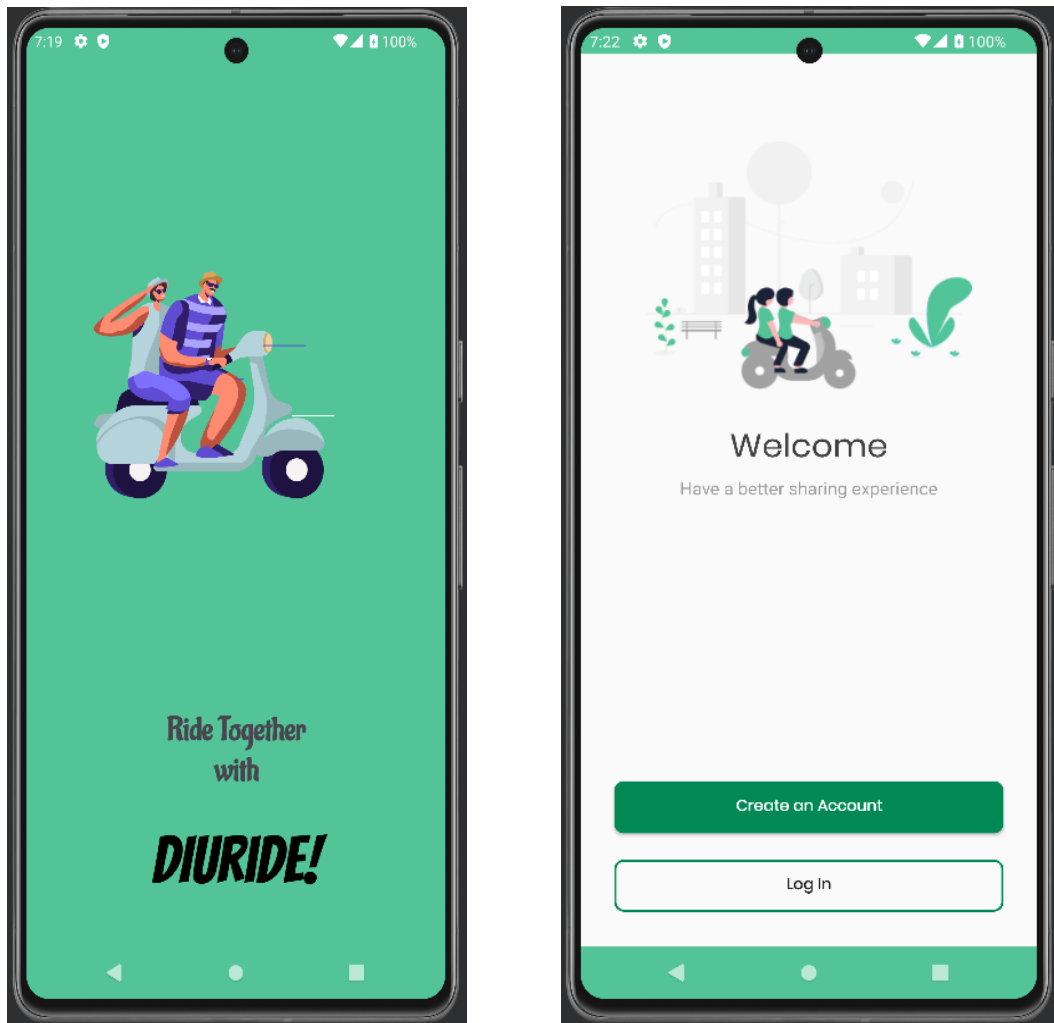


Figure 4.1.1: Front-End Design for Splash Screen and Welcome Screen

4.1.2 Front-End Design for Registration Screen & Log in Screen

Registration: A new user first need to register with his DIU email and need to provide other requirement. After click the signup button a verification mail will sent to the email. And user need to verify to login.

Log In: In the login screen user need to input log in info. Also, they have to pick user type Passenger or Rider. If the user is approved then it will move to the main activity according to user type.

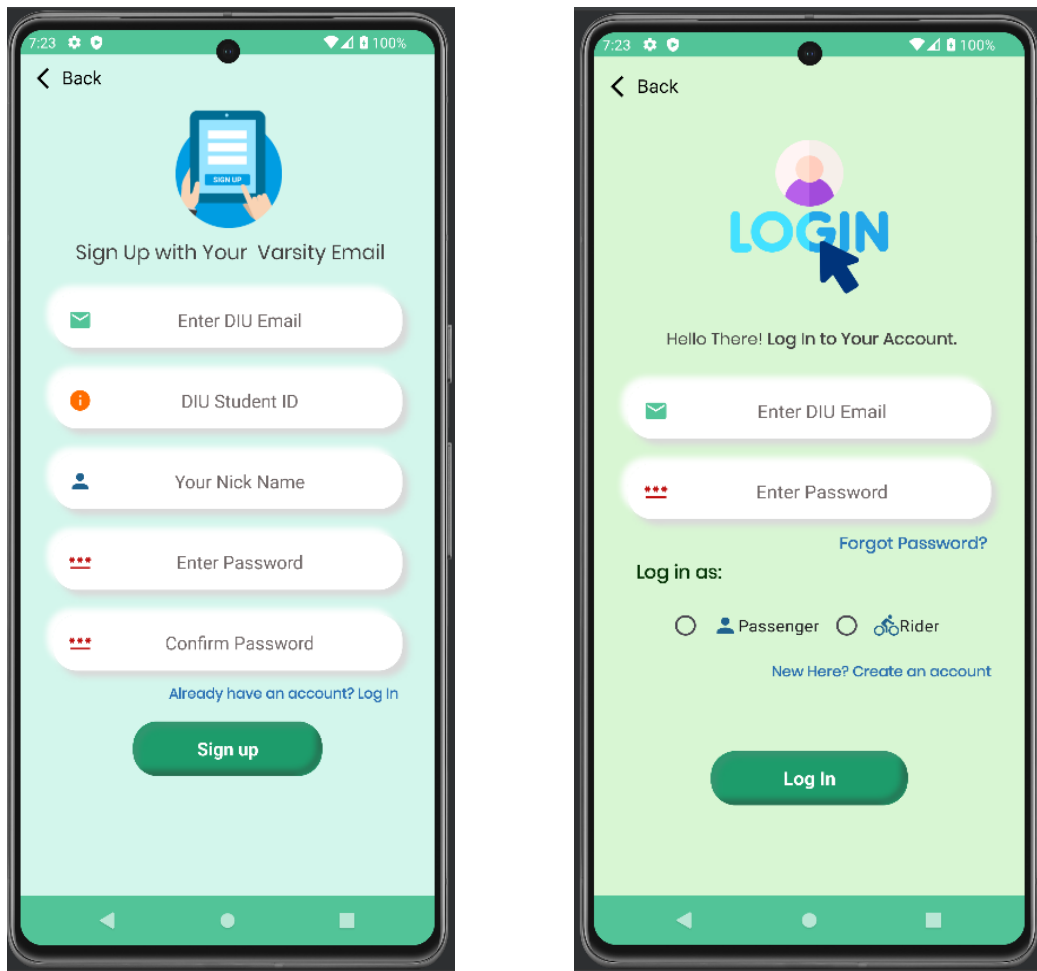


Figure 4.1.2: Front-End Design for Registration Screen & Log in Screen

4.1.3 Front-End Design for Forget Password Screen

If the user forgets his password, they may quickly retrieve that by providing his email address and a recovery password message will send to that email. Through that email they may reset the password.

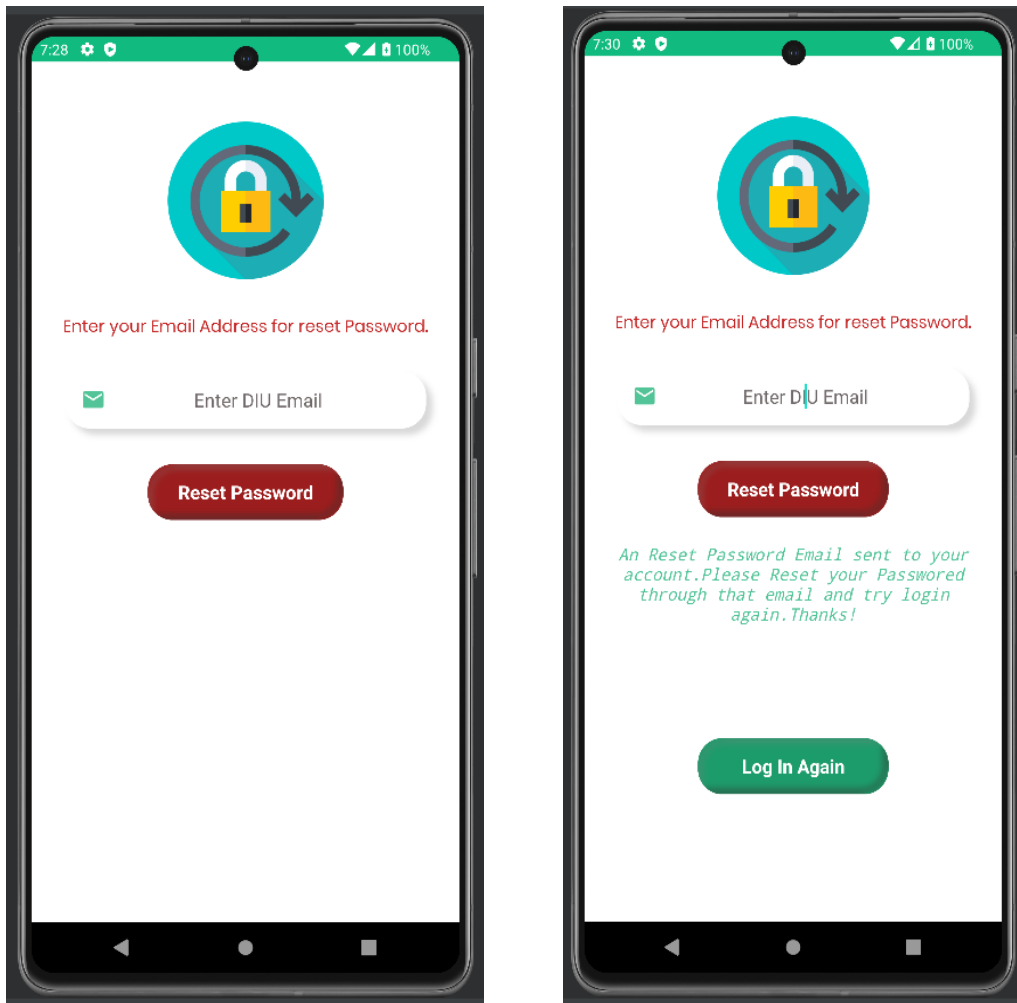


Figure 4.1.3: Front-End Design for Forget Password Screen

4.1.4 Front-End Design for Passenger Main Activity Screen

This is the Main Activity for Passenger. They can see his current location in the map. Also, navigation drawer shows the other functionality.

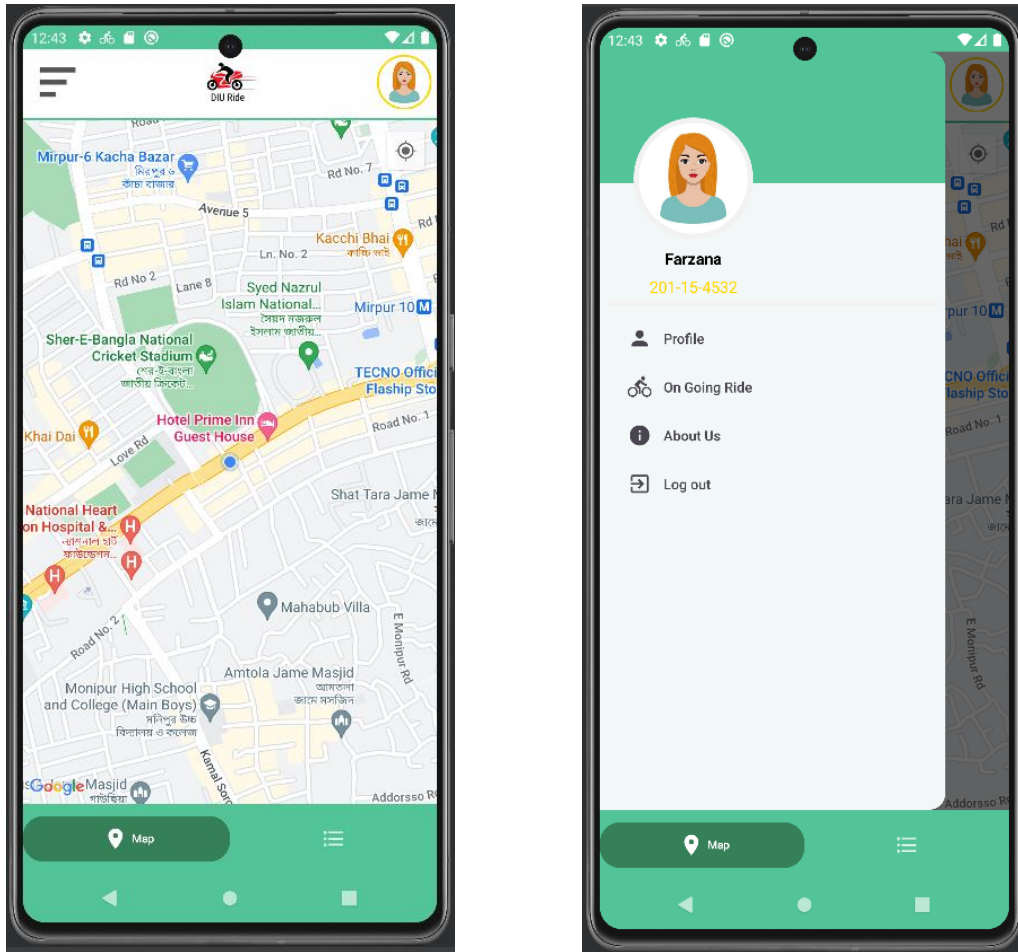


Figure 4.1.4: Front-End Design for Passenger Main Activity Screen

4.1.5 Front-End Design for Available Ride List Screen

In this screen passenger find the available ride offer and details. A passenger can book a ride as per their destination.

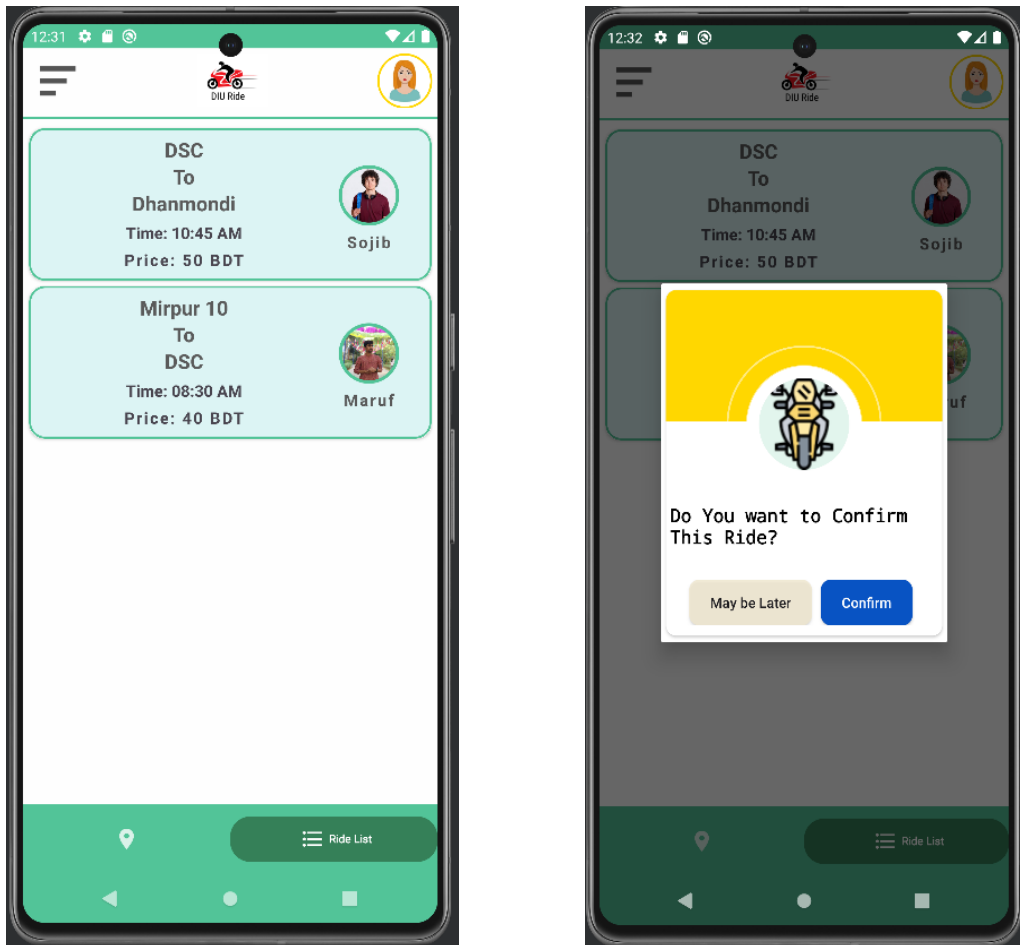


Figure 4.1.5: Front-End Design for Available Ride List Screen

4.1.6 Front-End Design for On Going Ride Screen

In this screen Passenger/Rider can find Passenger/Rider with the help of Map. This is a real time updating map. This will help the user to navigate to the passenger/rider easily.

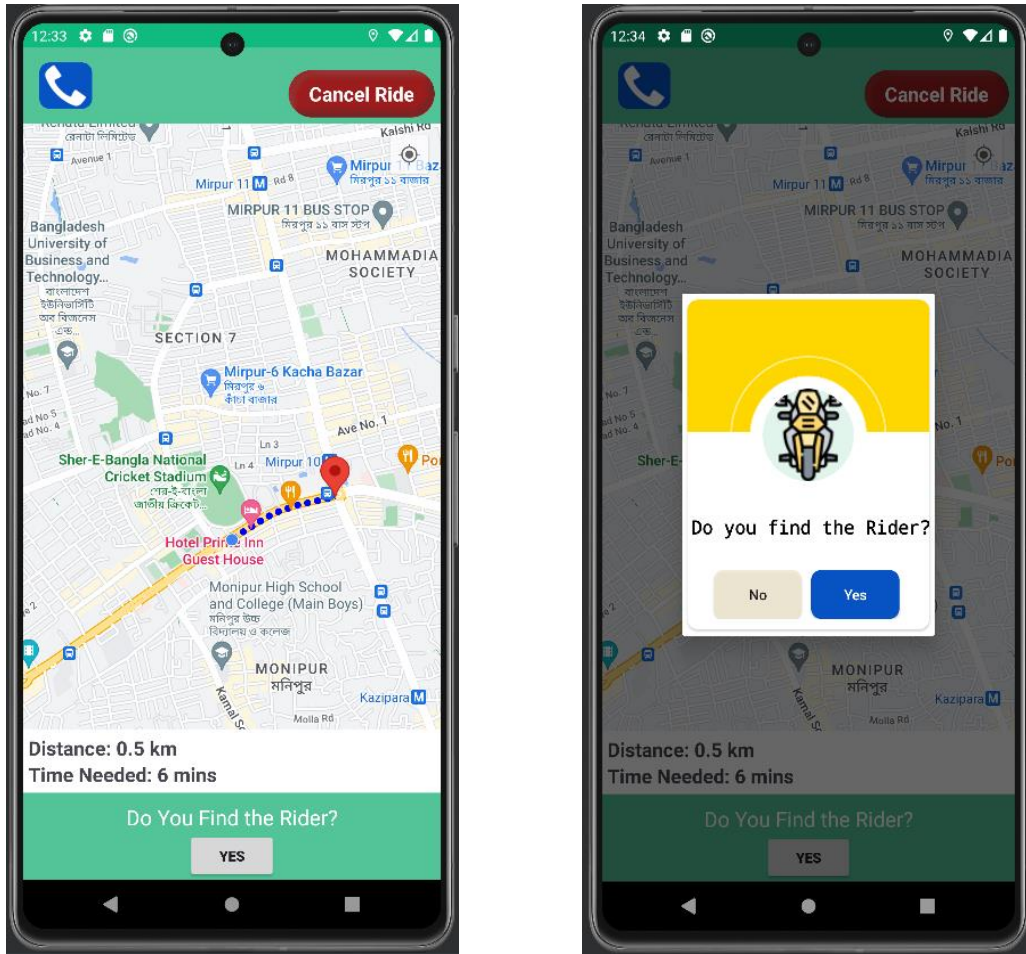


Figure 4.1.6: Front-End Design for On Going Ride Screen

4.1.7 Front-End Design for Call Screen

A user can call if they get any problem to find the passenger/rider.



Figure 4.1.7: Front-End Design for Call Screen

4.1.8 Front-End Design for Edit Profile Screen

In this Screen a user can edit their profile details. Also, they can upload a profile image.

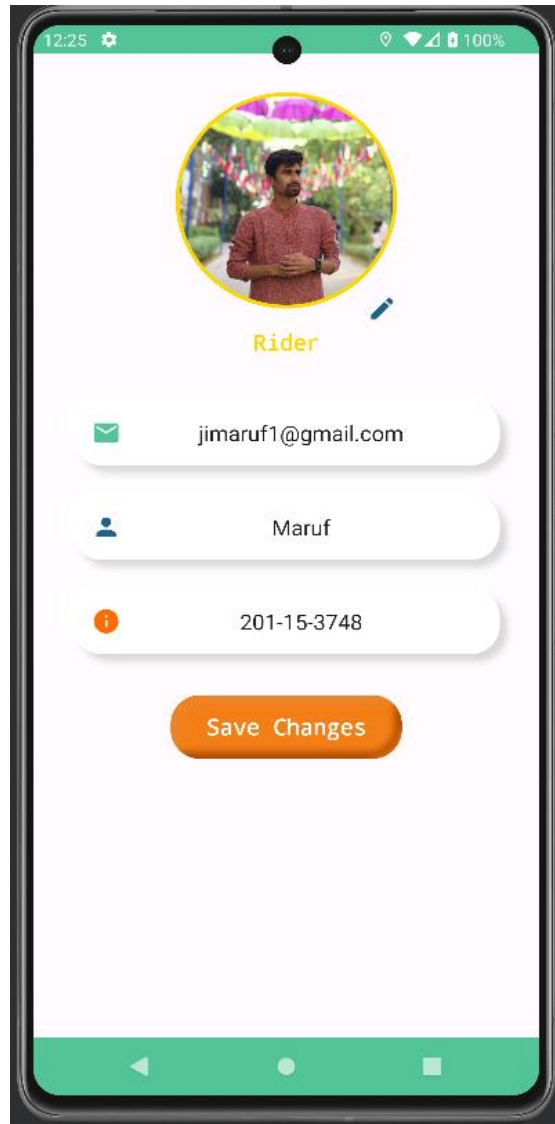


Figure 4.1.8: Front-End Design for Edit Profile Screen

4.1.9 Front-End Design for Rider Main Activity Screen

This is the Main Activity for Rider. Rider can offer a Ride in offerRide fragment screen. After click the “Offer a Ride” button the ride details will live for the passenger.

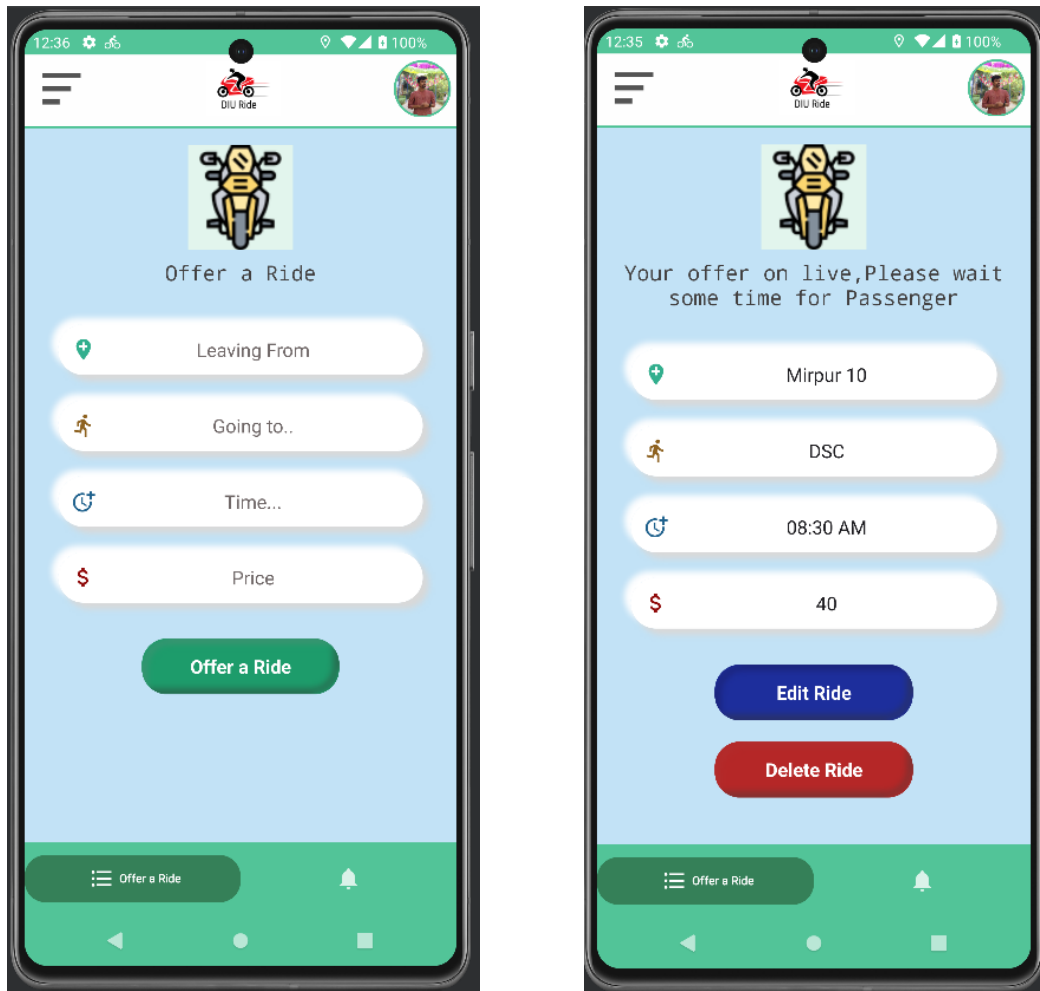


Figure 4.1.9: Front-End Design for Rider Main Activity Screen

4.1.10 Front-End Design for Rider Notification Screen & On Going Ride Screen

This is Notification Screen. After Confirm the ride by passenger a notification is send to the rider and also the notification appears in the notification fragment Screen. After tab on the notification On Going Ride Screen appear where Rider can view the Passenger location through map.

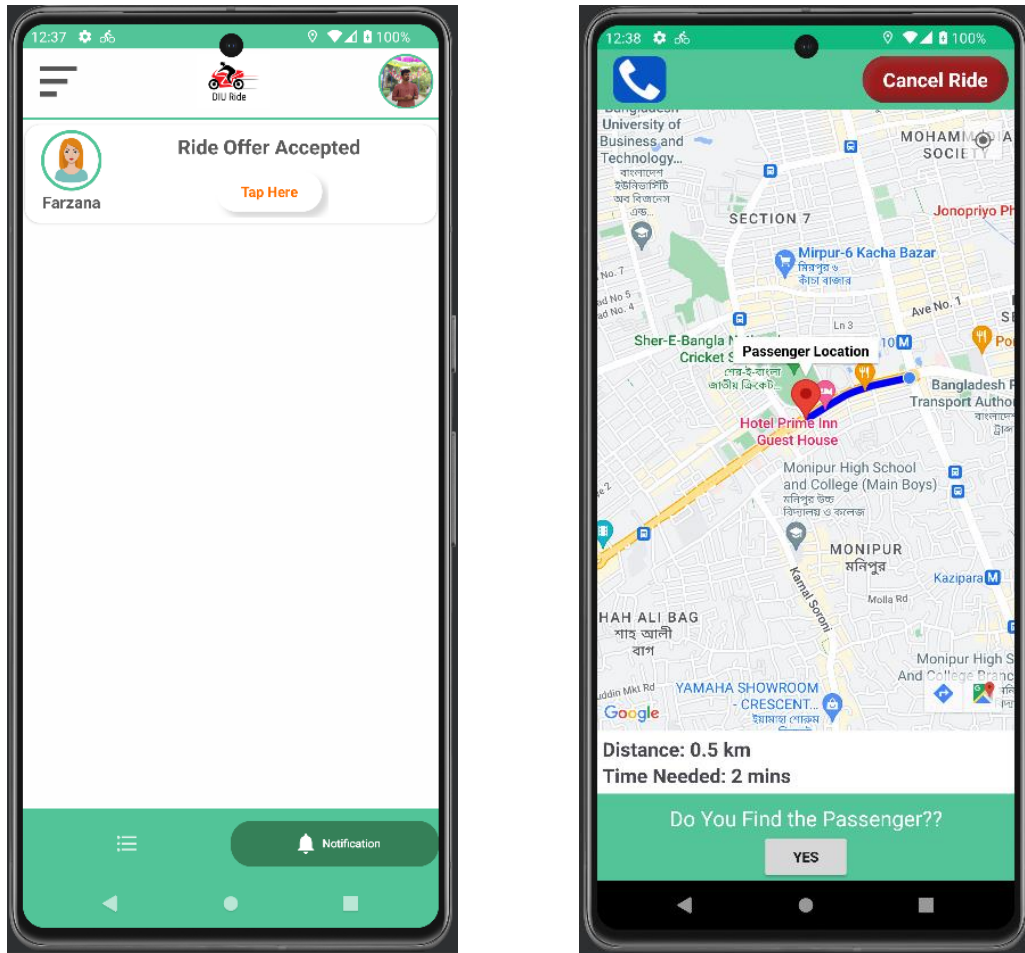


Figure 4.1.10: Front-End Design for Rider Notification Screen & On Going Ride Screen

4.2 Back-end Design

The backend part of DIUride leverages Firebase for implementation. The DIUride app's backend solution, Firebase, has a number of features that can improve the app's usability and speed.

This is a description of the design that makes use of Firebase:

1. **Real-time Database:** Use Firebase Realtime Database to sync and save app data instantly. Users will always be informed about the availability and status of rides in real time because to this database's fast updates and synchronization across numerous devices.
2. **Authentication:** To securely handle user login, utilise Firebase login. This feature ensures a reliable and secure login process for users by offering a variety of authentication options, such as phone number authentication, email/password, Google Sign-In, etc.
3. **Cloud Functions:** To handle server-side logic, implement Firebase Cloud Functions. These features enable efficient data processing and management by enabling the backend code to be executed in response to events brought about by user activities.
4. **Security Rules:** To specify who is able to access to the data and how it is structured, use Firebase Security Rules. These guidelines guard against unwanted access and alteration while ensuring data security.
5. **Notification:** Utilize Firebase Cloud Messaging (FCM) to notify users via push notifications. With the help of this function, customers can stay updated by receiving real-time notifications from the app regarding updates to rides, new deals, or other important details.

The establishment of database tables to hold necessary data is the first step in the back-end design process. Entities like Users, Ride List, On-going ride, User location, and Rider notification are included in these tables. The design establishes the proper data types, constraints, and table connections in order to maximize query efficiency and guarantee data integrity. User data, such as login credentials and personal information, is kept in the Users database. It offers the framework for controlling user accounts and access

management in addition to enabling user authentication. Ride List table store all the offer ride details. User location table hold the user’s current location for the map direction.

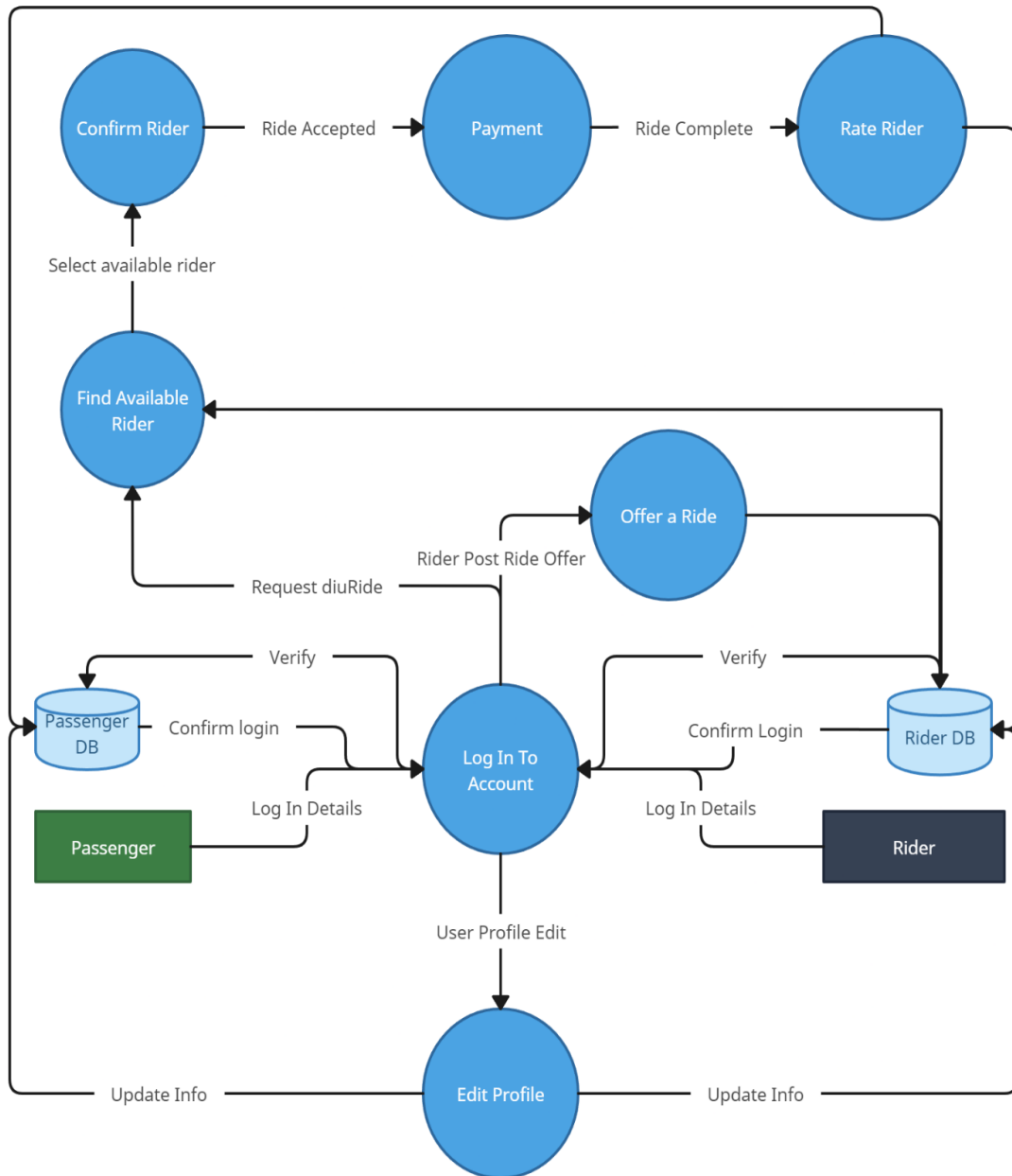


Figure 4.2: DFD Diagram for Back-end

4.3 Interaction Design and User Experience (UX)

Users are guided through every stage of the ride-sharing process by the interface design, which places an emphasis on simple and straightforward user processes. The design makes sure that the interface is simple to use and straightforward from the moment a user

logs in or signs up for the project to when they book or give a trip. Users may better understand the system's flow and their own progress by using visual cues like icons, labels, and progress indicators. By considering their preferences and behaviors, the UX design aims to satisfy the requirements and expectations of DIU students. Information clarity is given top priority in the design, which presents transportation options, trip details, timetable, and user's current position in an easily comprehensible and eye-catching way. A visually appealing and engaging interface is ensured by the important role that visual aesthetics play in UX design. To provide a visibly appealing experience that strengthens DIU's brand and improves the user experience overall, Typography, colour palettes, and visual hierarchy are given careful consideration. In order to improve the entire booking process, it gives shortcuts and minimizes the number of steps needed to complete activities. The user experience improves and annoyance is decreased by the efficient implementation of error management and validation, which give consumers concise. The DIUride's interface user experience seek to create a pleasant, user-centered experience using an iterative design process.

4.4 Implementation Requirements

a) Software Requirements

- Android Studio
- Android Virtual Devices (AVD)
- Firebase
- Figma

b) OS Requirements

- Windows Operating System

c) Language Requirements

- Java
- XML

d) Requirements for User

- Smartphone (Android Version 5.0+)
- Internet Connection

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

The DIUride's database is developed using Firebase, this is a cloud-based system that Google provides. Firebase offers a stable and flexible backend infrastructure, combining an immediate NoSQL database, for ease the preservation and retrieval data for the ride-sharing platform. The first step in implementing the database is to create a Firebase project and configure it as needed. This entails setting up authentication procedures, security rules, and a database instance within Firebase. The Firebase Realtime Database is utilized for the storage and administration of pertinent data in a ride-sharing platform. The database is prepared into “collections” and “documents” that serve as representations of entities and respective properties [4]. As an illustration, collections may consist of "Users," "RideList," "OnGoingRide," "UserLocation," and "RiderNotiList." Each collection contains documents that reflect specific instances of entities. As an example, a collection called "Users" may include of documents that store the login credentials, personal information, and booking history of each registered user. The "UserLocation" collection maintains user location data, which includes their user id, name, and other pertinent information. The NoSQL structure of Firebase Realtime Database enables adaptable and dynamic data modelling, facilitating adjustments and modifications as the system progresses [5]. It offers instantaneous synchronization, allowing instant updates across linked customers, guaranteeing a smooth and harmonized ride sharing experience for passenger. Firebase minimizes the need for manual scaling efforts by automatically managing the infrastructure and ensuring optimal performance as the system grows. A reliable and scalable solution is offered by the DIUride's use of Firebase as its database. In order to keep the effective storage and administration of data essential for the ride-sharing method, it includes solid security features, flexible data modelling, and real-time synchronization.

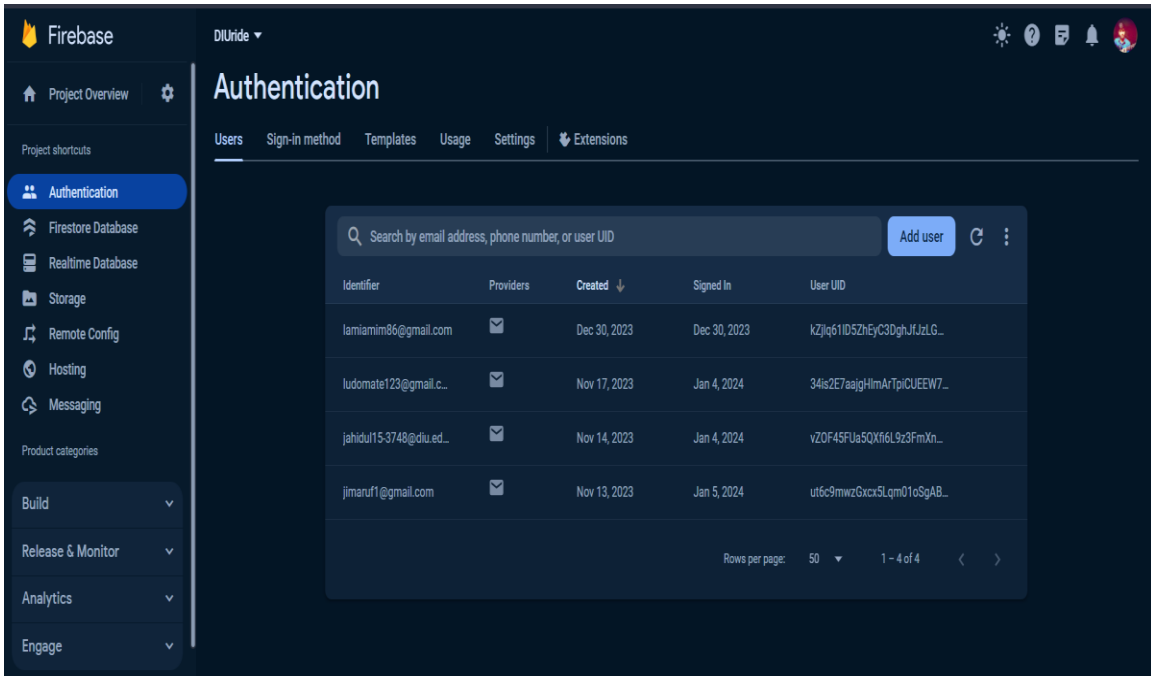


Figure 5.1.1: Firebase Authentication for DIUrIde

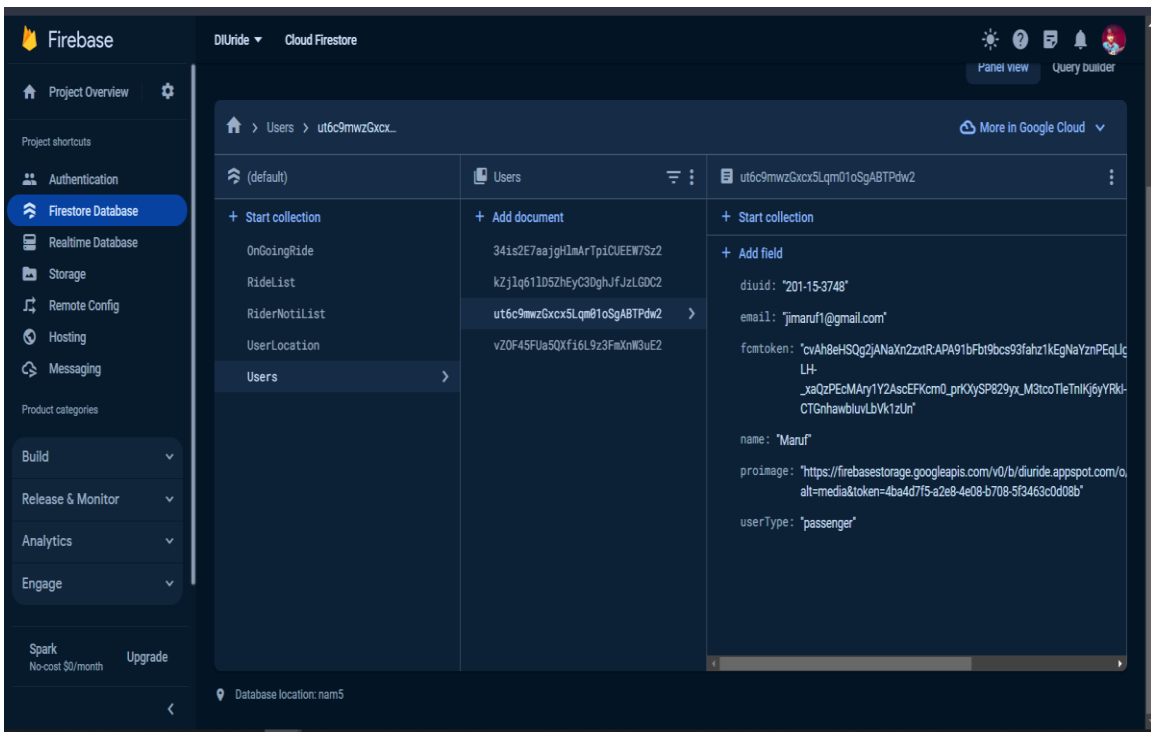


Figure 5.1.2: Firebase Database for DIUrIde

5.2 Implementation of Front-end Design

The primary objective of this project's front-end implementation is to provide a visually attractive and user-friendly interface by utilizing the XML language inside the android studio platform. XML in mobile app development offers several benefits for constructing user interfaces. The implementation starts by creating the landing page, which acts as the first window that attracts the user focus when the program initializes. The landing screen showcases the DIU identity and establishes the graphical atmosphere for the ride sharing experience. Subsequently, the execution proceeds to the login screen. Then the users have the opportunity to authenticate themselves using their credentials. The login screen is intentionally intended to prioritize simplicity and clarity, facilitating the effortless input of users' login credentials and subsequent sign-in. Users have the option to log in either as a rider or as a passenger. Once signed in, the application focuses on developing interfaces for the rider where they may offer a ride for the passenger. These screens include choosing the travel time, initial point, destination point, and cost. The graphical interface guarantees that these input forms are basic and user-friendly, leading passenger through the trip offer method quickly. In the passenger section they can book a ride. To provide the passenger with available transportation alternatives, The implementation entails providing a ride list interface that presents rides in a graphically organized manner. It highlights key elements including the rider's name and precise route information. The passenger can interact with this page by selecting a ride to book it. After successfully booking the passenger and the rider both may monitor the position of their rider/passenger in the On Going Ride screen. User can easily edit their given personal information through Edit Profile interface and also set a profile image. During implementation, consistent designing, typeface, and colour schemes are employed to produce a visually unified experience. Animation and transitions are employed to improve user engagement without compromising performance. The front-end solution for the DIUride focuses on developing a visually appealing, intuitive, and user-friendly interface employing the XML language. By implementing design principles, this implementation hopes to offer a seamless ride sharing experience for DIU students, delivering rapid navigation and a better user experience.

5.3 Testing Implementation

Table 5.3: Teste Case Table for DIUride

Test Case Description	Test Steps	Expected Result	Actual Result	Pass/Fail
User Registration	1. Enter registration details	User will get registered in the system. And direct to login screen	As expected,	Pass
	2. Then press the "Register" button			
User Login	1. Enter login credentials & user type	User is successfully logged in and sent to the home page	As expected	Pass
	2. Then press the "Login" button			
Offer a Ride (As Rider)	1. fill the ride details	Successfully Ride offer published	As expected,	Pass
	2. Click the "Offer Ride" button.			

Book a Ride (As Passenger)	1.Select “Ride List” button.	Ride booked Successfully	As expected,	Pass
	2. Choose desired ride from the available ride list.			
	3.After that confirm the ride.			
Cancel ride	1. Select “Cancel Ride” button then confirm it	On Going Ride Canceled Successfully	As expected,	Pass
Edit Profile	1.Click “Edit Profile” button	User Edited profile successfully.	As expected,	Pass
	2.After change information click “Save” button			
On Going Ride	1.Click “On Going Ride” button	User will redirect to the on going ride screen	As expected	Pass

5.4 Test Results and Reports

Test results and reports usually cover a variety of testing categories, such as usability testing, security testing, and functional testing, performance testing. Functional testing makes sure that every part of the DIUride performs as intended. It includes testing different scenarios, like user authentication, offer ride, ride booking, and cancel ride processing, to make sure they function as intended. The main goal of usability testing is to evaluate the system's interface and user experience. To find any usability problems or potential development areas, it entails performing user walkthroughs and obtaining input from actual users. Usability assessment assures the system is easy to use, spontaneous, and efficiently satisfies the demands of DIU students. Performance testing analyses the stability, scalability, and responsiveness of the system under various load conditions. It evaluates how well the system can manage several users at once and keep up its best performance. To make sure the system can manage the projected user demand, performance testing assists in the identification and elimination of any performance bottlenecks. The test reports and findings include thorough records of the test methods, problems found, and suggestions for enhancements. Among these are metrics for test coverage, pass rates, and performance benchmarks; also included are defect logs and summary reports. These reports support investors' understanding of the system's present condition, progress, and ability to make well-informed decisions about bug repairs and system advancements. Investors include developers, project managers, and quality assurance teams. Ensuring the DIUride's performance, dependability, and usefulness is largely dependent on the test reports and findings. They offer insightful analyses of the system's operation, point out areas in need of development, and help give DIU students with a premium, user-focused transportation option.

CHAPTER 6

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

6.1 Impact on Society

The DIUride is anticipated to have a substantial impact on the Daffodil International University community. Through transforming ride-sharing process and presenting a platform that is both convenient and user-friendly, it aims to initiate constructive changes that elevate the overall travelling experience and contribute positively to the wider social sphere. One of the primary societal impacts is streamlining transportation, leading to a reduction in time and effort expended. Through this smartphone application, students may save significant time and energy, allowing them to redirect these resources towards more industrious endeavors, such as academics, extracurricular activities, or personal growth. This efficient feature helps students balance their academic and personal lives more effectively while at DIU. Additionally, it cultivates a culture that values efficiency and punctuality, reducing the stress of uncertain travel plans and promoting better time organization practices. As a result, students acquire a greater sense of responsibility and punctuality, positively influencing various facets of their lives. DIUride's ride-sharing feature can significantly reduce fuel consumption, playing a crucial role in environmental sustainability. The implementation of this digital stage underscores the university's commitment to nurturing an environmentally aware campus and instilling supportable practices among to student body.

6.2 Impact on Environment

One of the key environmental benefits of this project is the lowering consumption of fuel. Car black smoke produces a large amount of carbon-dioxide, NO_x, SO_x, etc., increasing the global temperature and destroying the atmosphere, so black car smoke is very harmful to the environment [6]. Through this app, students will be able to share rides to reduce global warming caused by fossil fuels. This leads in a large reduction in fuel consumption, lowering the demand for natural resources and the energy necessary for fuel extraction. By lowering fuel consumption, the platform helps in conserving resources, mitigating environmental impacts linked to fuel extraction, and minimizing the carbon footprint associated with excessive fuel usage. By using DIUride two student

share the ride in the same direction. Students who travel by bike also have the same fuel consumption if someone else goes with them. So, sharing ride through our app can be a good option for the environment. This optimization effectively reduces fuel consumption and the associated greenhouse gas emissions, thereby contributing to a decrease in environmental pollution and promoting a more sustainable approach to campus transportation.

6.3 Ethical Aspects

One of the main ethical issues of the DIUride is the safety of user privacy and information security. Strict access limits and data encryption measures will be developed to preserve user information from unauthorised access or breaks. Any data gathering, sharing moves will be explained transparently to users, letting them make educated decisions and preserve control over their personal info. Regular assessments and evaluations will be done to assure compliance with ethical norms in the platform's operations. Inclusivity and Equality are important ethical features of the DIUride. The application will treat all user similarly, offering equivalent access to the consumer and independent of separate qualities or preferences. Acts of bias or prejudice based on factors such as religion, gender or other protected characteristics will not be permitted. In order to meet the varied needs of users, communication channels, user interfaces and support will be customised, guaranteeing inclusiveness and accessibility for all DIU students. The appropriate handling of user data is an ethical consideration. DIUride will solely gather and examine user information in order to improve system performance and enable ride-sharing services. Prior to any data collection or processing, users will be prompted for their consent in accordance with established protocols and regulatory mandates. We shall adhere to ethical data retention guidelines, keeping info just as long as it's required and safely terminating it when it's no longer required. Furthermore, moral guidelines for customer service and dispute resolution will be developed, providing a just framework for addressing consumer concerns or grievances pertaining to ride-sharing services. I'll offer polite, responsive customer support to help people overcome obstacles and have a great experience. Maintaining moral principles is essential to the creation and functioning of DIUride. Ensuring adherence to ethical norms via prioritising user

inclusivity, transparency, privacy, responsible information usage, and customer service fosters confidence and reliability among the DIU community. The integrity of the system is supported by these ethical issues, which also protect user rights and foster a reliable environment.

6.4 Sustainability Plan

DIUride contains sustainability plan and initiatives targeted at assuring the long-standing capability, ecological concern, and continuous success of the platform in Daffodil campus. The strategy covers major actions and observes that promote sustainability. One of the major mechanisms of the sustainability strategy is the continuous emphasis on a hassle-free ride sharing method. By removing strain on transport system and switching to a digital platform, the DIUride decreases gasoline use, and reduces the environmental effect related with fuel extraction. This dedication to a trouble-free riding platform will be supported by frequent campaigns, instructional initiatives, awareness and open lines of communication with university faculty, staff, and students. Energy-efficient technology will power the system's servers and infrastructure, and efforts will be taken to use as little energy as possible when operating and maintaining the system. The creation of environmentally friendly transport methods is another facet of the sustainability plan. The DIUride will work together with DIU's transport division to promote the use of cars and other environmentally friendly vehicles on campus. To reduce fuel consumption and emissions, this may mean researching alternative fuel options, encouraging the use of electric or hybrid vehicles, and implementing effective route planning. The sustainability strategy further stipulates that the system's operation and environmental effect must be regularly assessed and monitored.

CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 Discussion and Conclusion

The DIUride project emerges as a vital solution addressing the transportation challenges faced by Daffodil International University (DIU) students. By providing a specialized platform for ride-sharing, the project tackles the limitations of the existing transportation system within the campus. The implementation of DIUride aims to resolve the issues arising from limited accessibility to the varsity bus service. Students encountering difficulties due to missed bus schedules or infrequent visits to the campus find a practical alternative through this initiative. One of the pivotal aspects of DIUride lies in its encouragement of cost-efficient commuting practices. By facilitating shared rides, the project not only minimizes individual transportation expenses but also contributes to a more sustainable environment by reducing carbon emissions associated with individual commutes. Beyond the functional benefits, DIUride fosters a sense of community and collaboration among students. It serves as a platform for students to connect, engage in shared experiences, and build lasting relationships while commuting together. The DIUride project, centered on the principles of accessibility, convenience, and community, embodies the ethos of student-driven innovation. As we move forward, this initiative aims to continue enhancing the commuting experience for DIU students while striving for a greener and more connected campus environment.

7.2 Scope for Further Developments

1. Expansion of Services:

The DIUride project can explore the possibility of expanding its services beyond ride-sharing. This may include incorporating features for carpooling, or integrating with local transport services for enhanced accessibility.

2. Advanced Technological Integration:

Future developments could involve integrating advanced technologies such as AI-based route optimization, real-time traffic updates, or predictive analysis to enhance the user experience and optimize ride-sharing efficiency.

3. Enhanced User Interface and Features:

Continual improvement of the user interface (UI) and user experience (UX) remains essential. Introducing additional features like in-app messaging, emergency assistance options, or loyalty programs could further enhance the app's appeal and functionality.

4. Sustainability Initiatives:

Incorporating sustainability initiatives within the app, such as tracking and showcasing environmental impact metrics, promoting electric or eco-friendly transportation options, or integrating tree-planting initiatives based on shared rides, could align the project more closely with environmental objectives.

5. Community Engagement and Partnerships:

Exploring partnerships with local businesses, community organizations, or transport authorities could lead to synergistic collaborations, offering students added benefits or exclusive offers. Additionally, fostering a stronger community engagement aspect, perhaps through forums or events facilitated by the app, can further strengthen the app's user base and utility.

6. Data Analytics and Insights:

Leveraging data analytics to gather insights into user behavior, ride patterns, and preferences can provide valuable information for further app enhancements and strategic decision-making.

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DIUride: Enhancing Campus Transportation through Ride Sharing

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