# Design and Implementation of a Multi-Vendor Vehicle Rental Service

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Submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING SONARGAON UNIVERSITY (SU)

January 2023

### **APPROVAL**

The project titled "Design and Implementation of a Multi-Vendor Vehicle Rental Service" submitted by Abdullah All Mamum (CSE1703012072), Sumona Ferdous (CSE1902017003), Md. Jahidul Islam (CSE1902017024), Md. Rakibul Islam (CSE1902017043) and Jereen Jannat (CSE1902017053) to the Department of Computer Science and Engineering, Sonargaon University (SU), has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering and approved as to its style and contents.

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## **DECLARATION**

We, hereby, declare that the work presented in this report is the outcome of the investigation performed by us under the supervision of **Abu Said Md. Rezoun, Lecturer,** Department of Computer Science and Engineering, Sonargaon University, Dhaka, Bangladesh. We reaffirm that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

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#### **ABSTRACT**

This application presents a data management system for a transportation technology, sharing modern technology is also being used in rent-a-car and ride sharing services. In this project an app- based platform (Enjoy Trip) is developed and implemented for car renting and ride sharing. This application presents a data management system which enables the administrator to keep track of all the customers' information. This system increases customer retention and simplify vehicle and customers management in an efficient way. The car rental management system has a very user friendly interface. Through this platform users can rent any car for specific time easily. They can also pay the rent of car by Credit Card. Drivers and vehicle owner can also add their profile in this platform. By using this system admin can manage their rental, bookings, customer issues and vehicle issues etc. The transaction report of the car rental system can be retrieved by the administrator, when it is required. Thus car rental information can be captured very quickly and easily.

#### ACKNOWLEDGMENT

At the very beginning, we would like to express my deepest gratitude to the Almighty Allah for giving us the ability and the strength to finish the task successfully within the schedule time.

We are auspicious that we had the kind association as well as supervision of **Abu Said Md. Rezoun, Lecturer,** Department of Computer Science and Engineering, Sonargaon University, whose hearted and valuable support with best concern and direction acted as necessary recourse to carry out our project.

We would like to convey our special gratitude to **Prof. Dr Md Alamgir Hossain**, Dean, Faculty of Science and Engineering for his kind concern and precious suggestions.

We are also thankful to all our teachers during our whole education, for exposing us to the beauty of learning.

Finally, our deepest gratitude and love to my parents for their support, encouragement, and endless love.

## LIST OF ABBREVIATIONS

CPU Central Processing Unit

ER Entity Relationship

GPS Global Positioning System

HTML Hyper Text Markup Language

PC Personal Computer

RAM Random Access Memory

SDLC Software Development Life Cycle

UI User Interface

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# Chapter 1 Introduction to Ride sharing services

Ridesharing services such as Uber and Lyft have truly revolutionised passenger services around the globe, giving citizens a level of convenience and empowerment not experienced previously and eliminating many of the frustrations associated with other forms of transport, including public transport.

## 1.1 What is Ride Sharing?

Ride sharing literally means to share a ride. Whether you decide to share a ride with a family member, a friend or even a stranger, the principle remains the same: helping people who don't have their own vehicles get from point A to point B. Ridesharing in the modern context specifically refers to commercial ridesharing, otherwise known as peer-to-peer ridesharing. This refers specifically to the aforementioned services such as Uber, which rely on web applications and mobile technology.

## 1.2 History of Ride Sharing:

Ridesharing is not new. It began during World War II. In 1942, the U.S. government required ridesharing arrangements in workplaces when no other transportation options were available in order to save rubber during the war [1]. In the 1970s, the oil crisis and spike in gasoline prices encouraged another period of ride sharing. However, today's ridesharing revolution was made possible by the development of GPS, smart phone technology, and electronic payments. In the early 1990s, Kowshik et al. envisioned a future of ridesharing similar to what exists today that would use better matching techniques to provide dynamic ridesharing [2].

## 1.3 Ride Sharing Principle:

Ridesharing platforms connect drivers and vehicles with consumers who want rides at an agreed price. Typically, a customer uses an app on her smartphone to request a ride at a particular time and place. The app on the phone then walks the customer through a series of steps, including the actual or expected price of the ride, the location of the driver, and the likely wait time. It also allows the customer or the driver to contact each other without giving out personal information. These platforms take advantage of GPS to arrange for the ride and help determine a driver's best route. They also provide other benefits for riders and drivers, including measures of rider and driver quality to foster trust [3], and an efficient payment system, frequently using a credit card that is entered into the platform's data base. The platforms also can help balance demand and supply by adjusting prices in real time to accommodate shortfalls in the supply of drivers or surges in demand.

Ridesharing companies are able to implement "pay flexibility", a term that refers to a firm's ability to adjust labour costs, particularly wages, to changing market conditions [4].

## 1.4 Global top Ride Sharing Platform:

- Uber
- LYFT
- GoJek
- Career
- Ola
- Via
- BlaBla Car
- Bridj
- GoKid
- Hitch

## 1.5 Ride-sharing Service in Bangladesh

The concept of ride-sharing service is aged; however, the extension of this service gained much popularity recently in emerging economies like Bangladesh [5]. Besides, the concept of ride-sharing in Bangladesh differs significantly with that of many other developed countries like the USA and UK. While it refers to the concept to share a ride with other two or more passenger to reach the same destination in developed countries, in Bangladesh, the concept take a new dimension as to search a ride with the smartphone apps and internet connection by selecting the places of destination. Moreover, the infrastructure, road networks, and communication system of Dhaka are not fully matched with that of other cities of developed countries [6]. However, the current situation of transportation and communication system in Bangladesh is improving with the technological enhancement, and the transportation market is expanding with different forms of ride-sharing service [7]. The introduction of Uber has created massive popularity of ride-sharing service among the young generation as well as some middle-aged people in Bangladesh. The main reason behind this popularity is the demand for flexible movement of the busy people in Bangladesh. However, the previous studies regarding ride-sharing services discussed in the above sections focused mainly on different cities of developed countries rather than those of emerging economies. Thus, there is still a gap in the knowledge about the background, benefits, challenges, and prospect of ride-sharing service in emerging economies like Bangladesh, where ride-sharing service is evolving recently. A rigorous examination in this regard is essential for the people involved in this gig economy to know the present status and prospect of ride-sharing service in Bangladesh and develop their strategies accordingly.

## 1.6 Some Ride Sharing services in Bangladesh

- Uber
- Pathao
- OBHAI
- Pickme
- SAM
- Shohoz Ride

## 1.7 The Future of Ridesharing

Two features of the ridesharing revolution that could affect the future of ride sharing services. First, several interest groups are trying to raise the cost of ridesharing by imposing barriers to entry or trying to obtain greater benefits for driver partners. Second, it is likely that the technology of autonomous vehicles will dramatically affect ridesharing platforms. Notwithstanding the efforts of drivers to increase economic rewards, technology is propelling many firms to take a serious look at using autonomous vehicles with ridesharing. Some of the major ridesharing companies are running tests with such vehicles now. Indeed, driverless cars could largely displace conventional vehicles for ridesharing, and perhaps generally, within a decade or two. This, of course, could have a dramatic impact on ridesharing and consumer welfare. First, there are potentially significant consumer welfare gains from driverless cars used on a ridesharing platform because the price offered to consumers could drop. In addition, consumers may benefit from a decrease in congestion as autonomous vehicles displace conventional cars [8]. Second, the employment benefits that driver partners now enjoy may no longer exist. They may lose their jobs or part-time jobs. If there is a large displacement of employees with few alternatives, the losers from this new technology may need to be compensated or retrained. Third, while there will likely be an explosion in the use of this driverless technology for ridesharing as costs are reduced, the precise structure of the market is hard to know [9]. This technology revolution provides another reason for taking a dynamic view of these platforms in evaluating their economic efficiency and equity implications. The regulation of ridesharing will have a significant impact on the evolution of ridesharing platforms [10].

## 1.8 Technology Information:

To develop an online based ride sharing and rent-a-car services different technologies need to be used. Here are the list of technologies and their details which are used to develop this platform (Table 1.1).

**Table 1.1: Technology information** 

	Technology Information		
SL	Name	Details	
1	ReactJS	React is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta and a community of individual developers and companies.	
2	React Router	React Router is a standard library for routing in React. It enables the navigation among views of various components in a React Application, allows changing the browser URL, and keeps the UI in sync with the URL.	
3	TailwindCss & DaisyUi	daisyUI components. Use Tailwind CSS but write fewer class names. A free plugin for Tailwind CSS. Faster development. Cleaner HTML.	
4	TanStack Query	React Query is often described as the missing data-fetching library for React, but in more technical terms, it makes fetching, caching, synchronizing and updating server state in your React applications a breeze.	
5	Node.js	Node.js (Node) is an open source, cross-platform runtime environment for executing JavaScript code. Node is used extensively for server-side programming, making it possible for developers to use JavaScript for client-side and server-side code without needing to learn an additional language. Node is sometimes referred to as a programming language or software development framework, but neither is true; it is strictly a JavaScript runtime.	
6	Express js	Express.js, or simply Express, is a back end web application framework for building RESTful APIs with Node.js, released as free and open-source software under the MIT License. It is designed for building web applications and APIs. It has been called the de facto standard server framework for Node.js.	
7	MongoDB Atlas Database	With MongoDB Atlas, your database is a trusted foundation that enables you to work with data the way you want – easily and effortlessly.	
8	Vercel Server	Vercel is a cloud platform to deploy frontend applications. It's designed for the frontend experience; build Hybrid frontends with tools like Next. js, develop lightweight event-driven APIs, and deploy to our Global Edge Network.	

9		You can also of course host vanilla Javascript, HTML, and CSS projects. They also give you a free firebase domain that you can not alter. You can also use your domain. It is also only free up to a certain usage per day, but the cost is low after that.
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## 1.9 Objectives

The objective of this research is to design an initial proposal for the new car rental service based on utilizing the location-based service technology (LBS). During the study, value of LBS and the need of this new concept are discussed. The outcome is an outline of a new car rental service based on a wide online access and utilization of location-based services. This proposal is done from two perspectives, the customer perspective and the company perspective, and it also takes into account the need for suppliers for the new service. Therefore, this study also investigates the offers from the two suppliers to illustrate how the case company can build the new service and how to collaborate the practices in designing a platform for the new service.

- To design a ride sharing platform for Bangladesh market.
- To learn the practical use of programming language such as HTML, JavaScripts, ReactJs.
- To acquire practical knowledge on use of design software like Daisy UI, tailwindess, nodejs.
- To get practical knowledge on database like mongodb.

## **Chapter 2**

## **Working Procedure**

## 2.1 Working Procedure

Working is mainly the body of Working Procedure, rules, and a particular procedure or set of procedures for achieving proposed model's objectives. We use SDLC model to complete our project. This project work has completed by following some steps.

Diagrammatic representation of these steps of waterfall model is given below:

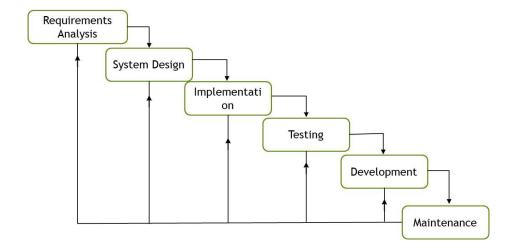


Figure 2.1: SDLC model

## 2.2 Justification of Procedure

Every software developed is different and requires a suitable SDLC approach to be followed based on the internal and external factors. The SDLC phases are as follows -

- Requirements are very well documented, clear and fixed.
- Product definition is stable.
- Technology is understood and is not dynamic.
- There are no ambiguous requirements.

- Ample resources with required expertise are available to support the product.
- The project is short.

## 2.3 Description of Procedure

A Description of Procedure is a type of diagram that represents a workflow or process. A Description of Procedure can also be defined as a diagrammatic representation of an algorithm, a step-by-step approach to solving a task. The Description of Methodology shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows.

#### 2.2.1 Requirement Analysis

Gathering and documenting data for moving forward. All your next phase decisions will be based on the data you've collected on this stage. You will consider client interviews and meetings for the development and customization of the project.

- User actions on the website. What all actions can a user perform on the website besides making a purchase.
- Seller Console & Admin Console.
- Inventory and Logistics Management and Order Fulfillment.
- User place order and payment.

#### 2.2.2 System Design and Development

The initial requirements that were derived in the planning phase drive the activities of the E-commerce design specialists. The E-commerce design specification is a comprehensive detailed design that meets current business and technical requirements and incorporates specifications to support availability, reliability, security, scalability, and performance. The design specification is the basis for the implementation activities.

#### 2.2.3 Implementation

With regards to our analysis and system design you will implement your code on this stage. You will apply all system logic and service integration to give your E-commerce its face.

#### **2.2.4 Testing**

All the programs for all possible defects, by running test cases either manually or by automation. The client is involved in the testing phase as well, to ensure all requirements are met.

#### 2.2.5 Maintenance

Installation and maintenance include making the appropriate modification to the product or system or enhancing, changing, or modifying attributes related to performance issues related to the system. Its main role is to improve the performance of the system with the maximum accuracy result of our blink apps output. These progressions raised during the support stage are significantly connected with changes started to be finished by the client or clients after the establishment and testing stage, which includes bugs like imperfections revealed during live employments of the framework or requests raised by the customers. So the customer is furnished with convenient upkeep and backing for the created item. You will really be amazed to know that the effort made in the design and development phase of the product is only 60% effort as compared to the efforts made in the maintenance phase.

Maintenance is the generally significant phase of a software life cycle. There are 3 types of maintenance:

- Corrective Maintenance: This sort of upkeep is done to address blunders that were not found during the item advancement stage.
- Perfection Maintenance: This kind of support is done to upgrade the functionalities of the framework in view of the client's solicitation.
- Adaptive Maintenance: Versatile upkeep is typically needed for porting the product to work in another climate like work on another PC stage or with another working framework.

## 2.4 Requirement Gathering Technique

Whether you are performing a system upgrade or re-platforming altogether, requirements gathering is crucial. Businesses need to establish a water-tight specification for the project with guidance around every feature. That's where Magpie comes in. We are specialist e-commerce consultants who can add invaluable insight to the planning process and make sure your project is a success.

## Chapter 3

## **Analysis of Requirements, Design and Implementation**

## 3.1 Analysis Requirements

Requirements Analysis is the analysis of defining the expectations of the users or client for an application that is to be built or modified. Requirements analysis involves all the acts that are conducted to identify the needs of the different stages of processing. Therefore requirements analysis is analyzed, documented, validate, system requirements and server requirements.

High-quality requirements are documented, actionable, measurable, testable, traceable, helps to identify business opportunities, and are defined to facilitate system design. For this reason, the system is easy to understand and also easy to modify or correct for future

- System requirements
- User requirements

#### 3.1.1 System Requirement

There are two types of requirements in this system requirements phase. Following is the two types of system requirements:

- Hardware requirements
- Software requirements

#### 3.1.2 Hardware Requirements

- CPU: for web 1,6 GHz, for web and database 4 x 1,6 GHz CPU.
- RAM: 4GB.
- Minimum database space: 10GB.

• CPU: Quad 2GHz+ CPU.

#### 3.1.3 Software Requirements

- ReactJS
- TailwindCss & DaisyUi
- TanStack Query
- Node.js
- React Router
- Stripe for Payment
- MongoDB Atlas Database
- Vercel Server
- Firebase Hosting

#### 3.1.4 User Requirement

- PC/Laptop/Mobile Device
- Must Have reachable to browser

## 3.2 Design and Implementation

Design and implementation parts have the same basic functions. The function is regarded as follows:

#### 3.2.1 Data Flow Diagram

A flowchart is a type of diagram that represents an algorithm, workflow, or process. The flowchart can also be defined as a diagrammatic representation of an algorithm (step by step approach to solving a task). The flowchart shows the steps as boxes of various kinds, and their order by connecting the boxes with arrows. This diagrammatic representation illustrates a solution model to a given problem. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

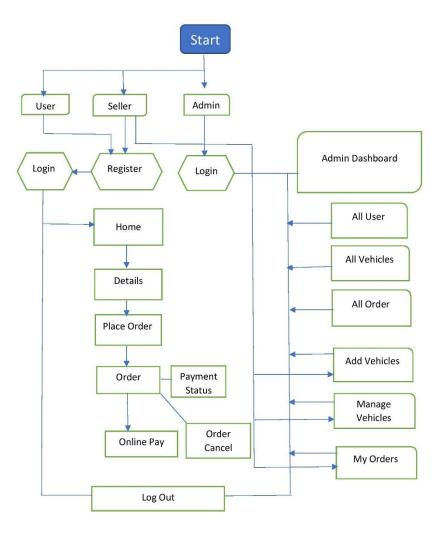


Figure 3.1: Data Flow Diagram

First, a login request needs to make with a username and password. If they are valid, the login will be successful. Here, the Customer will get his individual profile access. The reseller will get both users to create and individual profile access. The Admin will get the read/write and all the other access

#### 3.2.2 Use Case Diagram

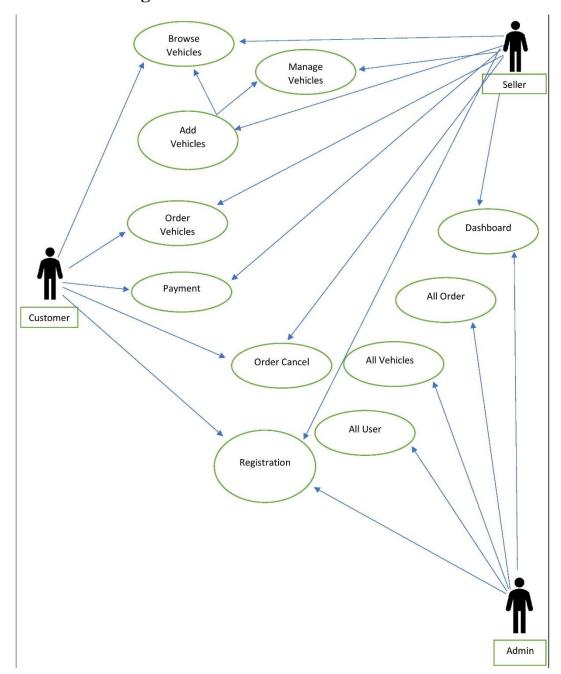


Figure 3.2: Use Case Diagram

**Register:** If a customer is a new user, request to register page. A register page opens and asks for total Information about the customer and also asks the customer to choose Iogin (email address) and password.

**Login:** The customer can login by entering their name and password. The system verifies is the name and password matches. If not matched, error messages show to the customer.

**Browse products:** The customer requests to view the product in the product category. The system will display information about the product of the selected category.

**Category Wise Search product:** The customers enter the search product parameters and request a search product. The system searches through products category in the database and gives information. If not matched, no products will shown.

**View Order:** The customer requested to view the shopping cart. The system returns the shopping order to the customer, the price, and the total price shown to the customer.

**Checkout:** The customer completes the shopping he requests to Payment. If the payment information exists the credit card information sends to Credit Verification Company. If credit card information does not match it shows enter valid information or cancel the order. If the credit card is valid, the order form will be processed by the system and checkout is complete.

**Verify credit card:** The credit verification company is validating credit card information. If the information is correct return it to a salesperson. If not, the customer will be asked to re-input his payment information.

**Update Vehicle info:** The sales clerk requests to update product info including price, brand.etc. and system updates in the database.

**Update Vehicle:** The sales clerk requested to update inventory. The system update's in the database.

#### 3.2.3 ER Diagram

Here is an ER diagram about the fashion E-Commerce database. An Entity Relationship Diagram (ERD) shows how entities (such as people, objects or concepts, etc.) relate to each other in a particular system. Generally, an ERD does not define business processes, but graphically displays business data patterns. In this case, the entity can be regarded as a noun and the relation can be considered as a verb.

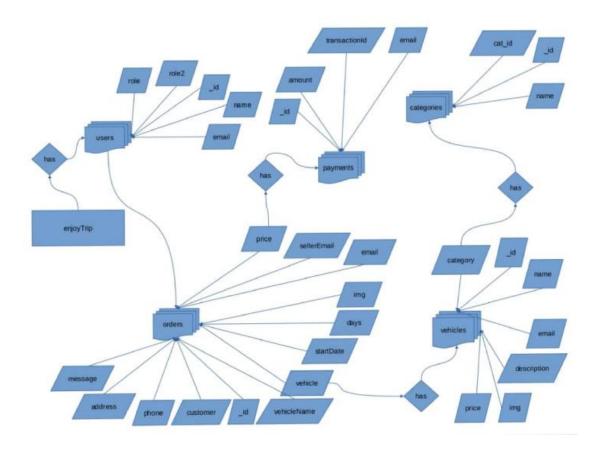


Figure 3.3: ER Diagram

# Chapter 4 Project Description

Here is our Project Screenshot Start. Here we will be able to see Vehicles, Passenger and order information.

#### 4.1 Admin Dashboard

This is our Admin Dashboard Page. Here we will be able to see all users, all vehicles and all order information of this platform. From this dashboard we can also add and manage vehicles. We can also see our order information.

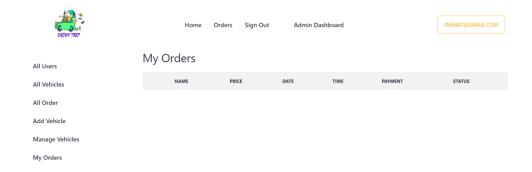


Figure 4.1: Dashboard Overview

#### 4.1.1 All user list:

Here we can see all user list of this platform

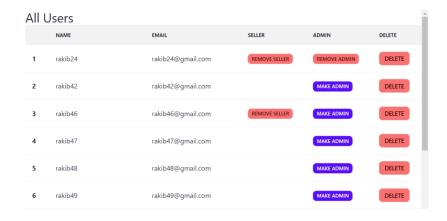


Figure 4.2: All user list

#### 4.1.2 All vehicle:

Here we can see all vehicle list of this platform

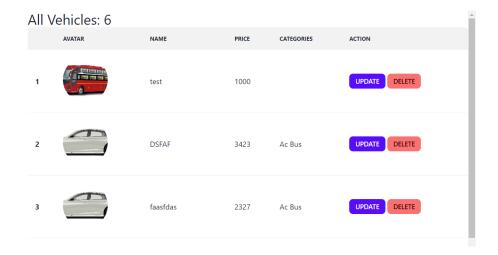


Figure 4.3: All vehicle list

#### 4.1.3 All order:

Here we can see all order information of this platform

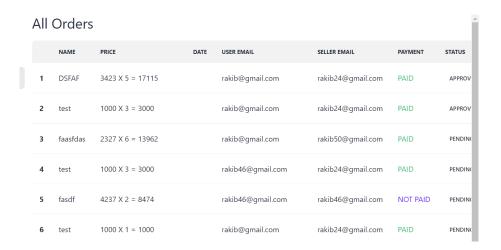


Figure 4.4: All order list

#### 4.1.4 Add a vehicle:

From this dashboard we can add any vehicle. Vehicles description, fare, photo etc. also be added.

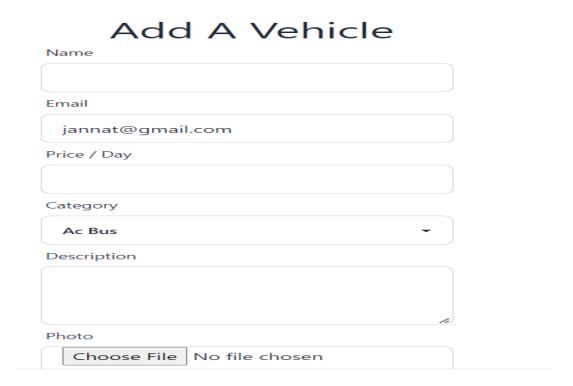


Figure 4.5: Add a vehicle

#### 4.1.5 Manage Vehicles:

From this we can manage vehicles like remove, change description etc.

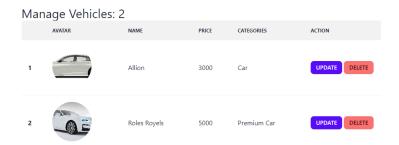


Figure 4.6: Manage Vehicles

## 4.2 Home Page

Here is the home page of this ride sharing platform. In home page at first two icon. "Home" and "Login" icon.

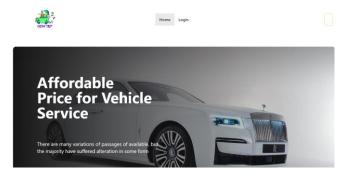


Figure 4.7: Home Page

In home icon if anybody go downward of the page he can learn about this platform

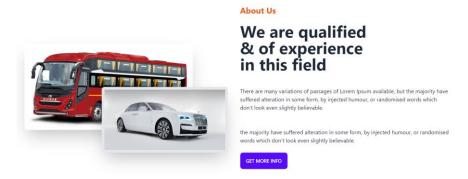


Figure 4.8: About this platform

From home page we can also see all types of vehicles of this platform. From here we can also place order of vehicles. If we click on "PLACE ORDER" system take him to the login page (Figure 4.10). If we already have Login ID than we can log into this platform by giving user id and password. If we have no user id than we can sign up by clicking "Sign Up" icon. We can also sign up through google platform.



Figure 4.9: Different types of vehicles

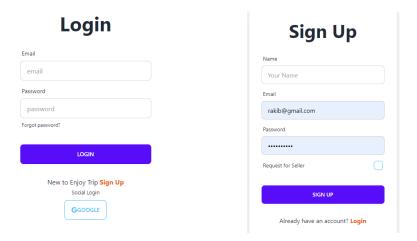


Figure 4.10: Login or Sign Up

#### 4.3 Place an order

To place an order for any vehicles at first we need to login the platform. Then click on "Place Order". After clicking on "Place Order", some information need to be given (Figure 4.11). Then "Place your order" icon need to be clicked. There will be a notification icon. Then press on "ok". The order will be placed and there will be a massage of order placed confirmation.

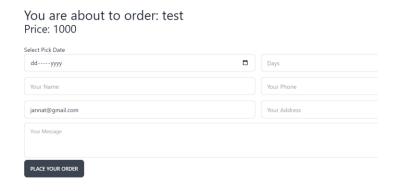


Figure 4.11: Information for place order

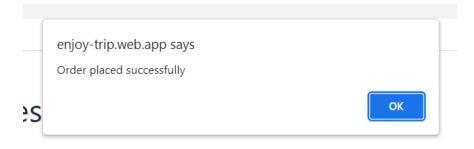


Figure 4.12: Order Notification

## 4.4 Confirmation of Order by Seller

After placing order by any customer/ passenger in seller need to go to the "Seller Dashboard" (Figure 4.13). Then he need to go to "My Orders" option. In my order orders will be as "PENDING" (Figure 4.14). If Seller want to approve the order than he need to click on "PENDING" than it will be as "APPROVED" (Figure 4.15).



Figure 4.13: Seller Dashboard



Figure 4.14: Pending order



Figure 4.15: Approved Order

## 4.5 Payment Gateway

Users can pay by payment gateway like visa card/master card in the payment section (Figure 4.16)

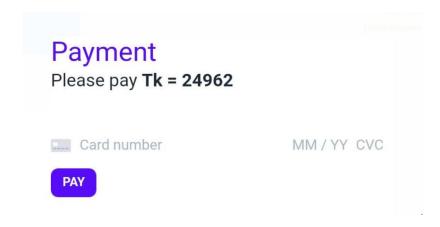


Figure 4.16: Payment gateway

## 4.6 Payment of Ride

After placing order for any vehicles there will be an option of payment (Figure 4.17). Payment option will also be as "NOT PAID". Through Card customer can pay. In time of payment card no., expiry date and CVC need to be entered. Then "PAY" icon need to be clicked (Figure 4.18). After payment refreshment need to be done and Payment option will be as "PAID" (Figure 4.19). In seller dashboard Payment option will also become "PAID" (Figure 4.20).

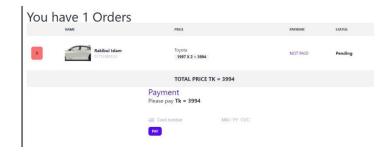


Figure 4.17: Before Payment



Figure 4.18: In time of Payment

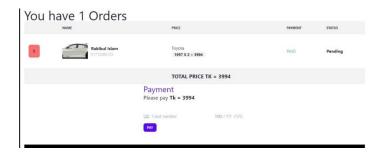


Figure 4.19: After Payment in customer order dashboard

#### My Orders



Figure 4.20: After Payment in seller dashboard

## 4.7 Confirmation Email

After placing order and completing payment process a confirmation email (Figure 4.21) would be sent to the user to make confirmed of the vehicle order.

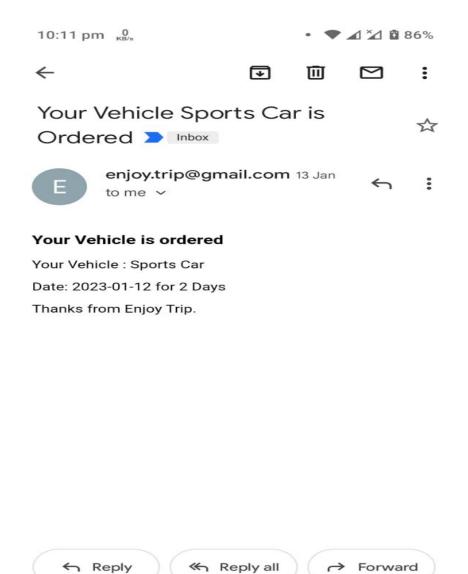


Figure 4.21 : Confirmation email

## Chapter 5

## **CONCLUSION AND FUTURE WORKS**

## 5.1 Limitations

- This platform need to be made more user friendly.
- Google users can not become admins and sellers.
- Users can pay using visa/master card only. Another payment gateway like bkash, Nagad can not be used in payment system.
- 'Forgot password' option doesn't work.

#### **5.2** Future Works

After overcoming all limitations of this platform one day this ride platform may use as a ride sharing platform for Bangladesh. Another this need to be added. This is our first project on ride sharing platform development throughout our bachelor life. From this projects we have learned so many things about different platform like ReactJS, TailwindCss & DaisyUi, TanStack Query, Node.js, Stripe for Payment, MongoDB Atlas Database, Vercel Server and Firebase Hosting etc. These knowledge will help us throughout our carrier. In near future, we are planning to hire cars daily basis. So that client can give their car to the customer on daily basis.

We are planning to add a new feature i.e. pay after the trip.We are working to increase automation in the system to increase user experience greatly. One day we will be able to develop more sophisticated platform.

## 5.3 Conclusion

In this project, we addressed the topic of ride sharing Platform. This knowledge is about new technology in the IT sector. This web system helps to find out the best vehicles for rent. It helps to select an appropriate vehicles for rent. Though this platform anybody can rent his preferred vehicles for specific time period. Vehicles owner and driver can also let out there car for specific time. It will be secured platform for rent-a car service.

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