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An Undergraduate Internship on One Stop vehicle aftersales solution for Detailing, Mechanics and Spare parts

Alif, Ashraful Islam

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An Undergraduate Internship on One Stop vehicle aftersales solution for Detailing, Mechanics and Spare parts

By

Ashraful Islam Alif

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Autumn, 2022

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January 19, 2023

Dissertation submitted in partial fulfillment for the Degree of Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

I, Ashraful Islam Alif, officially attest that no work in this report has been plagiarized from any sources. Any resources which are consulted are referenced in the report's reference section. And, no assistance from a third-party organization was requested during the report's completion, except for the one for which I interned for i.e. MASTODON LIMITED for the last three months. For further information, please contact Faridul Hasan Shuvo, Chief Executive Officer, the internship supervisor at my organization, at 01710684938.

Sincerely,



30/01/23

Signature

Date

Ashraful Islam Alif

Name

Acknowledgement

First of all, I would like to express my gratitude to Almighty Allah, for bestowing me with the determination, patience, and ability to perform hard and for providing me with the opportunity to complete my internship at Mastodon Limited. In addition, I would like to thank my respected mother for her unconditional love and support and my late father who is watching me from above. Secondly, I would like to express my gratitude to Md. Asif Bin Khaled, Internship Supervisor Lecturer, Independent University, Bangladesh, for his guidance, patience, time, and thoughtful advice regarding various aspects of my internship and the preparation of this report. It has been an incredible experience working as an intern at Mastodon Limited. I would like to show my thanks to the firm for providing me the opportunity to work with them and for which I came to know organizational systems and affairs. Moreover, I would like to thank my external supervisor, Mr. Faridul Hasan Shuvo, for accepting me as an intern for Mastodon Limited and integrating me into the organization. Finally, I would like to express my heartfelt appreciation to Independent University, Bangladesh for offering a student internship program that truly shapes and prepares us for the corporate world.

Ashraful Islam Alif
1822163
19th January 2023
Dhaka, Bangladesh

Letter of Transmittal

19 January 2022
Md. Asif Bin Khaled
Internship Supervisor Lecturer
Department of Computer Science and Engineering
Independent University, Bangladesh

Subject: After Car Sell Service Management System, a product for Mastodon Limited.

Dear Sir,
I am truly grateful for the chance to submit an internship report to you on the ' Mastodon Service- After Car Sell Service Management System,' a web application developed for Mastodon limited. This report is based on my three-month internship at the organization and the project I worked on. This report is based on my experiences and the work I completed during my internship at Mastodon Limited. Throughout my internship with the organization, I discovered that I acquired and used a variety of new skills and techniques. I will be delighted if the report I have written serves its intended purpose. I am indebted to you for your time, knowledge, direction, and support. I have attempted to complete the report as accurately as feasible. I genuinely hope and pray that you will accept the report.
Thank you for your cooperation and assistance throughout the semester

Yours sincerely,
Ashraful Islam Alif
ID: 1822163

Evaluation Committee

Asif Bin Khaled

Signature

Asif Bin Khaled 20.01.23

Name

Supervisor

Signature

Mahmudul Islam

Name

Internal Examiner

20-01-2023

Signature

Md. Mahmudul Kabir Payal

Name

External Examiner

Signature

Name

Convener

Abstract

This web development project aims to create an online platform for a car service company. The website will allow customers to book appointments, view available services, buy all kinds of parts and make payments. It will also include a backend system for the company to manage appointments, update service offerings, and track customer information. The project will use HTML, CSS, and React for the front-end and Node and MongoDB for the back-end. The website will also feature a responsive design, allowing customers to access the site on any device. Overall, this project aims to improve the customer experience and streamline the car service booking process.

Contents

Attestation i

Acknowledgement i

Letter of Transmittal ii

Evaluation Committee i

Abstract i

1 Introduction 1

1.1 Overview of work 1

1.2 Objective 1

1.3 Scopes 2

2 Literature Review 3

2.1 Relationship with Undergraduate Studies 3

2.2 Related works 3

3 Project Management & Financing 5

3.1 Work Breakdown Structure 5

3.2 Process/Activity wise Time Distribution 6

3.3 Gantt Chart 6

3.4 Process-wise Resource Allocation 6

3.5 Estimated Costing 7

4 Methodology 8

5 Body of the Project 10

5.1 Work Description 10

5.2 Requirement Analysis 11

5.3 System Analysis 12

5.3.1 Six Element Analysis 12

5.3.2 Feasibility Analysis 12
5.3.3 Effect and Constraints Analysis 13
5.4 System Design 14
5.5 Implementation 16
5.6 Testing 16

6 Results & Analysis **23**

7 Project as Engineering Problem Analysis **24**
7.1 Sustainability of the Project 24
7.2 Social and Environmental Effects and Analysis 25
7.3 Addressing Ethics and Ethical Issues 25

8 Lesson Learned **27**
8.1 Problems Faced During this Period 27
8.2 Solution of those Problems 27

9 Future Work & Conclusion **28**
9.1 Future Works 28
9.2 Conclusion 28

Bibliography **28**

List of Figures

3.1 Activity Wise Time Distribution 5
3.2 Gantt Chart 6

4.1 Agile Methodology 8

5.1 Rich Picture 11
5.2 Activity Diagram for Customer 14
5.3 Use Case Diagram 15
5.4 Login Page 16
5.5 Register Page 17
5.6 Home Page 17
5.7 Responsiveness 18
5.8 AboutUs Page 18
5.9 Blogs Page 19
5.10 Car Wash Booking Page 19
5.11 Spare Parts Order Page 19
5.12 Car Service Booking Page 20
5.13 Packages Page 20
5.14 Contact Us Page 20
5.15 Dsahboard Detailing Order Page 21
5.16 Dsahboard Mechanics Order Page 21
5.17 Dsahboard Spare Parts Order Page 21
5.18 Dsahboard All user page 22
5.19 Backend Database 22

List of Tables

3.1 Activity Wise Time Distribution 6
3.2 Activity Wise Time Distribution 7

5.1 Six Elements Analysis 12

Chapter 1

Introduction

1.1 Overview of work

Mastodon Limited is a one-stop vehicle after-sales solution for detailing, maintenance paperwork. They provide Home/ Pick Drop service. The company has since added multiple utilities to its services, such as; car wash, car repair, car buy sell, and a dedicated marketplace for authentic car parts and utilities. With a mission of recreating the Auto Detailing Industry in Bangladesh and making car maintenance easier than anything they are operating in the Bangladeshi market since 2015, or 2019 commercially. Now the company wants to extend its wings and will be opening its Spare parts, mechanics, and Buy car sections where customers can buy a car and get services from its website, and also customers can buy authentic parts.
Visiting the Mastodon Limited website customers will get the Spare parts and Buy a Car button on the Navbar and banner of the Homepage. After clicking on the Buy a Car button customers can choose their preferable brands and model of cars with that, a customer can buy their dream car from the Mastodon Limited website. Clicking the Spare parts button user can choose their preferable brands and model and give the required information, a customer can buy their car parts easily without any hassle. After confirming the order, customers will pay for their order on the payment section page. There will be a user dashboard section for clients and admins. In the customer dashboard section, the client can see their all-order list. And in the admin dashboard, all users can be seen who are logged in, there will button a Make admin button, where the admin can make a user admin, and there will be a delete button where the admin can delete a user. Admin can also see all order lists with paid and unpaid.

1.2 Objective

- Allow customers to buy car parts online.

- Allow customers to get car services by booking online.
- Provide customers top quality service.
- Provide customer support to answer all queries.

1.3 Scopes

- Login Page – Registered users will use this page to log into their accounts.
- Registration Page – New users will use this page to register their accounts.
- Forget Password Page – Users will be redirected to this page to enter their email if they forget their password and wish to change their password.
- Change Password Page – This page will allow users to change their password if they forget their old password.
- Detailing – Clients will visit this page to get car wash services.
- Mechanics – Clients will visit this page to get all kinds of car services.
- Spare Parts – Clients will visit this page to buy Spare Parts for their car.
- Contact Us Page – Clients will be able to contact the support team through the website.
- About Us Page – Clients will be able to see the information about the company's mission and vision.
- Dashboard – There will be a Dashboard for two different types of users – Client and Admin.
- Payment – Clients can pay for their booking services.

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

Mastodon Limited is developed with HTML, CSS, JavaScript, React, and NodeJs. The topics covered in CSC 455 i.e. Web Application Internet course is directly related to the application's both front-end and back-end. The Web Application Internet course was project-based, and many web-based projects were completed as a part of it. The topics covered in that course were very helpful in this project. CSE203 i.e. Data Structure helped me to build the basics of coding. and CSE211 i.e. Algorithms helped me to logic and code efficiently.

2.2 Related works

There are several existing websites that offer car service booking, such as CarService.com and AutoRepairBooking.com. These websites allow customers to view available services and make appointments, but they do not offer the ability to make payments online. In contrast, our proposed website will include an online payment system, making the booking process more convenient for customers. Additionally, while CarService.com and AutoRepairBooking.com offer basic appointment management tools for the company, our proposed website will have a more advanced backend system, allowing the company to track customer information and sales more effectively. Overall, our project aims to combine the convenience of online booking with the advanced management tools that car service companies need to run their business.

Our proposed website will feature a user-friendly interface that is easy to navigate and will be designed with a mobile-first approach to ensure that it is responsive and accessible on any device. Additionally, our proposed website will offer a personalized user experience by using machine learning algorithms to make recommendations and offer personalized services.

Overall, we believe that our technical differences will provide a better and more secure experience for the customers and a more efficient management tool for the car service company.

Chapter 3

Project Management & Financing

3.1 Work Breakdown Structure

Work breakdown structure (WBS) is a method for completing a complex, multi-step project. It is a method of dividing and conquering large projects in order to complete them more quickly and efficiently. A work breakdown structure (WBS) is intended to make a large project more manageable. Breaking it down into smaller chunks allows different team members to work on it simultaneously, resulting in higher team productivity and easier project management.

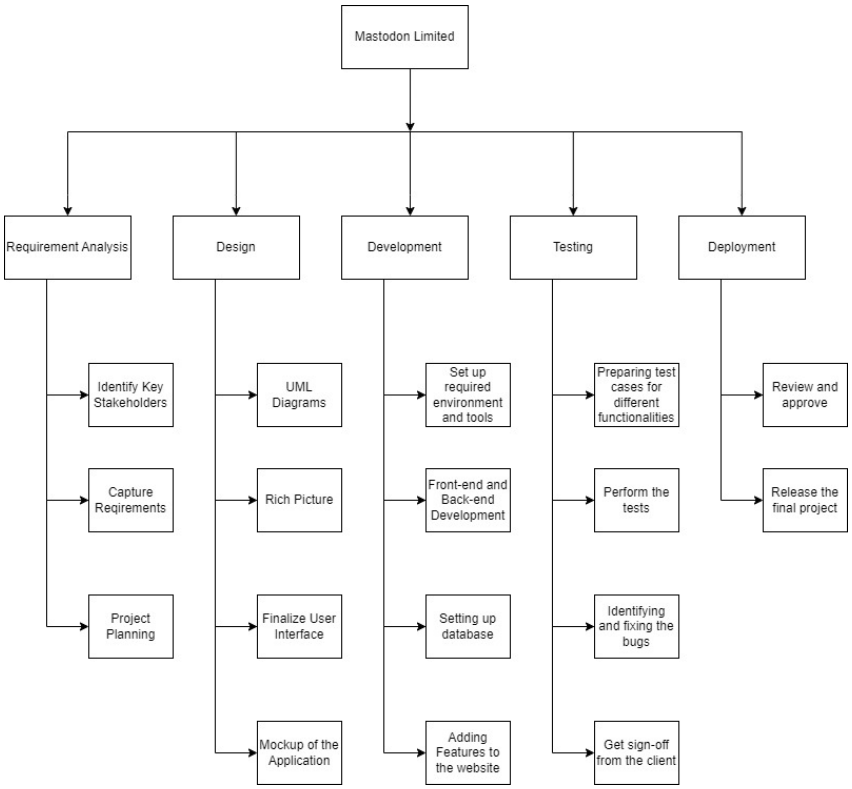


Figure 3.1: Activity Wise Time Distribution

3.2 Process/Activity wise Time Distribution

The time allocation for the three months project is as shown in the table. Any activity can be performed simultaneously with another activity or after the earlier one is completed.

Activity	Days	Percentage of work
Requirement Analysis	14	13
Design	14	13
Development	60	52
Testing	12	10
Deployment	15	12
Total	115	100

Table 3.1: Activity Wise Time Distribution

3.3 Gantt Chart

A Gantt chart is one of the most popular and useful methods of displaying activities (tasks or events) against time. A list of the activities is shown on the left side of the chart, and a time scale is shown along the top. Each activity is represented by a bar, with the position and length of the bar reflecting the activity's start, duration, and end dates.

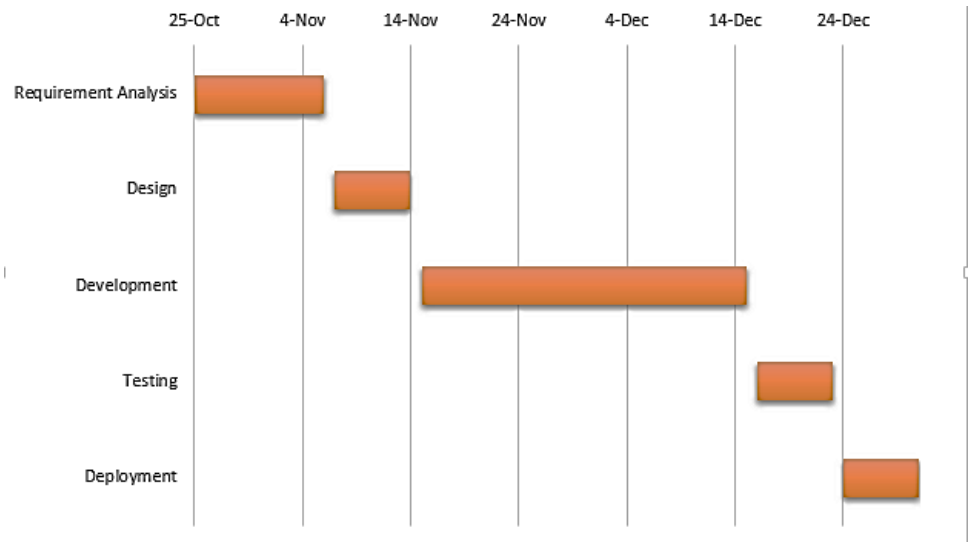


Figure 3.2: Gantt Chart

3.4 Process-wise Resource Allocation

1. Planning and Requirements Gathering: This stage will involve gathering requirements from the client, creating a project plan, and identifying the necessary resources. A project manager will lead this stage, and will work with a team of business analysts and developers to gather requirements and create a project plan.

2. Design and Development: This stage will involve creating the website's design and developing the front-end and back-end of the website. A team of front-end developers and back-end developers will work on this stage, and will use HTML, CSS, JavaScript, PHP, and MySQL to create the website. A lead developer will oversee this stage and will ensure that the development is in line with the project plan and requirements. A user can book their favorable service with all the correct information.

3. Testing and Quality Assurance: This stage will involve testing the website to ensure that it is free of bugs and meets the requirements. A team of testers and quality assurance engineers will work on this stage, and will use automated and manual testing methods to ensure that the website is of high quality.

4. Deployment and Maintenance: This stage will involve deploying the website to a live server, and providing ongoing maintenance and support for the website. A team of administrators and developers will work on this stage and will ensure that the website is running smoothly, and that any issues are resolved quickly.

3.5 Estimated Costing

The cost is an estimate based on the company's requirements for the web application system.

Requirements	**Costing(in taka)**
Salary	5000
Domain and Hosting	3000
Database	2000
Total	10,000

Table 3.2: Activity Wise Time Distribution

Chapter 4

Methodology

Agile methodology is used for this project because it allows for rapid development and frequent delivery of working software. It also allows for changes and modifications to be made quickly and easily, which is important for car service web development project that need to adapt to customer's needs.[1]



Figure 4.1: Agile Methodology

1. Form a cross-functional team: Assemble a team of developers, designers, and business analysts who will work together to deliver the project.

2. Create an initial backlog: Identify the initial set of requirements and create a backlog of user stories that the team will work on.

3. Prioritize the backlog: Prioritize the backlog of user stories based on the business value they provide and the dependencies between them.

4. Plan and conduct sprints: Use the prioritized backlog to plan and conduct sprints, which are typically 2-4 weeks in duration. During each sprint, the team will work on the highest priority user stories and deliver a potentially releasable product increment.

5. Hold daily stand-up meetings: Hold daily stand-up meetings to keep the team informed of progress and to identify and resolve any issues that may arise.

6. Hold sprint reviews and retrospectives: Hold sprint reviews and retrospectives to review the work completed during the sprint, to gather feedback from stakeholders, and to identify areas for improvement.

7. Adapt and adjust: Continuously adapt and adjust the process and product based on the feedback gathered during sprint reviews and retrospectives.

8. Use agile tools: Jira is used to manage the backlog, keep track of progress, and communicate with the team.

Chapter 5

Body of the Project

5.1 Work Description

At first, I was responsible for the full stack development. Since the application was developed in Visual Studio, the front end was created using HTML, and CSS, and the backend was written in MongoDB. MongoDB was utilized to store the data for the entire project. All tasks were performed within a certain time frame, and after a task or portion of the project was completed, we were required to explain our work to the project's supervisor.

5.2 Requirement Analysis

Rich Picture

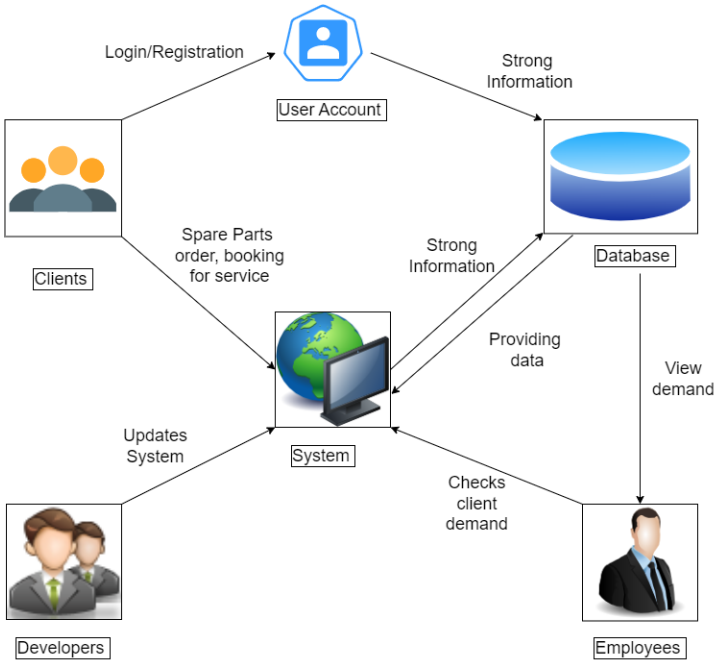


Figure 5.1: Rich Picture

Functional and Non-Functional Requirements

Functional Requirements:

1. User Login and Register: A user can register their account with all the required information.
2. Car Service Booking: A user can book their favorable service with all the correct information.
3. Spare Parts Order: A user can order parts with all the correct information.
4. Search and book a car: By searching from the website user can see detail and order for parts and book services.
5. Payment system integration: After giving order user can pay for confirming the order.
6. Contact support team: If the user is facing any difficulties or there is any complaint, then they can contact the support team.
7. Give review: The user can give a review of their experience.

Non-Functional Requirements:

1. Performance: The load time of the pages of the application will be less than 3 seconds if the users are accessing using a bandwidth of a minimum of 400 Kbps.

2. Security: User login credentials information will be secured using TLS (Transport Layer Security).

3. Availability: The system will be online 24/7.

4. Reliability: If any systematic problem arises, it will be removed by the developer team immediately.

5.3 System Analysis

5.3.1 Six Element Analysis

Requirements	Human	Computing Hardware)	Software	Database	Communication on Network)
Registration	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet
Login	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet
Car Service Booking	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet
Spare Parts Order	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet
Contact	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet
About Us	Client	Phone, Laptop	Website	N/A	Internet
Blogs	Client	Phone, Laptop	Website	MongoDB	Internet
Dashboard	Client, Employee, Admin	Phone, Laptop	Website	MongoDB	Internet

Table 5.1: Six Elements Analysis

5.3.2 Feasibility Analysis

A feasibility Study is considered a preliminary investigation that helps management to make decisions about whether the study of a system should be feasible for development or not. It identifies the possibility of developing a new system as well as improving an existing system and also produces refined estimates for further development of the system. It is used to obtain the outline of the problem and decide whether a feasible or appropriate solution exists or not.[2]

- **Technical Feasibility**
  This involves evaluating whether the project can be completed with the available technology, resources and expertise. This includes assessing the compatibility of the proposed technology with existing systems, the availability of required skills and resources, and the potential costs of any necessary upgrades or new software.

- **Operational Feasibility**
  This involves determining whether the project can be integrated into existing business operations, and whether it is practical to implement. This includes assessing the impact on current operations, as well as identifying any potential challenges or constraints.

- **Economic Feasibility**
  Economic Feasibility is concerned with the economic impact that a new system will have on the organization if it is implemented. The financial gains must be equal to or greater than the expenses. It is necessary to estimate the cost of implementing a complete system, which includes software and hardware costs, for the type of application under consideration. By examining the total application system, we discovered that it is feasible to undertake a comprehensive system analysis at a reasonable cost. There is no need for more labor in this situation. The suggested system has no additional costs associated with its upkeep and maintenance.

5.3.3 Effect and Constraints Analysis

A constraint is a limitation on a company's ability to provide a solution with as much flexibility as possible. Constraints are basically global needs, such as restricted development resources or a decision by top management that limits the development team's ability to construct a system. Economic, political, technological, and environmental constraints can affect project resources, schedules, target environments, and the system itself. The followings are some of the limitations and their effects:

Constraint 1: Time

Effect: Initially, it appeared the project might be completed within two and a half months. But due to a sudden shortage of developers, the project's given time was expanded due to extra work.

Constraint 2: Budget

Effect: No effect.

Constraint 3: Database

Effect: At the start of the project, it was decided that the data would be kept in the MongoDB database.

5.4 System Design

UML Diagrams

Activity Diagram

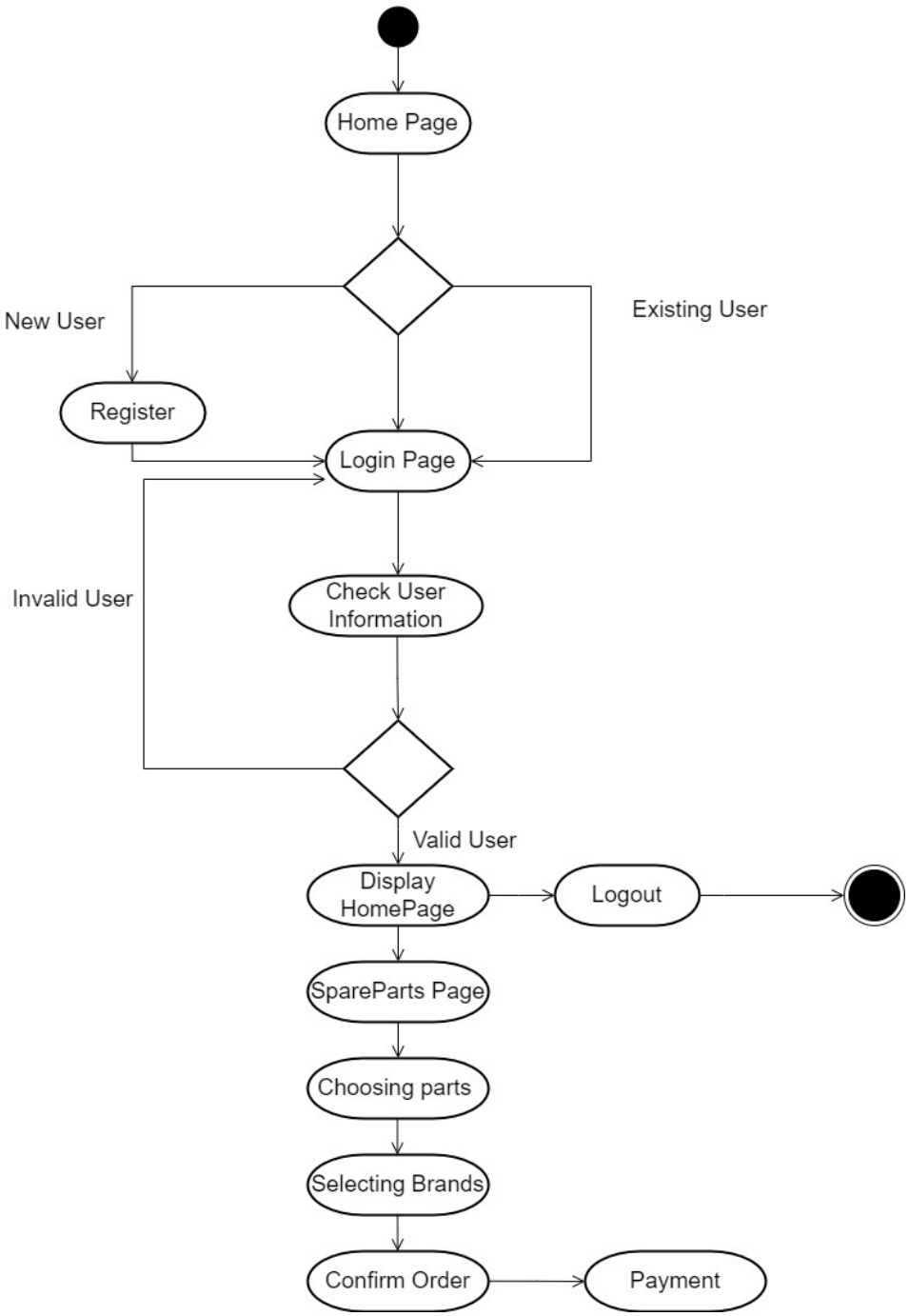


Figure 5.2: Activity Diagram for Customer

Use Case Diagram

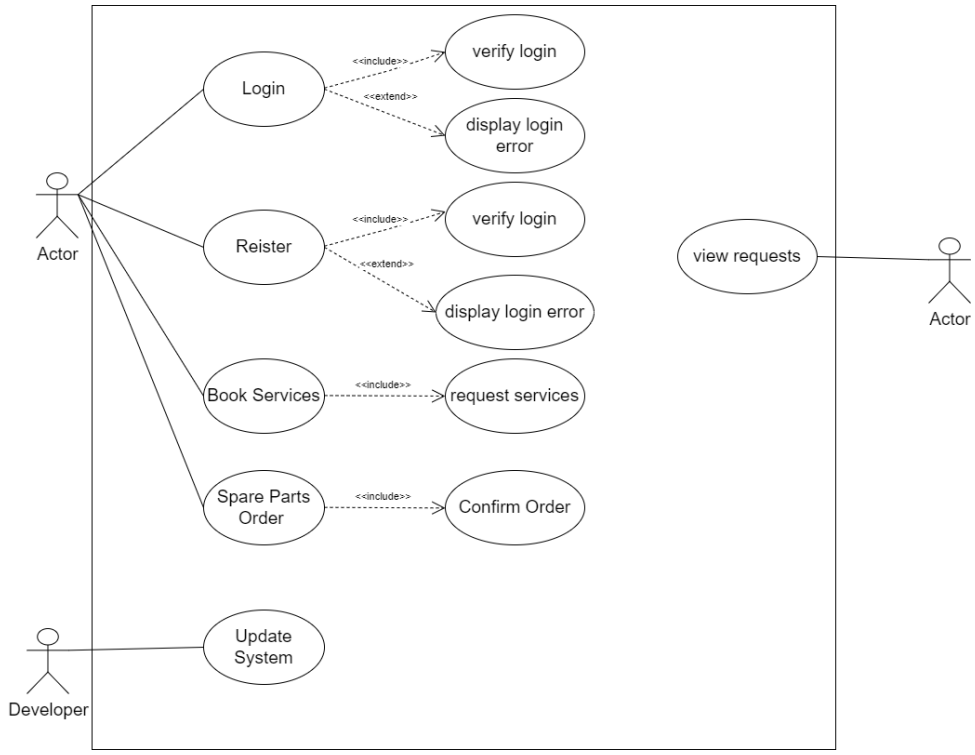


Figure 5.3: Use Case Diagram

Architecture

The architecture of this project refers to the overall design and structure of the system, including the technologies, components, and interactions between them. A typical architecture for this project might include the following components:

Front-end: This is the user-facing part of the system that interacts with the users through the web or mobile application. It is typically built using technologies such as HTML, CSS, and React.

Back-end: This is the behind-the-scenes part of the system that handles the logic and data processing. It is built using Node.js.

Database: This component is used to store and retrieve data for the system. It can be a non-relational database which is MongoDB.

API: The application programming interface (API) allows the front-end and back-end components to communicate with each other, passing data back and forth. This can be done using REST.

Security: This component is used to protect the system and its data from unauthorized access. This can be done by implementing security protocols such as HTTPS, and using firewalls and intrusion detection systems.

DevOps: This component is used to automate the deployment, scaling, monitoring and

maintaining the system. This can be done by implementing DevOps practices such as continuous integration and continuous deployment (CI/CD).

5.5 Implementation

After the design stage, this is the core phase where the system was being constructed as a working one according to the design planning and the client's requirements. The system has been developed by using the adequate tools and techniques. During the implementation stage the system was designed as a unit by unit and at the end of this stage, all the unit modules were integrated as a complete working system. While coding the system, using appropriate, meaningful comments with the codes is a good habit. The comments can be used for rework or future implementation of the system.

5.6 Testing

Input

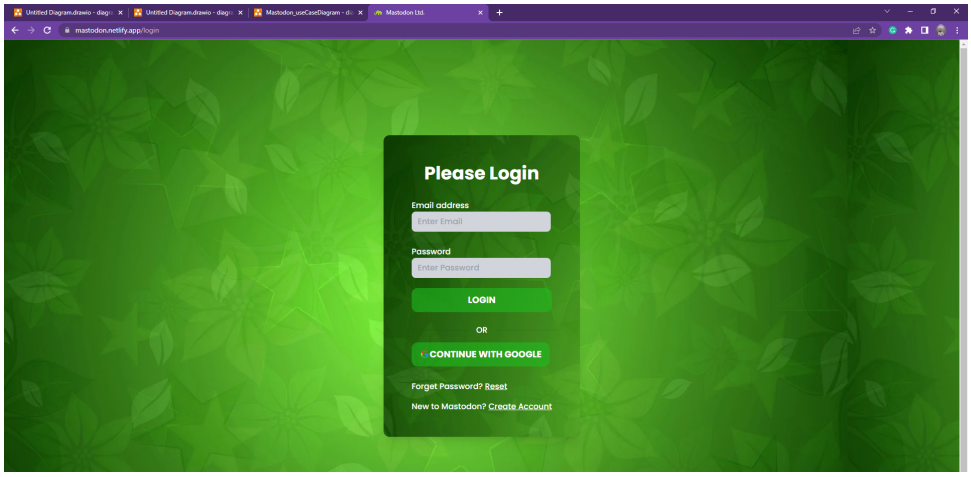


Figure 5.4: Login Page

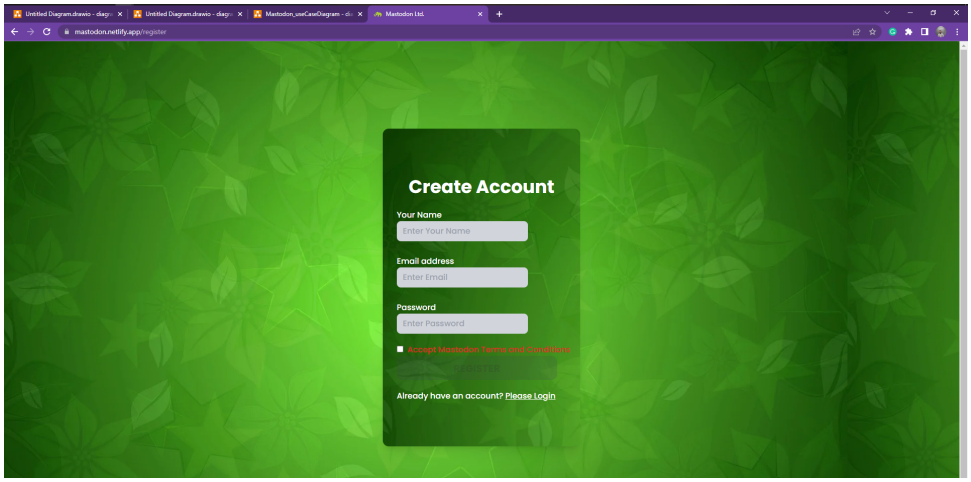


Figure 5.5: Register Page

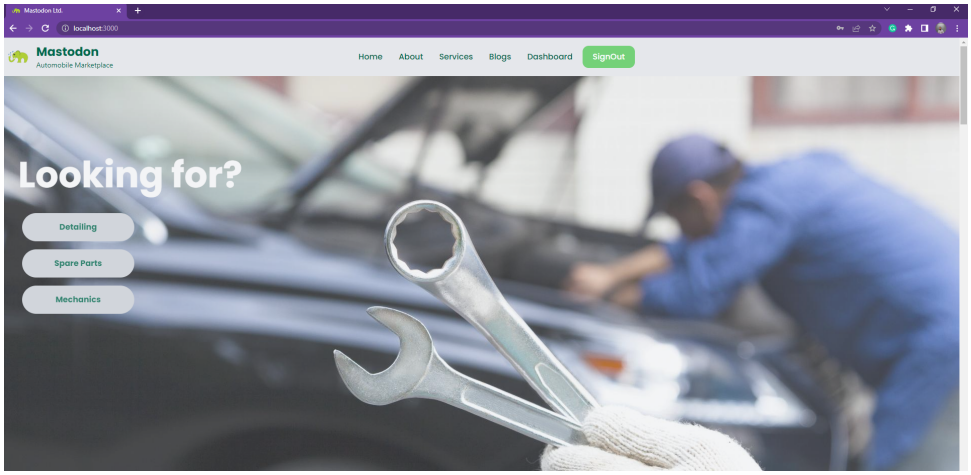


Figure 5.6: Home Page

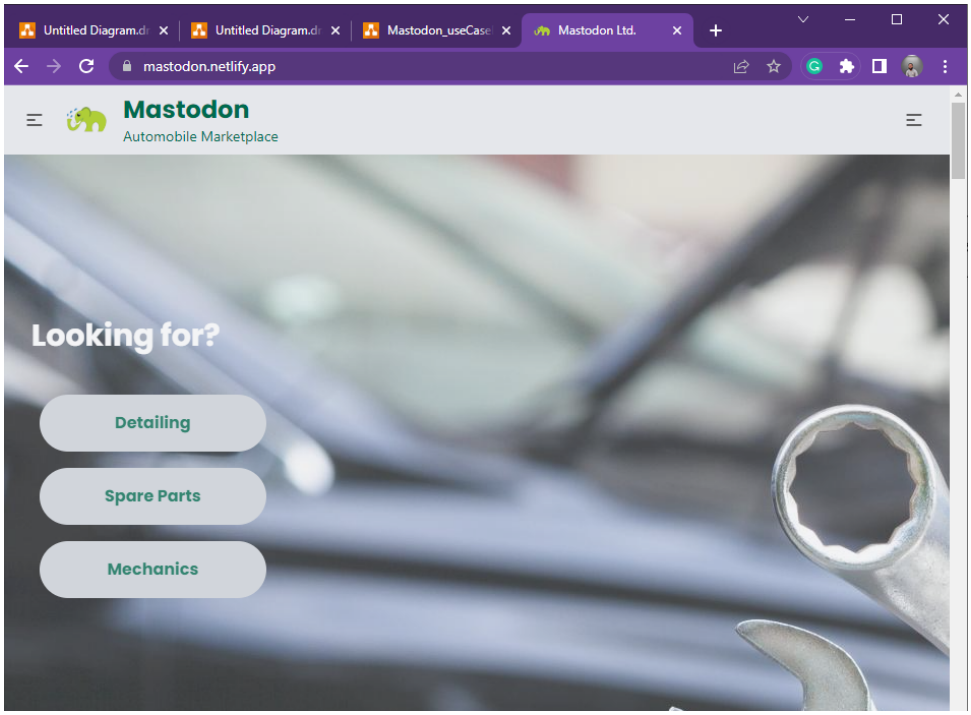


Figure 5.7: Responsiveness

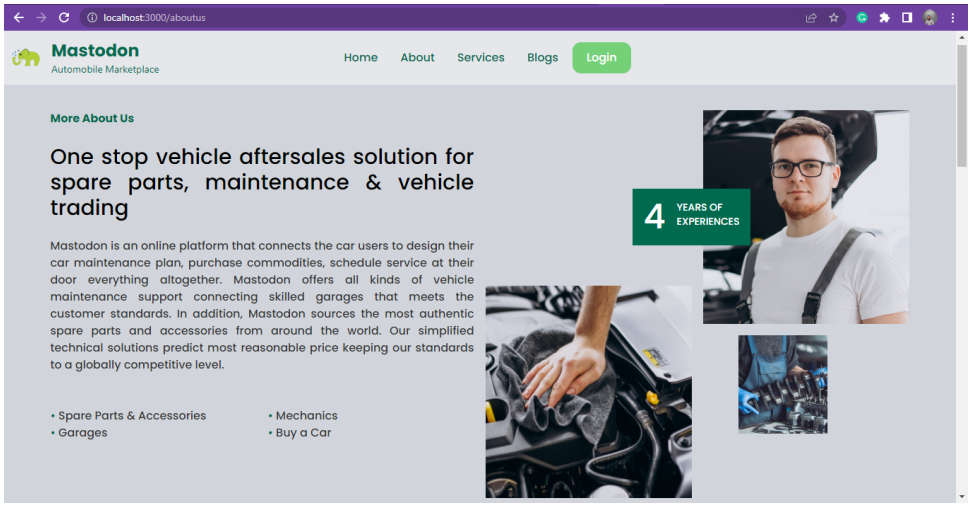


Figure 5.8: AboutUs Page

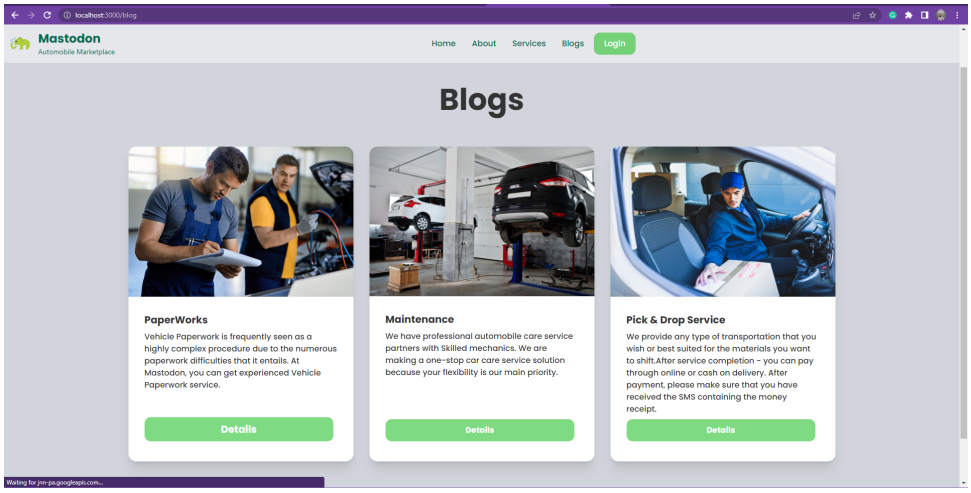


Figure 5.9: Blogs Page

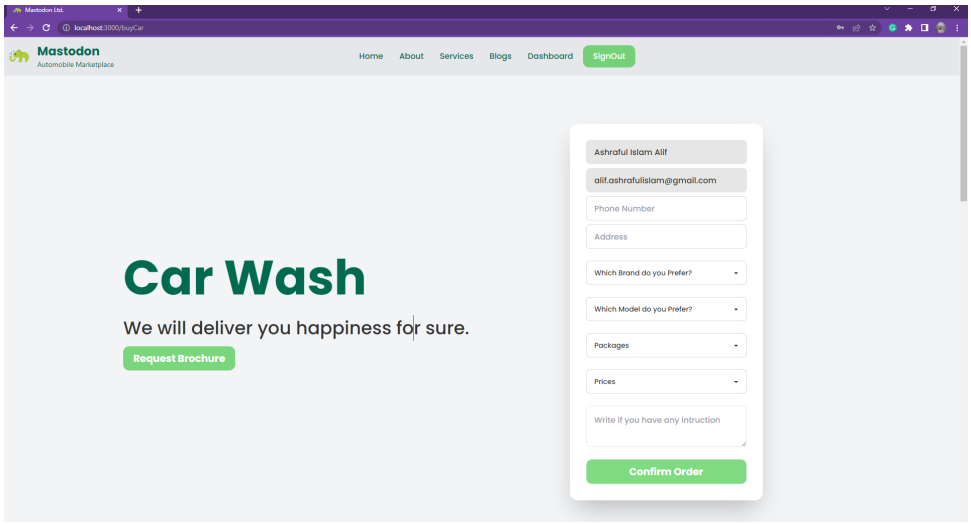


Figure 5.10: Car Wash Booking Page

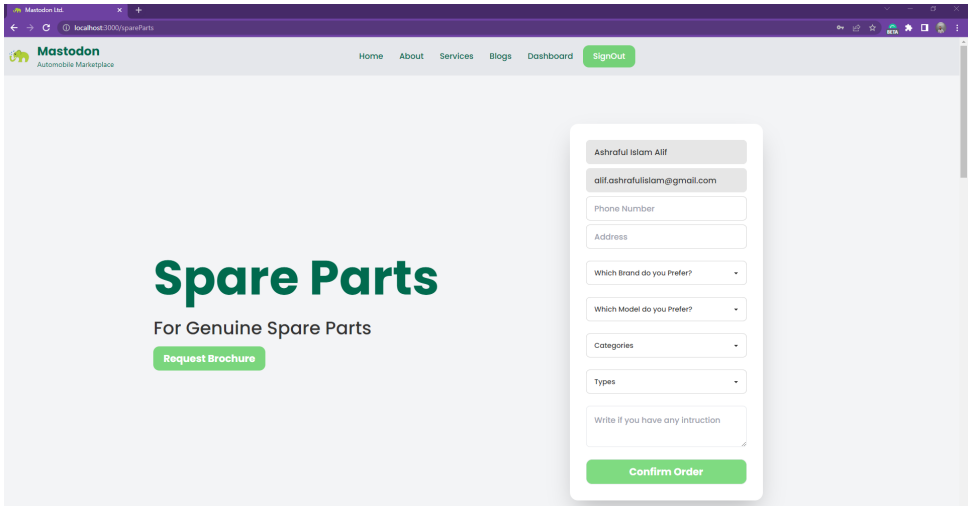


Figure 5.11: Spare Parts Order Page

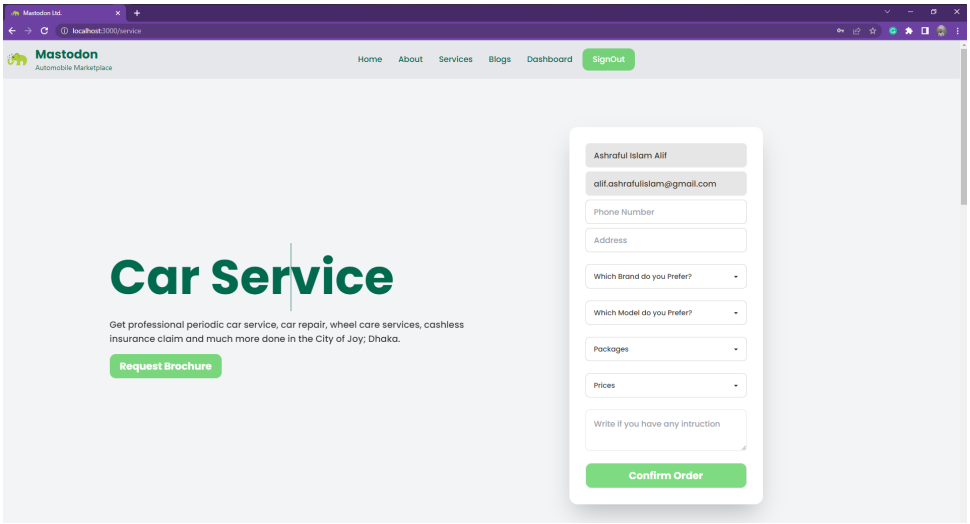


Figure 5.12: Car Service Booking Page

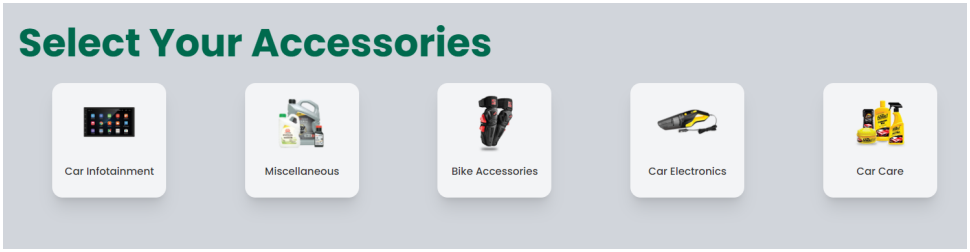


Figure 5.13: Packages Page

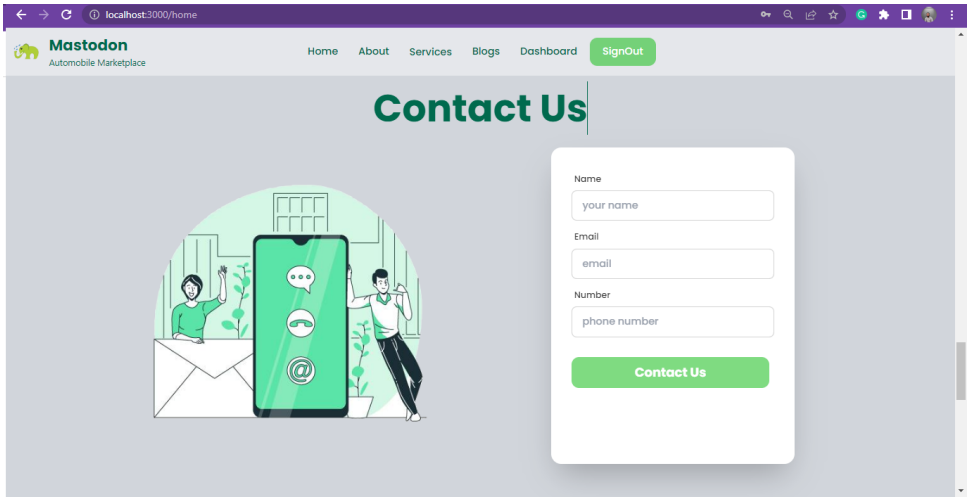


Figure 5.14: Contact Us Page

Output

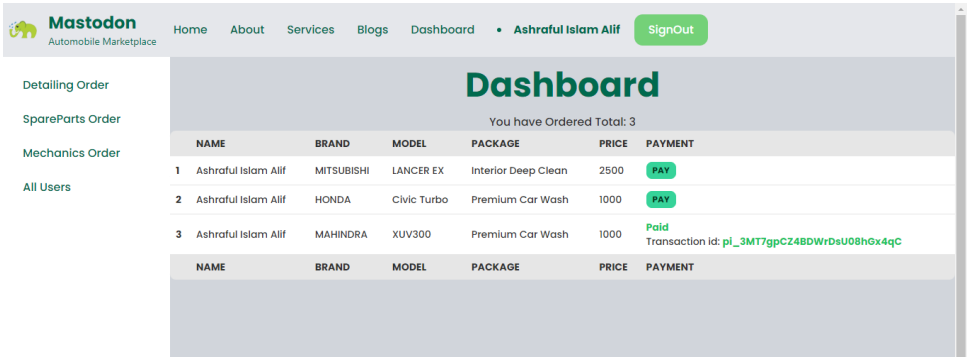


Figure 5.15: Dsahboard Detailing Order Page

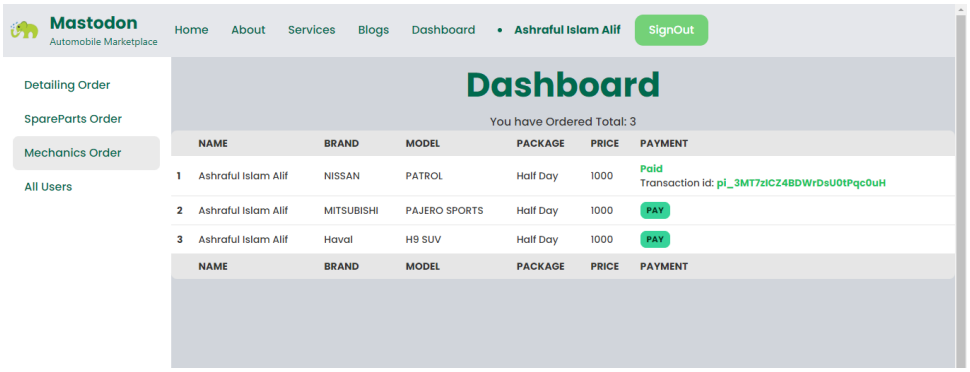


Figure 5.16: Dsahboard Mechanics Order Page

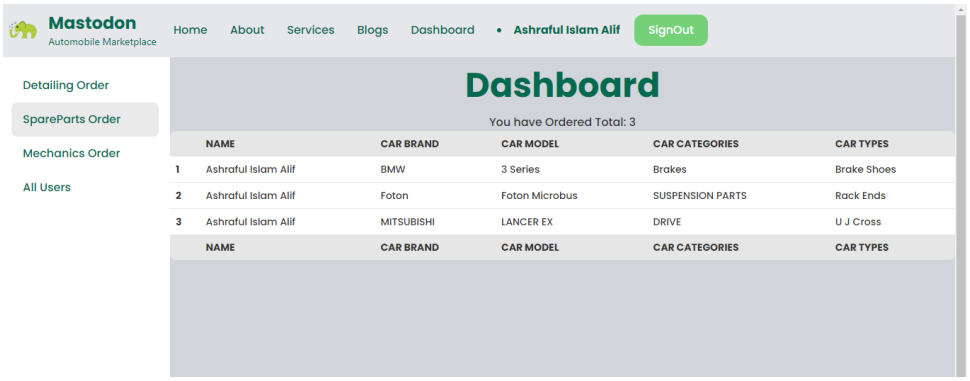


Figure 5.17: Dsahboard Spare Parts Order Page

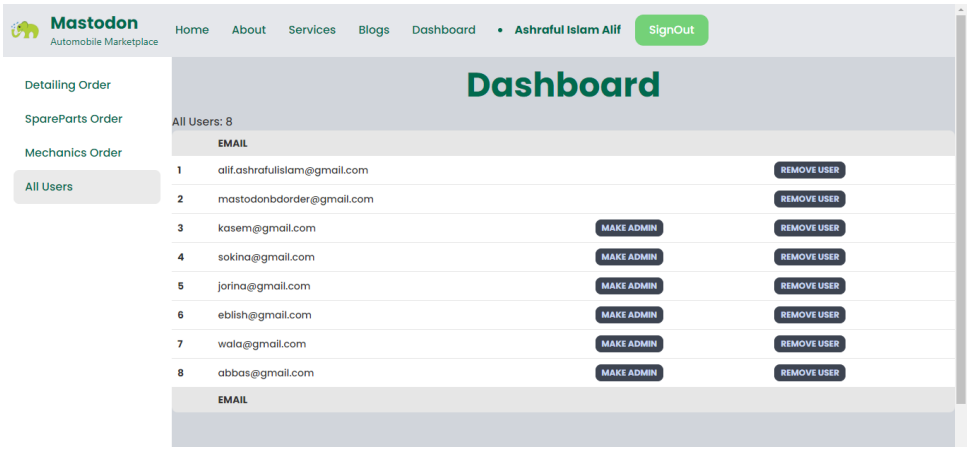


Figure 5.18: Dsahboard All user page

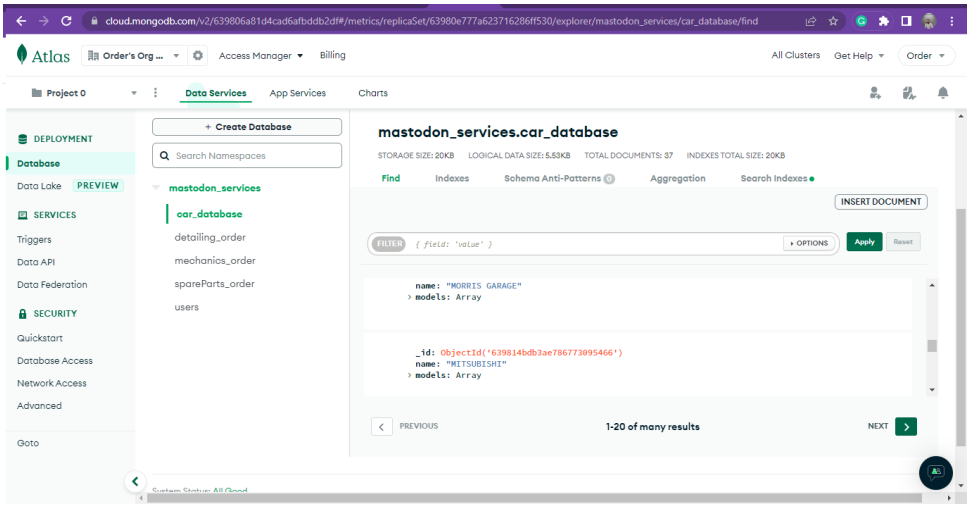


Figure 5.19: Backend Database

Chapter 6

Results & Analysis

Application development has been a success. I always tested the program when new features were added. I intended to complete the design and development process as cleanly as possible before proceeding to the testing phase, but time constraints required me to complete all three phases in a minimal amount of time. Many test cases were failing, requiring work to fix bugs and bugs. Not only did I run into bugs during development and testing, but I also had several issues with saving data to the MongoDB database, but they have finally been fixed. I am currently releasing a beta version. Once the test scenario is complete, we will release our final product.
Evaluating the success of the project in meeting its goals and objectives.
The system's performance is response time and reliability. This can be done using tools such as load testing and monitoring. Gather feedback from users of the system to understand their satisfaction with the system's functionality and usability through surveys and user testing. The impact of the system on the business in terms of increased revenue, reduced costs, and improved efficiency by By comparing the system's performance with previous systems. This involves evaluating the security of the system and identifying any vulnerabilities that need to be addressed. This can be done by performing penetration testing and security audits. This involves evaluating the system's ability to handle increased usage and growth in the future. This can be done by stress testing the system and identifying bottlenecks that may need to be addressed.

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project

The term "sustainability" refers to a product's ability to be maintained and upgraded. In today's environment, any program that is released must be maintained and regularly updated for the benefit of its users.

Community Sustainability

When the project is officially launched, it will significantly impact the community because people will be relieved of the hassle of physically going to the company, maintaining and waiting for his/her serial to come to the counter and getting car service also buying spare parts. Rather, they will be able to visit the website and fill up the required information and confirm them. In conclusion, this project will be community sustainable.

Financial Sustainability

After the project is launched, the primary goal will be to make it easier for clients to book car services Mastodon Limited. Even though the application is free for users, the company will profit from the initiative since clients are more inclined to do a time consuming work with no hassle. The company will profit more in terms of income because more through the website. The application will be upgraded and maintained more frequently with the revenue produced.

Organizational Sustainability

After the project is completed, the application may be maintained and upgraded by the same team, or the company may grow the team by adding more members to the project in order to improve the project. The company intends to expand more functionalities and improve the website's appearance by changing the UI. The development team will resolve any faults reported by clients. As stated in previous sections of this study, the application will be maintained and updated on a regular basis to improve the experience

of clients using the application so that the project is organizationally sustainable.

7.2 Social and Environmental Effects and Analysis

Socials Effects

Mastodon Service intends to simplify the process of ordering items by automating the procedure previously performed manually by clients. The application will save consumers time and money. Additionally, it will enable the employees to manipulate the order request submitted by the clients with a few clicks. Briefly said, the system will make the car service and buying car parts straightforward and stress-free for both consumers and employees.

Environmental Effects

Since Covid-19 is still not fully diminished from earth and still new variants are on news, this system will play a significant part in this situation since it will allow most employees to operate from home and prevent clients from physically visiting the company to get car service and buying car parts. As a result, a substantial amount of human contact is reduced, limiting the possibility of the virus spreading.

7.3 Addressing Ethics and Ethical Issues

With the proliferation of data collecting, hacking, and criminality in the world of sophisticated technologies, some unstated norms and ethics principles must be observed while developing and distributing an application. Developers of the system believe that the application complies with all applicable codes of conduct for application release and development, which have been taken into serious consideration. Some of them are,

Data Security: The MongoDB Database stores data on the cloud. When compared to on-premises security, cloud services provide more robust data security; as a result, there is a low risk of data exposure to the public. Security Rules act as a barrier between users' data and malevolent users. Complex rules have been written in Ghuri to ensure the best security for the data.

Data Storage: Since all our application data is stored in the MongoDB database, which is hosted in the cloud, there is essentially no risk of data loss or leakage due to system failure. If the data were retained on-premises, there would be the risk of data loss due to system failure or other disasters. However, because our application data is stored in the cloud, there is virtually little risk of data loss.

Collecting user data: The system will collect only user data relevant to the business. The user's data will be gathered only if the user gives permission to collect the data or willingly provides their data on our application.

Sharing User Data: Despite the fact that the data obtained is unlikely to cause any

privacy concerns for most users, the system does not give any service, business, or third-party access to the information acquired.[3]

Chapter 8

Lesson Learned

8.1 Problems Faced During this Period

The CEO, who is also my organization supervisor, is a very busy person. So, it somehow resulted in a breakdown of communication on the application's functionality and UI design. Though my company requested me to develop a professional application, and this was my first time developing a website for an organization, the skill set required for this process was fairly extensive. Initially, I was assigned a team member to assist me with my project in the backend portion, he left and the whole project was done by me single handedly.

8.2 Solution of those Problems

I tried my level best to keep in touch with my supervisor. Whether it was an online meeting or offline, I was expected to attend weekly meetings and discuss what I designed. It was my first time designing a professional application, but through my dedication and hard work, I overcame obstacles and achieved my goals. But as I gained knowledge and experience, after a while I got better at my job. We tested the program several times to ensure that any bugs or issues we encountered were fixed. This has paid off for me in the long run and saved me the time and effort it would take to troubleshoot the entire application from scratch.

Chapter 9

Future Work & Conclusion

9.1 Future Works

The project, Mastodon Service, is a Car Service website that is still evolving, and we intend to add additional features to it. Some of the features that we plan to add in the upcoming future are:

- Enable OTP login using the phone number.
- Including the option to choose multiple languages.
- Dark mode option.
- To develop the packages section of the site.
- Adding a chatbot for customers to communicate with the support team.
- Nearest car servicing shop of a client location.

9.2 Conclusion

This system was built using the technologies HTML, CSS, JavaScript, and ReactJS with back-end NodeJs and database MongoDB.Automation of the entire system improves efficiency. It provides a friendly graphical user interface that proves to be better compared to the existing system. It gives appropriate access to authorized users depending on their permissions. It effectively overcomes the delay in communications. Updating information becomes so much easier. System security, data security, and reliability are the striking features. The system has adequate scope for modification in the future if it is necessary. The developed Web-based vehicle service management system fulfilled the requirements of our clients and earned their full satisfaction too.

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An Undergraduate Internship/Project on One Stop vehicle aftersales solution for Detailing, Mechanics and Spare parts

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Autumn, 2022

The student modified the internship final report as per the recommendation made by his or her academic supervisor and/or panel members during final viva, and the department can use this version for achieving.

Asif Bin Khaled 30.01.23

Signature of the Supervisor

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