On Road Vehicle Breakdown Assistance

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN **COMPUTER ENGINEERING**

By

JIYA GANGWANI D12A/17

SOHAM PANJABI D12B /38

HITESH PUNJABI D12B/44

VARSHA CHHABRIA D12A/06

Name of the Mentor

Prof. MRS.VIDYA ZOPE

Vivekanand Education Society's Institute of Technology,

An Autonomous Institute affiliated to University of Mumbai

HAMC, Collector's Colony, Chembur,

Mumbai-400074

University of Mumbai (AY 2023-24)

CERTIFICATE

This is to certify that the Mini Project entitled **"On Road Vehicle Breakdown Assistance"** is a bonafide work of **Jiya Gangwani (17) , Soham Panjabi(38), Hitesh Punjabi(44), Varsha Chhabria(06)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Computer Engineering" .**

(Prof.MRS. VIDYA ZOPE)
Mentor

(Prof.DR. NUPUR GIRI)
Head of Department

(Prof.MRS. J.M NAIR)
Principal

Mini Project Approval

This Mini Project entitled "On Road Vehicle Breakdown Assistance**"** by **Jiya Gangwani(17), Soham Panjabi (38), Hitesh Punjabi (44), Varsha Chhabria (06)** is approved for the degree of **Bachelor of Engineering** in **Computer Engineering.**

Examiners

1……
(Internal Examiner Name & Sign)

2……
(External Examiner name & Sign)

Date: 16/10/23

Place: Mumbai

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Abstract

In our increasingly mobile world, vehicular breakdowns are an inevitable part of the driving experience. This abstract outlines an innovative and unique On-Road Vehicle Breakdown Assistance System designed to provide swift and efficient support to motorists in distress. The proposed system harnesses cutting-edge technologies, including GPS, mobile connectivity, and advanced roadside assistance coordination, to deliver a seamless and reliable solution to vehicle breakdowns.

Our On-Road Vehicle Breakdown Assistance System centers around a mobile application, easily accessible to both vehicle owners and service providers. Users in need of assistance can request help via the app, which then promptly identifies their location through GPS technology. This feature ensures a precise and efficient dispatch of service providers to the scene, minimizing response time and the risk of safety hazards on the road.

Service providers, on the other hand, can access the application to receive service requests, view the vehicle's location, and communicate with the distressed motorist. By streamlining this connection, the system optimizes the deployment of appropriate resources and expertise, enhancing overall service quality and customer satisfaction.

The system also incorporates a rating and review feature, allowing users to provide feedback on their experience with the assistance received.

Acknowledgments

We are thankful to our college Vivekanand Education Society's Institute of Technology for considering our project and extending help at all stages needed during the work of collecting information regarding the project.It gives us immense pleasure to express our deep sense of gratitude to Professor Mrs. Vidya Zope(Project Guide) for her kind help and valuable suggestions, advice for the development of project work and for her guidance and suggestions.

We convey our deep sense of gratitude to all teaching and non-teaching staff for their constant encouragement, support and selfless help throughout the project work . It is a great pleasure to acknowledge the help and suggestion, which we received from the Department of Computer Engineering . We wish to express our profound thanks to all those who helped us in gathering information about the project. In conclusion, the successful implementation and operation of the On road vehicle breakdown assistance are the result of the collective efforts of all those involved, and we express our sincere appreciation and gratitude to each one of them.

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1. Introduction

1.1 Introduction

Nowadays, the majority of individuals commute by car. Most of us are troubled by vehicle breakdowns on the road when traveling. This is the worst experience they have ever had. When our car breaks down on the road, the user must look for a mechanic and a spare-parts store near their position. We couldn't find a trustworthy mechanic at the moment, so we had to find another means of transportation. The On Road Vehicle Breakdown Assistance program functions as a virtual online application that allows users to schedule an appointment during an emergency vehicle breakdown at their convenience. The user can find an appropriate mechanic with the help of this program. This will display the user's location and result the user to the nearest service provider, as well as the chat platform, where the user may ask the mechanic important questions.

This website is open to the public. This website will assist users save time while looking for a good mechanic. The website displays the user's location and directs the user to the nearest service provider. To communicate with mechanics, there is a chat platform. When a user searches for a mechanic, the application will display mechanics based on their speciality, contact information, picture, and rating. After completing the work, the user can rate and provide feedback to the appropriate mechanic. User requests comprised the user's location, the type of service requested, vehicle characteristics, and a description. Admin has access to all registered user and mechanic information. The core features of on-road vehicle breakdown assistance services typically include 24x7 availability. Trained mechanics or service providers equipped with appropriate tools and equipment are dispatched to the breakdown location to address the issue. In today's growing mobile world, on-the-road car breakdown assistance is critical in assisting drivers and improving their entire travel experience. As technology advances, these services are expected to become increasingly more efficient and accessible, leading to safer and more dependable road trips for travelers.

1.2 Motivation

The on-road vehicle breakdown assistance service plays a pivotal role in ensuring the mobility and safety of individuals and communities. Effective and efficient delivery operations are vital to guarantee that stranded motorists receive timely and reliable assistance. Understanding the patterns of breakdown incidents and optimizing the response

can lead to better resource management and an enhanced customer experience. The on-road vehicle breakdown assistance service stands as a crucial part of the public support system, providing an essential lifeline to those in need. In this section, we delve into the profound motivation behind our pursuit of understanding breakdown patterns and optimizing assistance, recognizing that this endeavor promises to offer improved service quality and customer satisfaction in the sector.

Providing Timely Assistance to Stranded Motorists:

At the heart of the on-road vehicle breakdown assistance service lies the commitment to offering prompt and reliable help to motorists facing unexpected vehicle issues. Drivers depend on a rapid and efficient response to resume their journeys safely.

Elevating Customer Satisfaction:

Customer-centric care is paramount in the breakdown assistance industry. Swift access to assistance during vehicle breakdowns is a critical component of customer satisfaction and road safety. An optimized assistance system not only ensures that stranded motorists receive help promptly but also reduces the inconvenience and risks associated with breakdowns. This improvement in customer service not only contributes to road safety and traveler well-being but also enhances the reputation and trustworthiness of breakdown assistance providers.

1.3 Problem Statement & Objectives

The "On-Road Vehicle Breakdown Assistance Project" addresses the lack of a systematic and effective system for providing quick and dependable assistance to travelers experiencing vehicle breakdowns and emergencies while on the road. Travelers are now frequently trapped and vulnerable when their vehicles unexpectedly break down, causing aggravation, safety hazards, and significant traffic congestion.
In this situation, the only way is to look for some other transportation at that time of issue and then they need to get a mechanic to the particular location at which they have left their vehicle. In this application, the mobile users can get nearby area mechanics by searching at any time and anywhere. The admin can access the shop details and check whether the registered shop is licensed or not and provide approval.

1.4 Organization of the Report

Chapter 1: Includes the introduction to the report, the problem statement and our objectives.

Chapter 2: Includes various literature surveys related to our project.

Chapter 3: Introduction to various Architectural Framework, Algorithm and Process Design related to our project, includes the detailed explanation of our project with the various methodology applied

Lastly, we give the results of the project.

It includes conclusions and future work.

2. Literature Survey

2.1 Survey of Existing System/SRS

Issue 1: Limited Company-Specific Assistance

The problem with company-specific applications lies in their exclusivity. While they may provide tailored services for their own vehicles, this approach limits the accessibility and convenience for users with different vehicle brands. In the current market, where users often own diverse vehicles, the lack of cross-brand support poses a significant challenge. This approach fails to accommodate the needs of customers who own multiple vehicle brands or have family members or colleagues with different vehicles, restricting the overall utility and effectiveness of the assistance services.

Issue 2: Lack of Comprehensive Services

Several breakdown assistance services often fall short of delivering comprehensive support. Basic services, such as towing or battery jump-start, are indeed essential, but the omission of critical services like tire changes, fuel delivery, or access to cab services can severely limit the overall effectiveness and convenience of the service. This deficiency can leave customers stranded in situations where basic assistance is insufficient, leading to frustration and a lack of trust in the service provider. The absence of comprehensive support fails to address the diverse needs of customers, especially in emergencies that require immediate and varied solutions.

Issue 3: Unaffordable Costs for Frequent Users

The issue of unaffordable costs is particularly challenging for frequent users who heavily rely on breakdown assistance services. While these services are intended to provide immediate support during emergencies, the high costs associated with frequent usage can impose a significant financial burden on users. The lack of a cost-effective model or subscription plans tailored to the needs of frequent users can deter them from seeking timely assistance, potentially putting their safety at risk. This financial strain not only impacts the accessibility of the service but also undermines the overall trust and satisfaction of customers who require frequent assistance.

2.2 Limitation Existing system or Research gap

TITLE	AUTHOR	YEAR	ADVANTAGES	DRAWBACK
Help me app	vaibhavi Artigala	2019-2020	location tracker	
IOT Based On-Road Vehicle Breakdown Assistance	Prof. Milind Tote	July-August-2020	Sensors can detect accident	Potential Sensor or System Malfunctions, Inability to Handle All Accident, Scenarios Limitations in Detecting Accidents in Tunnels
On Road Vehicle Breakdown Assistance	Mrs. Surekha Khot, Mr. Prafull Malve, Mr. Vishal Jagdale, Mr. Lalit Gonji	March 2022	System is secured due to more verification steps	Extensive User Verification Process, OTP System Vulnerable to Poor Network Coverage, Balancing Verification and Emergency Response
Breakdown Assistance	Prof. Shital S. Aher, Unhale vrushali Tribhuvan, Gade pranjal Balasaheb, Patil tulshidas devashri	11, November 2022	Human employment can be promoted using such methods	Administrative Workload, Potential for Overwhelm, Dependency on Human Oversight
On Road Vehicle Breakdown Assistance	Prof. MS. Pranita P. Deshmukh, Mr. Yash S. Puraswani	March 2020	traveler can have easy access to the services based on the current location using Google Maps Navigation System. The services are provided in a wide range so that travelers enjoy the maximum benefit out of it. System recommends traveler to choose the best service	Unable to provide quick response due to lack of streamlined system with sufficient information available

2.3 Mini Project Contribution

In our effort to improve the existing on-road vehicle breakdown assistance system, we have identified several crucial research gaps and limitations. These gaps have hindered the system's efficiency and timely response to diverse user needs. Our proposed contributions aim to address these gaps and offer innovative solutions to enhance the overall user experience and effectiveness of the breakdown assistance services.

Identification of Research Gap

Our analysis of the existing system revealed a lack of a streamlined approach to dispatch breakdown assistance providers efficiently. This led to delays in response time, inadequate service coverage, and limited data integration for effective decision-making. Additionally, the absence of real-time data analytics has hampered the system's ability to predict breakdown patterns accurately, leading to suboptimal service delivery and user dissatisfaction.

Proposed Innovative Solutions or Strategies

To tackle the identified challenges, our team plans to implement a comprehensive system that integrates advanced technologies such as artificial intelligence, machine learning algorithms, and IoT. This integration will enable real-time monitoring of vehicle health, predictive analysis of breakdown patterns, and optimized dispatching of assistance providers based on location, severity of the issue, and available resources. By leveraging these technologies, we aim to revolutionize the breakdown assistance services and ensure prompt and tailored support to users in need.

Advantages and Impact of Proposed Solutions

The implementation of our proposed solutions is expected to yield several benefits, including a significant reduction in response time, improved service reliability, and a more personalized user experience. By leveraging predictive analytics, we anticipate a notable decrease in the frequency of service interruptions and an increase in the overall efficiency of the breakdown assistance system. Additionally, the integration of user feedback mechanisms will enable us to continuously enhance the system's responsiveness and tailor services to meet evolving user expectations.

Technical Implementation and Feasibility

In terms of technical implementation, our team plans to collaborate with industry experts and technology partners to ensure the seamless integration of AI, machine learning, and IoT into the existing infrastructure. We have outlined a phased implementation strategy that includes rigorous testing, data validation, and user feedback loops to guarantee the robustness and reliability of the upgraded system. Moreover, we have conducted a feasibility study to assess the cost implications, resource requirements, and scalability of our proposed solutions.

User Experience and Feedback Integration

User experience lies at the core of our project, and we have devised a comprehensive framework to collect, analyze, and integrate user feedback into the system. Through user surveys, interviews, and data analytics, we aim to gain valuable insights into user

preferences, pain points, and service expectations. This iterative feedback loop will enable us to continuously refine the system's functionalities, enhance user satisfaction, and ensure that the breakdown assistance services align with user needs and expectations.

Future Scope and Expansion Plans

Looking ahead, our project envisions the scalability and expansion of the enhanced breakdown assistance system to cater to a broader user base. We plan to explore partnerships with key stakeholders, including vehicle manufacturers, insurance companies, and roadside assistance providers, to further strengthen the system's capabilities and extend its reach. Additionally, we aim to adapt the system to accommodate emerging technologies and industry trends, ensuring that it remains at the forefront of innovation and user-centric service delivery in the on-road vehicle assistance sector.

3. Proposed System

3.1 Introduction

In our increasingly fast-paced and interconnected world, the sight of a stranded vehicle on the side of the road due to a breakdown is an all too common occurrence. Vehicle breakdowns can be inconvenient, stressful, and sometimes even dangerous, particularly when they occur in remote areas or during adverse weather conditions. To address these challenges and improve the overall experience of motorists facing breakdowns, we propose an innovative and comprehensive solution: the On-Road Vehicle Breakdown Assistance System.

Our proposed system is designed to revolutionize the way we deal with vehicular breakdowns, combining cutting-edge technology and seamless connectivity to provide efficient, reliable, and timely assistance to motorists in distress. By leveraging the power of smartphones, GPS, and a network of service providers, our system aims to transform the traditional approach to roadside assistance.

The need for such a system becomes evident when considering the frequency of vehicle breakdowns and the ever-growing demands on our transportation infrastructure. Every year, millions of vehicles experience mechanical failures or other issues that leave their owners stranded and in need of help. Existing roadside assistance services, while essential, often suffer from inefficiencies, delays, and a lack of transparency. This creates room for innovation and improvement, and our On-Road Vehicle Breakdown Assistance System seeks to fill this gap.

3.2 Architectural Framework / Conceptual Design

The architectural framework and conceptual design for an On-Road Vehicle Breakdown Assistance System should be structured to provide a robust, scalable, and user-friendly solution. Here's an overview of the key components and design principles for such a system:

- **User-Friendly Website**: The core of the system is a user-friendly website for both vehicle owners and service providers. The interface should be intuitive, providing easy access to essential features like requesting assistance, tracking service providers, and communication.

- **GPS Integration**: GPS technology is essential to accurately pinpoint the location of the distressed vehicle. This information ensures a rapid response and efficient dispatch of service providers.

- **User Authentication**: Secure registration and authentication processes are necessary to establish user profiles, manage access, and maintain a history of service requests and responses.

- **User Profiles**: Users and service providers should create profiles with relevant details, such as vehicle information, contact information, and service provider certifications.

- **Service Provider Management** : A database of authorized service providers, including tow truck operators, mechanics, and other roadside assistance professionals, should be maintained and regularly updated.

- **Service Request Assignment**: An intelligent algorithm should be implemented for automatic or manual assignment of service requests to the nearest, most appropriate service providers.

- **Service Request Workflow**: A structured workflow for handling service requests, including acknowledging the request, estimated arrival time, service completion, and user feedback collection.

- **Rating and Review System**: After service completion, users can rate and review the service, promoting accountability among service providers and helping other users make informed decisions.

- **Secure Payment Processing**: If applicable, integration with payment gateways for handling service fees, either on a per-service basis or through subscription models.

- **Data Collection and Analysis**: Gather data on service requests, breakdown types, response times, and user feedback. Use this data to improve the system's efficiency and for predictive maintenance,vehicle care.

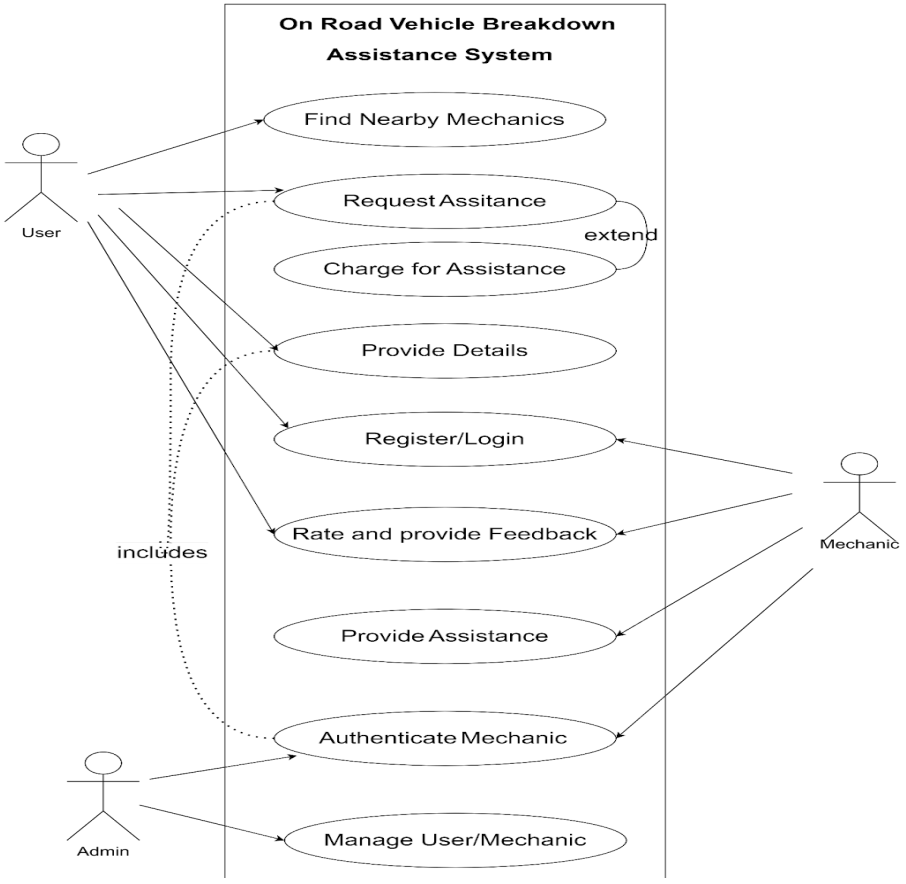

Fig 3.2.1 Use Case Diagram

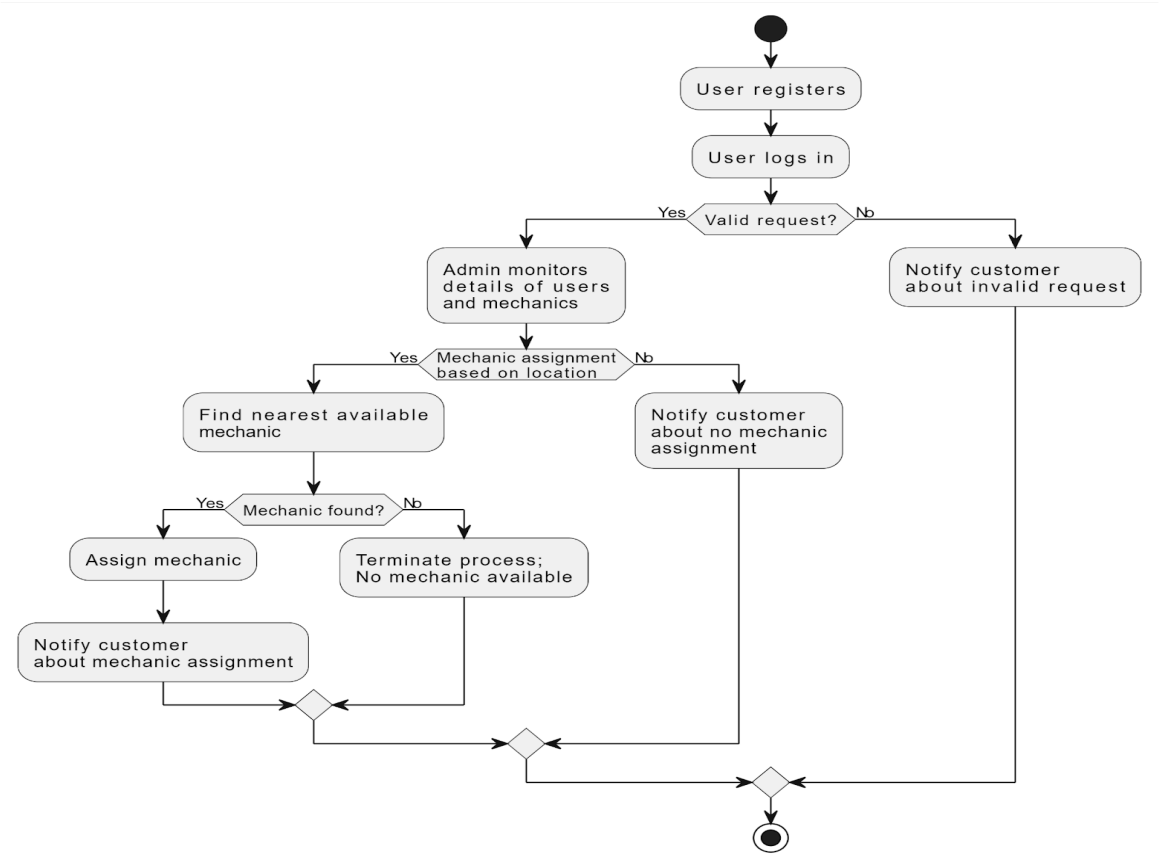

Fig 3.2.2 Activity Diagram

3.3 Algorithm and Process Design

Designing the algorithm and process for an On-Road Vehicle Breakdown Assistance System involves creating a well-defined sequence of steps that efficiently handles service requests from vehicle owners and coordinates the actions of service providers. Below is an outline of the algorithm and process design for such a system:

1. User Registration and Authentication:

Vehicle owners and service providers register on the mobile application.

The system verifies and authenticates user credentials.

2. User Profiles:

Users create profiles with personal information, contact details, and vehicle information.

Service providers provide their certifications and service capabilities.

3. Requesting Assistance:

When a vehicle owner experiences a breakdown, they open the app and request assistance. The system records the breakdown type, location, and user details.

4. GPS Location Tracking:

The system retrieves the user's real-time GPS location to pinpoint the vehicle's exact position. This location data is used to find nearby service providers.

5. Service Provider Assignment:

An assignment algorithm selects the most suitable service provider based on factors like proximity, service type, and availability. The selected service provider receives the service request with the user's location.

6. Service Provider Response:

The assigned service provider can either accept or decline the service request.

If accepted, the system notifies the user with the estimated arrival time.

7. Communication:

Users and service providers communicate within the website via text, voice, or image messages.

Users can provide additional information about the breakdown or their location.

8. En Route and On-Site Assistance:

The service provider navigates to the user's location using GPS directions.

On arrival, the provider assesses the situation and begins necessary assistance, which could include towing, repairs, or providing fuel.

9. Emergency Notifications:

Users have the option to send emergency alerts to predefined contacts or local authorities in severe breakdown situations.

10. Service Completion:

After the service is completed, the service provider updates the status in the app.

Users confirm the service's satisfaction and may rate and review the provider.

11. Payment Processing:

If applicable, the system processes payment for the service, which can be automated or require user confirmation.

3.4 Methodology Applied

There are several stages of implementation of the vehicle breakdown assistance system

[1] Planning and research:

In this, we conducted a study of the target users who are in need of such one-stop applications, also we read various research papers to get a better understanding of the entire scenario.

[2] Design the system:

We have designed the basic UI to get a glimpse of the functionalities of the user and mechanic side respectively

[3] Construction of the system:

In this stage, we will be actually working upon implementing the system
Deciding the requirements and schema of both user and mechanic and then actually working upon the frontend

[4] Integrating the APIs and some more features to make the website smarter.

[5] Last and the most crucial step would be to design the backend to store the data and successfully integrate the UI and backend.

3.5 Hardware & Software Specifications

3.5.1 Hardware Requirement

- Processor : Intel 11th gen i5 processor.
- Hard disk : 1TB
- Memory – 4GB RAM
- Monitor : 15’’ CRT or LCD monitor. Mouse : Compatible mouse.

3.5.2 Software Requirements

- Windows 7 or higher
- Visual studio Code
- Browser
- Jupyter/Google colab
- API’s

3.5.2 Languages

- HTML, CSS, JS
- Database(MySql or SQLite)
- Python
- Django

3.6 Result Analysis and Discussion

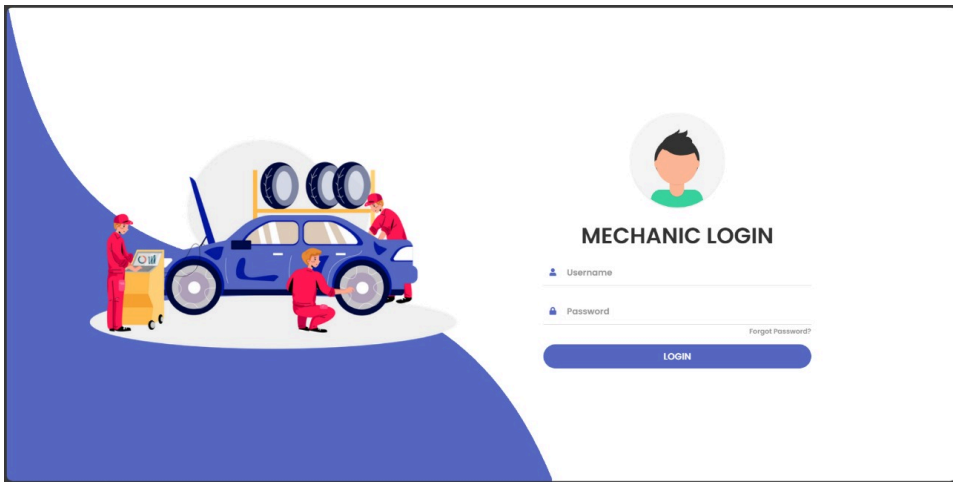

Fig 3.6.1 Mechanic Login Page

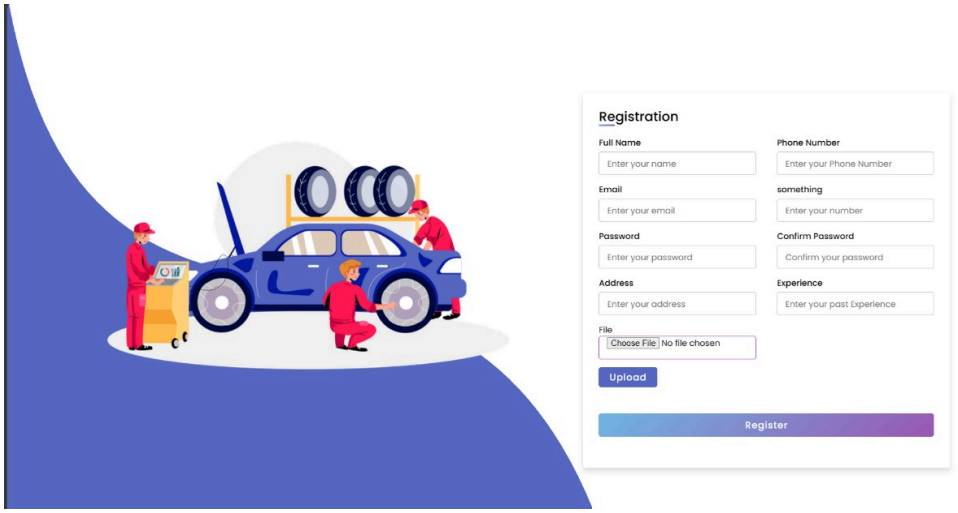

Fig 3.6.2 Mechanic Registration Page

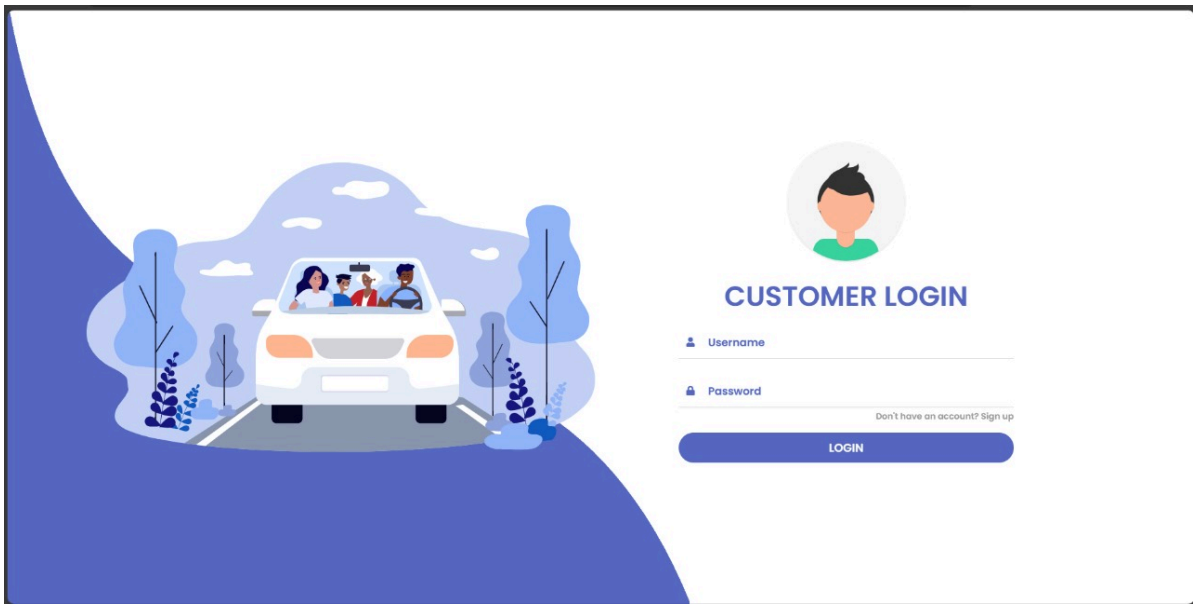

Fig 3.6.3 Customer Login Page

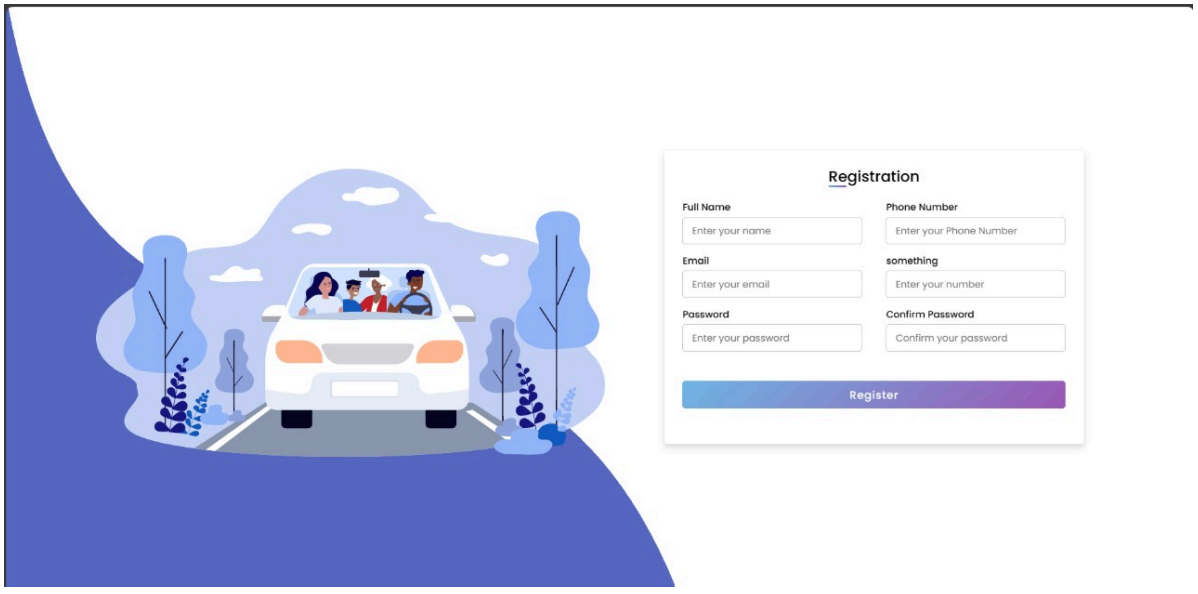

Fig 3.6.4 Customer Registration Page

3.7 Conclusion and Future work.

3.7.1 Conclusion

The application has come a long way to offer customers a better mechanic appointment online over time, and it will keep doing so for years to come. We, as developers, look forward to expanding the scope of this assistance and extending our help to the ones in need. While this has generally been the case, some people still believe that a trusted technician should assist them and their vehicle in an emergency.

However, the availability of on-the-road auto breakdown support has led to more adaptable clients as well as mechanics who can travel to the client and provide emergency services without the client having to wait a long time for the mechanic. In exchange, on-road vehicle breakdown assistance has given many small mechanics in small towns who work near highways the option to look for better employment opportunities. In the end, both consumers and mechanics have benefited from the scenario.

3.7.2 Future Scope

- Collaboration with local repair shops and service centers to facilitate repairs and ensure drivers' continued travel.

- Well-equipped and trained assistance teams dispatched promptly to the location of the stranded vehicle.

- Connected vehicle solutions for real-time alerts.

- In addition to that the list of hospitals and Fuels stations can be added.

- Payment gateway can be added.

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