Smart Location-Based On-Road Vehicle Assistance Management System Using Web Technology

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Abstract- *Vehicle breakdown is a common problem faced by vehicle users during travel. When a vehicle breaks down unexpectedly, it becomes difficult for users to find nearby mechanics quickly. This causes delay, inconvenience, and safety risks. The Smart Road Assist system is developed to solve this problem by providing real-time assistance to vehicle users. The system detects the user's current location through the browser and displays nearby available mechanics. Users can send service requests, and mechanics can accept the request through the system. The system also provides live tracking, secure login using JWT authentication, and real-time communication. This solution improves response time, reduces user stress, and makes vehicle assistance more efficient and reliable.*

Keywords: Authentication, Real-Time Tracking, Roadside Assistance, Vehicle Breakdown.

I. INTRODUCTION

Vehicle breakdown is a common issue faced by vehicle users in their daily transportation. When a vehicle stops working unexpectedly, it becomes difficult for users to find nearby mechanics immediately. This situation causes delay, inconvenience, and safety risks for the users. The traditional method of finding mechanics manually or contacting known service providers is time-consuming and inefficient.

With the development of modern web technologies, it is possible to provide smart and efficient solutions for this problem. The Smart Road Assist system is designed to provide quick vehicle breakdown assistance by connecting users with nearby mechanics. The system detects the user's current location through the browser and allows users to send service requests. Mechanics can view and accept the request and provide assistance.

This research focuses on developing a real-time web-based assistance system that improves response time and user convenience. The system also provides secure authentication and real-time communication to ensure reliable service. This

This system helps reduce response time, improves user convenience, and provides an efficient solution for vehicle breakdown assistance. It also enhances the overall user experience by providing quick and reliable support during emergency situations.

II. EXISTING SYSTEM

In the existing system, vehicle users face many difficulties when their vehicle breaks down unexpectedly. The common method followed by users is to manually search for nearby mechanics by asking people in the surrounding area or contacting known service providers. This process is time-consuming and does not guarantee immediate assistance.

Some users try to search for mechanics using phone calls or internet search, but these methods do not provide accurate information about mechanic availability or exact location. There is no proper system to send service requests directly to mechanics or to track their response in real time.

In addition, existing methods do not provide secure authentication, live tracking, or real-time communication between users and mechanics. This leads to delay in service, lack of reliability, and inconvenience for vehicle users.

Therefore, there is a need for an efficient system that can quickly connect users with nearby mechanics and provide real-time assistance.

III. PROPOSED SYSTEM

The proposed system, Smart Road Assist, is a web-based application designed to provide quick and efficient vehicle breakdown assistance to users. This system helps users find nearby available mechanics by detecting their current location through the browser and displaying mechanic details.In this system, users can register and log in securely to access the services. When a vehicle breakdown occurs, the user can

send a service request through the application. The nearby mechanics can view the request and accept it. Once the mechanic accepts the request, the user can view the mechanic details and track the service status.

The system also provides secure authentication using JWT and real-time communication between users and mechanics. This improves response time and ensures reliable service.

Advantages of Proposed System:

- Provides quick assistance to users
- Reduces delay in finding mechanics
- Provides secure login and authentication
- Supports real-time request and response
- Easy to use and efficient system

The proposed system improves the overall efficiency and provides a reliable solution for vehicle breakdown assistance.

IV. SYSTEM ARCHITECTURE

The System Architecture of the Smart Road Assist system defines the overall structure and working process of the application. It is designed as a web-based system that connects users and mechanics through a centralized server and database.

The system consists of three main components: Frontend, Backend, and Database.

Frontend:

The frontend is developed using HTML, CSS, and JavaScript. It provides the user interface for users and mechanics to register, log in, send requests, and view service details. It also detects the user's current location through the browser.

Backend:

The backend is developed using Node.js and Express.js. It handles user authentication, requests, communication between users and mechanics. It also manages the application logic and processes user requests.

Database:

MongoDB is used as the database to store user details, mechanic details, and service request information.It helps in managing and retrieving data efficiently.

Working Architecture:

1. The user logs into the system.
2. The system detects the user's current location.
3. Nearby mechanics are displayed to the user.
4. The user sends a service request.
5. The mechanic receives and accepts the request.
6. The system updates the request status.

This architecture ensures fast communication, secure access, and efficient vehicle breakdown assistance.

System Architecture of Smart Road Assist
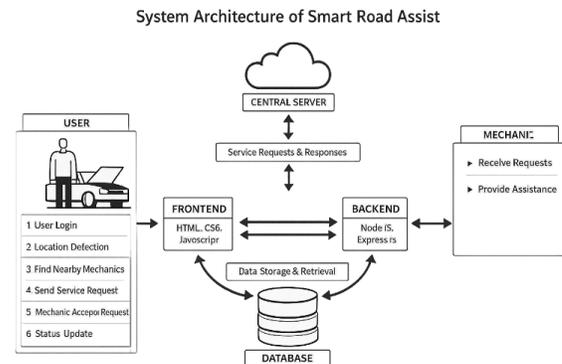
V. METHODOLOGY

The methodology describes the step-by-step working process of the Smart Road Assist system. This system is developed as a web-based application to provide vehicle breakdown assistance efficiently.

Step 1: User Registration and Login

The user first registers in the system by providing basic details such as name, email, and password. After registration, the user logs into the system using secure authentication.

Step 2: Location Detection

After login, the system detects the user's current location through the browser. This location is used to find nearby mechanics.

Step 3: Mechanic Search

The system processes the user location and displays the list of available nearby mechanics. The user can view mechanic details.

Step 4: Service Request

The user selects a mechanic and sends a service request through the system. The request is stored in the database.

Step 5: Request Acceptance

The mechanic receives the service request and accepts it. The system updates the request status.

Step 6: Service Completion

The mechanic provides the service, and the request status is updated as completed. The user receives assistance successfully.

This methodology ensures fast communication and efficient vehicle breakdown assistance.

VI. RESULT AND DISCUSSION

The Smart Road Assist system was successfully implemented as a web application. The following figures show the output screens of the system.
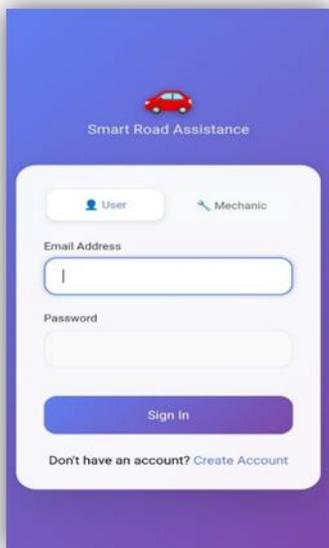
Fig. 1 Login page

Fig. 2 User and Mechanic Registration

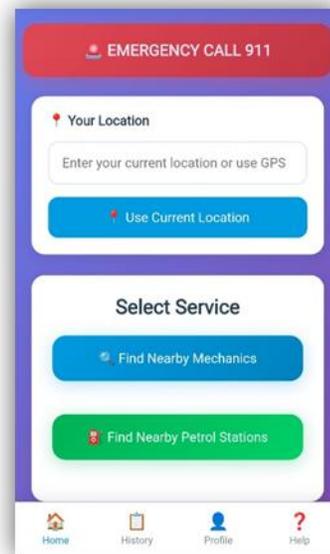This page allows new users to register by entering their personal details.

Fig. 3 User Dashboard

The User Dashboard allows users to view their current location and access system features.
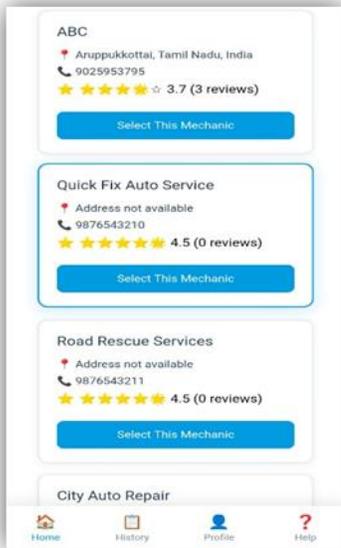
Fig. 4 Avaliable Mechanic
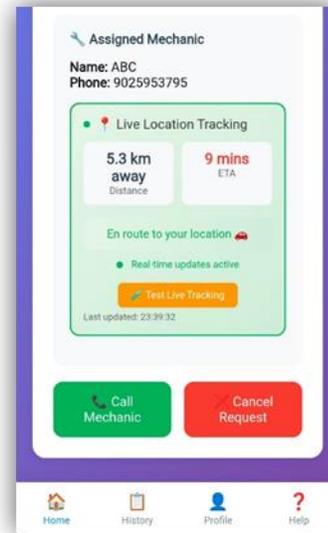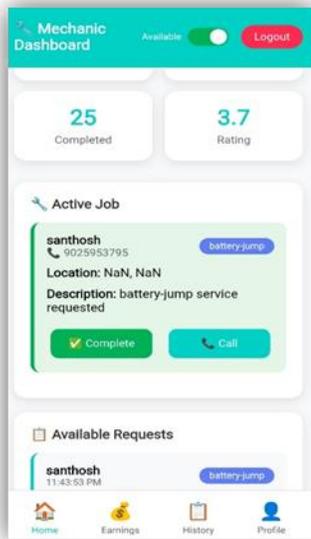
This page shows the available mechanics nearby.

Fig. 5 User request to Mechanic

This page shows the user request to mechanic if he accepts ,user will be notified.

Fig. 6 Live location

This page shows the live location of thee mechanic.
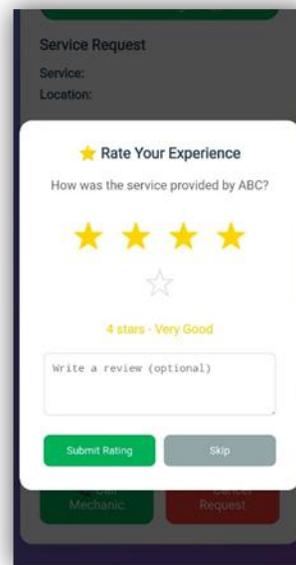

Fig. 7 rating

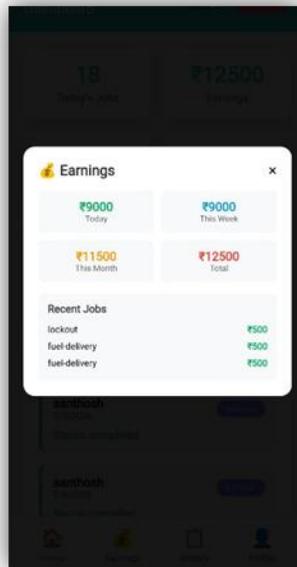After the mechanic complete the job user can rate the mechanic.

Fig. 8 Mechanic earnings

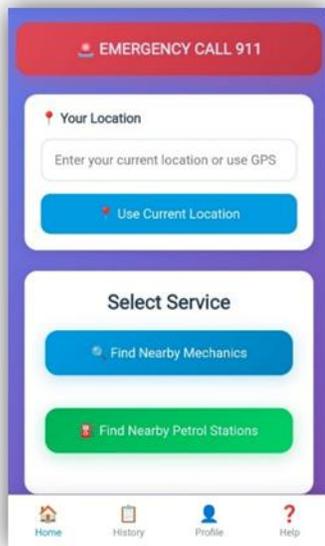The Mechanic will be displayed with their earnings.

Fig. 9 Emergency and Nearby petrol station

We can find the nearby petrol stations and call emergency.

VII. CONCLUSION

The Smart Road Assist system was developed to provide an efficient solution for vehicle breakdown assistance. This system helps users quickly find nearby mechanics and send service requests through a web-based platform. It reduces the time and difficulty involved in searching for mechanics and improves the overall response time. The system also provides secure login and real-time request handling, which ensures reliable communication between users and mechanics.

The developed system is user-friendly, efficient, and useful for real-world applications. It improves convenience and provides quick support during emergency situations. In the future, the system can be enhanced by adding a mobile application, online payment options, and advanced features to further improve performance and usability.

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