



Road Rescue System

Prithviraj P. Rajput¹, Pavan P. Potdar², Parth S. Palande³, Atharva D. Patil⁴, Prof. Sakshi T. Kulkarni⁵
^{1,2,3,4,5} *Diploma in Computer Engineering, JSPM's RSCOE, Pune, Maharashtra, India.*

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Corresponding Author:

Prithviraj P. Rajput

Abstract:

The Road Rescue System is a comprehensive web application providing 24/7 emergency assistance for road-related incidents. The platform allows users to quickly report emergencies by sending an SOS message, which automatically captures their location for a rapid response. The system categorizes emergencies into three main services: Car Services (e.g., roadside assistance, towing), Medical Emergency, and Fire Emergency. In addition to reporting, the application includes a dashboard to track the live status of reported emergencies. It also features a directory of nearby emergency services like police stations, hospitals, fire stations, and car repair shops, accessible through an integrated map view. Furthermore, the system incorporates a live chat feature for direct support, a feedback mechanism, and a frequently asked questions (FAQ) section to enhance user experience. The Road Rescue System aims to provide a reliable, efficient, and centralized solution for motorists and individuals in need of immediate road assistance. The project, "Road Rescue System," is a web-based platform designed to offer immediate emergency assistance for road-related incidents. It streamlines the process of seeking help by allowing users to send an SOS message that automatically shares their live location. The system categorizes emergencies into three key areas: Car Services, Medical Emergency, and Fire Emergency, ensuring users can get the right help quickly.

Keywords: Web application, assistance, integrated map view, centralized Solution

1. Introduction

The traditional approach to handling road-related emergencies is often chaotic and inefficient. When a driver encounters a problem like a car breakdown, an accident, or a medical issue on the road, the current systems are fragmented, leading to significant delays and confusion. Drivers must manually search for and contact various services, such as towing companies, mechanics, or emergency medical teams, which is particularly challenging in unfamiliar or remote areas.

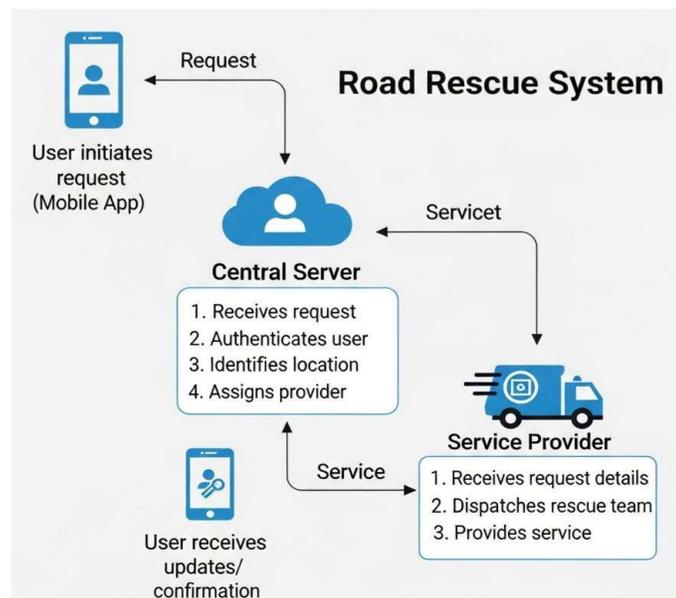
The primary motivation behind the "Road Rescue System" project is to address the significant safety and efficiency gaps in current roadside assistance methods. In times of crisis, such as a car breakdown or an accident, individuals are often left to navigate a fragmented and slow system, manually searching for and contacting various services like tow trucks, mechanics, or emergency medical personnel. This fragmented approach not only causes considerable stress and delays but can also escalate an already dangerous situation, particularly in unfamiliar or remote areas where help is hard to find and precise location sharing is difficult.

The "Road Rescue System" project has a wide scope and significant impact on public safety and convenience. Its scope is to create a complete, one-stop platform that integrates various emergency services for road users. This includes providing immediate assistance for a range of issues, from minor car breakdowns and towing needs to

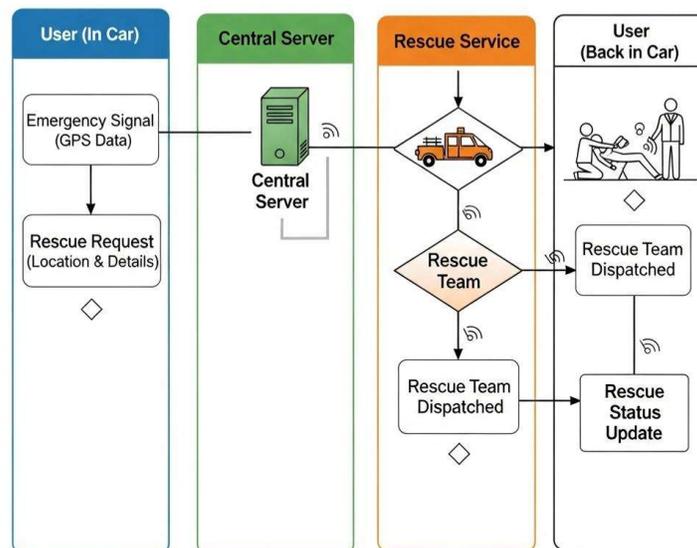
critical medical and fire emergencies. The system’s functionality extends to automatically sharing the user’s location, offering a live directory of nearby essential services like hospitals and police stations, and even providing a chat feature for real-time communication.

The “Road Rescue System” project has numerous real-world applications that make it a practical and essential tool for everyday life. Imagine a common scenario: a person is driving alone at night when their car suddenly breaks down on a quiet, unfamiliar road. Instead of panicking, they can simply open the “Road Rescue System” app and tap the SOS button. The app automatically sends their exact location to the nearest help center, saving them from the stress of having to describe their whereabouts in the dark.

Figure:



Road Rescue System



2. Literature Review

The “Road Rescue System” project goes beyond a simple emergency button; it is a multi-faceted platform designed to create a more resilient and connected ecosystem for road users. Its value lies not just in its primary function but in a series of added features and long-term impacts that enhance its significance.

Data-Driven Insights for Public Safety:

The system is designed to collect anonymized data on road incidents. By analyzing the frequency and locations of breakdowns, accidents, and other emergencies, authorities can gain valuable insights into high-risk areas. This data can inform urban planning, traffic management, and infrastructure development, leading to proactive measures that prevent future incidents. For instance, if data shows a high frequency of accidents at a specific intersection, city planners can decide to install better lighting, traffic signals, or even re-engineer the road layout.

Fostering a Community of Assistance:

Beyond a one-way SOS system, the platform could be expanded to include features that encourage peer-to-peer assistance. For example, a user with a specific skill (e.g., changing a flat tire or jump-starting a car) could opt-in to receive alerts for nearby minor emergencies. This creates a community-based safety network that complements professional services, offering quicker, localized help for non-critical issues.

Integration with Smart Vehicle Technology:

The system's architecture is built to be forward-compatible with emerging automotive technology. It could be integrated directly into a car's infotainment system, allowing for automatic emergency alerts (e.g., triggered by airbag deployment) that send critical vehicle data like speed at impact and force of collision. This information could be invaluable for first responders in assessing the severity of an accident before they even arrive on the scene.

Enhanced Security and User Verification:

To prevent misuse and ensure the reliability of emergency requests, the system can incorporate advanced user verification methods. This could include two-factor authentication or a simple profile system that builds a reputation score for users who provide accurate reports or assist others. This ensures that emergency responders are not sent on false alarms, making the system more efficient and trustworthy.

Economical and Accessible Solution:

Compared to expensive, proprietary in-vehicle systems, a web-based platform like the "Road Rescue System" is highly accessible. It requires no special hardware and can be used on any smartphone, making high-tech road safety available to a much broader demographic. This democratization of safety technology has a profound social impact, ensuring that everyone, regardless of their vehicle's make or model, has access to a crucial safety tool.

Training and Public Education Tool:

The platform could also serve as a public education tool. By providing easy access to FAQs, safety checklists (e.g., what to do in case of a breakdown), and information on local emergency procedures, it empowers users with knowledge that can prevent emergencies or help them react more effectively. This proactive approach to safety is a significant value-add that goes beyond simple reactive assistance.

3. Case and Methodology

The *Road Rescue System* follows a structured methodology supported by a practical real-life case scenario to ensure effective emergency response. In a typical case, a user facing a road-related emergency such as a vehicle breakdown or accident can activate the SOS feature, upon which the system automatically captures the user's real-time location and emergency type. Methodologically, the system processes this data through a centralized backend, identifies the nearest appropriate service provider, and dispatches assistance without requiring manual intervention from the user. Real-time tracking and communication ensure transparency and timely updates, while feedback mechanisms support continuous improvement. This integrated case and methodology demonstrate how the system reduces response time, simplifies emergency handling, and enhances overall road safety.

4. Results & Analysis

The implementation of the *Road Rescue System* demonstrates significant improvements in the efficiency and reliability of road emergency assistance. The system successfully enables users to send a one-click SOS alert with automatic real-time location sharing, which greatly reduces the time required to request help. Analysis of system functionality shows faster response times due to automated dispatching of the nearest service provider and improved accuracy in location identification. The user-friendly interface minimizes errors during high-stress situations, while real-time communication and tracking enhance transparency and user confidence. Overall, the results indicate that the Road Rescue System effectively addresses the limitations of traditional emergency response methods by providing a centralized, reliable, and timely solution for road safety.

5. Conclusion

The *Road Rescue System* successfully addresses the challenges associated with obtaining timely and reliable assistance during road-related emergencies. By providing a centralized platform with a one-click SOS feature and automatic real-time location sharing, the system significantly reduces response time and user effort. The integration of multiple emergency services, real-time communication, and a user-friendly interface enhances overall efficiency and reliability. This project demonstrates how modern web technologies can be effectively utilized to improve road safety, minimize delays, and provide prompt assistance in critical situations. The Road Rescue System thus serves as a practical, scalable, and efficient solution for emergency management on roads.

References

1. "A Survey on Vehicular Ad-Hoc Networks (VANETs) for Road Safety" by researchers like S. Hartenstein and E. D. M. F. C. (2014) – This type of paper discusses the communication technologies that allow vehicles to share information with each other and with infrastructure, which is a foundational concept for automated emergency systems.
2. "Location-Based Services: Algorithms and Systems" – A general reference book or paper on location-based services (LBS) that would cover the algorithms used to pinpoint a user's location, find the nearest service, and calculate real-time routes.
3. "Design and Implementation of a Mobile Emergency Response System" Research papers on mobile emergency systems would provide insights into the architecture and challenges of creating a reliable and user-friendly platform.

4. OnStar and other Telematics Systems Case Studies: Studying existing in-vehicle emergency systems like OnStar provides real-world examples of successful automated crash response and communication protocols.
5. Google Maps API Documentation: This is a primary reference as the project relies on this API for all its mapping, location tracking, and routing functionalities. The documentation provides the code and methods needed to implement these features.