



MECHFAST: a Tech Upgrade for Modern Garages

Himani Parmar, Devkumar Patel, Shivam Patel, Rahul Darji and
Vinit Hingu

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MECHFAST: A Tech Upgrade for Modern Garages

Prof. Himani Parmar

Department of Information Technology
Parul University
Vadodara, India

himani.parmar270199@paruluniversity.ac.in

Devkumar Patel

Department of Information Technology
Parul University
Vadodara, India

devp9713@gmail.com

Shivam Patel

Department of Information Technology
Parul University
Vadodara, India

spatel9898p@gamil.com

Rahul Darji

Department of Information Technology
Parul University
Vadodara, India

rahuld030206@gmail.com

Vinit Hingu

Department of Information Technology
Parul University
Vadodara, India

hingu.vinit@gmail.com

Abstract: An Android app aids travelers during vehicle breakdowns by pinpointing their location and offering a list of nearby repair shops. Users can input issue details, swiftly informing the chosen garage for efficient service. Payment is simplified through the app, eliminating cash hassles. Expense tracking helps manage repair costs. This app provides a high-tech solution to travelers' common vehicle breakdown challenges, enhancing their experience with easy communication, hassle-free payments, and expense transparency, providing reassurance and efficiency in emergencies.

Keywords: Real-time problem solving, online garage service system, user-friendly interface.

1. INTRODUCTION

In today's fast-paced world driven by the internet and digital technology, the desire for a more convenient and comfortable lifestyle is a common goal, particularly as we grapple with the challenges of busy and often stressful lives. The emergence of mobile apps tailored for garages signifies a significant leap in car maintenance and repair solutions. Vehicle breakdowns, often in inconvenient locations, coupled with limited service availability, pose frustrating and potentially unsafe situations for drivers, exacerbating the stress of modern life. Repair costs, which can vary greatly depending on the issue and parts needed, add financial burdens, especially for those on tight budgets. Furthermore, fragmented information about service stations compounds the problem, making it difficult for vehicle owners to locate and book appointments swiftly. Enter MECHFAST, an innovative mobile app that aims to transform the automotive service landscape. It streamlines car servicing, scheduling, and cost transparency, fostering real-time communication between car owners and mechanics. MECHFAST not only enhances convenience but also redefines the car servicing process, making it more efficient, cost-effective, and customer-friendly. In addition, MECHFAST addresses challenges related to accessing spare part information, supplier network fragmentation, compatibility issues, and trust concerns in online transactions, offering a comprehensive solution for vehicle maintenance and repair, ultimately improving the overall automotive ownership experience in a world where a comfortable life is the ultimate aspiration.

2. THEORETICAL BACKGROUND AND SURVEY

2.1 Rapid Service - Mobile App for Bike and Car Service, Proceedings of the Fifth International Conference on

Electronics, Communication and Aerospace Technology (IEEE 2021).

In the contemporary era marked by busy lifestyles, the "Rapid Service" mobile app, developed using Flutter, serves as a practical solution for vehicle maintenance. This platform acts as an intermediary, connecting users with mechanics for convenient booking of car and bike repair services. Users can monitor repair progress, engage with mechanics through chat and calls, and make online payments. Mechanics pick up vehicles at the user's location and, once repairs are complete, the task is marked as finished in the system.

Issues:

- Technical glitches like GPS errors and app crashes can disrupt service reliability.
- Handling user data securely and ensuring regulatory compliance is a constant challenge.
- Intense market competition can lead to pricing pressures and reduced profitability.

2.2 Car Service Slot Booking System, International Journal for Research in Applied Science & Engineering Technology (IJRASET) Apr 2022.

The Car Bath app was developed to enable users to easily schedule car servicing through their mobile devices, catering to the growing demand in the automobile detailing and washing industry. It offers a user-friendly platform for service providers to showcase and automate their services, including appointment scheduling, service package customization, and online transactions. This efficient application saves time, offers convenience, and securely stores customer data, reflecting the modern trend of accessible online services with minimal physical effort.

Issue:

- Booking may be inconsistent if the system is not well-designed
- Customers may wait a long time for a slot, especially if the service center is busy

2.3 Transportation and electricity systems integration via electric vehicle charging-as-a-service.

The rapid adoption of electric vehicles supports global decarbonization, but inadequate and unequal access to charging infrastructure poses challenges. Charging-as-a-service, an underexplored concept, can mitigate these issues.

We analyze media, marketing, and related literature to categorize functions offered by charging-as-a-service providers. Through four case studies, we illustrate how this approach reduces costs, shapes grid loads, and enables cost-effective charging installations. Collaboration with initiatives promoting charging access equity is crucial for maximizing societal benefits.

Issue:

- Charging at public stations can be expensive, especially for frequent users.
- There are still fewer public charging stations than gas stations, and they may be unavailable or congested.
- Public charging stations can be unreliable, and outages can be disruptive.

2.4 WEBSITE AND MOBILE APPLICATION FOR AUTOMOBILE SERVICE CENTRE, International Journal of Engineering Applied Sciences and Technology, 2020.

The Internet, as a technological backbone, facilitates web-based software infrastructure. A project, "Design Website and Mobile Application for Garages," aims to streamline garage operations for owners, mechanics, and users, expediting automobile servicing. Both Android and web apps enable vehicle users to connect with service centers. The system enhances service center management by monitoring transactions and providing user-friendly, time-saving registration for users.

Issue:

- Developing and maintaining a website and mobile application can be expensive and time-consuming.
- Websites and mobile applications can be vulnerable to cyber attacks, which could result in data breaches or other security issues.
- Automobile service centers may need to provide technical support to customers who are having trouble using the website or mobile application.

2.5 Towing Service Ordering System based on Android: Study Case - Department of Transportation, Pekanbaru, 2020.

The Department of Transportation in Pekanbaru, a government entity under the mayor's authority, is enhancing its services through technology. They offer towing services as part of their regional autonomy responsibilities. An Android app has been developed to allow car users to request assistance easily, eliminating the need for manual phone calls. This app also enables officers to pinpoint users' locations swiftly, addressing breakdowns efficiently, especially for unfamiliar visitors. from the system.

Issue:

- The system may not always be able to accurately determine the user's location, which could lead to delays in service.

2.6 Interactive Geolocation System Enhancing user-vendor Relationship in Automotive Services, 2013

The integration of geolocation technology has become a pivotal component in modern services during the twenty-first century. This article will elucidate a groundbreaking concept and delve into a case study to illustrate the conceptual design process of an application tailored for automotive mobile services. The overarching objective of this application is to foster and enrich positive interactions between customers and service providers, harnessing the power of mobile technologies and geolocation.

Issue:

- This could lead to users being misdirected or receiving inaccurate information.

2.7 My Car Service Application (MCaSeP) - Application for Smart Reminder of Car Service, 2022

Malaysians are advancing in various technical fields, particularly in IT, but some individuals lack knowledge about car engines, prompting the IT department to create a smart car service app. This project aims to analyze, design, develop, test, and evaluate a mobile app catering to vehicle users, including teenagers, women, and students with limited car knowledge. The Object-Oriented System Development approach guides the project, and it addresses the absence of a smart car service reminder app in the community. The successful development of the MCaSeP app completes all stages, with plans to enhance modules and functionality for optimal performance.

Issue:

- The system may be difficult to use for people who are not tech-savvy.

2.8 E-garage- Department of Computer Engineering, BSIOTR, Pune,2019

The E-garage system efficiently assists drivers when they encounter a vehicle breakdown, eliminating the need for time-consuming searches for nearby garages. This system not only offers precise information on the closest garage but also details the facilities available at each location, enabling drivers to make informed decisions and minimize downtime during unexpected incidents. Moreover, it provides pricing information, allowing drivers to budget accordingly for any required services.

Issue:

- May not be suitable for all types of vehicles or services.

3. PROPOSED WORKFLOW

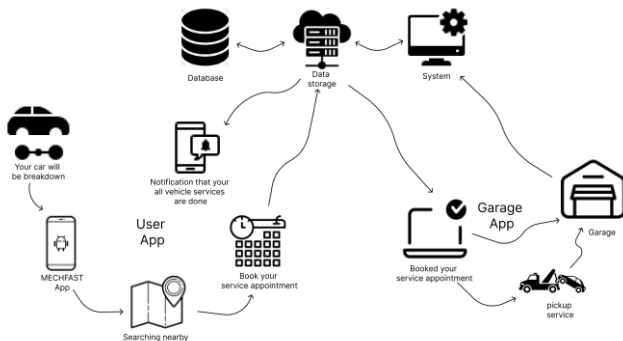


Figure 1 proposed workflow

Working

online garage systems are becoming increasingly popular. These systems offer a convenient and efficient way for vehicle owners to book and manage their vehicle servicing needs. To use an online garage system, vehicle owners would first need to create an account and register their vehicle. Once they have done this, they can browse through a list of available garages and select the one that best suits their needs. They can then choose the services they require and book a time slot. On the day of the appointment, A user would simply drive their car to the garage and leave it with the staff. The garage would then carry out the requested services and return the car to the owner at the agreed time. Online garage systems offer several benefits for both car owners and garages. For car owners, they make it easy to book and manage car servicing appointments online. They also provide access to a wider range of garages, which can help car owners find the best deals and services. For garages, online garage systems can help to improve efficiency and reduce costs. They can also help garages to reach a wider customer base.

Here is a more detailed example of how an online garage system might work:

- **Install MECHFAST App:** Download and install the MECHFAST app on your Android smartphone.
- **Log In:** Launch the app, log in with your mobile number, and verify your identity via SMS OTP.
- **Find Nearby Garages:** Use the app to locate nearby garages for quick assistance.
- **Book Service:** Schedule a service appointment through the app, and you will receive a confirmation SMS.
- **Mechanic Assistance:** On the scheduled date, a mechanic from the chosen garage arrives to assess and repair your vehicle.
- **Garage Services:** Skilled technicians perform the requested services.
- **Vehicle Return:** Your vehicle is returned at the agreed-upon time and place in improved condition.
- **Payment Options:** Choose between cash or Unified Payments Interface (UPI) for payment.
- **Service Completion SMS:** After payment, you will receive an SMS confirming the completion of services.

MECHFAST simplifies handling unexpected vehicle breakdowns, ensuring a smooth and trustworthy experience for users to continue their journey confidently.

Advantages

- This system provides a User-friendly interface.
- Vehicle owners can book and manage their car servicing appointments online, from anywhere, at any time
- Vehicle owners have access to a wider range of garages and services.
- MECHFAST can help garages reach a wider customer base by making it easier for vehicle owners to find and book their services.

4. RESULTS AND DISCUSSION DEVELOPMENT SOFTWARE AND TOOL

Android Studio: It is the official integrated development environment (IDE) for the Android operating system. Built on JetBrains' IntelliJ IDEA, it is tailored for Android app development, supporting various programming languages like Java and Kotlin. Android Studio offers an efficient emulator, enabling users to create GUIs with a drag-and-drop feature, providing a real-time Android app development experience, which enhances efficiency and reduces development time.

Google Firebase: It is a web and mobile app development platform offering tools for building and enhancing applications. Its features include authentication, real-time databases, configuration, file storage, hosting, and cloud functions, simplifying direct interaction with services through code queries.

Mapbox: It is a platform for developers and businesses to create custom maps and location-based apps. It provides map rendering, geospatial data management, map customization, location services like geocoding and routing, SDKs for interactivity, visual design via Mapbox Studio, and scalability for high traffic. Widely used in various industries, it integrates interactive maps and location-aware features into websites and mobile apps, with pricing options for different application scales.

Implementation

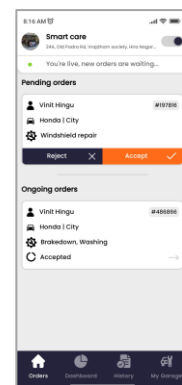


Figure 2 Pending and ongoing order list

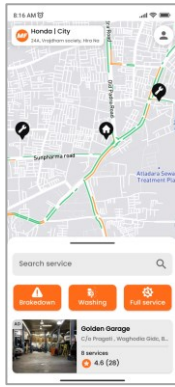


Figure 3 Nearby garages

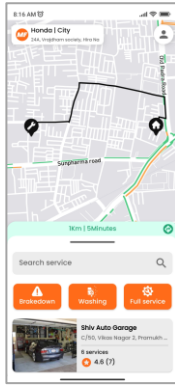


Figure 4 Garage route

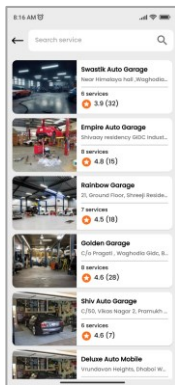


Figure 5 Search screen

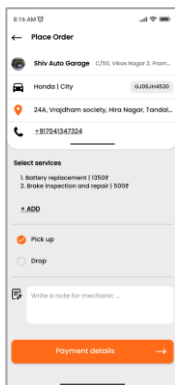


Figure 6 Garage details and Order information

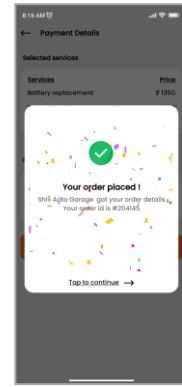


Figure 7 Successful payment

CONCLUSION

MECHFAST is set to revolutionize the vehicle service industry by integrating technology and connecting vehicle owners with nearby garages and mechanics using the MECHFAST app. It promotes transparency, facilitates real-time communication through Google Firebase, and offers pickup, drop and discounts. Focusing on Android development, MECHFAST aligns with India's smartphone culture. It aims to transform vehicle breakdown management, enhancing customer satisfaction. MECHFAST is not just an app but a revolutionary solution for vehicle owners in India.

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