



An Android App For On Road Vehicle Breakdown Assistance

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Abstract

The project, which is “An Android App for On-Road Vehicle Breakdown Assistance,” was created using the Android Studio environment, with Java and XML being the front-end technologies and SQLite being the back-end database. The application presented here will help in finding mechanics nearby in case of vehicle breakdown. It is hard to find a mechanic when traveling; this system solves the problem by providing a one-click option to view mechanic information. The locator option provides users with an option to look for mechanics at various locations, making it easier to access services. The system is intended for three main actors: Admin, Mechanic, and User. Mechanics are able to see requests for services from users and offer feedback to the admin. In case of emergencies like a flat tire, brake failure, or any other mechanical problems, the users can depend on the app to locate the closest service provider. The app facilitates smooth resource management and allows mechanics to add service bill details, which can be easily accessed by users. By simplifying the process of requesting roadside assistance, this system improves efficiency in services, thereby making car breakdown assistance more reliable and accessible.

Keywords: *Vehicle Breakdown Service, Android App Development, Mechanic Finder, Roadside Emergency Service, Service Request Management, User-Friendly Interface, Resource Optimization.*

Introduction

Road vehicle breakdowns are inconvenient and stressful, usually leaving the drivers stranded with very little immediate help. In order to remedy this situation, technology-based services like mobile applications have been introduced to facilitate quick and effective roadside support (Gowthami et al., 2023; Padmaja et al., 2024). A smartphone application built on the Android operating system is an On-Road Vehicle Breakdown Assistance program that offers a computerized interface connecting stranded drivers to local mechanics, towing, and emergency responders in real-time. This app combines GPS tracking, auto-service requests, and

easy-to-use interface to provide instant response times and effective communication between service providers and users(Jayavarthini et al., 2021; Rakhra et al., 2024). Using cutting-edge technologies like cloud computing, push messages, and in-app payments, this app maximizes user experience while providing reliability. With the rise in the number of cars and their reliance on computerized solutions, a streamlined breakdown assistance app will greatly enhance access to roadside servicing, decrease tension among drivers, and simplify the entire process of accessing mechanical services.

Review of Literature

Technological innovation has revolutionized the automotive service sector, especially in vehicle repair and maintenance. The advent of digital solutions has optimized service access, offering real-time location tracking, automated job allocation, and enhanced customer-mechanic engagement (Rakhra et al., 2024). Such innovations solve problems such as the inconvenience of finding mechanics in emergency situations and inefficiencies in conventional service models (Jayavarthini et al., 2021).

The convergence of mobile apps and cloud-based systems has improved vehicle service management through centralized databases, GPS tracking, and automatic service requests (Maduabuchukwu & Abel, 2024). The Vehicle Service Management System (VSMS) provides smooth communication between users, mechanics, and administrators, enhancing efficiency and accountability (Padmaja et al., 2024). Modern applications also support EV charging slot booking and on-road vehicle services, minimizing range anxiety and maximizing service delivery (Gowthami et al., 2023).

User experience is of pivotal importance in the automotive technology sector. Studies emphasize the significance of natural interaction patterns and intuitive interfaces in mitigating cognitive load and enhancing driver safety (Moorhouse, 2022). These studies collectively underscore the importance of sophisticated, user-centric solutions that promote greater service accessibility, responsiveness, and overall efficiency within the automotive industry.

Objectives

The main aim of the proposed system is to create an easy-to-use interface for hassle-free roadside assistance. The system provides an effective means of assistance for users with car problems on the go. If a registered user is experiencing a problem, he/she can click on the Get Service Assistance button. The system then fetches service mechanic information on the basis of location matching. Full mechanic details are shown to the user, and they can choose a mechanic and request for service. The request is sent automatically to the mechanic for acceptance. The mechanic can accept or decline the request, and the user will be notified of service confirmation or rejection through SMS in real-time.

Project Planning

Project planning is a systematic process to finish a project within a predetermined time frame by adhering to major stages and using allocated resources. Planning is the process involving the following steps:

1. **Setting Measurable Objectives:** Formulating well-defined goals and achievement criteria for the project.
2. **Identifying Deliverables:** Describing anticipated outcomes and functionalities of the application.

3. **Resource Allocation:** Allocating required tools, technologies, and human resources for effective development.
4. **Implementation & Testing:** Designing the system and thorough testing to achieve functionality and reliability.
5. **Deployment & Maintenance:** Deploying the application for mass use and giving constant updates from user reviews. This systematic method guarantees the successful execution and success of the project, making vehicle breakdown help more accessible and reliable.

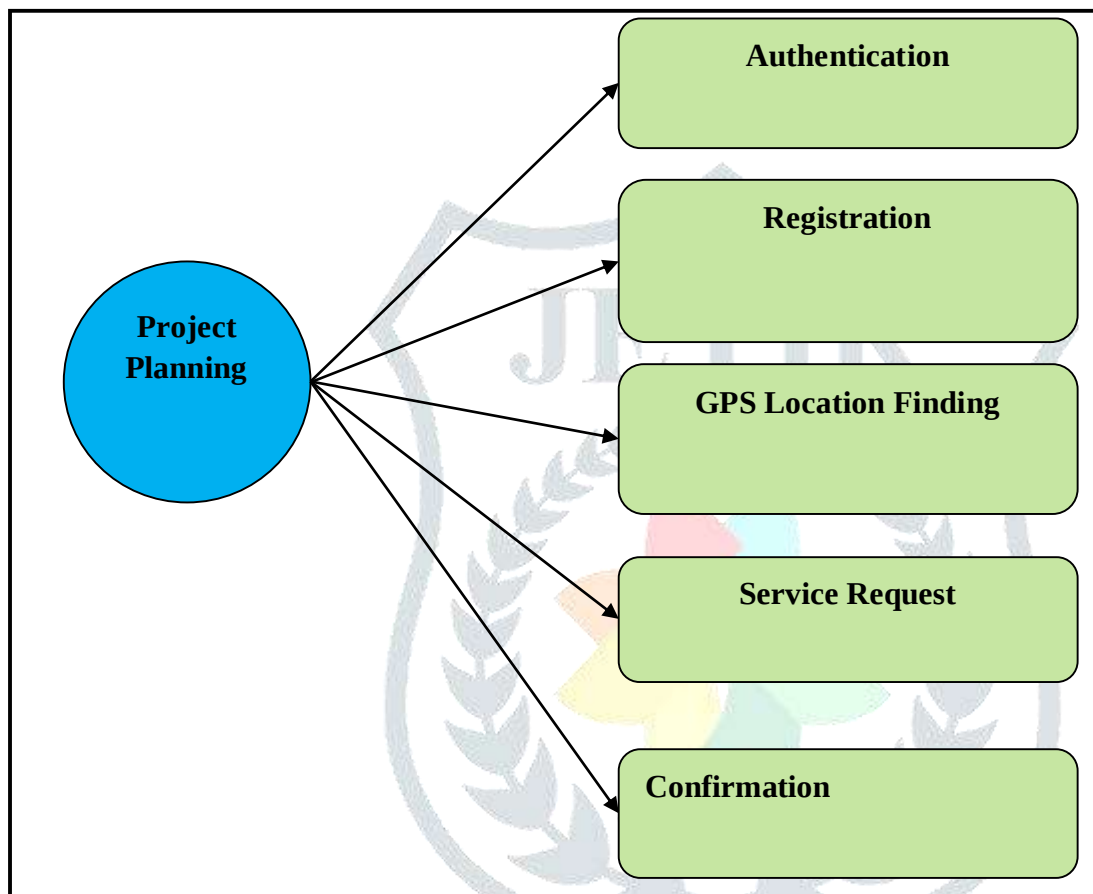


Fig 1 Conceptual Framework

SYSTEM REQUIREMENT

HARDWARE REQUIREMENT

- CPU type : Intel
- Clock speed : 3.0 GHz
- Ram size : 4 GB
- Hard disk capacity : 500 GB
- Monitor type : 15 Inch color monitor
- Keyboard type : Internet keyboard

SOFTWARE REQUIREMENT

- Operating System : Windows, Mac, Linux, etc (any one)
- Language : JAVA
- Back End : SQLite
- IDE : Android Studio 2.3
- Documentation : Ms-Office

EXISTING SYSTEM

In the existing system, everything is done manually, so the process is very time-consuming and not efficient. Customers who want mechanical help have to either go to the workshop in person or outsource to get a service mechanic. This reliance creates immense delays in getting right guidance. One of the biggest problems of this system is the time factor users usually have difficulty in getting timely service, which may inconvenience them or their plans/journeys. Travelers are especially hard hit as they are not aware of available service points within their vicinity. Sometimes, they are left stranded with no means of help because there are no accessible service providers nearby.

Key Drawbacks:

1. **Time-Consuming Process:** Manual operations result in the delay of getting mechanic support.
2. **Dependency on Human Effort:** Customers have to physically go to workshops or ask for assistance from others.
3. **Lack of Timely Assistance:** Service unavailability at the right time can make users unable to proceed with their journey.
4. **Limited Awareness of Nearby Services:** People usually are not aware of the service providers around them.
5. **Unavailability in Remote Areas:** Users might find themselves stranded with no help since there are no nearby mechanics.

DISADVANTAGES

- ✓ Time consuming process
- ✓ Needs someone help to get complete service assistance.
- ✓ Difficult to get mechanic information.
- ✓ huge amount of time is needed for it gets proper help
- ✓ Existing system does not provide any assistance.

PROPOSED SYSTEM

The problems encountered in the current system can be efficiently addressed through the use of the On-Road Vehicle Breakdown Assistance system. The solution seeks to offer a convenient, effective, and automated platform for travelers requiring mechanic services. Registered users are able to log into the application

whenever their vehicle breaks down on a trip. After successful login, the application provides a list of registered mechanics in the user's location. Through GPS technology, the system records the current location of the user and pairs it with nearest mechanics, providing the availability of quick service. Users are able to send the request for service directly via the app, while the mechanics are able to login to approve or decline requests according to their availability. After the service is done, mechanics can upload the details of the service bill via the application, and users can leave ratings and reviews based on their experience. The system reduces manual processes, makes it more accessible, and provides a hassle-free experience by minimizing delays and offering real-time service support.

ADVANTAGES

- ✓ Less Time consuming process
- ✓ Live location based service assistance.
- ✓ Easy to get mechanic information.
- ✓ Less time is needed for it gets proper help
- ✓ User can post reviews and rating for service this helps to other user choose service mechanic effectively.

Modules

1. Enrollment/Authentication

This module allows for both the registration and login process of users and service mechanics. Registration is required, which provides secure access to the mobile application using a username-password system. Depending on their role, users and mechanics will be redirected to their respective dashboards once logged in.

2. Process for Profile Uploads

This module has been specifically developed for service mechanics so that they can upload full business information, such as the name of the service workshop, the type of service provided, location, working hours, payment method, contact number, and address. All of this information is kept in a specific database table so that it can be easily accessed and managed.

3. GPS Location Finding

This module provides location tracking in real-time via GPS or network-based location services. It pulls the user's exact location by satellite tracking and sends the information to a server located centrally through an integrated wireless modem in the Android smartphone.

4. GPS Navigation Process

The GPS navigation module calculates the user's location and offers real-time tracking of their movement. This feature ensures that the system keeps updating the user's position, allowing for accurate navigation and assistance.

5. Service Assistance Request

This module is user-friendly and enables them to request mechanic services easily. Once a user presses the "Get Service Assistance" button, the system fetches their real-time location using GPS automatically and associates it with the registered mechanics nearby. A list of available service mechanics appears, from which the user can choose and initiate a service request. There is also a call service feature included, through which users can make direct calls to the chosen mechanic at one tap.

6. Service Confirmation

This module is reserved for service mechanics to see and administer incoming service requests. Mechanics either accept or reject a request, and the user is immediately informed through an SMS notification of their request status.

7. Review Process

This module enables customers to leave ratings and reviews about mechanics based on their experience in receiving services. Reviews are stored in a database and made public, allowing other users to make informed choices while choosing a mechanic.

Database design

Login table

Field Name	Data type	Description	Constraints
User name	Varchar (30)	This field contains Name of the user	Not Null
Password	Varchar (30)	This field contains Password information	Not Null

Register Table

Primary key: user id

Field Name	Data type	Description	Constraints
user id	int (30)	This field contains User id	Not Null
User name	Varchar (40)	This field contains User name	Not Null
Password	Varchar (35)	This field contains Password	Not Null
Contact Number	int (10)	This field contains Contact Number	Not Null
Email id	Varchar (30)	This field contains Email id	Not Null
Address	Varchar (40)	This field contains Address	Not Null

MechinfoTable

Primary key: mechid

Field Name	Data type	Description	Constraints
mechid	int (30)	This field contains User id	Not Null
User name	Varchar (40)	This field contains User name	Not Null
Password	Varchar (35)	This field contains Password	Not Null
exp	Varchar (25)	This field contains exp	Not Null
Contact Number	int (10)	This field contains Contact Number	Not Null
Email id	Varchar (30)	This field contains Email id	Not Null
Address	Varchar (40)	This field contains Address	Not Null
Service_type	Varchar (40)	This field contains service type details	Not Null

Booking table**Primary key: Booking id****Foreign key: User_Id****Foreign Key: mechid**

Field Name	Data type	Description	Constraints
Booking id	Varchar(30)	This field contains Booking id	Not Null
User_Id	Varchar(30)	This field contains User id	Not Null
mechid	Varchar(30)	This field contains employee id	Not Null
Vehicle type	Varchar(30)	This field contains Types of vehicle	Not Null
Complaints	varchar(30)	This field contains Details of problems	Not Null
Spare	varchar(30)	This field contains need any spare	Not Null
Date of post	date	This field contains Date of post	Not Null
location	varchar(30)	This field contains location	Not Null

Confirmation**Foreign key: Booking id**

Field Name	Data type	Description	Constraints
Booking id	Varchar (30)	This field contains Booking id	Not Null
Remarks	Varchar (30)	This field contains remarks	Not Null
Status	Varchar (30)	Accept/Reject	Not Null

Feedback:

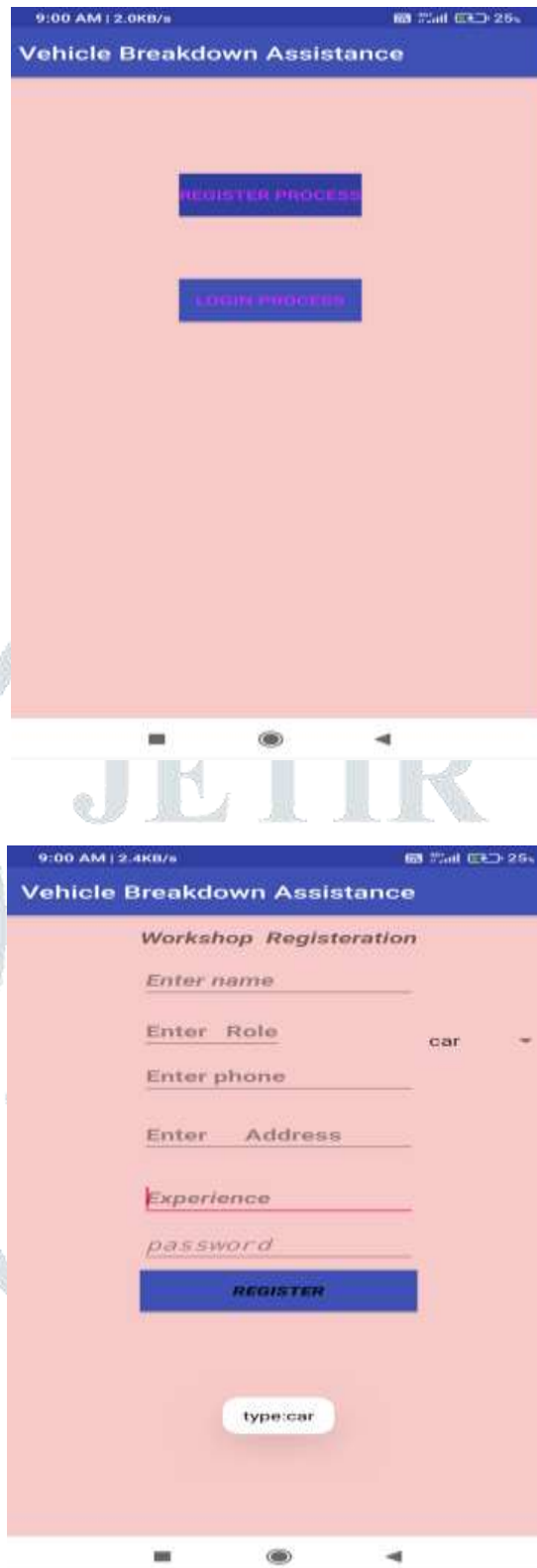
Foreign Key: User_Id

Foreign Key: empid

Field Name	Data type	Description	Constraints
Feedback date	Date time	This field contains Date	Not Null
User_Id	int (30)	This field contains user id	Not Null
name	Varchar (30)	This field contains Customer name	Not Null
empid	Varchar (30)	This field contains employee details	Not Null
Feedback	Varchar (30)	Feedback	Not Null

Screens





Test Case Design

Admin

Serial no	Form	Test case	Expected result	Actual result	Final Result
1	Admin form	Without any key input click the login button	Please enter username and password	Please enter username and password	pass
2	Admin form	Without any proper key input click the login button	It should show key invalid.	It should show key invalid.	Pass
3	Admin form	If we pass Proper key input click the button	Its moves the admin form	Its moves the admin form	pass

Conclusion

An Android On-Road Vehicle Breakdown Assistance application is a critical innovation in the automotive repair business, solving the problems of sudden vehicle breakdowns with effectiveness and ease. Through the use of real-time GPS location tracking, computerized service requests, and direct communication with local mechanics, this app improves the dependability and responsiveness of roadside assistance services. The inclusion of cutting-edge features like secure payment gateways and digital service histories also enhances user experience. With more drivers embracing digital solutions, this app can potentially transform roadside assistance into a quick, efficient process that reduces delays and disruptions. Predictive maintenance notifications based on AI and wider service networks are potential future improvements that can enhance the efficiency of the app. Finally, this app fills the gap between car owners and service centers, providing an easy, tech-based solution for managing on-road breakdowns and making travel safer and stress-free.

Future Work:

Each application has its advantages and disadvantages. This project has been able to meet nearly all the necessary requirements, providing an effortless user experience. Because it is designed with a structured and modular approach, the system makes it easy to make changes and improvements. Future enhancements can be made by updating existing modules or adding new ones as required. More development can be done by adding an IoT interface, which will allow GPS devices to retrieve live locations and show nearby mechanic details on an LCD touchscreen. By a single touch on the name of the mechanic, an automatic service request will be made, making the process more efficient and providing instant help. All these developments will enhance service efficiency further, making the process easier to use and allowing quicker appointments with the mechanic.

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