

## My Details

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**Problem Statement Industry**

**Smart Road Assistance and Emergency  
Response**

## Defining the Problem

Getting stuck on the road due to a car breakdown is a situation most drivers fear. Whether it's a sudden engine failure, a flat tire, running out of fuel, or even worse - a car accident - these problems can happen to anyone, anytime and anywhere, often in highways or an unknown city. In case of accidents, the lack of immediate help can be life-threatening. For drivers who aren't car experts, figuring out what to do next can be stressful and dangerous and waiting for help on a deserted highway or struggling to find a reliable mechanic nearby adds to the frustration. The absence of quick support and guidance makes a bad situation worse.

•**Safety and Life-Saving Concerns:** Being stuck on unfamiliar roads, especially after an accident, can put lives at risk if emergency services aren't contacted immediately.

•**No Quick Fixes:** Most drivers don't know how to handle even simple breakdowns without mechanics advice or tools.

•**Difficulty Finding Help:** Locating a nearby mechanic, service center, or emergency service quickly is tough.

## Why the Problem Matters?

**1. Life Threatening:** Car breakdowns and accidents can quickly become dangerous, especially at night or in remote areas.

**2. Can Happen to Anyone:** This problem can happen to anyone - female drivers, families with kids, or even truck and bus drivers. Most people aren't vehicle experts, so being stuck without clear help is scary.

**3. Long Waiting:** Finding a reliable mechanic or towing service quickly is tough, leading to long waits and ruined travel plans.

## Who is Affected?

- Everyday Drivers
- Female Drivers
- Families with Kids
- Truck and Bus Drivers
- Emergency Services
- Highway Authorities

# Proposed Solution - RoadMate



## My Solution

To solve this problem, I propose a mobile app called **RoadMate**. RoadMate is designed to be a reliable companion for drivers, offering quick and practical solutions during emergency on the road.

- When a user encounters a car issue, he can enter his problem on RoadMate which will first attempt to assist them with simple, step by step do-it-yourself guides - such as how to change a tire or jump-start a dead battery. These guides will include easy to follow instructions and videos, making it possible for drivers to handle issues independently.
- If the problem turns out to be more serious or beyond the user's ability to fix, RoadMate will seamlessly switch to finding professional help. By integrating Google Maps, the app will display nearby service centers, car mechanics registered on the app, and roadside assistance providers, along with their contact details. This ensures that users can quickly connect with trustworthy professionals without wasting time.
- In case of accidents, drivers can use RoadMate to immediately contact emergency services, sharing the user's location for faster response times. The app will also offer direct access to highway authorities and towing services to prevent long waits and ensure driver safety.
- Additionally, a built-in AI chatbot will be available to assist users in their preferred language, allowing them to describe their problems more comfortably and receive accurate guidance.

## Innovation and Uniqueness of Solution (USP)

E	Efficiency	Offers step-by-step DIY guides that enable drivers to resolve minor issues on their own thereby streamlining the process of finding help and reducing wait time.
E	Emergency Help	In case of accident, user can directly contact local emergency services like police, ambulance or family and inform them about their location ensuring fast response.
I	Integration	Seamlessly utilizes Google Maps to locate nearby service centers, registered mechanics, and towing services for immediate assistance.
M	Multilingual	RoadMate features a built-in AI chatbot that communicates in the user's preferred language, making guidance accessible and user-friendly.
O	Opportunity	RoadMate allows car mechanics to register as help providers on the platform, boosting their business prospects and creating new employment opportunities.

# TECHNICAL APPROACH

01

## App Development

RoadMate will be built using Flutter which will allow to develop the app for both Android and iOS user. Also, the app will include three different types of users:

- a) Car Drivers, who will use the app for emergency services and car service-related help.
- b) Mechanics, who can list their businesses and provide service to drivers.
- c) Emergency service providers like ambulance and police.

02

## User Management and Authentication

**Firestore Authentication** will be used to handle user sign-ups and logins securely. Different user roles (drivers, mechanics, and emergency providers) will be managed in Flutter using models. Each user type will have customized dashboards and different functionalities, ensuring that the app's services are relevant and accessible based on their needs.

03

## Location Services and Navigation

**Google Maps API** will be integrated to provide real-time location-based services. Drivers will be able to see nearby service centers, registered mechanics, and emergency contacts directly on the map. The app will also offer navigation support to help users reach these locations efficiently.

04

## Database

The guides and tutorials for DIY car repair service can be stored in either MongoDB database or Firestore database. So, any of those databases can be used to store the guides and tutorials. I will prefer MongoDB for the same.

05

## Real-Time Alerts and Notifications

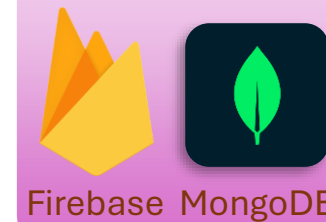
Firestore Cloud Messaging (FCM) will send real-time notifications. When a driver requests help, nearby mechanics receive issue details and location. In accidents, emergency services are notified with exact coordinates and emergency details.

# TECH STACK & TOOLS

## Frontend



## Backend



## AI Chatbot

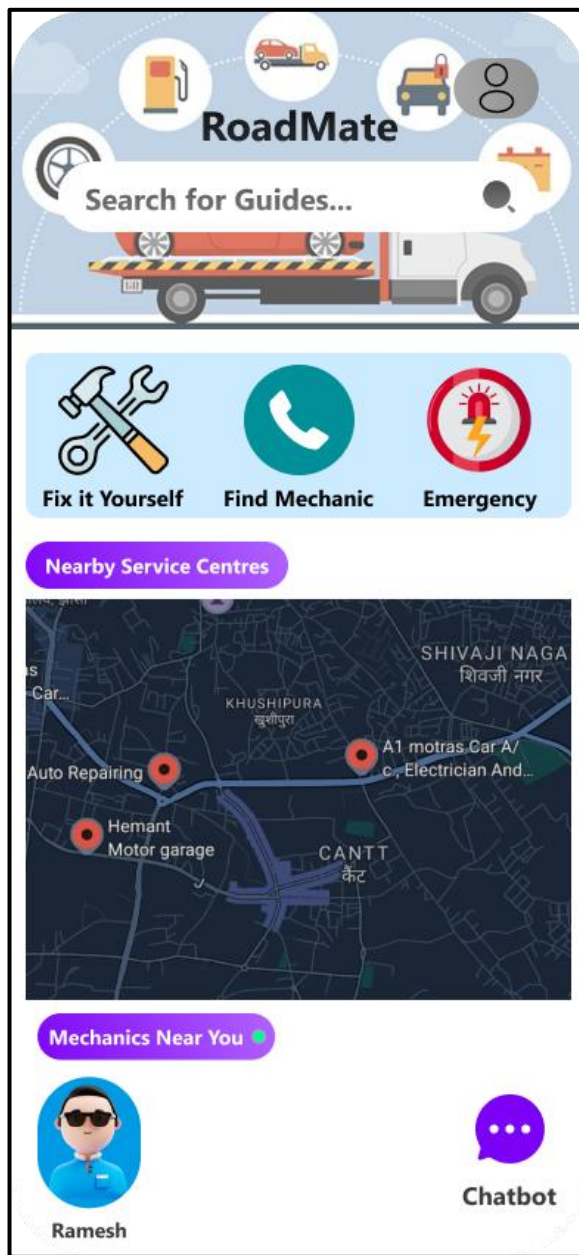
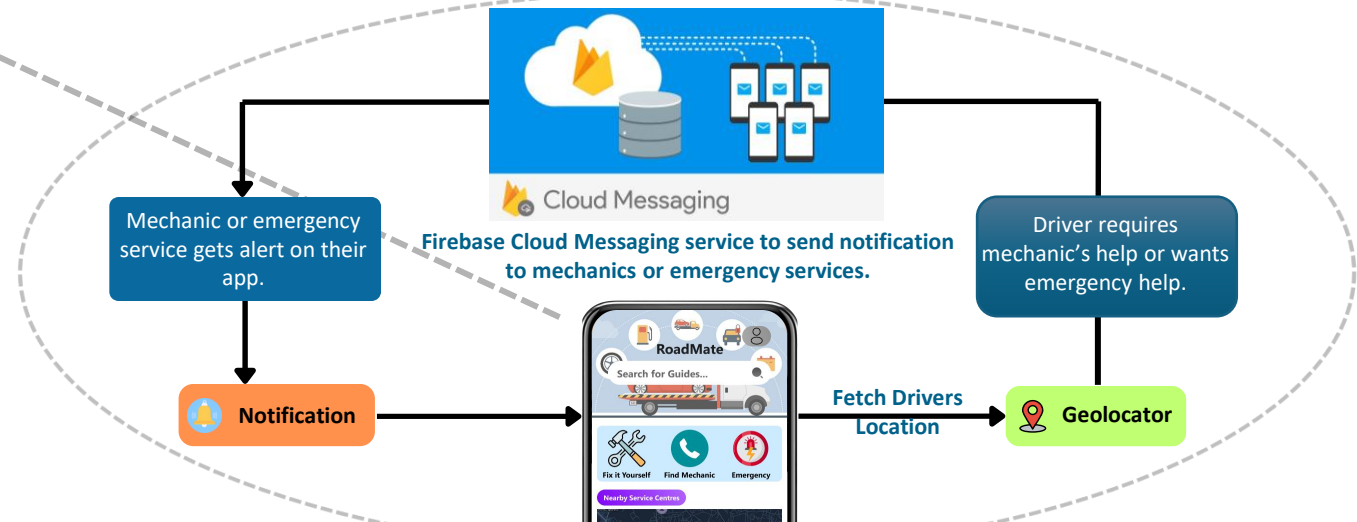
To build the AI chatbot for RoadMate, I'll use Google Gemini and fine-tune it with a dataset of car troubleshooting queries, DIY guides, and emergency responses stored in Google Cloud Storage. Gemini's advanced NLU capabilities will help understand user queries accurately, while its multilingual support will enable interactions in different languages.

## APIs



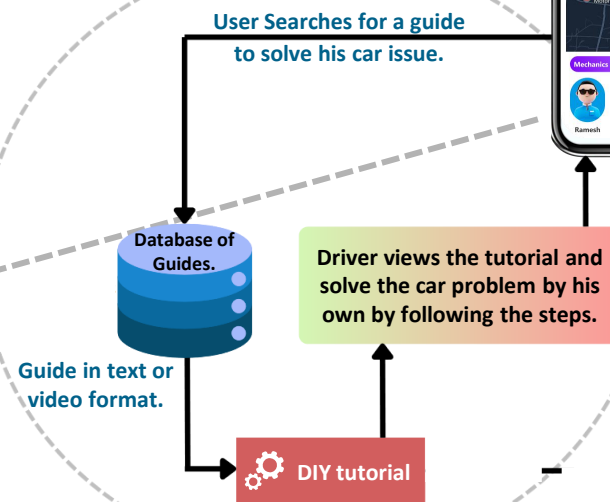
# Architecture Overview

## 1. Emergency Alert System

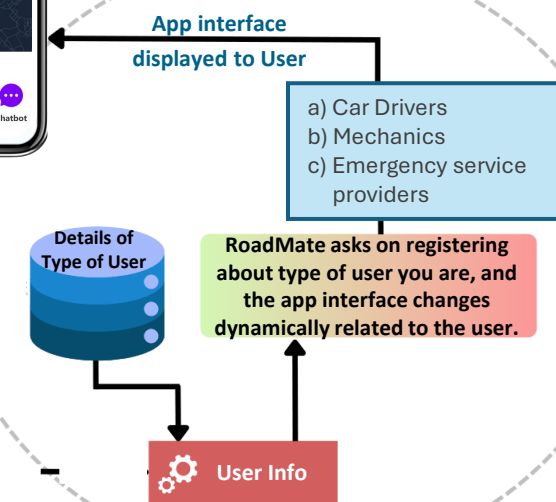


Figma design prototype of app.  
(The actual design will vary)

## 2. Viewing tutorials to solve car related problem by your own.



## 3. Types of User





## Feasibility of the idea

### 1. Technological Feasibility

The app utilizes the Google Places API to find service centers and mechanics shops so, it is very easy to implement and less cost. Also, the app will be built using Flutter so from the single codebase cross platform app will be developed.

### 2. Financial Feasibility:

The app is cost-effective to develop by leveraging existing APIs and services. Also, the app can earn revenue by taking commissions from the mechanics every time they get request from drivers for services.

## Potential challenges and risks

**1. Building a Large User Base:** Attracting a significant number of users, including drivers, mechanics and emergency help, will be challenging.

**2. Accurate and Real-Time Data:** Ensuring that information about nearby mechanics, service centers, and emergency services is accurate and up-to-date can be difficult.

**3. Language and Accessibility Barriers:** Supporting multiple languages and ensuring that the app is easy to use for people of all backgrounds can be a challenge.

**4. Reliable Connectivity in Remote Areas:** Ensuring the app works smoothly on highways or remote locations with poor internet connectivity can be a challenge.

## Strategies for overcoming challenges

**1. Marketing:** Implement referral incentives, targeted marketing, and partnerships with car service centers to attract drivers, mechanics, and emergency services to join the platform.

**2. Multiple APIs and Feedback:** Use multiple APIs for live data updates and establish a feedback system for users to report inaccuracies, ensuring timely corrections.

**3. Multilingual:** RoadMate can be made multilingual and with easy-to-use interface so anyone can use the app without any issue.

**4. Offline Access:** Enable offline access to basic features like DIY guides and cached maps to assist users in areas with weak internet signals.

# *Thank You*

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**There are 69 million vehicle breakdowns annually in the U.S. or about 189,000 daily.**

**Approximately 1-in-3 American drivers are affected by vehicle breakdowns.**

**As you can see from the image that many drivers are affected by vehicle breakdown in USA but, this problem is worldwide.**

**RoadMate will solve this problem as well as it can help save lives during car accidents.**