Breakdown Buddy

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ABSTRACT

The On-Road Vehicle Breakdown Assistance System is a mobile app designed to assist motorists in times of breakdowns. It uses advanced technology like GPS and mobile networking to coordinate roadside assistance. The app is user-friendly and accessible to both vehicle owners and service providers. Users can request assistance, trigger GPS location identification, and receive timely assistance. Breakdown Buddy addresses mechanical issues in maximum locations, providing a comprehensive directory of qualified experts. This system aims to make breakdowns a seamless and reassuring experience, similar to ride-sharing services like Uber and Ola.

Keywords:
On-road vehicle breakdown assistance, roadside assistance, mobile app, GPS, service providers, timely assistance, system architecture, real-time location tracking, security measures.

Need of our work:
So far, we've developed a user-friendly app that accurately pinpoints a user's location in real-time. This feature will be invaluable for mechanics, as they'll know exactly where to go to help users in need, making the whole process smoother and more efficient.

Work till now:
Our goal is to help people who experience car breakdowns by creating a system that quickly connects them with reliable help, making their travel experiences safer and less stressful.

1. INTRODUCTION

Traveling by automobile is common in the modern period, but one of the biggest challenges for travelers is the discomfort of on-road vehicle breakdowns. The On Road Vehicle Breakdown Assistance program emerges as a virtual solution, providing an online platform for users to schedule emergency appointments conveniently. When faced with a breakdown, users can locate nearby mechanics and spare-parts stores through the application, eliminating the stress of finding trustworthy assistance on the spot.

The program offers a user-friendly interface, displaying the user's location and directing them to the nearest service provider. With the help of specializations, ratings, and contact details, our open-source software connects consumers with reputable mechanics quickly and effectively, saving them time.

User requests are comprehensive, encompassing location, service type, vehicle details, and a description. Administrators have access to a centralized database containing registered user and mechanic information. Key features include 24x7 availability, ensuring trained mechanics equipped with appropriate tools to promptly address breakdowns. In our mobile-centric world, on-road vehicle breakdown assistance is pivotal, enhancing overall travel experiences. As technology advances, these services are poised to become more efficient, ensuring safer and more dependable road trips for travelers.

2. LITERATURE SURVEY

2.1 Survey of Existing Systems

Several existing systems aim to provide on-road vehicle breakdown assistance services but have limitations in key areas:

1) Help Me App (Artigala, 2019-2020)

The Help Me App provides basic GPS location tracking for users needing assistance. However, it lacks comprehensive breakdown support features beyond locating the user on a map. The inability to detect breakdown problems and the lack of immediate dispatch capabilities are the main drawbacks.

2) IoT Based Breakdown Assistance (Tote, July-August 2020)

This system uses IoT sensors on vehicles to automatically detect accidents and initiate assistance dispatch. A benefit is identifying incident locations without user input. However, potential errors or failures of sensors, inability to account for all accident scenarios, and lack of tunnel accident detection capability are major limitations.

3) On-Road Breakdown Assistance (Khot et al., March 2022)

This solution requires the submission of an OTP and multi-step security verification using registered phone numbers before assistance is dispatched. However, the extensive identity verification process causes delays in emergency response. Additionally, reliance on OTP is vulnerable to poor network coverage.

4) Breakdown Assistance System (Aher et al., November 2022)

This technique promotes human skill development and job possibilities by using on-the-ground agents to help via mobile applications or calls. But, the key constraints are high administrative overheads and human dependency challenges for scalability.

5) Google Maps Based Assistance (Deshmukh & Puraswani, March 2020)

This concept allows location-based access to breakdown assistance services through Google Maps and wide coverage recommendations. However, the lack of real-time coordination hampers quick response. Additionally, insufficient data analytics on breakdown trends and assistance resources prevent effective dispatch.

In summary, existing systems have limitations in features, efficiency, coverage, analytics, and security. Upgraded technologies, predictive insights, and personalized solutions are needed to deliver rapid, reliable, and tailored assistance during breakdowns.

2.2 Limitations of Existing Systems

Key limitations of current breakdown assistance systems include:

1. Delayed Response Time:

Response times are delayed in existing systems due to the absence of real-time coordination and streamlined dispatching protocols to rapidly send assistance vehicles when breakdowns occur. The inability to accurately anticipate demand and optimally allocate assistance resources based on real-time needs also causes lags in service response, exacerbating delays.

2. Inadequate Service Coverage:
Failure to thoroughly analyze real-time breakdown location data results in suboptimal positioning and allocation of assistance providers. This leads to coverage gaps when incidents occur in under-served areas. Existing systems also lack robust demand-supply analytics and dynamic resource positioning mechanisms to bridge coverage gaps.

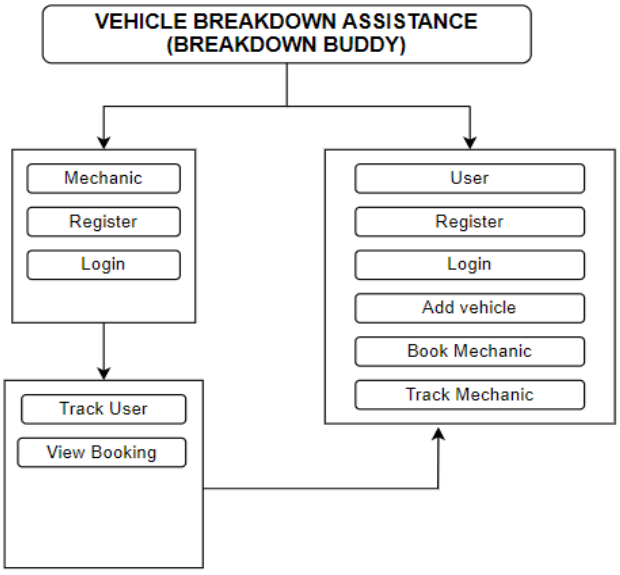
3. Limited Data Analytics:
Systems currently have limited capabilities to continuously gather and process real-time vehicle sensor, location, and usage data. This hampers efforts to reveal insightful patterns to accurately predict imminent breakdowns preemptively. Constraints also exist regarding generating proactive maintenance recommendations based on granular vehicle telematics analytics.

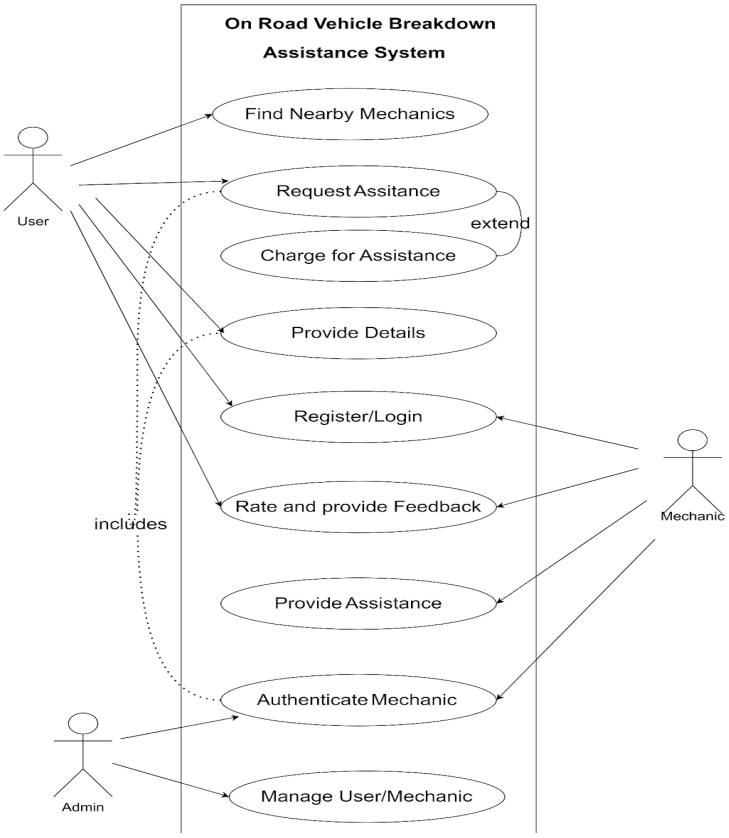
4. Suboptimal Service Delivery:
The inability to tailor and customize assistance based on analysis of specific vehicle issues and user needs reduces effectiveness. For example, dispatching a tow truck for a flat tire or an ambulance for a medical emergency demonstrates poor issue recognition. Such ineffective solutions lower user satisfaction.

5. Security and Privacy Risks:
Most systems lack robust encryption, access controls, and data governance for securing user data. This undermines user trust in privacy preservation and creates an unwillingness to adopt smart assistance systems.

3. IMPLEMENTATION

3.1 System architecture





3.2 Existing system

As there are many current systems, users contact individuals they know from a specific location seeking support from them exclusively; if they are not willing to do so, they end up in problems. In remote regions, it is impossible to locate a suitable mechanic for the needed service. In such cases, users may have to find alternative transportation and then arrange for a mechanic to come to their location to repair their vehicle. Users have no clue if their vehicles broke or if they experienced mechanical troubles in distant regions or on the road where maintenance services are not available. Another framework just informs you of the present location of users, implying that further software requirements are required if a user wishes to book a mechanic for some other known people.

Loopholes of Existing System

1. Isn't a suitable application during a crisis.
2. Finding a mechanic manually is a time-consuming task.
3. Finding mechanic workshops on the roadside is a tedious job.
4. There is a possibility that customers may not be satisfied with the service provided by the mechanic.

3.3 Proposed System

In our increasingly fast-paced and interconnected world, the sight of a stranded vehicle on the side of the road due to a breakdown is an all too common occurrence. Vehicle breakdowns can be inconvenient, stressful, and sometimes even dangerous, particularly when they occur in remote areas or during adverse weather conditions. To address these challenges and improve the overall experience of motorists facing breakdowns, we propose an innovative and comprehensive solution: the Breakdown Buddy.

Our proposed system is designed to revolutionize the way we deal with vehicular breakdowns, combining cutting-edge technology and seamless connectivity to provide efficient, reliable, and timely assistance to motorists in distress. By leveraging the power of smartphones, GPS, and a network of service providers, our system aims to transform the traditional approach to roadside assistance.

The need for such a system becomes evident when considering the frequency of vehicle breakdowns and the ever-growing demands on our transportation infrastructure. Every year, millions of vehicles experience mechanical failures or other issues that leave their owners stranded and in need of help. Existing roadside assistance services, while essential, often suffer from inefficiencies, delays, and a lack of transparency. This creates room for innovation and improvement, and our Breakdown Buddy System seeks to fill this gap.

Advantages

1. One of the best applications for emergency services.
2. User Friendly UI, easy to use.
3. Finding mechanics on the road is easier with this updated software.
4. Users can book a mechanic for themselves, with the option for the service to be provided at the current location detected by their device.
5. The user can pay based on their service as the estimated amount displayed on the user's screen.

4. MODULES

4.1 User Side Modules:

1. Registration and Login: Users can easily create their accounts by providing necessary details such as name, email, and password. In order to verify user accounts and improve platform security, email authentication is also a part of the registration process. Once registered,

users can log in using their email and password, gaining access to the full range of features offered by the application.

2. Add Car Details: The application provides users with a user-friendly interface to seamlessly input their car details, including the model, year, and name. This step empowers users to customize their vehicle information according to their preferences, enabling mechanics to better understand and prepare for the specific needs of each user's car.

3. Choose Breakdown Type: To streamline the user experience, selection options are provided for users to specify the type of breakdown they are experiencing. This may include options such as engine issues, flat tires, or electrical problems. Clear selection choices enable mechanics to prepare adequately for the service appointment, ensuring efficient problem resolution.

4. Send Service Request: Send Service Request: After inputting all necessary car details and selecting the type of breakdown, the application automatically allocates the nearest mechanic suitable for the request. Users then proceed to confirm the request without the need to fill in additional details. Once confirmed, the service request is sent to the allocated mechanic, triggering a notification on their end.

5. Assigned Nearby Mechanics: Utilizing the user's location data, the application automatically assigns a nearby mechanic to the user without requiring manual selection. The assigned mechanic is chosen based on their proximity to the user and their expertise. This streamlines the process for users, ensuring a mechanic is readily available to assist them without the need for manual selection.

4.2 Mechanic Side Modules:

1. Registration and Verification: Mechanics go through a comprehensive registration process where they provide essential details about their expertise and experience. This information is crucial for users to make informed decisions when selecting a mechanic. Additionally, the registration process is followed by a verification conducted by platform administrators to ensure the quality and reliability of mechanics.

2. View Incoming Service Requests: Upon successful registration, mechanics gain access to a dashboard displaying incoming service requests. Each request includes detailed information about the breakdown, the user's location, and the type of service required. This comprehensive overview assists mechanics in deciding whether to accept or reject a service request.

3. Accept/Reject Service Requests: Mechanics have the autonomy to review incoming service requests and make decisions based on their availability and expertise. Clear indications of the user's location and breakdown type empower mechanics to accept or reject service requests efficiently, ensuring that they can provide quality service.

4. Confirm Service Appointment: Once a mechanic accepts a service request, a confirmation screen appears, specifying the agreed-upon service appointment details. This includes the date, time, and location of the service. This confirmation triggers a notification sent to the user, providing them with assurance and confirmation of the scheduled service.

5. FEATURES:

User Authentication and Authorization: The system implements secure authentication mechanisms, including email verification, to protect user accounts. Role-based authorization

is employed to distinguish between user and mechanic roles, ensuring that each role has access to the appropriate functionalities.

Mechanic Verification: The mechanic verification process is robust, involving a comprehensive review of the information provided during registration. This verification is conducted by platform administrators to maintain a high standard of quality among listed mechanics, offering users reliable and experienced service providers.

Real-Time Location Tracking: The real-time location tracking feature enables the system to pinpoint the exact coordinates of both users and mechanics. By leveraging GPS technology or similar location-based services, the system obtains real-time updates of user locations, allowing mechanics to efficiently navigate to the precise site of assistance. Moreover, this feature facilitates the identification of the nearest available mechanic, thereby minimizing response times and optimizing resource allocation. Through seamless integration with the service platform, users can expect swift and accurate assistance tailored to their specific location.

Service Request Handling: The system is designed to efficiently manage user service requests. Notifications are integrated to inform mechanics promptly upon receiving a service request. The service requests contain all necessary information, empowering mechanics to make informed decisions and provide effective solutions.

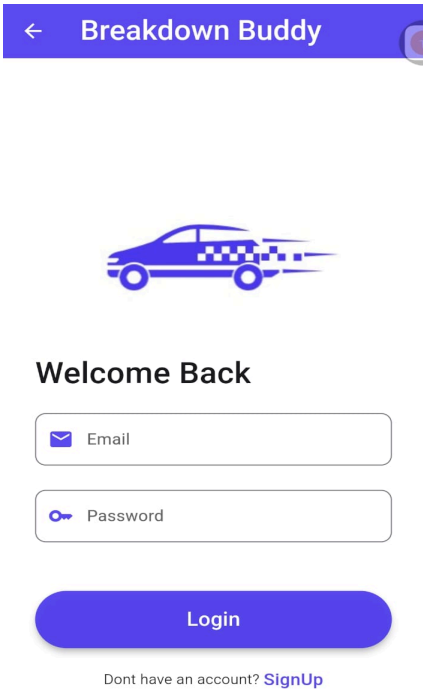
Euclidean Distance Calculation: Upon retrieving the coordinates of users and mechanics, the system computes the Euclidean distance between them to determine proximity. This distance metric serves as a crucial determinant in assigning mechanics to users, prioritizing those in closest proximity to minimize travel time. In scenarios where the primary mechanic is unavailable, the system automatically redirects the request to the next nearest mechanic, ensuring prompt assistance without compromising efficiency. By employing mathematical algorithms to calculate distance, the system optimizes resource utilization and enhances service accessibility for users across diverse geographical locations.

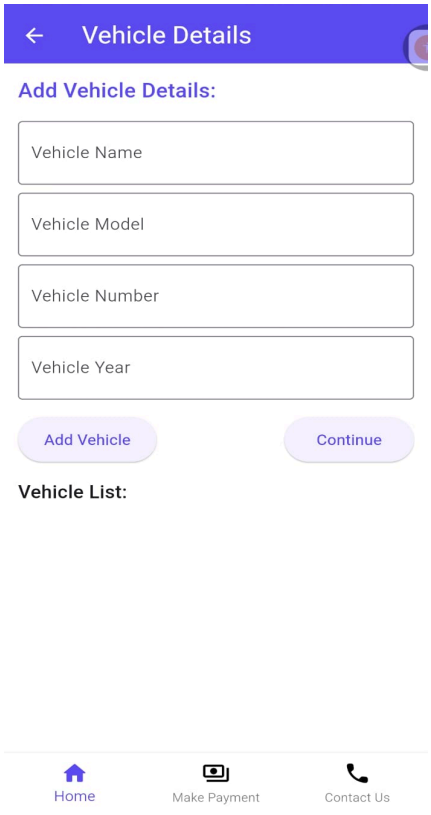
Security Measures: The application prioritizes the security of user data by employing end-to-end encryption for sensitive information. Regular security audits are conducted, and updates are implemented promptly to address potential vulnerabilities, ensuring the integrity and confidentiality of user data.

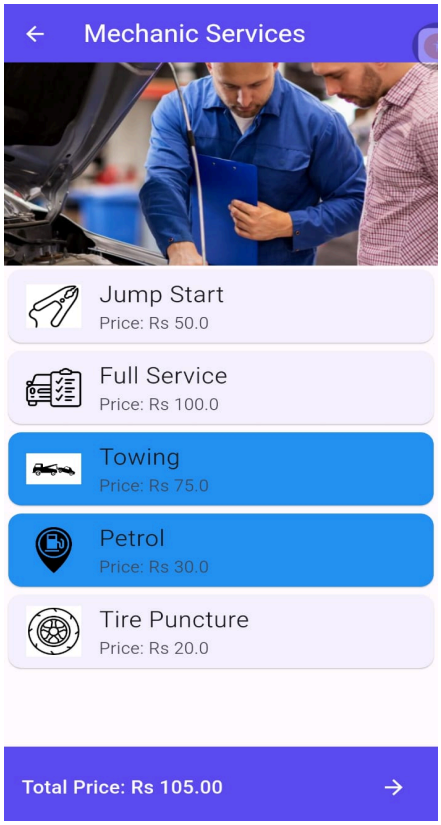
Call and Email Functionality: Effective communication channels are paramount in fostering trust and resolving issues promptly. To facilitate seamless interaction between users, mechanics, and customer support, the system incorporates call and email features. Users can directly communicate with assigned mechanics or customer care representatives via phone calls or emails, enabling them to convey specific requirements, provide feedback, or report any concerns regarding the service or the application itself. This two-way communication not only enhances user satisfaction but also enables timely resolution of queries or complaints, thereby fostering a supportive and responsive service environment.

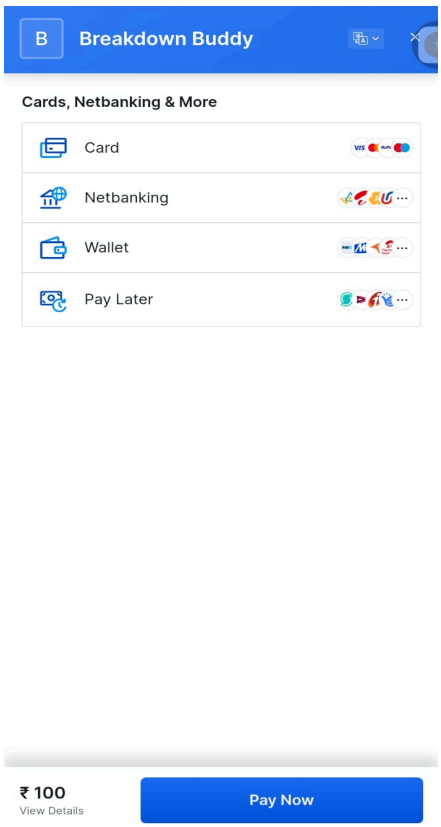
SCREENSHOTS:

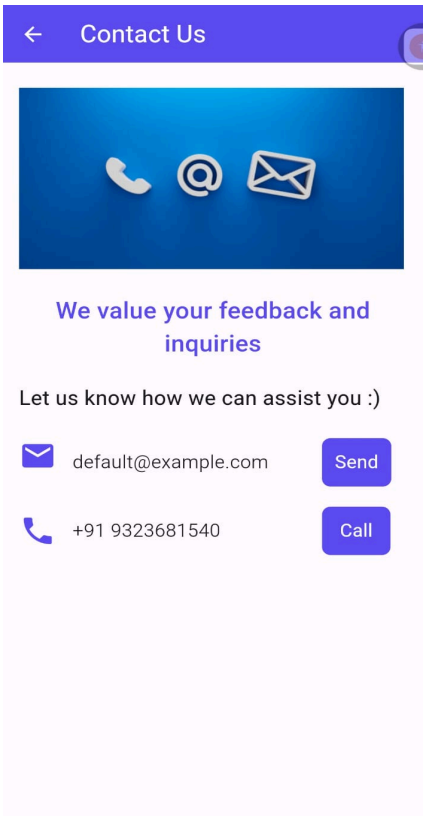
User/Customer



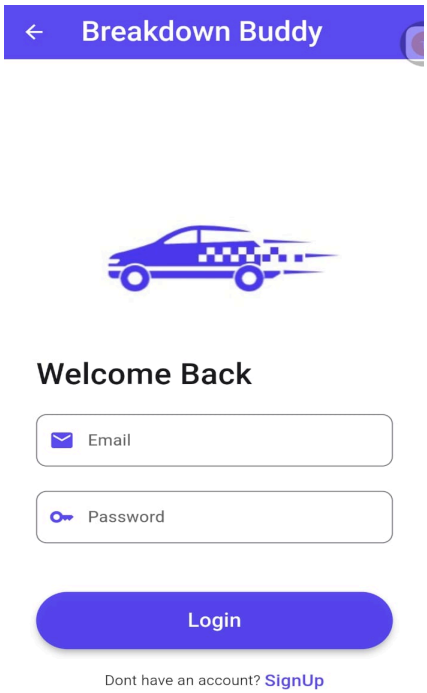


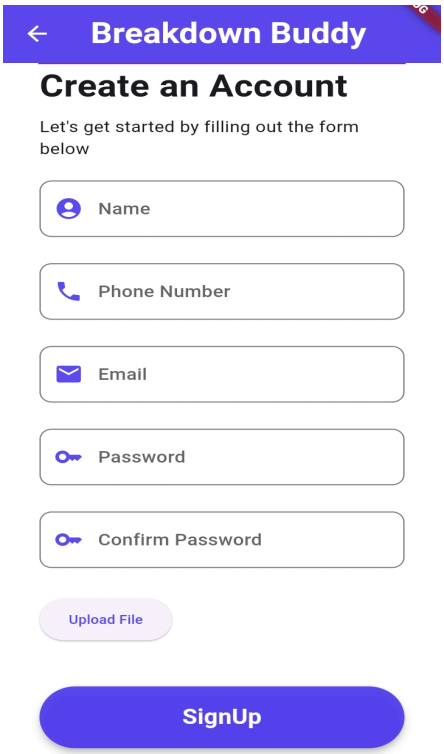






Mechanic


Breakdown Buddy
Welcome Back
Email
Password
Login
Dont have an account? SignUp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Create an Account
Let's get started by filling out the form below
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Phone Number
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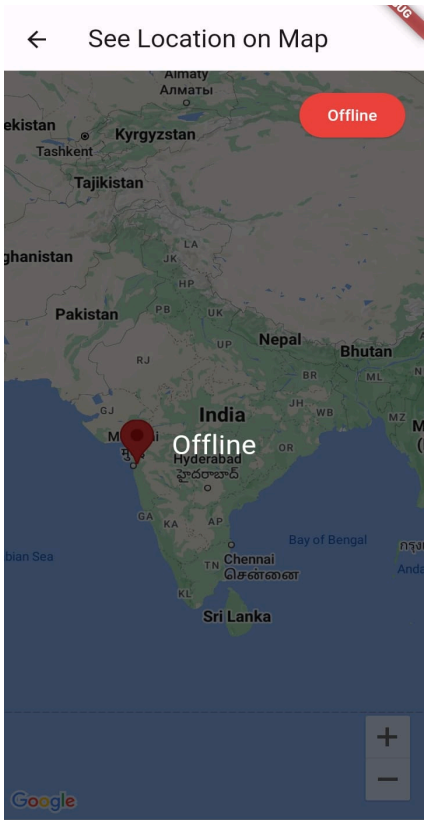
Password
Confirm Password
Upload File
SignUp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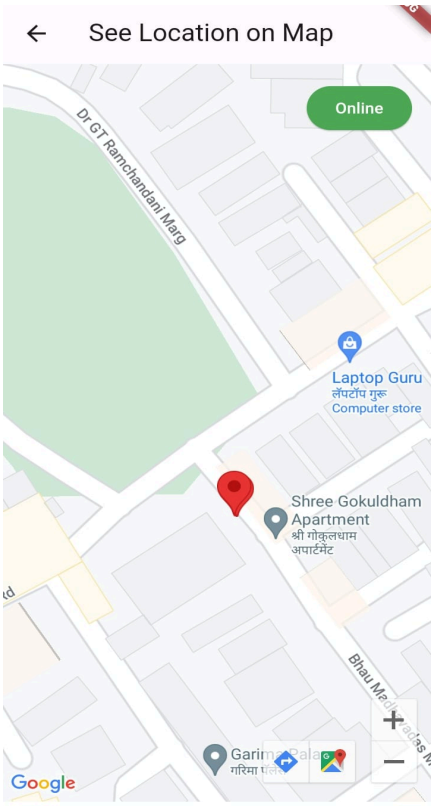
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