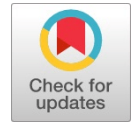# An In-Depth Analysis of the Mobile Application "Rescuennect" Leveraging Telematics Technology for Roadside Assistance and Emergency Response Solutions

Albert T. Padilla

*Abstract***:** *This paper presents the development of Rescuennect, a mobile application designed to enhance roadside assistance and emergency response services on Siargao Island using telematics technology. The application integrates GPS and Google Maps API to provide real-time tracking, service availability, and a directory of roadside assistance and emergency response services. Users can request services such as battery jumps, flat tire changes, gasoline delivery, and towing with a few taps while tracking response times and the progress of assistance personnel in real time. Additionally, Rescuennect updates traffic conditions, road closures, and nearby points of interest. Developed using the Rapid Application Development (RAD) model and evaluated using ISO 9126 standards, Rescuennect achieved high scores in usability (4.37), functionality (4.13), and maintainability (4.20). This integrated approach promises to revolutionize Siargao Island's roadside assistance and emergency response landscape, providing faster, more reliable, and transparent services for residents and tourists.*

*Keywords***:** *Telematics, GPS, RAD Model, Siargao, Roadside Assistance, Emergency Response.*

I. INTRODUCTION

Siargao Island, renowned for its world-class surfing spots and pristine beaches, continues to attract a growing number of tourists and residents yearly [1]. However, the island's infrastructure, particularly its roadside assistance and emergency response capabilities, must help keep pace with this growth [2]. The increase in vehicular traffic and tourism-related activities necessitates innovative solutions to ensure the safety and convenience of everyone navigating the island's roads. This project proposes Rescuennect, a comprehensive roadside assistance and emergency response system that leverages advanced telematics technology. Telematics combines telecommunications and informatics to transmit real-time data about a vehicle's location, condition, and driver behavior [3]. Rescuennect aims to create a faster, more reliable, and transparent system for roadside assistance and emergency response on Siargao Island by integrating this technology into vehicles and connecting it with a user-friendly mobile application. The Rescuennect system goes beyond traditional in-vehicle technology.

It encompasses a user-friendly interface as the primary platform for requesting assistance, tracking response times, and accessing relevant information [4]. Users can initiate service requests for battery jumps, flat tire changes, gasoline delivery, or towing with just a few clicks or taps [5]. They can also view their vehicle's location, track the progress of assistance personnel in real time, and access a directory of nearby gas stations, repair shops, and other points of interest [6]. Additionally, the application updates traffic conditions, road closures, and potential hazards on the island. This integrated approach, combining telematics technology with a comprehensive, user-friendly application, promises to revolutionize the roadside assistance and emergency response landscape on Siargao Island. The system aims to enhance safety, efficiency, and peace of mind for all road users, ultimately fostering a safer and more enjoyable experience for residents and tourists.

II. OBJECTIVES

The study uses telematics technology to develop and implement Rescuennect, a mobile application for roadside assistance and emergency response on Siargao Island. Specifically, it seeks to:

i. *Design and develop the Rescuennect application, which will consist of the following:*
- Real-time GPS tracking and vehicle diagnostics.
- Service request initiation for battery jumps, flat tire changes, towing, and gasoline delivery.
- Response time tracking and real-time updates on the status of assistance personnel.
- A comprehensive directory of nearby gas stations, repair shops, police stations, hospitals, fire stations, and other relevant points of interest.
- Traffic condition updates, road closures, and potential hazard notifications.

ii. *Implement Rescuennect on Siargao Island with incorporated telematics technology and embedded GPS functionalities.*

iii. *Evaluate the application using the system evaluation tool parallel to the ISO 9126 Standards for usability, functionality, and maintainability.*

III. REVIEW OF RELATED SYSTEMS

A. Overview

Telematics technology, which combines telecommunications and informatics, has significantly transformed the landscape of roadside assistance and emergency response.

The integration of telematics in vehicular systems allows for real-time data transmission regarding vehicle location, condition, and driver behavior, providing essential information for timely and effective assistance [7]. This technology is pivotal in improving response times and enhancing the safety and convenience of motorists.

B. Telematics Technology in Roadside Assistance and Emergency Response

Telematics technology, which combines telecommunications and informatics, has significantly transformed the landscape of roadside assistance and emergency response. The integration of telematics in vehicular systems allows for real-time data transmission regarding vehicle location, condition, and driver behavior, providing essential information for timely and effective assistance [8][28][29][30][31][32]. This technology is pivotal in improving response times and enhancing the safety and convenience of motorists.

C. Applications of Telematics in Roadside Assistance

Several studies have explored the applications of telematics in roadside assistance. Smith et al (2022) discusses how mobile applications utilizing telematics can offer comprehensive support for roadside services, including battery jumps, flat tire changes, and towing services. These applications enhance user experience by providing real-time tracking and updates on service requests [9]. Davis and Jones (2020) further elaborate on the impact of telematics on the insurability of risks, highlighting its role in reducing uncertainty and improving the reliability of roadside assistance services [10].

D. Emergency Response and Telematics Integration

The integration of telematics in emergency response systems has been extensively studied. Syed et al. (2020) developed an IoT-based emergency vehicle communication system that improves the coordination and response times of emergency services [11]. Similarly, Raman and Gurpur (2024) demonstrated the effectiveness of cloud-connected bus tracking systems in enhancing safety and medical assistance during transit emergencies [12].

E. Geographic Information Systems (GIS) In Emergency Response

The application of Geographic Information Systems (GIS) in emergency response is another crucial area of research. Kumar et al. (2021) highlighted how GIS can serve as an intelligent system for emergency responses, providing critical information about road traffic accidents and facilitating quicker response times [13] . Damaševičius et al. (2023) discussed the Internet of Emergency Services (IoES), which leverages GIS to manage disaster and emergency responses more efficiently [14] .

F. Mobile Applications for Roadside Assistance

Mobile applications have revolutionized roadside assistance by providing users with easy access to essential services. Fong et al. (2023) discussed the reliability optimization in designing vehicle-to-infrastructure systems for emergency management, emphasizing the role of mobile applications in providing real-time updates and facilitating communication between users and service providers [15]. Karmakar et al. (2020) developed a smart priority-based traffic control system for emergency vehicles, demonstrating how mobile apps can enhance the coordination of roadside assistance and emergency response [16].

G. Overview User-Centered Design and Usability

The success of mobile applications for roadside assistance heavily depends on user-centered design and usability. Patel et al. (2022) highlighted the importance of user-friendly interfaces in tourism-related applications, stressing that ease of use significantly affects user satisfaction and adoption rates [17]. Gomez et al. (2020) also emphasized the need for intuitive design in mobile applications to ensure users can easily navigate and utilize the services offered [18].

IV. EVALUATION OF TELEMATICS APPLICATIONS

Evaluating the effectiveness of telematics applications is critical for continuous improvement. Mantena (2020) discussed methods for verifying the reliability of third-party components in telematics systems, which is essential for maintaining high standards of service reliability and user trust [19]. Feng and Cui (2021) provided a comprehensive review of emergency response systems, highlighting the need for ongoing evaluation and refinement based on user feedback and technological advancements [20].

A. Real-Time Data and Predictive Analytics

The use of real-time data and predictive analytics in telematics systems is an emerging area of interest. Singh et al. (2022) explored how big data and IoT can be used in vehicle telematics to predict maintenance needs and prevent breakdowns, thereby enhancing the overall efficiency of roadside assistance services [21]. Ziakopoulos et al. (2022) examined how driver behavior telematics can improve road safety and inform insurance practices [22].

B. Challenges and Future Directions

Despite the advancements, there are challenges in implementing telematics technology for roadside assistance. Issues such as data privacy, security, and the reliability of communication networks in remote areas need to be addressed [23]. Furthermore, ongoing collaboration with local authorities and continuous updates to the system are essential for adapting to evolving user needs and technological developments [24].

C. Contextual Integration with Local Needs

Rescuennect, by integrating telematics with local roadside assistance services on Siargao Island, aims to address specific regional needs.

The application considers the unique infrastructure and challenges of the island, providing a tailored solution that enhances both resident and tourist safety. Research by Kim et al. (2022) on the development of tourism infrastructure on Siargao Island supports the need for such innovations to sustain growing tourism and ensure safety [25].

D. Adaptive and Predictive Features

Advanced features such as predictive maintenance and adaptive user interfaces can significantly improve user experience and service efficiency. The work of Lee et al. (2019) on predictive analytics in telematics systems highlights the potential for preemptive measures in vehicle maintenance, which can be crucial for reducing roadside emergencies [26]. Additionally, the inclusion of user feedback mechanisms and continuous system evaluation, as discussed by Brown and Greem (2021), ensures that the application remains relevant and effective [27].

V. CONCEPTUAL FRAMEWORK

The "Rescuennect: Siargao Island Roadside Assistance and Emergency Response using Telematics Technology" conceptual framework utilizes the Input-Process-Output (IPO) model. This framework outlines the necessary components and stages to develop and implement the system.
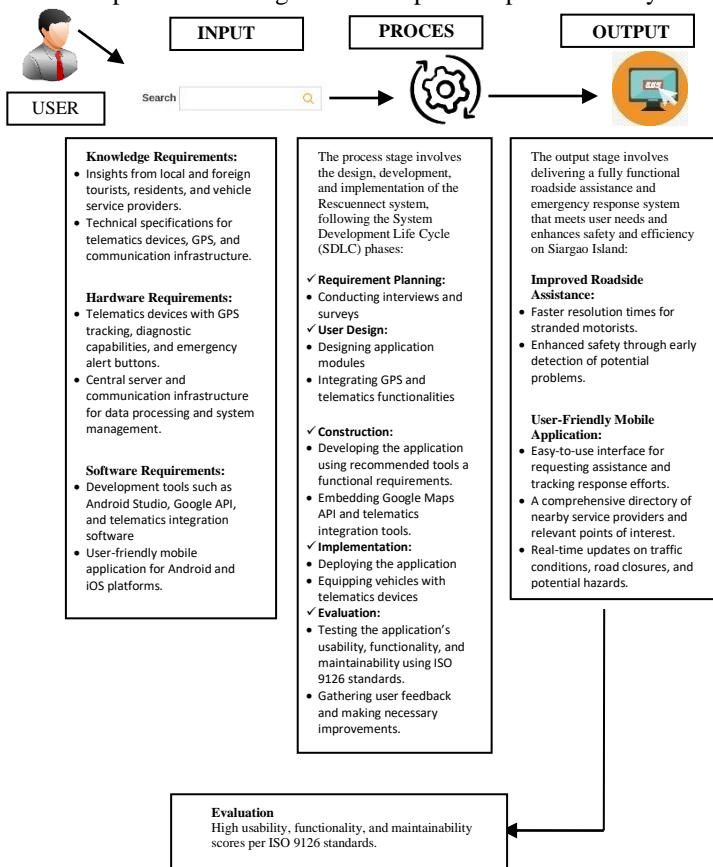
[Fig.1: IPO Model]

As shown in Figure 1, This IPO model illustrates the flow of data and processes that contribute to the successful development, implementation, and operation of the Rescuennect system. This system will ultimately enhance roadside assistance and emergency response on Siargao Island.

A. Discussion on the IPO Framework

The conceptual framework can be visualized as an Input-Process-Output (IPO) model:

Input: The system receives data from vehicles equipped with telematics devices. This data includes:

- GPS location: This is used to pinpoint the exact location of an incident.
- Vehicle diagnostics: To identify potential problems before breakdowns occur.
- Emergency alerts: Triggered by passengers in case of accidents or critical situations.

Process: The system processes the received data to determine the nature and location of the incident. It then utilizes communication technology to:

- Dispatch roadside assistance for breakdowns or minor issues.
- Send emergency alerts to designated responders (ambulances, fire trucks) for accidents or critical situations.
- Provide real-time updates to concerned individuals (e.g., roadside assistance providers, emergency responders, vehicle owners).

Output: The expected outcome is a more efficient and reliable roadside assistance and emergency response system on Siargao Island. This will lead to:

- Faster resolution times for stranded motorists.
- Improved safety for motorists through early detection of potential problems.
- Reduced stress during emergencies due to faster response times and real-time updates

VI. METHODOLOGY

Rescuennect's development and implementation follow the Rapid Application Development (RAD) methodology, emphasizing quick prototyping and iterative feedback. This approach ensures continuous refinement and alignment with user requirements. The methodology is divided into phases: Requirement Planning, User Design, Construction, Implementation, and Evaluation.
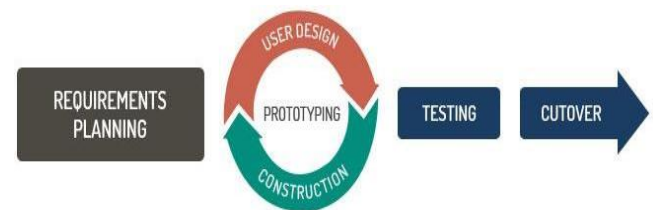
[Fig.2: Rapid Application Development]

The Rapid Application Development model, shown in Figure 2, was used to ensure continuous refinement of the application.

A. Requairement Planning

In the requirement planning phase, the proponent employed various methods to gather and analyze the requirements for the Rescuennect application:

3

An In-Depth Analysis of the Mobile Application "Rescuennect" Leveraging Telematics Technology for Roadside Assistance and Emergency Response Solutions

i. Feasibility Study:

- A thorough feasibility study assessed infrastructure requirements, operational costs, and potential challenges, such as internet connectivity in remote areas of Siargao Island.
- Evaluated technical specifications for telematics devices and communication infrastructure to ensure compatibility and efficacy.

ii. Stakeholder Consultation:

- In-depth interviews and surveys were conducted with local and foreign tourists, residents, vehicle service providers, and emergency responders to gather insights and define application requirements.
- Key stakeholders, including transportation agencies(Land Transportation Office, Land Transportation Franchising and Regulatory Board) and telematics service providers, were engaged to ensure compliance with regulatory standards and to secure necessary permits.
- Engaged vital stakeholders, including transportation agencies (Land Transportation Office, Land Transportation Franchising and Regulatory Board), Gas Stations, Vulcanizing Shops, Hospitals, Police stations, Fire Stations, and telematics service providers to ensure compliance with regulatory standards and to secure necessary permits.

iii. Scope Definition:

- The application's scope, processes, and data requirements were clearly defined based on the insights gathered and the feasibility study outcomes.
- Essential features and functionalities were identified, including real-time GPS tracking, vehicle diagnostics, emergency alerts, service request initiation, and response time tracking.
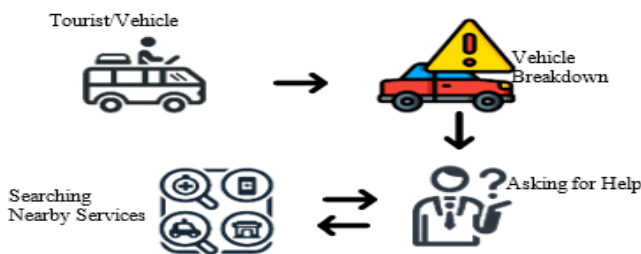
[Fig.3: Current Technical Situation]

The current technical situation on Siargao Island is depicted in Figure 3.

B. User Design

In this phase, the application modules were meticulously designed to address identified needs and enhance user experience:

i. Application Module Design:

- User interface and application modules were designed to focus on usability and functionality, ensuring an intuitive user experience.
- Integration of GPS technology to provide real-time location tracking and telematics for vehicle diagnostics and emergency alerts was prioritized.

ii. Prototyping:

- Application prototypes were developed to visualize and refine the user interface and functionalities.

- Usability testing was conducted with a small group of potential users to gather feedback and make necessary improvements to the design.

[Fig.4: Application Module Design]

The design of the application module is presented in Figure 4.

C. Construction

The construction phase involved the actual development of the Rescuennect application, guided by current infrastructure and user preferences:

i. Development:

- The application was developed using Android Studio for the mobile platform and integrated Google API for map functionalities.
- Telematics integration tools were utilized to enable real-time tracking and diagnostics. Core functionalities included service request initiation, response time tracking, and emergency alert systems.

ii. Integration:

- Telematics devices were embedded in vehicles to enable real-time data transmission and monitoring.
- Secure and reliable communication between vehicles, the central server, and emergency responders was ensured through robust data transmission protocols.

iii. Testing:

- Comprehensive testing was conducted to identify and rectify any bugs or issues within the application.
- Stress tests were performed to ensure the system efficiently handled high volumes of data and service requests.
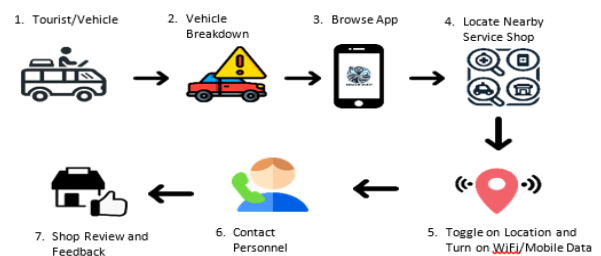
[Fig.5. System Architecture]

The system architecture is detailed in Figure 5 shows the system flow of the app as follows:

1. **Tourist/Vehicle:** The system begins with the tourist or vehicle on the road. The vehicle could be a car, motorcycle, or any other mode of transportation used by tourists on Siargao Island.

4

2. **Vehicle Breakdown:** In the event of a vehicle breakdown, the user (tourist) encounters a problem such as a flat tire, engine failure, or any other emergency and mechanical issue that renders the vehicle inoperable.
3. **Browse App:** The tourist uses the Rescuennect mobile application, which is designed to help users find roadside assistance and emergency services quickly and efficiently.
4. **Locate Nearby Service Shop:** Using GPS integration, the app locates nearby service shops, including vulcanizing shops, repair shops, gas stations, hospitals, police stations, and fire stations. This feature helps users identify the closest and most appropriate service provider.
5. **Toggle on Location and Turn on WiFi/Mobile Data:** To ensure accurate location tracking and data transfer, users toggle on their device's location services and activate WiFi or mobile data. This step is crucial for real-time updates and communication with service providers.
6. **Contact Shop Owner:** The user can contact the selected service shop directly through the app. This feature facilitates communication between the user and the service provider, allowing for quick response times and efficient coordination of roadside assistance.
7. **Shop Review and Feedback:** Users can access reviews and feedback from previous customers after selecting a service shop. This feature helps users make informed decisions based on the experiences of others. It also allows users to leave their feedback after receiving service.

D. Implementation

In this phase, the proposed application was built and introduced to evaluators as end-users:

i. Pilot Testing:
- The application was deployed on a limited scale with a select group of vehicles and users for pilot testing.
- System performance was monitored, focusing on the accuracy of GPS data, effectiveness of vehicle diagnostics, and functionality of the emergency alert system.
- Feedback was gathered from pilot participants, including drivers, passengers, and emergency responders, to identify areas for improvement.

ii. Full-Scale Deployment:
- The system was implemented across Siargao Island, prioritizing high-traffic zones and areas with limited existing roadside assistance options.
- Additional vehicles were equipped with telematics devices, and widespread access to the mobile application was ensured.

E. Evaluation Methods and Tools

The application's usability, functionality, and maintainability were evaluated based on the adopted instrument from ISO 9126. The evaluation focused on assessing how well the application meets user needs and standards of quality:

i. Usability:
- **Frequent Use:** Users were asked if they were likely to use the application frequently. The average response indicated a firm agreement.

ii. Functionality:
- **Essential Functions:** Users rated the application highly for having appropriate and essential functions.
- **Correctness of Functions:** The correctness of the functions and commands received positive feedback.
- **Functioning in Isolation:** Users agreed that the application functions well even in isolation.
- **Compliance with Guidelines:** The application met institutional guidelines and requirements.
- **Security:** The application was rated highly for its security features, preventing unauthorized access.

iii. Maintainability:
- **Identifying Root Causes:** The ease of identifying the root cause of issues within the software was positively rated.
- **Sustainability of Updates:** The ability to sustain updates and verify changes was highly rated.
- **Storing Data Changes:** Users felt confident that data changes could be stored effectively.
- **Changing Data:** The ability to change data within the application was rated favorably.

Table 1: Evaluation of the Application

Evaluation Criteria	Mean Score	Adjectival Rating
Usability		
Frequent Use	4.40	Strongly Agree
Ease of Use	4.35	Strongly Agree
Integration of Functions	4.25	Strongly Agree
Learning Curve	4.35	Strongly Agree
User Confidence	4.50	Strongly Agree
Functionality		
Essential Functions	4.40	Strongly Agree
Correctness of Functions	3.90	Agree
Functioning in Isolation	3.85	Agree
Compliance with Guidelines	4.30	Strongly Agree
Security	4.20	Agree
Maintainability		
Identifying Root Causes	4.30	Strongly Agree
Sustainability of Updates	4.50	Strongly Agree
Storing Data Changes	3.85	Agree
Changing Data	3.95	Agree

The evaluation results of the application are detailed in Table 1.

The results from the evaluation indicate that Rescuennect is highly usable, functional, and maintainable. User feedback and ISO 9126 evaluations confirm that the application effectively enhances the efficiency and reliability of roadside assistance and emergency response services on Siargao Island. These findings suggest that Rescuennect can significantly improve safety and convenience for both residents and tourists.

VII. RESULTS AND DISCUSSIONS

A location is a particular place or position where people are considered the "end-point" of the travel. The Rescuennect application was developed to enhance Siargao Island's roadside assistance and emergency response experience. This section presents the results and discussion based on the deployment and evaluation of the application.
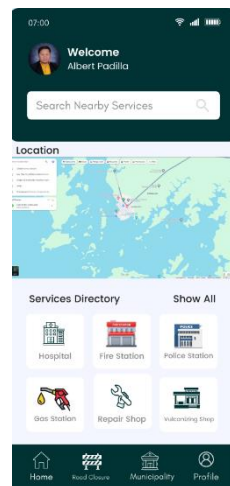
An In-Depth Analysis of the Mobile Application "Rescuennect" Leveraging Telematics Technology for Roadside Assistance and Emergency Response Solutions

A. Application Interface

The app's splash screen, the first image users see when launching the mobile application, is shown in Figure 6.

[Fig.6: Splash Screen]   **[Fig.7: Home Screen]**

The home screen of the Rescuennect app is shown in Figure 7.

B. S Overview

The Rescuennect app's home screen is designed to provide a user-friendly interface for accessing essential roadside assistance and emergency services. The layout is clean and minimalistic, featuring easy-to-navigate icons and a map view to enhance the user's experience.

C. Key Features

i. Welcome Section:
- The top part of the screen displays a welcome message along with the user's name and profile picture, personalizing the user experience.
- Example: "Welcome, Albert Padilla."

ii. Search Bar:
- Below the welcome section is a search bar labeled "Search Nearby Services." This allows users to quickly find specific services they need.
- The search functionality enhances the efficiency of locating nearby services.

iii. Map View:
- The central part of the Home Screen features a map view labeled "Location." This map shows the user's current location and nearby services.
- The interactive map allows users to pan and zoom to explore the surrounding area.

iv. Services Directory:
- Below the map, a section labeled "Services Directory" showcases icons for various services users can access. The icons are minimalistic and easily recognizable.
- Services include:
  - ✓ Hospital
  - ✓ Fire Station
  - ✓ Police Station
  - ✓ Gas Station
  - ✓ Repair Shop
  - ✓ Vulcanizing Shop
- A "Show All" option is also available to view more services.

v. Bottom Navigation Bar:
- The bottom of the screen features a navigation bar with the following icons:
- Home: Takes the user back to the home screen.
- Road Closure: Provides information about road closures.
- Municipality: Offers details about the municipality.
- Profile: Accesses the user's profile and settings.

vi. Functionality:
- **Search Nearby Services:** Users can type in the search bar to find specific services nearby, such as hospitals or gas stations.
- **Interactive Map:** Users can interact with the map to visually represent their surroundings and the location of nearby services.
- **Quick Access:** The Services Directory lets users quickly tap icons to access the needed services.
- **Navigation Bar:** The bottom navigation bar provides quick access to other app essential features, making it easy for users to switch between different sections.

This home screen design ensures that users can efficiently find and access the services they need, enhancing their overall experience with the Rescuennect app.

The Siargao map view via Google Maps within the application is shown in Figure 8. This user interface is used to locate or find a specific service shop in each municipality.
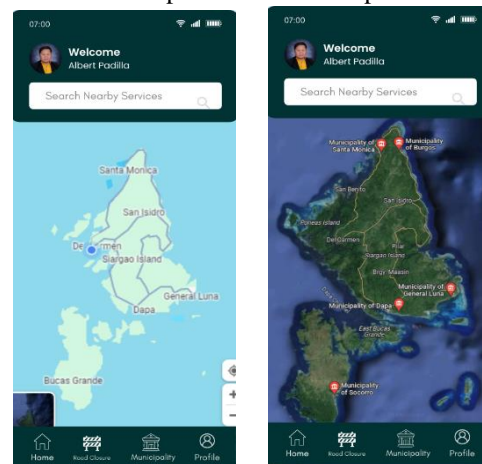
[Fig.8: Siargao Map]
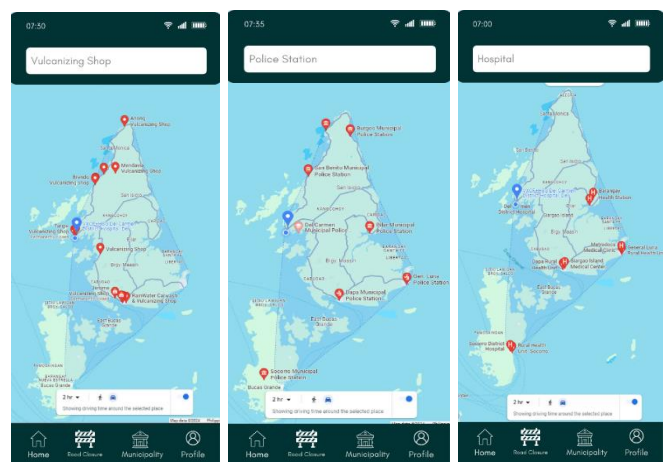
[Fig.9: Search and Display of Nearby Services]

6

The search and display of nearby services are shown in Figure 9.

Overview: When a user searches for a specific service, such as a vulcanizing shop in the Rescuennect app, the Home Screen displays the search results on an interactive map. This feature enhances the user's ability to locate nearby services quickly and efficiently.

D. Key Features

i. *Search Bar:*

- The search bar remains at the top of the screen, allowing users to enter the service they seek. In this example, the user searches for "Vulcanizing Shop."
- The search bar ensures that users can refine or change their search without navigating away from the screen.

ii. *Interactive Map:*

- The central part of the screen is occupied by an interactive map that displays the user's current location and the locations of nearby vulcanizing shops.
- Each vulcanizing shop is marked with a red pin on the map, making it easy to identify available services.
- A blue pin indicates the user's current location, providing context for the distance and direction to the nearby shops.

iii. *Map Interaction:*

- Users can interact with the map by zooming in and out to get a better view of the surrounding area and the locations of the vulcanizing shops.
- Tapping on a red pin reveals more information about the shop, such as its name, address, and contact details.

iv. *Bottom Navigation Bar:*

- The bottom navigation bar remains consistent with Home, Road Closure, Municipality, and Profile options, allowing users to navigate to other sections of the app quickly.
- This consistency ensures a seamless user experience when switching between different app functions.

v. *Additional Services:*

- The same functionality applies to other services such as hospitals, fire stations, police stations, gas stations, and repair shops.
- When a user searches for these services, the map will update to show the locations of the nearest available services, marked with the appropriate icons.

vi. *Functionality:*

- **Real-Time Updates:** The map provides real-time updates on the location of services, ensuring users have the most current information.
- **Ease of Use:** The search functionality and interactive map are designed to be intuitive, making it easy for users to find and access nearby services.
- **Comprehensive Information:** Users can access detailed information about each service provider by tapping on the service pins to help them make informed decisions.

This feature of the Rescuennect app enhances the overall user experience by providing a transparent and efficient way to locate essential services, ensuring that help is always nearby when needed.
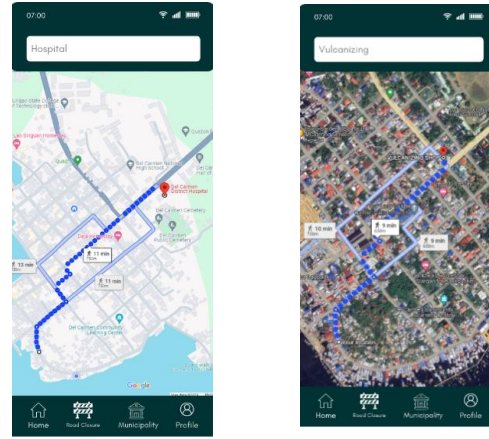
[Fig.10: Navigation to Selected Service]

Navigation to the selected service is illustrated in Figure 10.
Overview: When a user selects a specific service in the Rescuennect app, such as a hospital, the app provides automatic navigation guidance to the selected service's location. This feature ensures that users can easily access essential services without additional hassle.

E. Key Features

i. *Search Bar:*

- The search bar at the top of the screen allows users to enter the service they seek. In this example, the user searches for "Hospital."
- The search bar remains accessible for refining or changing the search.

ii. *Interactive Map with Navigation:*

- The central part of the screen displays an interactive map showing the user's current location and the route to the selected service (in this case, a hospital).
- A red pin marks the selected service location, while a blue one indicates the user's location.
- The route is highlighted with a clear path, typically in blue, showing the user the best way to reach the service.

iii. *Real-Time Navigation:*

- The map provides real-time navigation, updating the route as the user moves. This ensures that users are always on the correct path to their destination.
- Distance and estimated time to reach the destination are displayed along the route, helping users plan their journey.

iv. *Interactive Elements:*

- Users can interact with the map by zooming in and out to better view the route and surrounding area.
- Tapping on the service pin provides additional information about the service, such as its name, address, and contact details.

v. *Consistent Navigation Bar:*

- The bottom navigation bar remains consistent with Home, Road Closure, Municipality, and Profile options, allowing users to quickly navigate to other sections of the app.

- This consistency ensures a seamless user experience when switching between different app functions.

vi. *Functionality:*

- **Automatic Route Guidance:** Upon selecting a service, the app automatically generates a route from the user's current location to the service location, ensuring easy navigation.
- **Real-Time Updates:** The map provides real-time updates on the user's location and route, ensuring
- they remain on the correct path.
- **Comprehensive Information:** By tapping on the service pin, users can access detailed information about the service provider, helping them make informed decisions.
- **Ease of Use:** The search functionality, interactive map, and automatic navigation are designed to be intuitive, making it easy for users to find and reach essential services.

This feature of the Rescuennect app enhances the overall user experience by providing precise and efficient navigation to essential services, ensuring that users can get the help they need quickly and easily.
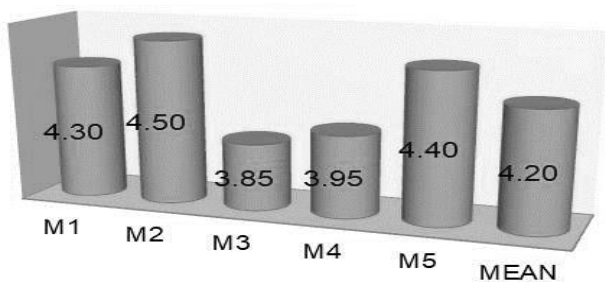
F. Evaluation of the Application

The application was deployed and evaluated using the regulatory standards set by the International Standard Association (ISO). In particular, it employed ISO 9126, which assessed the application's usability, functionality, and maintainability.

i. *Usability:*

- **Frequent Use:** Users rated "Strongly Agree" with a mean score of 4.40.
- **Ease of Use:** The application received a mean score of 4.35, indicating "Strongly Agree."
- **Integration of Functions:** The mean score was 4.25, suggesting strong integration.
- **Learning Curve:** Users quickly learned to use the application, with a mean score of 4.35.
- **User Confidence:** The confidence in using the application was very high, with a mean score of 4.50.
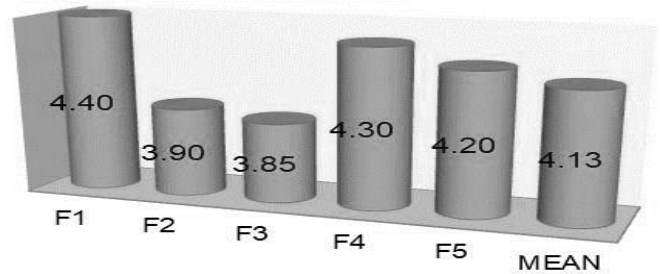

[Fig.11: Usability of the Application]

The usability evaluation results are summarized in Figure 11. The overall mean of the usability index was 4.37, indicating that respondents "Strongly Agree" that the application is usable.

ii. *Functionality:*

- **Essential Functions:** Users rated the application "Strongly Agree," with a mean score of 4.40.
- **Correctness of Functions:** The mean score was 3.90, indicating "Agree."

- **Functioning in Isolation:** The mean score was 3.85, indicating "Agree."
- **Compliance with Guidelines:** The mean score was 4.30, indicating "Strongly Agree."
- **Security:** The mean score was 4.20, indicating "Agree."

[Fig.12: Functionality of the Application]

The functionality evaluation results are depicted in Figure 12. The overall mean of the functionality index was 4.13, indicating that respondents "Agree" with the application's functionality.

iii. *Maintainability:*

- **Identifying Root Causes:** Users rated "Strongly Agree" with a mean score of 4.30.
- **Sustainability of Updates:** The mean score was 4.50, indicating "Strongly Agree."
- **Storing Data Changes:** The mean score was 3.85, indicating "Agree."
- **Changing Data:** The mean score was 3.95, indicating "Agree."
- **Resource Capability:** The mean score was 4.40, indicating "Strongly Agree."
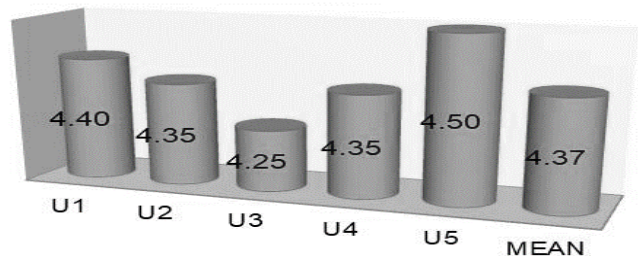
[Fig.13: Maintainability of the Application]

Figure 13 shows the maintainability evaluation results. The overall mean of the maintainability index was 4.20, indicating that respondents "Strongly Agree" that the application is maintainable.

Table 2: Application Evaluation Result

System Evaluation Criteria	Mean Score	Adjectival Rating
Usability	4.37	Strongly Agree
Functionality	4.13	Agree
Maintainability	4.20	Strongly Agree
Grand Mean	**4.23**	**Strongly Agree**

The application evaluation result is presented in Table II. The evaluation results indicate that Rescuennect is highly usable, functional, and maintainable.

The high usability, functionality, and maintainability scores confirm the application's effectiveness in enhancing roadside assistance and emergency response services on Siargao Island. The application's success in pilot testing and full-scale deployment suggests it can serve as a model for similar initiatives in other regions.

VIII. CONCLUSION

Based on the results, the proponent conclude that Rescuennect significantly enhances roadside assistance and emergency response on Siargao Island. The application provides real-time GPS tracking, service request initiation, and comprehensive information about vehicle service shops, which are crucial for residents and tourists. The high usability, functionality, and maintainability scores indicate that the application is practical, reliable, and user-friendly. Rescuennect addresses a critical need on the island by ensuring timely and efficient roadside assistance and emergency response. It improves response times, enhances safety through early detection of potential issues, and provides a seamless user experience. The application's comprehensive features, such as real-time tracking, route optimization, and service shop directories, significantly contribute to the convenience and safety of motorists.

The findings suggest that Rescuennect can be a model for similar applications in other regions, particularly areas with high tourist activity and limited roadside assistance infrastructure. The successful implementation and positive user feedback demonstrate the potential for further development and expansion of the application. Overall, Rescuennect provides a robust solution to roadside assistance and emergency response challenges, contributing to the overall safety and convenience of motorists on Siargao Island.

IX. RECOMMENDATIONS

The developed Rescuennect application provides users efficient and effective roadside assistance and emergency response services on Siargao Island. To further enhance the application's functionality and user experience, the following recommendations are proposed:

i. Expand Service Network:
- To ensure comprehensive coverage across the island, the number of participating service providers should be increased, including more vulcanizing shops, gas stations, and repair shops.

ii. Integration with Local Authorities:
- Collaborate with local government units and transportation agencies to integrate Rescuennect with existing emergency response systems and regulatory frameworks. This collaboration can help streamline response efforts and improve overall efficiency.

iii. Enhance Application Features:
- Incorporate additional features such as predictive maintenance alerts, user reviews, and ratings for service providers. These features can help users make informed decisions and enhance the overall user experience.

- To further improve users' safety and convenience, implement real-time traffic updates and notifications about road conditions, closures, and potential hazards.

iv. Regular Updates and Maintenance:
- Ensure continuous updates and maintenance of the application to keep it aligned with user needs and technological advancements. Regular updates can also help address any bugs or issues that may arise.

v. User Education and Awareness:
- Conduct awareness campaigns and training sessions to educate users about the Rescuennect application's benefits and functionalities. This can help increase user adoption and satisfaction.
- Provide user manuals and tutorials within the application to assist users in navigating and utilizing its features effectively.

vi. Data Privacy and Security:
- Strengthen data privacy and security measures to protect user information and ensure compliance with relevant data protection regulations. This can help build user trust and confidence in the application.

vii. Performance Monitoring:
- Continuously monitor the application's performance through user feedback and key performance indicators such as response times and user satisfaction scores. This can help identify areas for improvement and ensure the application meets user expectations.

By implementing these recommendations, Rescuennect can further enhance its effectiveness and reach, providing a valuable tool for improving roadside assistance and emergency response services on Siargao Island. Continuous development and stakeholder collaboration will contribute to motorists' overall safety and convenience.

DECLARATION STATEMENT

After aggregating input from all authors, I must verify the accuracy of the following information as the article's author.

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9

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