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Android Based Real Time Road Accident Reporting Application

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Abstract – *With the current increase in the development of transportation, road widening projects, and motorcycle loops, the community has been suffering from road-related accidents, especially in an unfamiliar and isolated area. Victims of accidents may receive immediate medical assistance and increase the chance of survival if the accident is reported immediately to the corresponding authority. This study is conceptualized to develop an android-based real-time road accident reporting application using your android mobile devices. It is a mobile application that captures the accident and automatically gets the coordinates or the location of the accident and sends it to the nearest PNP office. In addition, the application requires the USER to input their full name and contact details for validation. Furthermore, the conforming office will receive a notification on the web application and validate the report. Afterward, the medical team will be notified for immediate assistance. This study followed the RAD model for web applications and MADLC for the mobile application with the ISO-9126 questionnaire as an approach to gathering data. Respondents were categorized into three. 1) Police Officers and 2) Car and Motorcycle Riders 3) Civilians. Generally, the respondents evaluated the application as acceptable in terms of functionality, usability, efficiency, maintainability, and portability as it benefits the community, especially the victims of road accidents to minimize fatality and lifelong injuries.*

Keywords – *Real-Time Road Accident Reporting, GPS, Android-Based, level of acceptability*

I. INTRODUCTION

The improvement of human existence and well-being has been made possible in numerous ways through transportation. Unfortunately, unpredictable events like accidents have been occurring that impact many people's lives and families.

According to an article by the Philippine Star, road accidents are still responsible for 1.3 million annual deaths and 50 million injuries all over the world as of December 2021. The World Health Organization (WHO) said that more than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.

One of which is Kenya that listed approximately 3000 lives every year and leave a number of people with serious injuries and lifetime disabilities. To save lives after an accident is an issue that needs a rapid response by the emergency service bodies (Callo, M. S. 2019). In connection to this, the government of India through the ministry of road transport and Highways, India ranks first in the number of road accident deaths across the 199 countries and accounts for almost 11% of the accident-related deaths in the World. As per the Road Accident Report for 2019, a total number of 449,002 accidents took place in the country during the calendar year 2019 leading to 151,113 deaths and 451,361 injuries. In addition, the WHO data published in 2018 on Road Traffic Accident Deaths in the Philippines reached 10,624 which accounted for 1.74% of total deaths in the country. The age-adjusted Death Rate is 11.40 per 100,000 of population ranks Philippines #118 in the world. (Rodriguez,

R. L., & Villamaria, J. T. B., & Noroña, M. I. 2021).

Given these increasing cases of vehicle-related accidents, it is necessary to devise a procedure to effectively and immediately reduce the emergency response time in case of any road casualty (Parasana et al., 2021). Response time for emergency medical services vehicles is especially important for areas where travel distances are often much larger than in urban areas (Vanga et al., 2021). Similarly, after roadway crashes occur, a quick emergency response is essential for minimizing tolls and economic losses (Liu, C. 2022).

In September 2020, the UN General Assembly adopted resolution A/RES/74/299 "Improving global road safety", proclaiming the Decade of Action for Road Safety 2021-2030. The Global Plan for the Decade of Action for Road Safety 2021-2030 was launched to guide the Member States in the implementation of key actions to improve road safety with the target to reduce road traffic deaths and injuries by at least 50% by 2030 (Brondum et al., 2022).

Even with these initiatives and mechanisms from our government, lives could have been saved if the information related to the accident is reported on time (Bautista, et al., 2019). Nevertheless, it is possible to improve search and rescue team response time and increase the victim survival rate by taking into account the victim prioritization and technology utilization through mobile disaster applications (Berawi et al., 2021).

In the event of a road accident, certain details must be disclosed for further situational analysis, an application must have the capability to send pictures and the location of the incident and report the incident to the competent authorities without the need to disrupt traffic (Alkandari, et.al. 2021), it will automatically get the GPS location of the vehicle using the GPS module and sends a notification message to the nearby PNP office via SMS using the GSM module (Bautista, et al., 2019). In the event that any accident should occur as a result of the operation of a motor vehicle upon a highway, the driver present, shall show his driver's license, give his true name and address and also the true name and address of the owner of the motor vehicle (R.A. 4136, Article 5, Section 55).

As cell phone use grows in Kenya, there is a chance for reporting accidents in time for first responders to act before paramedics arrive. The potential exists for first responders to respond to accidents that happen in their communities by reporting those using mobile phones and utilizing their untapped potential. (Callo 2019).

Based on the literature review, reporting an accident is by means of sending GPS location and picture of the incident, limited information leads to poor analysis of the situation. Therefore, the primary goal of this project is to create a mobile application and enhance the current reporting system by incorporating new features that will alert the police force automatically whenever a traffic accident occurs. The application will use the GPS system to supply the coordinates, and users must also enter the incident's photo and the reporter's contact information.

The study aims to develop an Android-Based Real-Time Road Accident Reporting Application to aid the Police and medical team to quickly responding to an accident to minimize further damage and complications to the victims. Besides, it will examine the level of acceptability of the application in terms of Functionality, Usability, Efficiency, Maintainability, and Portability.

II. METHODOLOGY

The mobile application will be created using Java programming language and Android Studio (Alshutayria et al., 2021).

The Mobile Application Development Life cycle (MADLC) was selected as the

methodology for creating the application (Mohd Fauzi, 2022).

On the other hand, interview guide and acceptability questionnaire (ISO 9126) and sub characteristics to implement and evaluate applications to gather data. (Sanjaya, H., & Andry, J. F. 2021. A total of 50 respondents categories into Police Officers (7) and Car and Motorcycle Riders (43) were used in this research. The study took place at the Municipality Agoo, La Union.

Table 1. Midpoint Scale

Scale	Statistical Range	Descriptive Interpretation
5	4.20 – 5.00	Highly Acceptable
4	3.40 – 4.19	Acceptable
3	2.60 – 3.39	Less Acceptable
2	1.80 – 2.59	Not Acceptable
1	1.00 – 1.79	Highly Not Acceptable

III. RESULTS AND DISCUSSION

The developed mobile application as shown in the following figures.

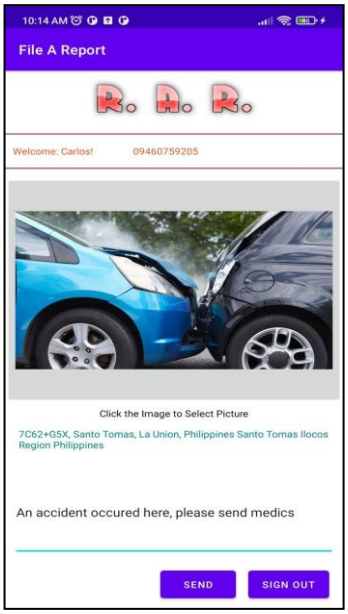

Figure 1. Filing of Incident

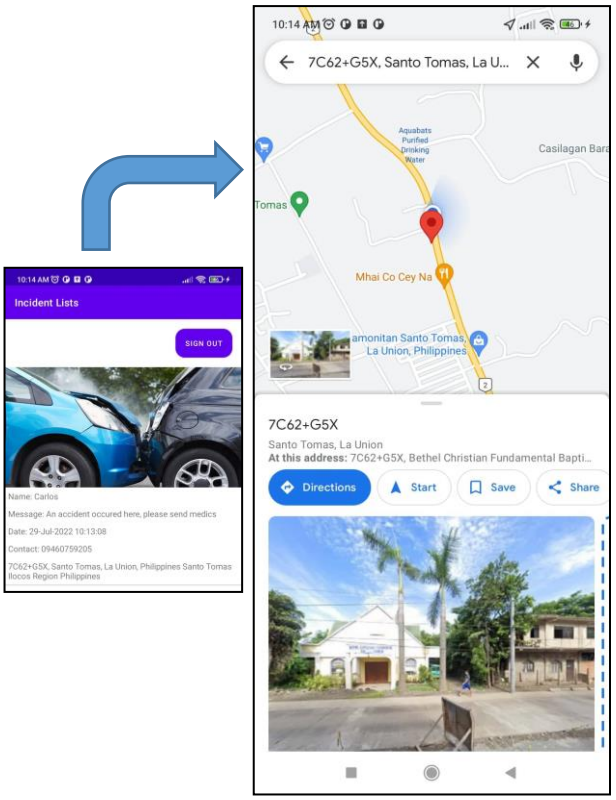

Figure 2. Location of accident

A summary of the police officers' evaluations appears in table 1. Inferred from the table, in all of the questionnaire's categories, respondents thought the application was satisfactory, with Usability receiving the highest mark. This indicates that the application is useful to the police officers and helps their unit respond to road accidents immediately.

Table 2. Evaluation Summary of Police Officers

Item	Mean	Descriptive rating
Functionality	3.9	Acceptable
Reliability	4.0	Acceptable
Usability	4.2	Acceptable
Efficiency	4.1	Acceptable
Maintainability	3.9	Acceptable
Portability	3.8	Acceptable

Summary of car/motorcycle owners' ratings appears in table 2. According to the table, the respondents thought the application is also appropriate in each of the questionnaire's categories together with its Usability and most highly rated was efficiency. This means that respondents were satisfied and was easy to use the application and file a report as alternative in the traditional way of filing an incident.

Table 3. Evaluation Summary of Car/Motorcycle owners.

Item	Mean	Descriptive rating
Functionality	3.9	Acceptable
Reliability	3.9	Acceptable
Usability	4.1	Acceptable
Efficiency	3.9	Acceptable
Maintainability	3.8	Acceptable
Portability	3.7	Acceptable

IV. CONCLUSION AND RECOMMENDATION

As evidenced by the results above, the developed application is suitable. This is beneficial to both car/motorcycle owners, civilians and police personnel. This suggests that the application might be able to save lives and lessen serious and lifetime injuries in the event of an accident, even if it occurred in a distant location.

Future projects could include enhancing the application by incorporating the advice of the respondents. Implementing the application in a real situation is also suggested.

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