

Analysis and Design of a Mobile Technology Solution for Emergency Management: The Case of The Button in Nigeria

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Abstract—One critical nationwide problem is the life-threatening delay in response to emergency situations by emergency services. This delay may be attributed to either the inefficiencies inherent in the emergency services or to a general apathy among Nigerians towards seeking assistance from these services. This paper aims to address this problem through the utilization of mobile technology. The paper develops a platform that enables users to instantly and effectively alert kin who are most likely to provide assistance during an emergency. This would minimize the delay in response to emergency situations, which is the objective of this research. To achieve this objective, surveys were conducted to gather relevant information, and the system was designed using Unified Modeling Language (UML) tools and a User Interface Mockup. The designed system was then implemented into an Android-based mobile application called “The Button.” “The Button” is user-friendly and intuitive. It enables users to instantly call for help from pre-specified emergency contacts with the click of a button. “The Button” has been rigorously tested to demonstrate and confirm its ability to perform its functions as required. With the availability of such a platform to the general populace, reliable help can now be quickly summoned, and emergencies can be effectively managed — ultimately contributing to a safer Nigeria for all.

Keywords— *Emergency Management Mobile Technology Solution Alert System, Unified Modeling Language Android Application Design Specification Requirements.*

I. INTRODUCTION

The timeliness of assistance during emergencies plays a pivotal role in determining the outcomes of such situations. Response time (RT) is a key indicator of the quality of care offered to those in need [1]. Rapid assistance significantly impacts the chances of survival and the extent of recovery for victims, as evidenced by a Red Cross study which found that 59% of injury-related deaths could have been prevented with prompt assistance [2]. Conversely, delayed response times, such as ambulance RTs exceeding 8 minutes, can be equivalent to hours of delay in care [3]. Slow RT of ambulances has had devastating consequences,

with around 30% of road accident deaths in India in 2016 attributed to this issue [4] [5] [6] [7].

Effective communication is a crucial factor in addressing these response time challenges [8]. In Nigeria, the absence of a comprehensive communication system has hindered timely responses to emergencies. To highlight the potential impact of such a system in Nigeria, this paper examines the emergency service provision in the United States of America (US).

The US, with a population of 331.9 million, boasts a more secure environment and a well-established security infrastructure, anchored by a robust legal system and advanced technology. Despite this, approximately 240 million calls are made to the US emergency service provider, “9-1-1,” annually, averaging 456 calls per minute [9]. These calls have led to life-saving interventions, demonstrating the effectiveness of prompt assistance.

In contrast, Nigeria, with a population of 213 million and facing security challenges, struggles to provide an efficient response to emergencies. Only Lagos has a state-run emergency medical service and a functioning public safety answering point (PSAP)/emergency communication center among the 37 sub-national regions. The absence of a nationwide, state-funded infrastructure for emergency response results in emergency calls often going unanswered. Personal mobile phone numbers of police officers are sometimes provided, but they are frequently ineffective. The Nigerian Police Force is overwhelmed, with a police-to-citizen ratio of about 1 to 400, prioritizing high-net-worth individuals’ calls over those of the general public.

Furthermore, the NPF’s reputation for corruption, inefficiency, and brutality has eroded public trust. Citizens are reluctant to seek help from the police and instead turn to family, friends, and peers, who are emotionally connected to them. However, there is no effective means to alert these individuals in case of an emergency.

This paper proposes a system to address these challenges. By enabling instant and effective alerts to interested parties during emergencies, this system aims to

save lives and enhance security. It can assist in cases like rape or kidnapping, where the presence of a third party or sharing a victim's location could be crucial. The proposed system is intended to function as a mobile application on the Android Operating System (OS) due to its widespread use. Users will sign up, and in emergencies, pressing a large, easily accessible button will trigger alerts to preselected contacts and interested parties, along with location and real-time video updates.

This system aims to empower the community, reduce reliance on a small police force, and create a safer environment for all in Nigeria. The contribution in this paper is fivefold:

- (i) Theoretically, it outlines the process of identifying a significant national problem, determining a solution, and following due process to implement that solution.
- (ii) Systematically, it highlights the challenges faced by Nigerians in obtaining protection from the current public infrastructure setup.
- (iii) Practically, this thesis creates a mobile emergency alert system that provides timely assistance to individuals in situations where help is needed, ultimately saving lives.
- (iv) Methodologically, this thesis identifies the factors to consider when attempting to address the lack of an efficient public security infrastructure, and this framework can be applied in other research papers on similar topics.
- (v) Analytically, the resulting mobile application from this thesis will collect and provide data that can be used to assess the current state of Nigeria's security infrastructure and make predictions about its future.

II. MOTIVATION AND PROBLEM STATEMENT

Nigeria is currently facing a crisis of insecurity. Incidents of kidnapping, terrorism, banditry, murder, and theft, among others, have risen sharply. These have resulted in countless loss of life and property across the country. The emergency response system of Nigeria, in terms of security, is often the Nigerian Police, which lacks an efficient central official contact system. The situation is similar to the health system of the country.

The Nigerian emergency alert system is underdeveloped, with no adequate and functional surveillance systems established by the government [10]. In some locations, up to 93% of emergencies fall within the jurisdiction of the Police and the health sector to resolve. With Nigeria severely lacking in both of these areas, Nigerian citizens are left to their own to find their own solutions.

The situation underscores the need for comprehensive and robust emergency response systems in Nigeria, encompassing both security and healthcare. It also highlights the importance of technological solutions, like the proposed mobile application, in bridging the gaps and providing a means for citizens to seek help and support during emergencies. Such solutions can play a vital role in improving the overall safety and well-being of Nigerian citizens in a time of rising insecurity and health challenges.

III. RELATED WORKS

Existing research on the provision of emergency aid via the use of mobile devices shares key insights on the progress made and the gaps yet to be filled. Repanovici et al. [11] focused on assessing whether mobile applications are the optimal option for making emergency calls for help. To assess this, the efficacy of mobile applications in handling emergencies was compared to the efficacy of other methods of handling emergencies, which include voice calls and emergency SMS (MMS). Repanovici et al. [11] stated that the rapid development of the telecommunications market enables mobile devices to play a crucial role in protecting members of society.

Mobile devices can be considered a vital instrument to contact emergency services and allow for more effective aid during emergencies [12] [13]. They efficiently communicate voice data, accurate location, hazard predictions, and other relevant information about the user or the situation. To identify the best way to employ mobile devices as a tool to access emergency help, the three aforementioned alternatives (mobile applications, voice calls, and eSMS) [14] [15] were examined.

The examination revealed that the time required to make an emergency call via a voice call or a mobile application was similar, ranging from 5 to 10 seconds. However, eSMS took longer, with 10 seconds or more required to send the distress message. In terms of the time required for the contacted person to receive the call, mobile applications and eSMS had a zero-second response time, while voice calls took an estimated 10 seconds, as the contacted person had to answer the call.

Furthermore, it was observed that voice calls provided more detailed information about the emergency situation, including the victim's address, which could be automatically received in 10 to 261 seconds. On the other hand, eSMS could only contain the address information if manually included by the victim in the distress message, which could take longer to send. In contrast, mobile applications could automatically provide accurate location information using trusted technology such as GPS, making it the most precise and reliable method.

Voice calls could also be utilized to share address details with the contacted person manually, but this could take up to 30 seconds and have a wider location accuracy of 500 meters to 40 kilometers. eSMS was the least reliable in terms of the accuracy of victim location as the information was heavily dependent on what was shared by the victim at the time of sending out the call for help.

Repanovici et al. [11] established that the utilization of emergency mobile applications has multiple advantages, including providing credible and reliable data in a short time, eliminating the language barrier, and enabling all citizens to access emergency services. Additionally, the automatic sharing of accurate location information and other essential details can assist emergency responders in providing timely and efficient assistance, ultimately saving more lives.

Bulusan et al. [16] conducted this study with the main objective of designing and developing a mobile application that enables swift, accurate, and effective responses to emergency incidents by transmitting and documenting

incident details, such as the incident type, images, and location details, among others, to ACS Riders. ACS Riders is a group of 38 Adventist motorcycle riders that volunteer to help victims of automobile accidents in the Municipality of Silang, Philippines.

The recruitment focus on ACS Riders is on locals motivated to help to ensure that people most knowledgeable of the Filipino terrain are tasked with aiding victims during emergencies. Currently, ACS Riders, as a group, uses SMS, phone calls, and social network tools to communicate between members during emergencies. However, these methods are prone to errors and misinterpretations, and they lack the ability to provide an accurate description of the exact accident location.

The proposed mobile application employed the prototyping model software development method, where end users (ACS Riders) had access to initial versions of the software to refine it to their needs. The end users provided feedback that the developed application is highly accurate, less prone to errors, and easy to use. The mobile application utilises Global Positioning Systems (GPS) available on modern smartphones to accurately and automatically report a specific incident location within five meters. This shortens reporting time and also reduces the chances of human error. Furthermore, the application provides the location and contact details of emergency services in the closest proximity to the incident site, which is essential in seeking further help.

To make the most of historical data, the system stores reported information centrally for reference. Data gathered from this central system can be used to predict potential incident hotspots, peak incident times, and other similar types of information. Artificial Intelligence (AI) is being considered to support a possible implementation of the system in a larger geographical area. AI would automatically identify nearby critical facilities and request help from them [17] [18] [19].

Bulusan et al. [16] established that the proposed mobile application is an overall significant improvement over the current methods of communication used by ACS Riders (SMS, phone calls, and social network tools). The mobile application enables the efficient transmission of incident type, location, and images, among other details, for the provision of assistance in emergency situations. The mobile application is easy to use, and the data gathered can be mined to determine places and times of interest.

AI implementation can also expand the system to a larger geographical territory, improving the response process during emergencies [20] [21]. These capabilities in the hands of knowledgeable locals would significantly increase the chances of providing required aid to victims on time. However, the victim's family members, friends, colleagues, and other kin likely to be most motivated to help are not promptly notified by the proposed mobile application.

Ford et al. [22] explored how smartphones are already being considered as a tool to enhance personal safety and reduce the economic burden of interpersonal violence. Violence poses a society-wide economic burden by increasing healthcare requirements, reducing productivity, and so on. In England and Wales alone, between 2015 and

2016, violence was reported to have cost £47.1 billion. Violence prevention is therefore sought after constantly. According to Ford et al. [22], smartphones, via specific-purpose anti-violence apps, could provide a platform for easy intervention of violence-prevention efforts.

Taking the United Kingdom as a sample size, the study assessed the level of acceptance of these apps on the mobile application stores for the two main mobile operating systems, iOS and Android OS — Apple Store for iOS and Google Play Store for Android OS. The assessment was executed by identifying relevant smartphone applications, downloading them, and extracting data from their user reviews.

Five hundred and three (503) applications were considered, but only 86 applications met the review criteria. Of these 86 applications, only 52 applications (61%) offer full functionality at no cost. Over half of the mobile applications (52%) focused on serving the general population; 16% of these were prioritised for women and 13% for families. The functionality of the apps varied; 22% provided an alarm, 71% provided alerts sent to prespecified contacts, 34% provided evidence-capture tools, and 26% offered educational resources. 61 applications (71%) had a user rating of four or above out of five. For these 61 applications, 3,820 user reviews were extracted.

Over half of the reviews (52.4%) were rated positive, 8.8% were neutral, and 38.8% were negative. Key considerations for users were identified to be the positive impacts of application use, technical and usage issues of the application such as reliability, high costs, privacy issues, and other ethical issues. Therefore, if mobile applications are made more reliable, affordable, and in compliance with standard safe data handling practices, people would be interested in using them. This is further buttressed by an online survey conducted by Statista Survey, which conducted a survey in 2017 to determine the percentage of adults in the US willing to use an app for health emergencies.

In the survey, 962 American adults (18 years old or older) responded when they were asked if they would consider using a mobile application for health emergencies. The results of the survey showed that 4% of respondents already used an app regularly for health emergencies, while 71% showed interest in using a mobile application for health emergencies. While the high interest could be a result of high expectations of future mobile emergency applications to address the reservations that users have, the low percentage of people using mobile applications for health emergencies could be a result of the technical and usage issues highlighted in Ford et al. [22].

Having reviewed relevant related works [11] [16] [22], it is already established that mobile applications are the most effective means to provide emergency aid to victims. It's also established that the general populace, although yet to embrace mobile applications fully, has high expectations for the platform. To meet these expectations and create a mobile application that the general populace would use and benefit the most from, technical and usage issues must be overcome, kin most likely to promptly provide help must be considered, and the mobile application must be fully implemented.

IV. METHODOLOGY

The paper employs the mix method research approach involving the qualitative and quantitative methods of data collection and analysis in a case study [24]. The qualitative method focused on gathering and analyzing the responses from participants used in the study using interview and survey. The goal is to gain insights into the underlying motivations, experiences, and perspectives of individuals regarding emergency management in the Nigerian context. On the other hand, the quantitative method involves collecting and analyzing data using statistical techniques. We used the quantitative method to measure and quantify the response of the study respondents to prove the usability and acceptability of the mobile technology solution for emergency management.

Further, the paper adheres to established software engineering guidelines in [25] to design and implement a mobile prototype tool. This approach is essential for ensuring the quality, reliability, and effectiveness of the mobile application developed [26]. The tools used for development include Android Studio as the development environment, Jetpack Compose, Kotlin, and Google Maps SDK for the mobile frontend, Kotlin, Firestore Database, and Google Maps API for the backend and database. The choice of these tools is based on the input from the system design. Subsequently, testing of the implemented system is conducted to ensure optimal performance and compliance with all requirements.

A. Requirement Gathering and Analysis

The gathering and analysis of requirements are crucial aspects of the development of the mobile technology system. This process facilitates the identification and definition of the needs of the application's target users and stakeholders, as well as the features and functionality necessary to fulfill those needs. These requirements are established through comprehensive research, the collection of feedback from potential users, and close collaboration with stakeholders. Table 1 presents the key requirements identified.

Table 1. Key requirements identified

ReID	Requirements
Re001	Rapid access to available emergency services
Re002	Real-time location tracking.
Re003	Timely notifications for emergency alerts
Re004	Immediate sharing of relevant information with emergency responders
Re005	A user-friendly and intuitive UI/UX interface

B. Design Specification

This stage analyzed the data and designed the system based on user needs and expectations. The design used tools like Umbrello and StarUML to show the user-system interaction. Fig. 1 to 5 shows the user interface mockup of the mobile application. The user interface mockup gives a clear representation of the mobile application, including its layout, typography, icons, style guide, colour, and other user interface elements. It is a realistic model that gives a general insight into what the mobile application could look like when completed.

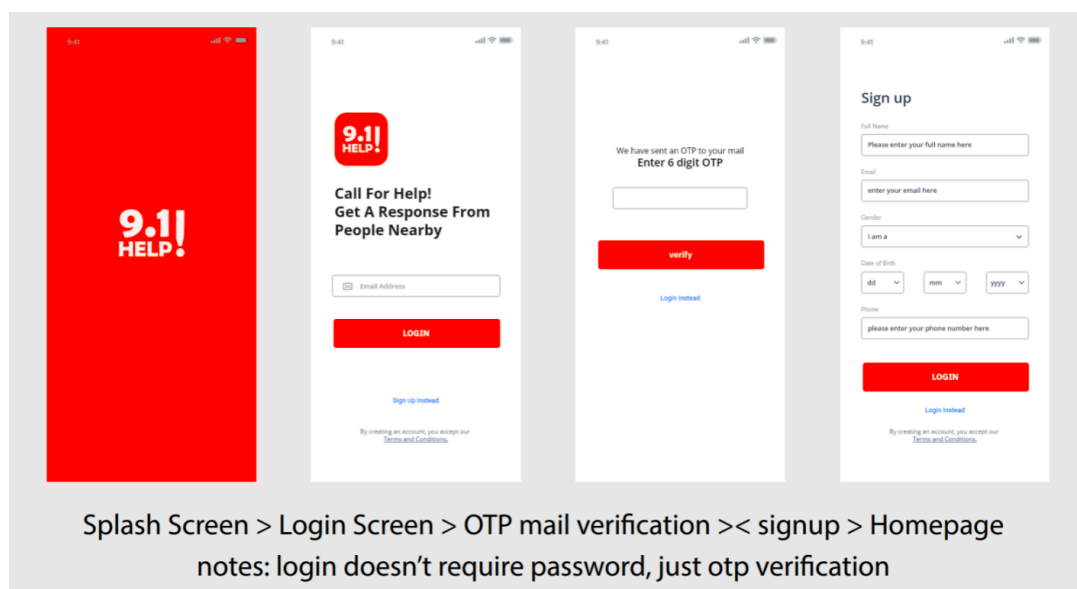


Fig. 1. User Interface Mockup showing concepts of the views of the mobile application

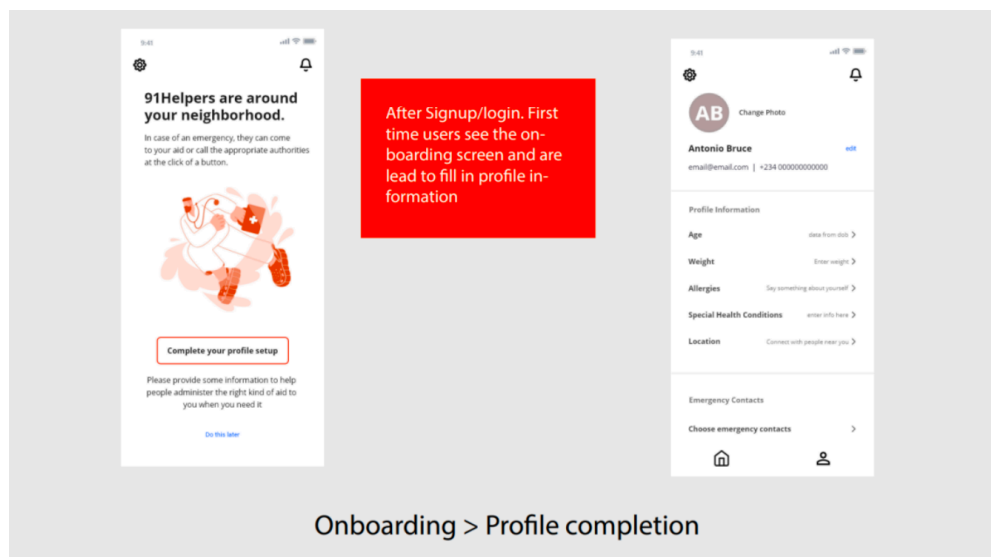


Fig. 2. User Interface Mockup showing concepts of the views of the mobile application

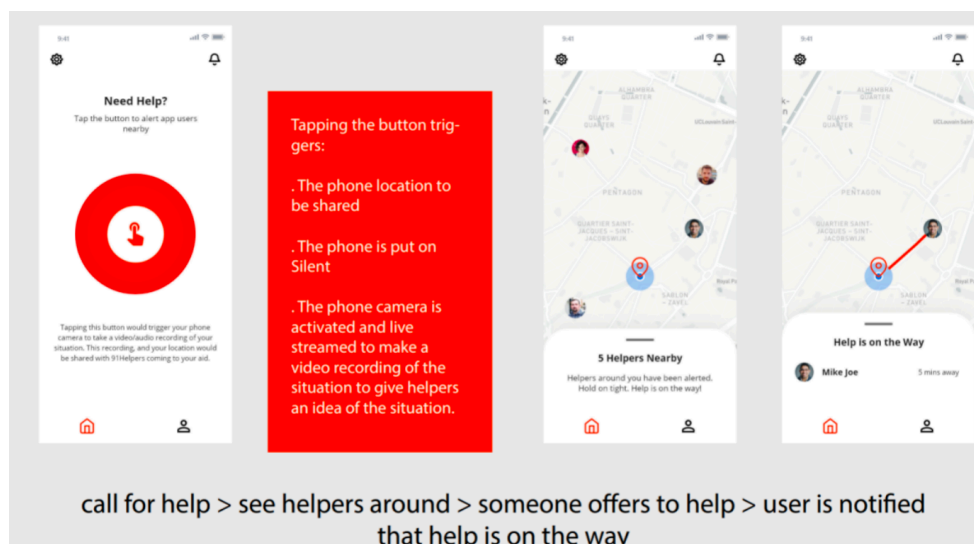


Fig. 3. User Interface Mockup showing concepts of the views of the mobile application

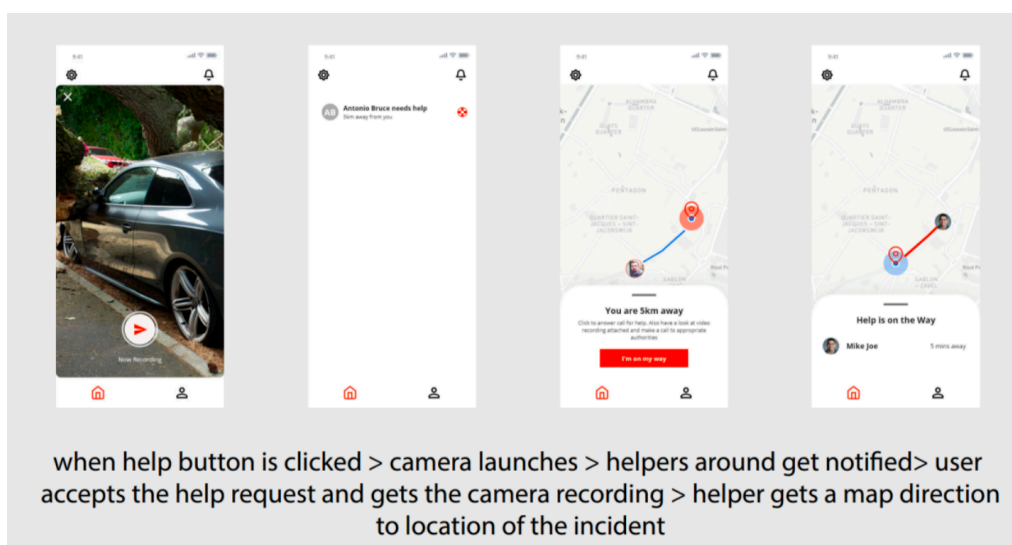


Fig. 4. User Interface Mockup showing concepts of the views of the mobile application

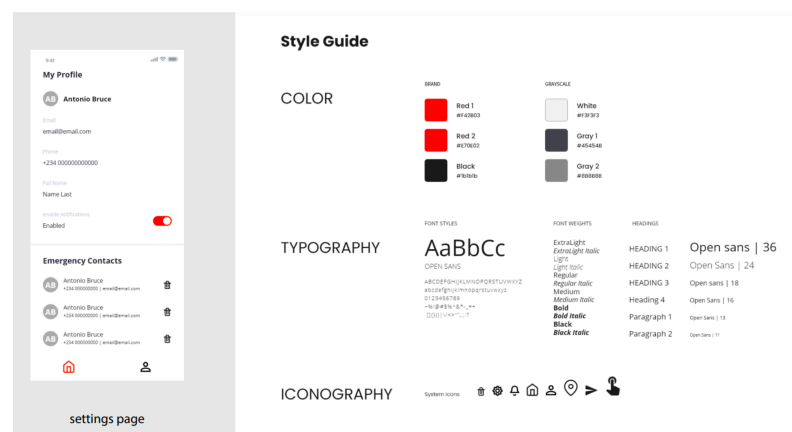


Fig. 5. User Interface Mockup showing concepts of the views and the style guide of the mobile application

Fig. 6 shows the context diagram of the mobile application. As shown in Fig. 6, the relationship between the data and the operation of the mobile application is shown. It primarily helps define the scope of the mobile application, its boundaries, and its relation to external components such as the emergency helper. The system architecture diagram

of the mobile application is shown in Fig. 7. This diagram depicts the components of the mobile application, their constraints, boundaries, and how they interact with each other. It also communicates the overall design and functionality of the system [27] [28].

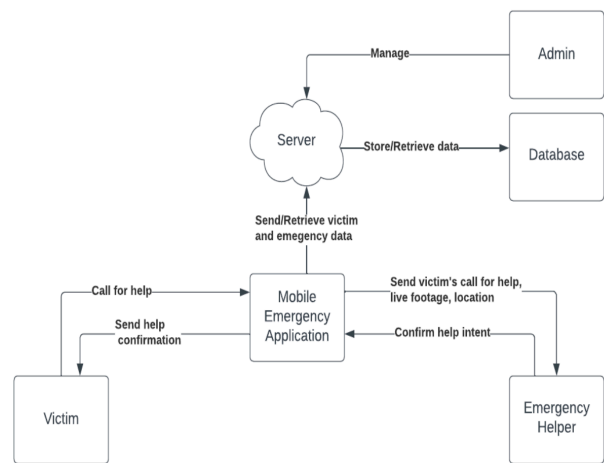


Fig. 6. Context Diagram

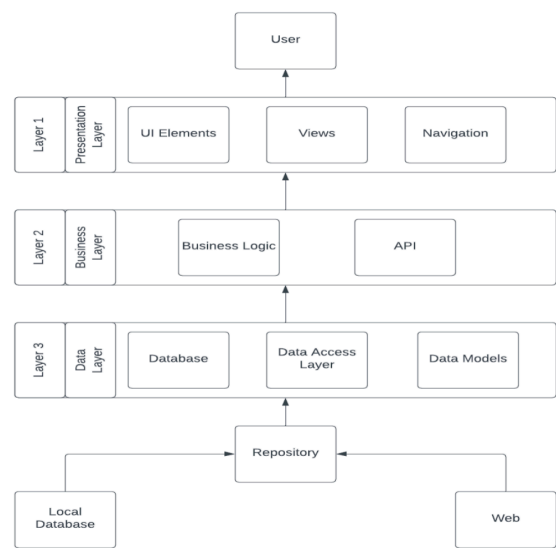


Fig. 7. System Architecture Diagram

Fig. 8 shows the block diagram of the mobile application. This diagram provides a high-level representation of the components of the mobile application and the tasks that each component can perform. Fig.3.8 helps clarify possibly complicated concepts of the mobile application by providing specific details of its implementation. In Fig. 9, we have shown the use case

diagram of the mobile application. The diagram provides a visual representation of the interactions between the mobile application and its user. It shows the different ways and scenarios the mobile application can be used, the tasks within the mobile application, and the functions of the mobile application. This helps users and professionals explain and understand the mobile application.

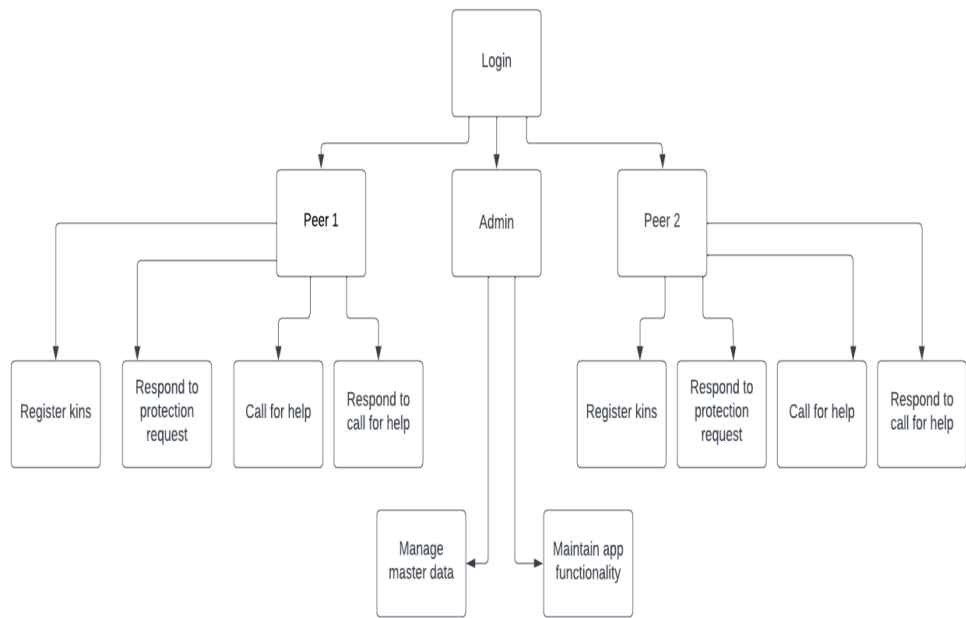


Fig. 8. Block Diagram

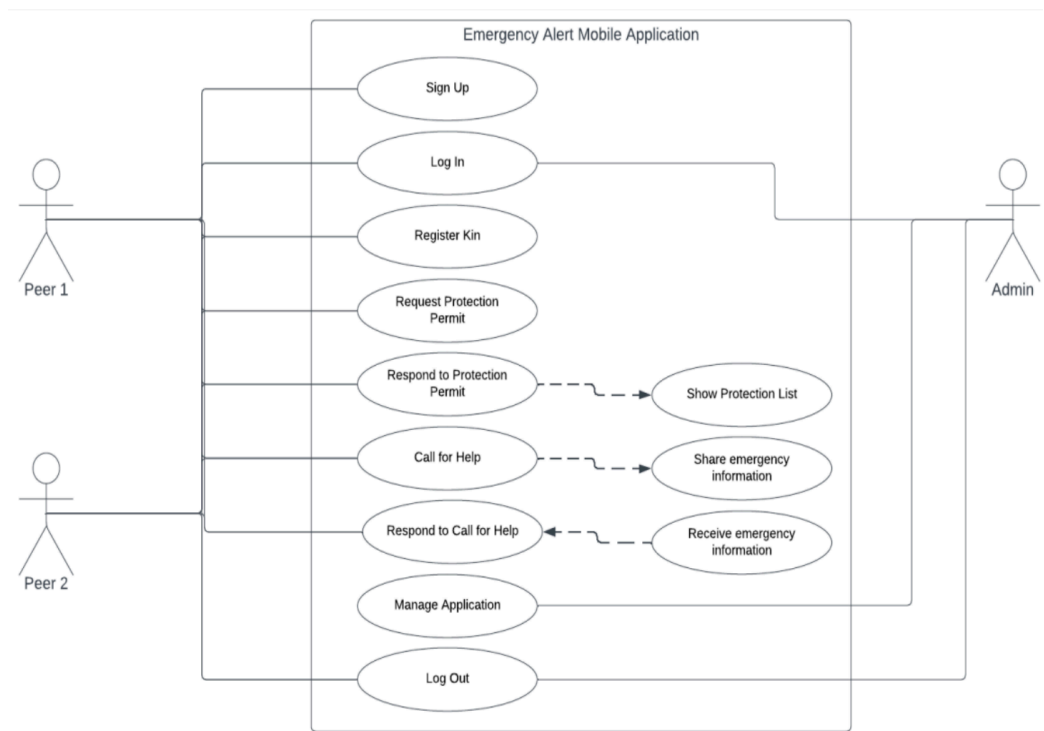


Fig. 9. Use Case Diagram

C. Procedure for Implementation

The implementation of the mobile application consists of three main parts. This include, constructionof the system frontend, backend and integration of system frontend and

backend. The construction of the frontend of the system involves the implementation of the design outlined in Fig. 1 to 5. Thus, the frontend is the actual user interface with which the user interacts. To construct the frontend, several

tools and technologies were utilized. Jetpack Compose was employed to build the user interface, while the Kotlin programming language was used to develop the business logic that manages interactions between various views. Additionally, the Google Maps SDK was utilized to render map features within the system.

To construct the backend, we focus on performing the core functions as instructed by the user interface, which in turn was controlled by the user. The primary responsibilities of the backend included assigning functions to the frontend, storing data related to the activities carried out by the system, and traversing the maps provided by the Google Maps SDK. These tasks were accomplished using Kotlin, a Firestore Database, and the Google Maps API, respectively.

Also, to integrate the frontend and backend, we created a complete and operational system. This integration enables the frontend to communicate commands from the user to the backend, which then executes the commands. The integration of the frontend and backend was accomplished using the Android Studio platform.

The mobile technology solution was developed for Android devices with version 5.1 to 10, RAM 2GB or higher, ROM 32GB or higher, and stable internet connection. The development process took five months, and the pilot testing lasted for three months. The authors designed a user-friendly interface.

V. SYSTEM IMPLEMENTATION

This section presents the implementation of the system. It will take into account the system design and device requirements defined in the previous section to create a system that functions as required. The frontend and backend will both be implemented using the specified tools, and then they will be integrated together to make a complete system. The system will then be subjected to rigorous testing where potential users will use it briefly but intensely to confirm that it operates as specified and addresses the problems it was created to solve. The feedback from the participants of the test is gathered and assessed. An overall positive user sentiment would stamp the system as complete, functional, and marketable—a mobile application ready to aid in saving lives.

A. System Operation

The operation of the system was designed to be user-friendly, intuitive, and straight to the point. To use the mobile application, the user would first launch the app. The user is greeted with a flash screen welcoming the user into the application, as seen in Fig. 10. If it is the first time using the app, the user is met with a Sign-Up page, as seen in Fig. 11. The Sign-Up page features a form that collects relevant information about the user. If this is not a first-time use of the app and the user already has an account, then the user can log into that account via the Login Page, as seen in Fig. 12.



Fig. 10. Flash Screen

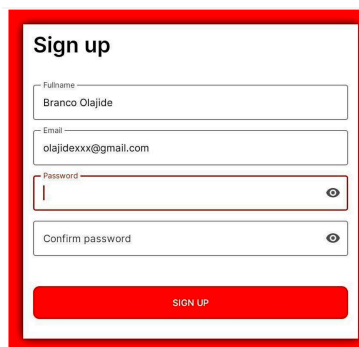


Fig. 11. Sign Up Page



Fig. 12. Login Page

Once logged in, the user is met with the Homepage, as seen in Fig. 13. The Homepage features the main red button at the centre, the profile button in the lower right corner, the notifications button at the top right corner and the settings button at the top left corner. To call for help during an emergency, the user must click on the red button. On clicking the button, the system rings up the user's emergency contacts who have the app installed and are registered.

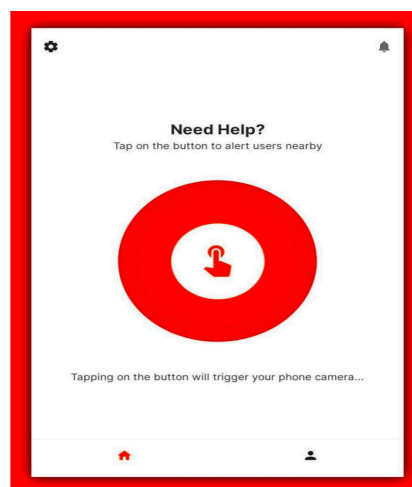


Fig. 13. Homepage

Every emergency contact would have his/her phone pinging constantly as an alert for an emergency. Their notifications page would also indicate an incoming request for help, as seen in Fig. 14. On tapping the notification request, the emergency contact sees a live Google map with the location of the victim marked on it, as seen in Fig. 15. The emergency contact then decides whether or not to go provide emergency aid to the victim (user).

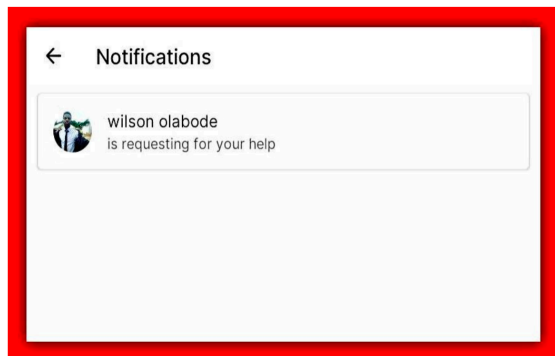


Fig. 14. Notifications Page

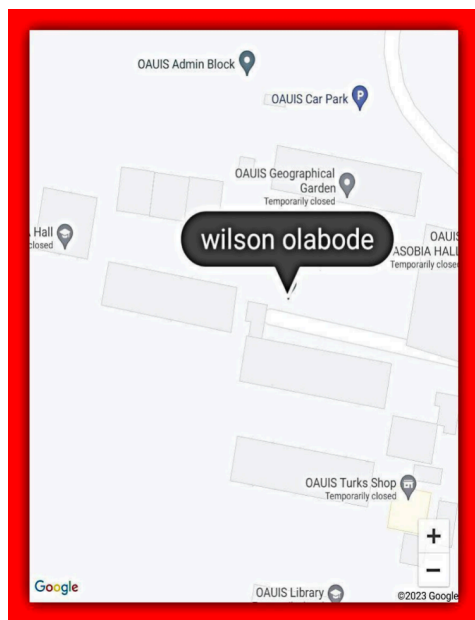


Fig. 15. Live Maps

For this sequence of events to happen, the user would initially have to specify emergency contacts to alert during emergencies. To do this, the user would tap on the profile button. This action takes the user to the Profile Page, as seen in Fig. 16. On this page, the user can see his/her profile

picture, email address, phone number, profile information, and emergency contacts. To add a new emergency contact, the user clicks the “Add Contact” button and then fills in the required information of the emergency contact to be added.

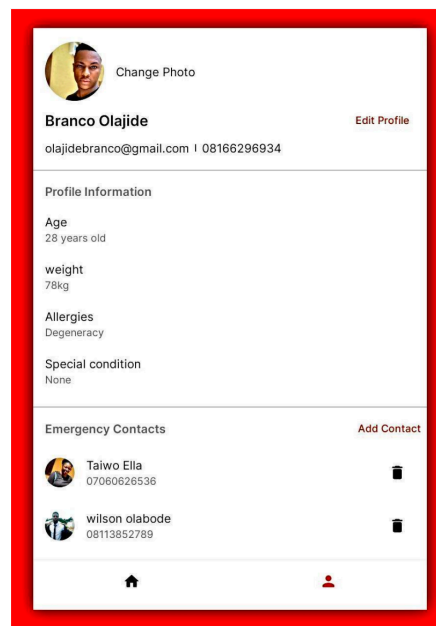


Fig. 16. Profile Page

VI. SYSTEM TESTING

To evaluate the effectiveness of the system, it was tested in a controlled environment with its intended users — everyday people. The system was considered to be effective if it successfully alerted a registered helper of a user's demo emergency. After using the system, users were asked to complete a feedback form based on their experience. The results of this feedback were collected and analyzed to assess the overall effectiveness of the system.

A. Assessment of Participant Feedback

The feedback from the test participants provided insights into the performance, user interface, and overall likelihood of use of the mobile app. The sample size consisted of 25 people, aged between 21 and 28, who participated in the test by critically and thoroughly using the application and then answering some questions that evaluated the app's operations. The participants' answers are summarized in Table 2.

Table 2. Percentage summaries of participant response to questions regarding the mobile App

Questions		Yes	No	Maybe
Do you usually have data (internet connection)?		64%	12%	24%
If you are certain that help will come, will you be calm enough to use an emergency app during an emergency?		64%	8%	28%
How satisfied are you with the app's speed?	Very Satisfied	8%	0%	0%
	Satisfied	56%	0%	0%

	Neutral	28%	0%	0%
	Dissatisfied	8%	0%	0%
	Very Dissatisfied	0%	0%	0%
How satisfied are you with the response of the big red button?	Very Satisfied	28%	0%	0%
	Satisfied	48%	0%	0%
	Neutral	20%	0%	0%
	Dissatisfied	4%	0%	0%
	Very Dissatisfied	0%	0%	0%
What types of emergencies could you use the mobile app for?	Fire Outbreak?	84%	0%	0%
	Theft?	36%	0%	0%
	Health-related Emergency?	25%	0%	0%
	Burglary?	88%	0%	0%
	Drowning	8%	0%	0%
Does the app meet your expectations and needs in an emergency situation?		72%	4%	24%
Does the app meet your expectations and needs in an emergency situation?		48%	0%	52%
Do you think this app could save lives?		76%	0%	24%

The analysis of the participants’ answers revealed that 88% of people were somewhat optimistic about usually having an internet connection (see Fig. 17). 64% of participants indicated that they would be calm enough to

use an emergency app during an emergency if they were certain help would come, while another 28% indicated that there was a possibility of being calm enough to use the app (see Fig. 18).

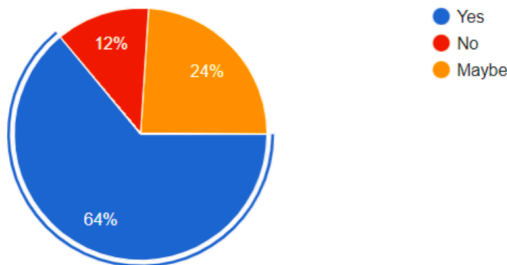


Fig. 17. Pie Chart displaying user-response percentage to the question, “Do you usually have data (internet connection)?”

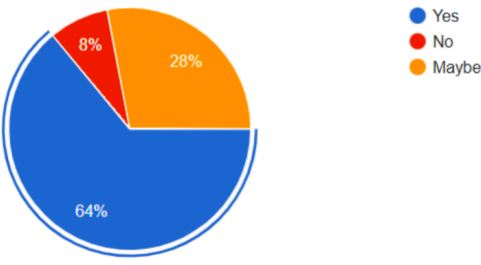


Fig. 18. Pie Chart displaying user-response percentage to the question, “If you are certain that help will come, will you be calm enough to use an emergency app during an emergency?”

Regarding performance, 92% of participants were either neutral, satisfied, or very satisfied with the app’s speed (see Fig. 19). 76% of participants were satisfied with the response of the app’s main function — the response of the

red button (see Fig. 20). The majority of the participants reported that the app was satisfactorily responsive, easy to use, and did not experience any crashes.

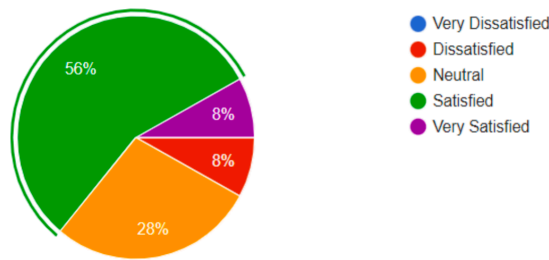


Fig. 19. Pie Chart displaying user-response percentage to the question, "How satisfied are you with the app's speed?"

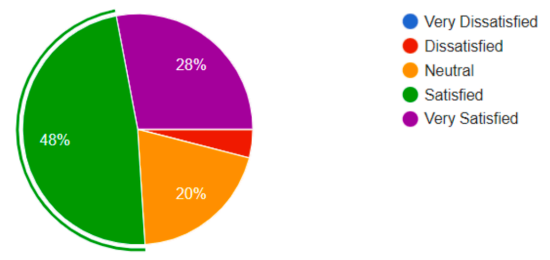


Fig. 20. Pie Chart displaying user-response percentage to the question, "How satisfied are you with the response of the big red button?"

Regarding the user interface of the mobile app, 85% of participants considered the app's visual design appealing. The user interface made it easy to call for help, according to 75% of users. 70% of participants reported that the app compared well or neutrally to other emergency mobile apps they have encountered.

Regarding the likelihood of use, participants expressed a neutral likelihood of encountering emergency situations that require the use of the app. 80% of participants were satisfied with the app's help-calling features, such as the alerts and maps.

Given the options of Fire Outbreak, Theft, Health-related Emergency, Burglary, and Drowning, participants voted a likely use of the app for Fire Outbreak, Health-related Emergency, and Burglary. Theft and Drowning were the least voted for (see Fig. 21). 76% of participants reported that the app met their expectations and needs in an emergency situation (see Fig. 22). 46% of participants reported that they would recommend the app to other people who might need it, while 52% reported that maybe they would recommend it (see Fig. 23). 100% of participants reported that the app could potentially save lives (see Fig. 24)

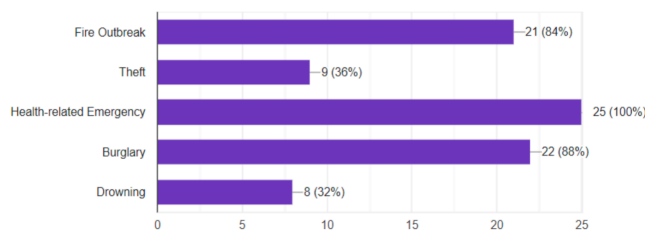


Fig. 21. Pie Chart displaying user-response percentage to the types of emergencies they could use the mobile application for.

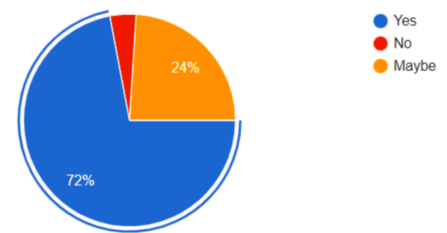


Fig. 22. Pie Chart displaying user-response percentage to the question, "Does the app meet your expectations and needs in an emergency situation?"

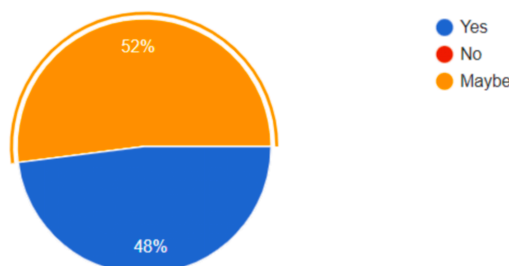


Fig. 23. Pie Chart displaying user-response percentage to the question, "Are you likely to recommend the app to others who could themselves in an emergency situation?"

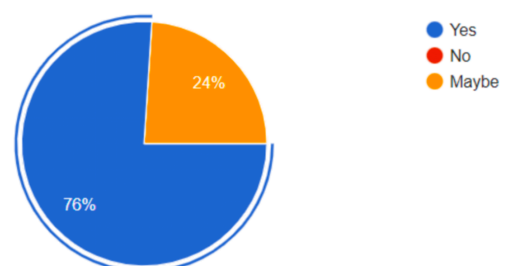


Fig. 24. Pie Chart displaying user-response percentage to the question, "Do you think this app could save lives?"

VII. RESULTS AND DISCUSSION

The overall sentiment towards the mobile application was positive. The tests highlighted that the app caters to the needs of society while demanding requirements that society can provide with ease. The app's speed, responses, user interface, and usefulness in a wide array of emergency situations were the particular highlights, along with the requirement of an internet connection, which is not taxing for the majority of users to provide. All of these suggest that there is a community of users waiting to be created and that the app works as designed.

VIII. LIMITATIONS

This paper limits research to focus on individuals residing in urban, semi-urban, and rural areas who have access to internet-connected mobile devices and are willing to adopt a new application. The paper presupposes that peer, such as friends, family members, colleagues, and users who express their willingness to help, will respond to a call for help when they receive it. The scope is limited to the events discussed in this paper.

IX. CONCLUSION AND FUTURE WORK

The ultimate goal of this paper was to create a platform that could save lives by enabling individuals to instantly and

efficiently call for help from those most likely to provide assistance, such as friends, family, and colleagues. “The Button” is the resulting platform of this paper, and it has demonstrated its capability to achieve this goal. As a result, Nigerians will have a safer country, and the world will be a better place.

Although “The Button” is a fully functional system with real-life applications, studies have been conducted to determine how the mobile application can be further improved to better serve society. Based on the findings of these studies, future research could explore the following areas: 1) The integration of “The Button” with event-specific hardware components. For example, a camera programmed to detect a drowning event could be further configured to activate “The Button” and call for nearby assistance upon detecting a drowning victim. 2) The addition of region-specific features to enhance the effectiveness of the app in calling for reliable help. For instance, in high-income neighborhoods with functional security-aid-providing institutions, the app could be upgraded to contact these institutions in case of an emergency. 3. An additional feature that enables the app to live stream video footage through the device of the phone to keep emergency helpers updated as the situation unfolds. 4. General research on additional features that emergency mobile apps should possess to become more effective in achieving the goal of a safer Nigeria.

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