

iReport: An Android-Based Real-time Incident Reporting App for PNP Urdaneta

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Abstract— Inevitably, incidents happen everywhere at any time. Incidents vary based on the level of complication and severity. Most incidents are not reported to authorities to protect their identity, hence, excluding themselves during the investigation. In addition, the individual belief of the weak capability of the law in terms of investigation makes citizen ignore such incidents. Furthermore, the lack of interaction platform of the general public to law enforcer to report an incident is one of the main concern.

Knowing this, this paper presents the development of a mobile application that will help individual to report an incident anonymously and conveniently without the hassle of going to police stations. It allows the police department to get information about the incident quickly through online reports, viewing the photos or videos of the incident along with the map, thus, responding to such cases will become easier and faster. Moreover, the police department can plot the statistic of incidents by looking at a graph, allowing them to decide which one will be prioritized to receive an immediate action. The application shall be used by the public in a specific area where the database was deployed in a certain police station.

Keywords—iReport, Incident Reporting App, Mobile Reporting App.

I. INTRODUCTION

Technology has been so helpful in the improvement of humans' daily lives. With the use of technology, people can easily do the job quick and easier, communicate with friends and families in an instant, and search for information as fast as a lightning. More importantly, technology has also been used in life-saving tool and in criminal investigation.

One of the most widely used technologies nowadays is surveillance cameras which help lots of people in any nature of businesses either in medicine, education or any institutions. According to Phillips (2008), "CCTV systems can provide warning signs of potential criminal offenses and act as a reactive tool. CCTV monitors crowds and individuals, responds to threats and thus notifies the operator(s) of harmful behavior and actions before, during and after the occurrence of an event." [14]

Another technology which is very beneficial to the public, particularly to the car owners, is the automatic detection of

accidents and remote alarms. The study of Goud and Padmaja (2012) proves the benefits of installing a device in the car where an accident can be tracked down easily through GPS location and remote alarm to notify the emergency stations for them to be able to respond as quickly as possible. These are some of the evidence which proves that technology not only changes the lives of the individual but it also contributes to life saving.

Elnas et al. (2015) mentioned that almost every individual is using a mobile device as a way of updating themselves. This concept is strongly supported by Statista, which states that the year 2015, more than 1.8 billion are smartphone users around the world and will continue to increase up to 2.6 billion in the following four years [6]. In relation to that, the same website plotted down that Philippines has an estimated of 26.2 million smartphone users and will continue to leap to 39.2 in the next four years [7]. Therefore, mobile devices are viable tools for incident reporting.

Additionally, according to Agangiba and Agangiba (2013), "The introduction of 3G/4G cellular network technologies by most mobile network operators has improved the communication demands of mobile users [1]." Thus, combining the concept of mobile devices with the active participation of general public and the service of mobile networks drew the concept of mobile incident reporting.

A. In the Context of Incident Reporting

Different incidents happen every day. This includes less serious cases such as theft, quarrels and shoplifting to more abusive acts such as rape and homicide. Whatever the case is, it is very necessary to inform the authorities to make an immediate action to resolve the issue and, at least, formulate some prevention methods to lessen its occurrences. The Philippine National Police (PNP) recorded that there is 15.36% decrease of crime volume this year against the total crime volume last year, translated to a decrease from 602,449 last year to 509,924 for the first five months of this year [8]. This proves that it can still be declined in the next years with the participation of the general public in incident reporting.

Contrary to that, there are incidents which are not reported, most especially murder and rape, thus increases the statistics of unreported and unsolved incidents. Medina (2010) said, "The main reasons for not reporting these crimes can be attributed to the victims' knowledge of the offender and no evidence to prove the culpability of the crime suspect." Truly, that reporting an incident requires evidence to make it justifiable. Additional reasons for not reporting such incidents are: (1) people fear of retaliation, worrying that if the offender knew

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someone reported the incident, things may get worse; and (2) lack of trust in law enforcement agencies, where people have negative experiences in the past incident reports which are not taken with action [5]. Hence, being anonymous can be helpful in reporting incidents to protect one's self.

B. Related Studies

In relation to the development of the application, researchers made a thorough study of different deployed applications or systems which uses the almost similar concept of iReport in incident reporting.

[3] Location-Based Reporting and Mapping of Crimes Using Google Maps, portrays a very good example of mapping the location of an incident through the utilization of the Google Map's capability and it is a browser-based. Reporting is done by allowing the user to point to a location on a map where the incident occurred, thus, retrieving the coordinates which consist of latitude and longitude based on the Google API. The system was already deployed in Iligan City, Philippines.

Another outstanding study is made by Agangiba and Agangiba entitled "Mobile Solution for Metropolitan Crime Detection and Reporting". With this developed application, the general public can conveniently and silently post suspicious activities in the nearby area for the police to take action

Another famous Android-based application that was developed by TipSoft and widely used by many schools, communities and governments. TipSubmit is known to be the first anonymous tip submission mobile software. It allows citizens to submit crime tips to Crime stoppers securely and anonymously. The system identifies tipsters by their tip number only, which it assigns to the tip. The Mobile App allows tipsters to upload photos or video and is able to send the location of the video by a GPS locator.

With the concept of the above-mentioned studies, mobile devices can really be a big help in lessening incidents and make the law officers and public more productive. Regarding this idea, android platform is the most practical operating system to use in the development of iReport, since most users of the smartphone in the country are with the android operating system.

C. On the Project Context

The Urdaneta City Police Department, as a source of data for this study, experiences inherent issues particularly in the current procedures in incident monitoring and response strategies.

Due to this fact, the researchers proposed iReport, a mobile application which can help the police department in incident mapping, not only allowing the public to report the certain incident but also for law enforcers to have the needed evidence instantly for them to respond as quickly as they could. iReport shall allow the public to send photos together with the description and location of the incident happening or just happened. In this way, there is no reason for a delay in responding cases.

D. The Project Objectives

The main goal of this study is to design and develop a mobile application that is primarily used to report incidents directly to the authorities. Specifically, it aims to:

1. Identify the current procedures used in incident reporting.
2. Identify the problems encountered in the current procedures.
3. Identify the framework to be used in the development.
4. Identify the features to be implemented in the system.

II. METHODOLOGY

In this phase of the study, researchers followed specific methods throughout the project development. With this method, researchers were able to make all the requirements organized to expedite the development.

Since user requirements for certain application changes anytime, the study took XP approach. With this methodology, it allows developers to change or add application features depending on the need of refactoring it.

A. Data Gathering Techniques

Extensive data gathering about the topic was performed to fully understand how people respond to an incident once encountered. Basic gathering tools that the researchers used in the study are the questionnaires, interview and literature reviews.

Furthermore, interviews and surveys were disseminated among the respondents using close-ended questions in which the respondents or the incident witnesses are asked to select from a range of predetermined answers on what they did when they encountered a certain case and what have been the challenges in reporting such events.

B. Respondents of the Study

The respondents of the study include random people from different municipalities such as Urdaneta City who witnessed any type of incident and police officers from different municipalities mentioned above assigned in incident blotter reporting.

TABLE 1: DISTRIBUTION OF RESPONDENTS

Position/Entity	Number of Respondents
Police Officers	35
Citizens	120
Total	135

III. RESULTS AND DISCUSSIONS

This part of the paper summarizes the results of the study in developing mobile-based incident reporting application. The discussions were divided into four main subject areas:

A. Existing Processes in Incident Reporting

The existing process used by police department where the study was conducted is traditional. The incident report comes either it is reported walk-in or thru texting or calling.

Currently, authorities are still using the typical blotter reporting system.

Persons involved, time and date the incident happened, and motive of the offender or suspect and the narrative on how it happened are viable information collected from the reporter to be used for further investigation. On the other hand, when the incident was reported via text message or call, police officers will validate it by calling back the message sender and verify if it really happened by asking same questions asked to a walk-in reporter.

B. Problems with the Existing Processes

Researchers have identified major challenges with the existing system of incident reporting. Based on the survey results conducted in the population of the respondents, most people opted not to report an incident due to privacy concerns. People value much of their identity to avoid further engagement with the investigation. Moreover, many of them do not want to spend time going to police stations which may affect their productivity and resources.

Another challenge identified in the existing system during the conduct of this study is that police officers will still respond to a reported incident, even it is not yet clearly identified if it's a false alert or real. They will have to verify the reality upon arriving at the reported location where the incident happened, thus spending their resources on an unsure rescue. Figure 1 shows the result of the survey conducted.

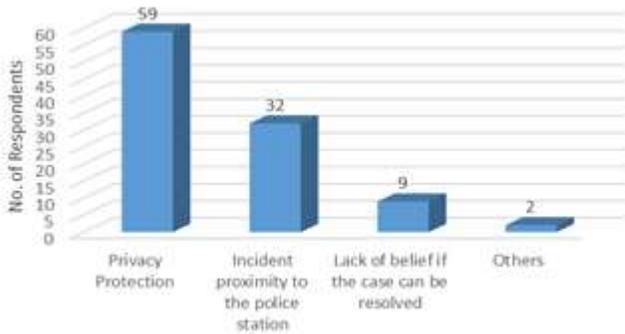


Fig. 1. Reasons Considered in Traditional Incident Reporting

C. The Mobile Incident Reporting Architectural Framework

Understanding how the developed mobile incident reporting application works can be analyzed through looking at its framework. The framework can be defined as the foundation for developing a system or application. It shows the ongoing processes invisible to users.

Figures 2 shows specifically the frameworks of the proposed mobile application. These frameworks served as the blueprint of the developed application. Researchers have used the frameworks to convey essential processes that is part of the user requirements of the applications

The mobile application framework shows how the reporter will send a witnessed incident. Upon witnessing an incident, the reporter shall open the iReport application, which will then pop up a warning message on the proper usage of the application with its terms and conditions to avoid false reports. If the user declines on this statements, then the application will automatically close, otherwise, the application will take the

user to capture the incident. After capturing the incident, the app will redirect the user to click on the Send button, which then sends the viable information to the server including the sender's current location and phone number, which was automatically retrieved from the user's phone. The incident report will then be marked as pending. If the report has been confirmed by police officers to be true upon further validation, then the user will receive a notification informing that the incident report was confirmed.

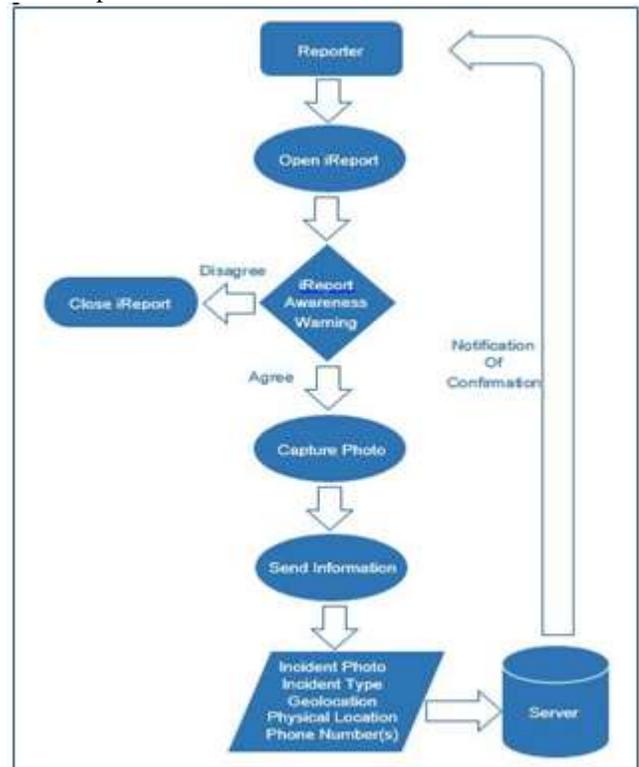


Fig. 2. The Mobile Application Framework

To sum up everything, figure 3 shows the system overview of the application. This demonstrates the interaction of the reporter with the server side application. All the information sent by the reporter will be stored in the database temporarily and will be marked by its status as pending. This information will be retrieved by the application server in the police department. When the police department confirmed that the reported incident is valid, the information from the temporary storage table will be stored in a permanent table and its status will be marked as 'confirmed'. Reporters with confirmed reports will then receive a notification of confirmation.



Fig. 3. The System Overview

D. Features of the Mobile Application

This section of the study shows the most important features of the developed mobile applications. The features were advertently supplied by the users of the system.

The Home Screen

There are instances that the witness is not a resident of a certain place where the incident happened, which can be a traveler who passed by while on the way home. The iReport Home Screen displays the current location of the reporter, including the address, the geo-location latitude, and longitude.

Another, the reporter’s phone number is also displayed on this screen, making the reporter aware that this information will be sent to the server for further validation and investigation. The application shall automatically detect the active SIM number stored in the local phone’s memory and display it into the Home Screen of the application. The functionality of the feature is based on the user requirements from the clients. Figure 4 shows the iReport Home Screen.



Fig. 4. The Home Screen

The Camera Tab

Indeed, an image tells a lot of story about a certain subject. iReport relies heavily on the incident photo that the witness have captured. The Camera Tab, when activated, opens the application camera immediately to take a photo of the event.

Figure 5 shows the Camera Tab taking a sample photo to be sent to the server.



Fig. 5. Camera Tab

As one of the system’s main functionality, the server was designed to it’s to provide the best user experience in incident viewing. It was well-planned to run to both large screen devices like PC’s and mobile devices such as tablets and mobile phones since it is built to be mobile responsive. This section of the study shows the most important features of the mobile application server.

The Incident Report Map

To easily identify the location of the incident, the server has the capability of plotting the coordinates submitted by the reporter and display it in Google map with the fastest route to respond. Thus, officers can respond to the incident faster knowing where it’s exact location. Figure 6 shows the incident map of a particular incident report.

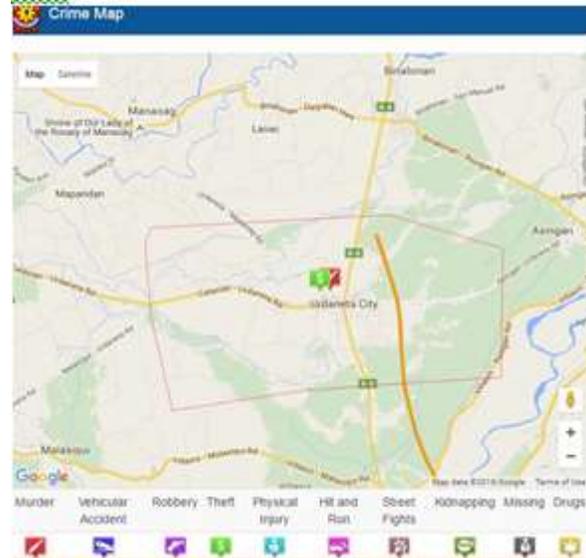


Fig. 6. The Incident Map

An incident, once confirmed, will be stored to the database as future reference in data gathering. All confirmed incidents

will be plotted to the confirmed incidents map for police officers to view where a certain incident happened mostly in a specific location within the city. The confirmed incidents map provides a legend with icons for a particular incident.

Additionally, the officer can zoom in and out of the map maintaining the centered location of the incident. The officer can also use the built-in controls in Google map such as viewing the location as terrain and looking closer to the location by using the 360 Google Street View.

IV. CONCLUSIONS

After the conduct of the study, the researchers have defined the following conclusions of the conducted study.

First, the existing process used by the police departments in receiving blotter reports is still in the traditional process. Currently, all the respondents have showed a clear manifestations that the use of the traditional blotter reporting is carried. No indication of technology enhancement of the process is manifested.

Secondly, the challenges with the existing process include human factors such as the delayed information dissemination, and protection of personal identity and privacy. The further challenge includes the validation of the report, thus spending the rescue time to an unidentified and unsure incident.

Third, the framework have been developed to show the actual process in incident reporting: the mobile app framework and the app server framework. These frameworks are indeed helpful in making incident report faster and convenient to the end users.

Lastly, the features implemented in the application and server are very helpful and reliable to both public and the authorities. These features increase the productivity of both parties to solve the case as soon as possible, hence reducing unreported incidents.

V. RECOMMENDATIONS

The researchers highly recommend the following for further development of the same project.

1. Include more than one incident photo and, at least, a video of the incident to encourage police officers to consider the report as real and reliable.
2. Add more servers depending on the nature of incident to immediately get a respond to a specific incident by the specific rescuer.
3. Update public where is the most highly occurred incidents by plotting it on the map, thus making people aware of these places to avoid the further occurrence of the incident.

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