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ALERTO SILANG: Incident Locator Mobile Application

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Abstract. Geolocation has been widely used in areas such as navigation, social media, weather forecast and location search to determine and provide the exact location of a computer or a device. This study aimed to use this current technology available on mobile devices to send geolocated incident report to the local authorities to provide immediate response. This will serve as a new communication tool between the citizen and local agencies of the Municipality of Silang. Evolutionary development methodology was used in developing the android application for sending geo-located incident and web application which receives the citizens' report. A beta test was conducted where random residents and local authorities of Silang tested the software to validate its acceptability. The beta test results confirmed that the current trend in mobile device can be used as a tool to enhance the communication between concerned citizens and local agency respondents in times of incident.

1. Introduction

An incident is something that happens, often something that is unpleasant **[1]**. It is typically categorized by crime, and/or fire incidents, man-made and natural disasters. It may happen anywhere and anytime which needs appropriate response from concerned agencies. If these incidents were not responded immediately, the life of the people is under high risk. Reporting these kinds of event should be done as quickly as possible to lessen casualties. Others may be reluctant to engage closely to the incident but through the development of the mobile application, citizens now have an option to at least report it. The emerging trend of mobile phone technologies can help individuals or even organization to stay alert in their location. Before, the people in the emergency response team had little to none to rely upon raw reports.

In the occurrence of an incident, people around it tries to exert effort to respond but it still takes time to call for help. Today, wireless innovation gives a new way of handling unexpected events. An individual's smartphone can be a handy tool to save lives or properties. There are variations of location-based systems which was used to report and locate incident. An incident locator will basically connect people and emergency response agencies. This allows response team to receive reports from concerned individuals and give quick and appropriate action to it.

The purpose of this project is to apply an existing technology to develop an efficient tool to the people of Silang which can help decrease the risk of lives or properties. Hence, this will advance the communication medium of the citizen and the local government.

2. Objectives

The study aims to address issues in incident reporting by developing a tool which uses current technology to enhance communication between concerned citizen and local agencies respondents.

Specifically, the project is designed to address the following:

1. Provide the citizen a tool than can send geo-located incident report and a web application which local authority can view and administer the report.
2. Update the community in the occurrence of unnecessary events on the locality of Silang through a news feed module posted by the administrator through the web application
3. Provide an easy to use SOS tool for users.

3. Literature Review

3.1 Mobile Communication

Mobile technology has been widely used in communication and information dissemination. It is used either for social purposes, public awareness or even used as a reporting tool. The following studies present the use of mobile devices in public awareness and disaster management and emergency report:

"Albay Emergency Response and Report Tool" or simply called ALERRT is an aide to the citizen of Albay in case of emergencies, accidents and concerns that require government's quick response [2] . It focused on taking an action based on the post of concerned citizen. Stated on this paper that the main goal of his study was bridging communication between the constituent and concerned agency.

Another good example is the Incident Reporting System using GIS. It is an application which provide a communication medium for the public to indicate to the respective authorities about the emergencies or incidents identified. Most of the incident reporting tools are designed for particular purpose such as road accident, forest fire, etc. so they aimed to create an application that integrate all this feature [3].

3.2 Incident Locator

The smartphone's GPS feature can be a great tool to identify the location of its user. This technology is also used in different mobile application for useful purposes such as accident locator, geo-targeted alerts and navigation system. The following studies show the use of GPS in incident locator.

Vehicle Accident Alert and Locator (VAAL) features a GSM/GPS module which detects and report automatically an automobile crash to the nearest agencies. three main player of the project which were the automobile incorporating a machine-to-machine device, the mobile operator and the emergency organizations [4].

The study entitled Mobile Emergency Response Application Using Geolocation for Command Centers was focused on developing a mobile application which will be used by the end user and a web application for command center. The application is internet dependent for sending request and identifying the device' real time location. The mobile application would detect user's current location through geolocation and sends to the web application deployed in a command center the name, age, mobile number and location of the user [5] .

3.3 Synthesis

The researcher reviewed the important features and modules of the gathered related systems and studies. Most of the studies are application of the mobile technology used to save life or properties of citizens. Mobile communication discussed that today's smartphone can be used as a tool to report undesirable incidents. Like the mentioned studies, the purpose of the system is to bridge communication between the citizen and concerned agency. It also covered reporting incidents such as road accident, forest fire and crime. Incident locator is another application of GPS feature available in mobile phone. Studies showed that this feature can be used for beneficial purposes such as locating an

accident. “Alerto Silang” app also used the GPS feature of the user’s mobile phone to automatically detect the location of the sender of the incident report. A web application is also part of this study as a medium for receiving reports and posting of news. This application is not just a reporting tool but also an easy to use SOS Kit in time of emergency designed specifically to the needs of the people of municipality.

4. **Methodology**

The researcher used the Evolutionary Development methodology which is an evolution of the traditional Waterfall methodology that is more adaptable to changes. This enabled the researcher to produce a product that better fits the users’ need. It divides the cycle in waterfall model into smaller, incremental method which users can get the product in the end of each cycle.

The researcher planned and identified the structured process of the creation of the software to its final manifestation. After the planning phase, the researcher conducted data gathering procedures to identify the functional and non-functional requirements of the system. It was followed by the development of immediate version of the software. The software then tested by users to obtain feedback for revisions and validation of the functionality of the software.

Below is the context diagram of the project

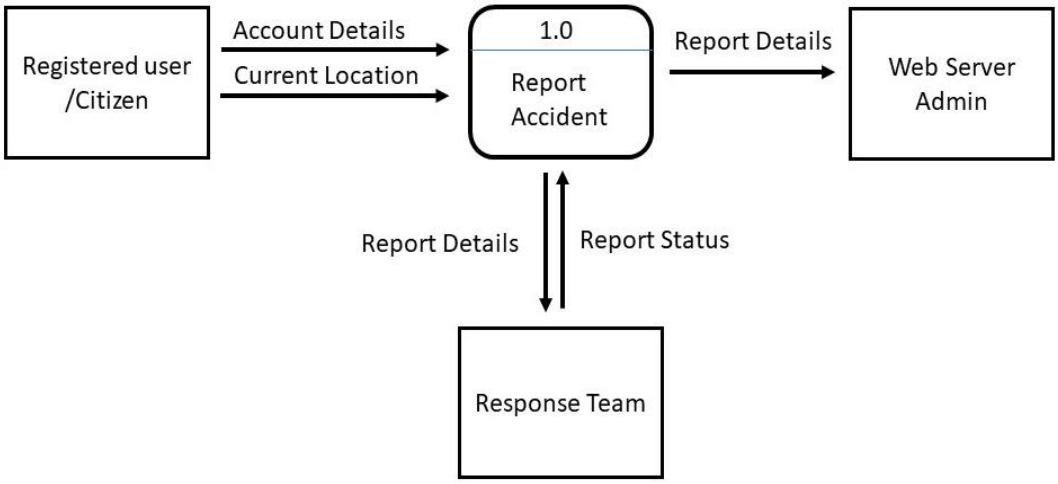

Fig.1 Context Diagram

A user can submit an incident report using the mobile app which includes his registered name, type of incident, time and date, and the current location of his device and a supporting details and image. The report details will be delivered in the web server which is administered by PNP office of Silang. After assessing the incident, they will dispatch appropriate response based on the assessed incident report. Below are the main modules of the system:

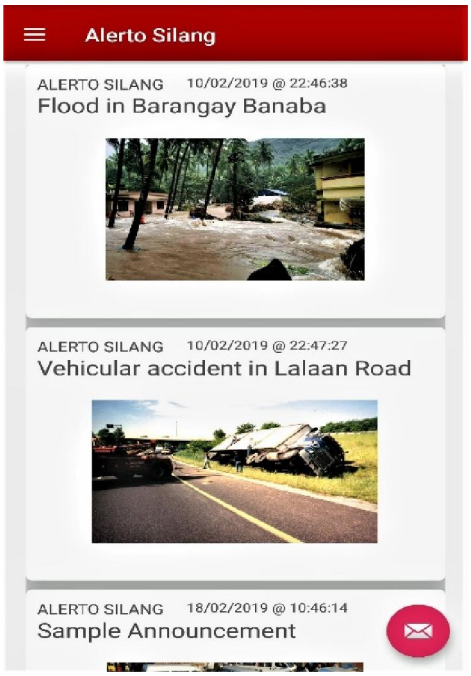

Fig.2 Report Module

Figure 2 shows the module that allows the user sends an incident report by filling only the supporting details and image. Current location, date and time of the device used to send the report will be automatically captured and delivered together with the details of incident.

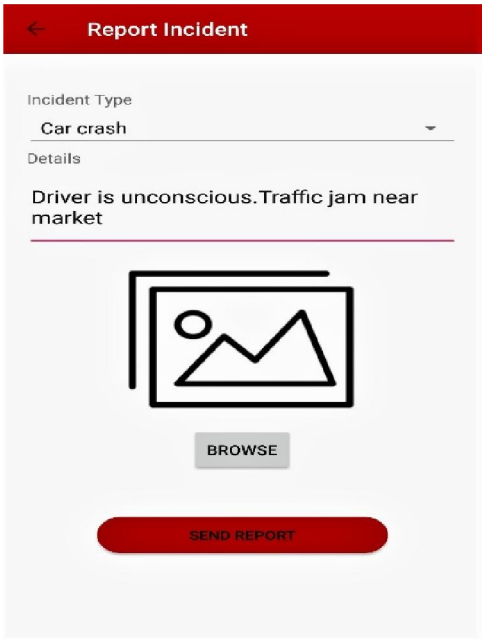

Fig.3 News Feed Module

Figure 3 shows the module that serves as the news feed of the mobile application. News posted from the web application is displayed in this section to alert the residents in times of undesirable incidents.

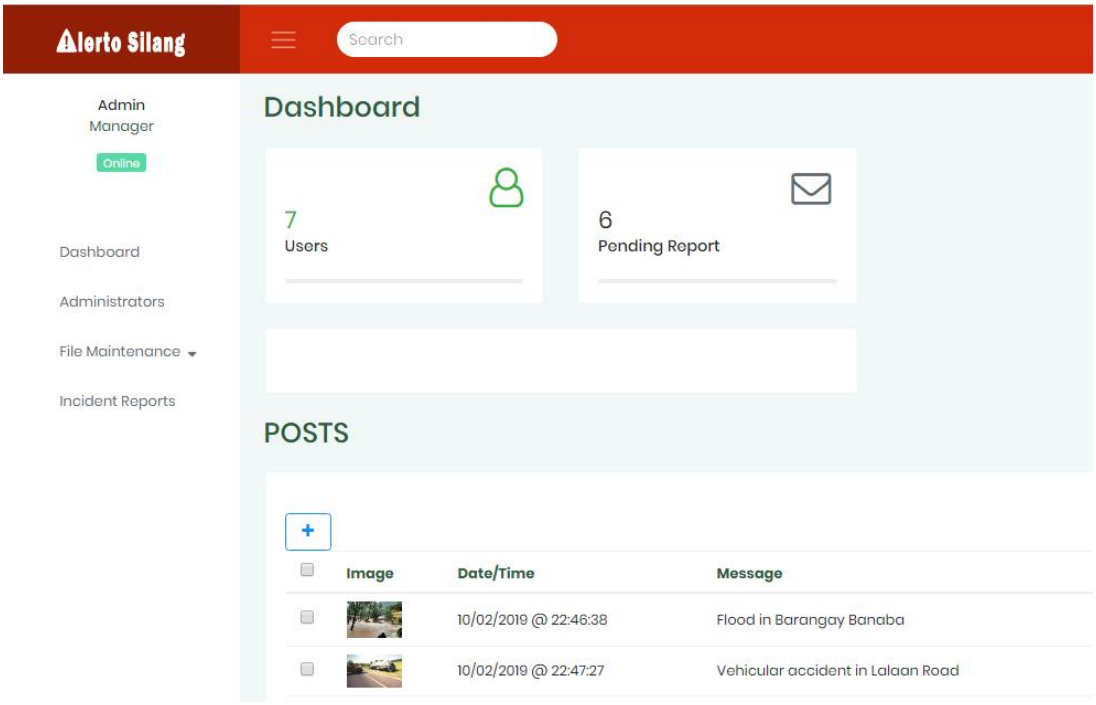

Fig. 4 Web Application Dashboard

Figure 4 displays the web page where the administrator can view the notification of new incident report. This module will also be used in posting announcement or news that will be viewed on the mobile application.

5. **Results and Discussion**

A beta test was conducted by the researcher to measure the acceptability of the developed software. The researcher randomly selected 100 respondents resided in Silang. The purpose of the testing is to verify if the developed system meets the requirements and objectives of the study.

The following are the results of the evaluation process conducted with respondents.

Table 1. Results of the survey for incident reporting functionality

Characteristic	**Mean**	**Interpretation**
Timely sending of geo-located incident using the mobile app	4.83	Very Effective
Immediate receiving of geo-located incident in the web application	4.78	Very Effective

Responsive notification/action once the reported incident was verified	4.72	Very Effective
TOTAL	**4.78**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

Table 1 shows the extent of effectiveness of the incident reporting functionality of system to the user. It illustrates that all indicators are assessed by respondents as very effective: (1) item 1 obtained a mean score of 4.83 which means the mobile application can send the geo-location incidents quickly, (2) item 2 obtained a mean score of 4.78 which means that the web application immediately receives the geo-located incident, (3) item 3 obtained a mean score of 4.72, which indicates that the application provides a quick notification and action once the reported was verified.

Table 2. Results of the Survey for Updated news feed

Characteristic	Mean	Interpretation
Real-time posting of incident using the web application	4.84	Very Effective
TOTAL	**4.84**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

Table 2 shows the degree of effectiveness of the developed system in terms of real time posting of incidents. It illustrates that the indicator is assessed by respondents as very effective: (1) item 1 obtained a mean score of 4.84, which means the community is updated on the occurrence of incidents posted on the web application.

Table 3. Results of the Survey for Easy to use tool

Characteristic	Mean	Interpretation
User-friendliness of emergency tools provided by SOS Kit	4.83	Very Effective
Informative instructional guides/tips included on the SOS Kit	4.85	Very Effective
TOTAL	**4.84**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

Table 4 shows the degree of effectiveness of the developed system in providing easy to use SOS Kit to the user. It illustrates that all indicators are assessed by respondents as very effective: (1) item 1 obtained a mean score of 4.83 and item 2 scored a mean of 4.85, which means that the provided SOS tool is easy to use and can be used as informative instructional guide in times of emergency.

Table 5. Summary of Results

Characteristic	Mean	Interpretation
Incident Report Functionality	4.78	Very Effective
Updated news Feed	4.84	Very Effective
Easy to use tool	4.84	Very Effective
TOTAL	**4.82**	**Very Effective**

Legend: 1.0-1.80 Not Effective 1.81- 2.60 Less Effective 2.61 – 3.40 Moderately effective 3.41-4.20 Effective 4.21-5.0 Very Effective

The table above summarizes all the results of the testing and evaluation of the citizens of Silang. Results obtained from the response of the testers showed that all indicators are assessed by respondents as very effective: (1) item 1 which scores a mean of 4.78, pertains to effectivity of the system to send and receive and manage geo-located incident report, (2) item 2 scored a mean of 4.84 interpreted as very effective in terms of the real-time updates of the community with the current undesirable events, (3) item 3 scored a mean of 4.84 which interpreted as very effective in providing the user with an easy to use SOS tools.

6. Conclusion

Based on the result of evaluation from the Silang residents and PNP officer:

1. "Alerto Silang" is an effective tool to send geo-located incident report and notify the concerned authority to provide response to it;
2. The system is an effective medium of communication between the citizen and local agency where they can be updated of the happenings on their locality; and
3. The mobile app is a useful tool and guide in times of emergency.

7. Recommendation

During the study, the researcher identified various areas where further development was needed. For further enhancement of "Alerto Silang", additional studies could be:

1. adding videos for more reliable reporting,
2. new algorithm and/or geolocation API for more accurate location mapping,
3. validation methods for incident reports, and
4. development of application compatible with IOS

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