

Accident / crash notify with geographic coordinator using android application

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Abstract: Crash Notify System is a system developed based on Android application for smartphone. This application monitor smartphone acceleration sensor in order to detect the sudden deceleration produced in CRASH. In case of an accident, an alarm will warn you that a crash has been detected. This application will automatically detect crash location and at the same time it will send an alert SMS to immediate family members (assigned phone number) in order to get an assist of emergency call. This is because this application has been accompanied by a tracking system Global Positioning System (GPS) to track the exact position (Latitude & Longitude) area of the accident. This system has been 100% fully tested and it is to be useful in any kind disaster rescue mission.

Key words: Search & rescue; Accident; Alert system

1. Introduction

In this modern era, technology and sophistication is now growing rapidly. Various technological tools created for the sake of convenience all the users. In accordance with the rapid development of technologies, all the things are at your fingertips. Crash Notify system is a system developed by android application in parallel with sophisticated facilities of the existing smart phone. This system was developed to assist the driver when involved in a road accident to inform directly to the parties such as their family members by detecting violations that occurred during the accident and sending messages through short messaging system (SMS) to them automatically.

As all known, when there is an accident involving the unconscious victim, family members or close relatives are rather difficult to be reached and informed about the incident if there were no witnesses who knew the victim intimately.

The proposed project aims to develop a system which can inform or send an alert about the accident automatically through quick access short message system (SMS) using android application.

In addition, other objective Crash Notify system using this android application is:

- Investigating the characteristics suitable for the system to be developed.
- Developing effective system for Notify Crash
- Tested the system in terms of validation and usability.

Thus, the facility adopted this system to be applied to every driver on the road to help them to inform the accident directly to the parties such as family members of the victims quickly.

2. Related works

With the system in place now, users had to track down and find out the latest place where the accident occurred to allow them give the information to their parties such as their family members. Crash Notify system was developed to assist the driver in road accidents to inform directly to the parties such as their family members by detecting violations that occurred during the accident and sending messages through short messaging system (SMS) to them automatically.

This system was developed to help replace the manual message delivery system to automatic message delivery system thus helping to inform the driver in road accidents directly to the closest party by detecting collisions that occurred during the accident and sending messages through short messaging system (SMS) to them automatically.

This system is similar study conducted to identify more closely with software that has been developed in common with that system. The study was carried out similar system of three systems similar to the system developed. But the three systems have advantages and disadvantages that have been used to strengthen the systems developed.

The first similar system is Smart Fall Detection System [3]. This system was developed as a result of research in the field of Artificial Intelligence Computer System by Hamideh Kerdegari under the supervision of Dr Khairulmizan Samsudin, Department of Computer and Communications Systems Engineering University Putra Malaysia (UPM). Smart Fall Detection System using Artificial

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Neural Network (ANN) to process the acceleration signal.

This system has been tested with a sample drop of ways to track responses fall detection system of the smartphones. This system is generally used by the elderly in order to help them to move freely when no companions. The system will respond if the smart phone used by the user is fall. The reaction when the smart phone used by the user is fall, the system will continue to transmit a message via SMS to the assigned phone number.

The next similar system is Car Crash Emergency eCall System [4]. This system is a mobile smartphone application developed by Miguel Rubio. The system has been configured to the assigned e-mail as a link to send the information about the accident. The system also uses Global Positioning System technology (GPS) to inform others of the consumer.

This system serves as the sender of the message to the recipient information using e-mail platform. When an impact occurs by a great shock, the system will send a message to the e-mail address that has been set with the latest application user. In addition, this system is the demonstration concept aimed at testing and improving the system.

Another similar system is Car Alarm System GSM MT [5]. This system was developed by taking advantage of the initiative, which has been available in all mobile smartphones that use the Android operating system. All smart phones using the Android operating system has been equipped with a

sensor or accelerometer sensor. Accelerometer sensor systems were sensitive detectors or scanners that will detect the presence of vibration of the mobile smartphone. This serves as the alarm sound for a situation like the earthquake when the user is sleeping and detect when someone opened the door while the user is sleeping.

According to a study that has been made, there are several features that are comparable between similar systems and Crash Notify system. The first is its transmission system with immediate response to inform the other using short messaging system (SMS) as a quick access to the scene of an accident alert transmission.

Sending alert for Car Crash Emergency eCall system is using the e-mail platform. As all known, sending a message using e-mail platform requires internet connection, and when the accident occurred at the no internet network coverage places, it will cause the message delivery system failed whereas Crash Notify system is developed using the platform of short message system (SMS) which does not require internet network coverage.

In terms of content alert message, the system Smart Fall Detection only send content that tell accidents happened but do not contain the exact position where the incident happened while Crash Notify system will send a message about the accident with an accurate location based on Global Positioning System (GPS).

Table 1: Comparison of similar applications

System	Advantages	Disadvantages
Sistem Smart Fall Detection	Continue with automatically send a short message.	Did not specify the location of the accident
Car Crash Emergency eCall System.	User can select the level that would shake or vibration is detected.	Use e-mail platform to send alerts. (will stop is no internet connection or coverage)
Car Alarm System GSM MT.	Able to detect large-scale shaking like an earthquake motion.	Only produced alarm sound.
Crash Notify System	Able to select impact value that would detect. Continue with automatically send a short message.	The parties (who will receive the message) cannot detect the place if there is no smart phone with GPS included.

3. Proposed system

3.1. System design

Design in system development is an important process to meet the requirements of the functions and modules required in the design of the system. System design must be consistent and in line with the objectives, needs and requirements of users of the system. The importance of this design can be seen if there are any changes whether it comes from a user or developer of the system itself.

A user-friendly interface design is essential to facilitate all levels of users are using the system.



Fig. 1: System interface on smart phone

Fig. 1 is a menu displays of mobile smart phones using Android software. On display there is a developed system of systems Crash Notify.



Fig. 2: Display the Interface of Application (first page)

Fig. 2 is an application interface of Crash Notify loaded on mobile smartphones. There is a Start button and Exit button on the display page. A Start button is the button to start the application, which is proceed to the next page and the Exit button is to exit the application. When the user selects a 'Start' button on the second page, then it will go next page.



Fig. 3: Display Interface of Application (second page)

Fig. 3 represents the second page of the application. In view of this page, users are required to enter the phone number of the second party for the delivery of messages of an accident. There is a button 'Adjust / Set Accelerometer', 'Start' and 'Cancel' on the display page. A 'Adjust / Set Accelerometer' button is where the user must select the button to set the G-force readings. 'Start' is the button to the next page while the 'Cancel' button is to return to the previous page of the application's main page.

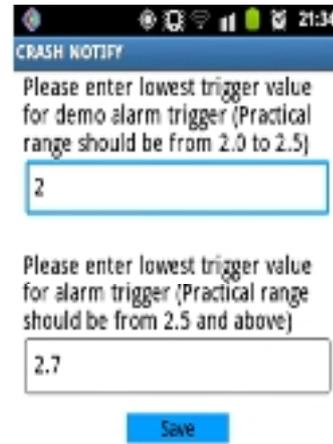


Fig. 4: Display Interface of Application (third page)

Fig. 4 is the third page of the application. In view of this page, users are required to enter the reading accelerometer or G-force on which there are two rooms in the space of this page. The first column is the reading of the accelerometer or G-force for the purpose of the demonstration while the second column is for the reading of the accelerometer or G-force for the purpose of calculating the actual value of the reading system. There is a button 'Save' on this page that serves as a reading setting the save button and also as a button to return to the second page, as Fig. 3.



Fig. 5: Display Interface of the Application (fourth page)

Fig. 5 represents the fourth page of the application. On this page there are 'slide button'. The user must push the button to the left to enable the calculation of reading accelerometer or G-force, while the right is to stop reading accelerometer or G-force. There is also the 'Emergency' on this page that serves as the activation of the Alert System manually going to the next page.



Fig. 6: Display Interface of the Application (the fifth)

Fig. 6 represents the fifth page views for the applications. This displays only work when the reading of the accelerometer or G-force exceeds the value that has been entered in the third page (Fig. 3.1), or the 'Emergency' activated manually. On this display, position or location of smart phones will appear based on the Global Positioning System (GPS) and at the same time the siren will scream for 30 seconds and the time has been reduced in every second. There is a button 'I am okay' that serves as the button to turn off the message delivery system via short messaging system (SMS) and also the calculation time which is 30 seconds. When the 30-second time period expires and the user does not shut down the system by pressing the 'I am okay' button on this page, the system will automatically will sending an alert messages through short messaging system (SMS) automatically (running in background) to the assigned phone number as shown in Fig. 7.



Fig. 7: Display Interface of the Application

When the system is set up to send messages through short messaging system (SMS) automatically to assigned phone number, the recipient will receive the message content of the message as shown in Fig. 8.



Fig. 8: Display the Short Message System (SMS)

When the recipient receives the message content of the message as shown in Fig. 8, the recipient will know that the sender (user of the Crash Notify application) has been involved in an accident. The recipient will check that location using Google Maps application to find out the exact location of the accident based on Longitude and Latitude are sent in the content of the message as shown in Fig. 9.



Fig. 9: Display Google Maps Application Interface

4. Discussion and findings

System performance results Notify Crash is expected to help the user in order to help drivers and other road users to inform the latter about the accident that befell them automatically.

4.1. Advantages of the system

i. Detecting impact during the accident to send the alert messages automatically. This system facilitates the development of the transmission system alert message to the second party by detecting impact when the accident happened and next, identify the exact location of the position based on the Global Positioning System (GPS) to enable users to identify the latest.

ii. Display a user-friendly interface.

The system is able to provide comfort to all levels of users is using the system application Crash Notify. The interface of this system using the concept of

understanding, the needs of consumers and indirectly, users can use the system easily and smoothly.

5. Conclusion

Crash Notify is one of the alternatives for driver or motorists to help them to inform about the accident that befell them automatically using smart phone sophistication available on most road users.

Using this system, users no longer need to bother typing content of the message that will be sent to both parties to inform about the accident that befell them automatically and do not need to be looking for a place where the incident because it has been identified by the system automatically using Global Positioning System (GPS) technology that is loaded into the application system developed.

With this system, it can provide a very useful contribution to each user to increase the performance and quality of road safety. Furthermore, the development of systems like this can show the progress of existing technologies and functions that can be applied to everyday life.

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