



A SCAFFOLDING FOR EMERGENCY MANAGEMENT THROUGH ANDROID BASED MOBILE DEVICES

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ABSTRACT

The crucial necessity for disaster alert suggests the technique of air broadcasting to be one among optimum available technologies widely adopted for the purpose of emergency management. It supports emergency in ranging from natural disasters to women's safety. The work proposes mainly focuses on women's safety. When women feel that they are in comprised in emergency situation that time they can use these applications that on one click it can send a location to our family members and to any police stations continuously until we stop with password word button or turning of GPS. The traditional system of communication is commonly available over mobile devices such as voice, images etc. does not serve accurately to the fullest at the time of emergencies and disasters. At the time of emergency a rich situational framework that combines text and voice is facilitated through GPS tracer and an emergency alert is conveyed to all the trusted entities in concern. Also privacy in terms of location of the user with geosocial application is managed by key based encryption techniques. Experimental results have been concluded with a higher rate of accuracy in generating alerts at emergency situations and also preserve the location privacy of users at non-emergency situations

Keywords-SMS, Emergency Notification, AES, GPS Tracer, Alert.

I. INTRODUCTION

Emergency broadcast system (EBS), which in turn superseded the CONELRAD (control of electromagnetic radiation) occur when enemy attack. The *Emergency Alert System* (EAS) is a national warning system in the United States put into place on January 1, 1994, when it superseded the System. In addition to this requirement, EAS is also designed to alert the public of local weather emergencies such as tornadoes[23] and flash floods EAS is jointly coordinated by Federal Emergency Management Agency (FEMA)[27], the Federal Communications Commission (FCC), and the National Weather Service (NOAA/NWS). The EAS regulations and standards are governed by the Public Safety and Homeland Security Bureau of the FCC. Each state and several territories have their own EAS plan. EAS has become part of IPAWS – the Integrated Public Alert and Warning System, a program of FEMA through geosocial applications[2].EAS also transmitted in home based appliances such as satellite

television, Digital cable providers, Digital television, Digital radio broadcaster, Dish TVs with the help of media etc.[7,10].

Here the main concern is the security of women [5] at night and at times even in day when travelling alone. On 16th December, 2012 New Delhi, capital of India witnessed a heinous crime. The ambulance and other service had reached the spot late hindering emergency medical treatment [6]. It has been observed that at times the instant communication of message of one's whereabouts precisely is a problem. This paper describes about a safety triggering application [1] developed in android platform. The uniqueness of this application apart from other Safety application available is that the user need not spent time navigating inside the phone menu; unlock the screen, to trigger the service. He instead, can directly press the power button and thereby, popping up a alert screen and user can directly click the safety triggering button triggering the application in the background, sending the location

(latitude and longitude) to all the pre-registered phone numbers in the application. Many applications available in the market send a custom message to the number registered but not the location of the user. In the proposed and tested application the longitude, latitude information and the general idea of the place (BTS location area) of the current position of the mobile user is appended with the custom message that had been initially set in the application and is transmitted to the phone numbers registered. This feature of the application not only helps in finding the exact location of the person in problem but also will help the police to trace the location of incident at later time.

The advanced capabilities for location-based services of smart phones are mostly used for travel applications, navigation or business fleet management and also if any patient suffers from injuries or heart attack he uses to press a single button to get through nearby hospital [4]. We motivate a social emergency alert service that makes use of the wide availability of smart phones and activates nearby social contacts in cases of emergency. Research has shown that especially in busy urban districts help from fellow citizens is hard to receive because of the so-called bystander-effect here Nearby people [15] often do not recognize or take responsibility for ongoing emergency situations. A simple and fast mechanism to call for help is necessary. Additional to local authorities as the police or rescue services, assistance from family or acquaintances is a valuable and fast(er) supplement. We describe the architecture of an emergency alert service providing the functionality required for the activation of social contacts and present a prototype. The distribution of tasks between mobile devices and server infrastructure and the underlying communication protocol are designed energy-efficient and privacy preserving. The central tracking of geo-positions is avoided.

In 2008, the FCC began work on a system for public alerting designed and targeted at smartphones, meant to support the EAS. The Commercial Mobile Alert System made its debut in about early 2013 in select states for select events. While this system functions independently from the Emergency Alert System, it may broadcast identical information. An emergency notification system is an important tool for personal security and safety. Recently, there are two kinds of common emergency notification systems. One is designed to allow the user designed a button with a connection to the device host at home with a developed app. Another is specially designed single-function phone (the phone for elders) whose back has an SOS button. When unexpected something happen, users just need to push the button to secure, systems could send a message to some specific institutions or people setting in advance. However, these two kinds systems mostly do not embed GPS [9] functions and information may not clear enough in an emergency, which motivates this project. In this paper, an emergency notification

application for mobile devices will be designed using a Freeware, named APP Inventor. In the application, the position function of GPS and an easy used interface capable for sending emergency notification messages or phone calls are included it mainly focused for women's safety Users can quickly push the designed buttons for help via sending (short) messages or phone calls, both of which automatically include position information, to default emergency corresponding people or institutions. In the existing system the location latitude and longitude is encrypted and stored in server for decryption the particular key is send through trusted servers or meet in person or through *sms* (short message service). In this paper we also developed a encryption for key which is send through via *sms*. That message send in encrypted form to a person who is not installed that app.

II . DEFINING THE PROBLEM

In Existing method we only encrypt the location latitude and longitude and record in a server and send a key to particular members store via meet in person or *sms*, while sending a *sms* an interrupt may occur through hackers [14] they get the key to open a lock of the location. Then also another problem also occur where there is no options for voice or image reorganization suddenly in emergency situation. Here no way to track the victims locations easily because of strong usage of AES [15] algorithm so the peoples are sometimes attacked by others peoples when they alone or specified members in offline and there is no proof to proving crimes and also no way to find the crime location easily.

III . SYSTEM REQUIREMENTS

Data privacy: The server does not able to view the information or a content of key that a data stored at a location [20].

Confidentiality: Trusted parties can view the *sms*

Integrity: The *sms* cannot be tampered by the intruders. The system should able to find out such alteration.

Non-repudiation: No party can deny the receiving or transmitting the data communicating between them.

Authentication: Each party has the ability to authenticate and alert the other party[8].

Notification: Send an immediate alert to persons when hackers try to access the information

Efficiency: Terms refers to computation, bandwidth, speed or time to operate on mobile devices.

IV . RELATED WORK

Google service known as Google Places API [28] which provides services like spatial location and preferred point of interest. The request is processed through HTTP request and coordinates is got through response as latitude and longitude. The place details [29] give more detailed

description about the location address, street name, contact number etc. If the reference number and place is provided to search, it initiates rescue operation by alerting contact number stored in database. Location based Services [11] is implemented on Android based smart phones and provides the value-added services like advising clients of current traffic conditions, providing routing information, helping them to find nearby hotels.

Chris Thompson et al. has proposed a solution for using the on board sensors [12] to detect car accident using android mobile. It uses physical information to identify accidents. Kai-florin et al. [13] describe modular architecture [19] which focuses on the outcomes of LBS for users. The user-centric model highlights the effects of differences in interaction for users. The process of informing the network about the current location of the mobile user is known as location update. In paper [29] the author integrates the camera with the smart phone for face detection and for the safety of the people in home and ease control of home entrance. In the proposed work, we have designed the danger assistance system to provide location based service and sensor is activated during emergency situation.

Android application fetches the location and address of the user using GPS [17]. The application deduces the mobility of the user with the help of accelerometer. The location and mobility details of the user are updated periodically to the database. During danger situation, the application provides user, the nearby safe places and their details according to their preferences. If the user is in extreme danger and she is unable to use the mobile, the application senses the danger and takes a picture automatically and sends it to the server for image processing. The caretaker will call the emergency number automatically and forwards the image to the number stored in the database. Thus the rescue operation is imitated.

V. ENVIRONMENTAL SYSTEM SETUP

App Inventor[16][26] is a complete cloud[6] development environment, whose programs and resources is completely work on internet or network which is mainly divided into three operating modules associated with each other: App Inventor Designer, App Inventor Block edit, Emulator Android Phone. The programming of App Inventor is formed via stacking function blocks. As a management tool, browser is required. In addition, one must install Java to perform App Inventor. The environment for the projects work under Windows7 and Google Chrome browser. Some of the packages used to accomplish retrieving the location using GPS services are android.location.Location, android. Location. Location Listener, android. Location. Location Manager etc. The package used for sending SMS to the emergency numbers is android.telephony.SmsManager. The custom class

AppPreferences.java imports preference. Preference Activity to save the numbers and add Preferences From Resource is used for calling the emergency numbers and retrieving them from the stored directory. Meant another custom BroadcastSetter.java imports the android.content.BroadcastReceiver. The file Displays the Safety screen above the mobile home screen.

Issues to be addressed:

- Bad audio or voice quality
- Lack of a Primary Entry Point in some areas, leaving those areas without a direct connection to FEMA
- Inability of some participants to receive/transmit the EAN
- Short test length when sending an alert

VI. FUNCTIONALITY OF SYSTEM

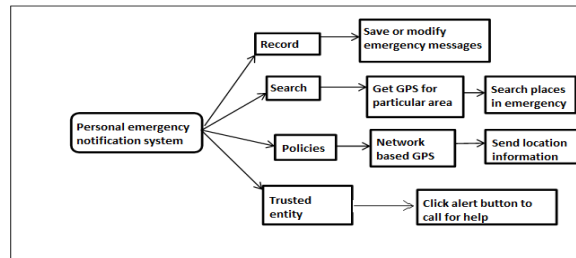


Fig. 1. Functions of emergency system

The functions of application include Record, Search, Locate, and Emergency Contact [3] as shown in figure1. In Record function, one can save or modify information about emergency corresponding people and default short messages. In search function, it is used to search a nearby police office and send a location image in a single click on button. In Position function it provides a location via getting a signal from GPS or networks here user can send short or default messages which or default in settings with the location information. In this emergency alert system user click photo button to send a alert message to trusted persons or an police office department.

VII. METHODOLOGY

A. SMS Alert

The global service for mobile is to communicate with the greatest worldwide number of users in low cost. When an user roaming from one network to another network there internet exposes to various vulnerabilities and attack to overcome this here an alert is activated by the system, the android application will initiate an alert SMS[8] to the primary contact person where they are in online and app is installed they get direct key otherwise they receive a encrypted key using AES algorithm or directly send to police departments about their location, whose number is already filled with the setting activity of android application. Here AES uses 10, 12 or 14 rounds.

The key size depends upon number of rounds.

B. E-mail Alert

After the SMS alert, the E-mail alert [7] is initiated by the android application. As the Android Smartphone is always connected to the internet, it is possible to send the email alert in real time. The email is sent to the primary contact person, whose email id is filled in the setting of android application. Simple Mail Transfer Protocol (SMTP) is used to send the email alert to the concern person.

C. Notifications

OS X's Notification Center puts you in touch with what's happening on your Mac and elsewhere in the world it display banners, alerts, badge notifications and lock screen notifications to let user to know what's going on. Notification banners are those little bubbles of information that appear in the upper right corner of mobile screen can be helpful when continuous message receive it alert a person.

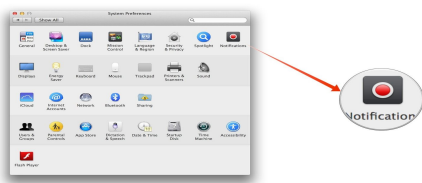


Fig.2. Notification display

VIII . ANDROID BASED SMARTPHONE

A. Android Operating System

Android is the most popular operating system in the Smartphone. It is a software stack made for mobile devices which consist of an operating system, applications and middleware. The Android operating system is based on a Linux kernel basically, designed for different touchscreen mobile devices like Tablets and Smartphones[8]. Android is an open source operating system for touchscreen devices. In Android operating system many applications can run at a time and user may switch between the running applications. Android OS has the several advantages as: simple and powerful, Java-based development kit, Android development tools, Its excellent documentation and library, including classes like Bluetooth, Network useful to develop on many platforms, like Windows, Linux and Mac operating system.

B. Android Application

Android is the very popular operating system in the Smartphones. It's popularity increasing day by day. It has powerful Java based development kit, so the user can develop an android application according to its requirements. Eclipse is the officially supported

integrated development environment (IDE). Android software development kit (ADK) is used to develop Android applications. The Smartphone should acquire data from wireless network through GPS and provide a Graphical User Interface (GUI) to servers, on which different physiological parameters are displayed. So, to do this an Android application is required. This application should feature several functions such as, data acquisition from GSM using for communication, data analysis and representing location data to transfer a data from a person to server via GSM or cellular network.

IX . IMPLEMENTATION

Location based service is another key functionality that gets used in smart phone applications. It is often combined with maps to give a good experience to the user about their location. Location service allows finding out the current location[22] of the device. The application requests for periodic update of the device location information. The application can also register an intent receiver for proximity alerts[24] like, when the device is entering and existing from an area of given longitude, latitude and radius.

The proposed system has been implemented using Android SDK with the Eclipse IDE and AVD (Android Virtual Device) emulator. AVD is an emulator which provides the android hardware and software environment to test application on computer. In Eclipse, the application is run under Windows -> Android SDK and AVD Manager. The following functionalities are enabled such as Android Location API

These are the different classes present under Location API package to retrieve the Location information of the user. *LocationManager*- The class provides access to the location service. It also provides facility to get the best Location Provider as per the criteria [25].

LocationProvider- It's an abstract super class for location providers. A location provider provides periodic reports on the geographical location of the device. *LocationListener*- This class provides callback methods which are called when location gets changed. The listener object has to be registered with the location manager.

Criteria- The class provides the application to choose suitable Location Provider by providing access to set of required properties of the LocationProvider. Android also provide an API to access the google maps. So with the help of the google maps and the location APIs the application can show required places to the user on the map.

X . EVALUATION AND RESULT

The role of the user in this application is to send SMS in emergency situation in Android Smart phone having GPS and if GPRS enabled.



Fig. 3. Panic SOS Button

When an emergency occurs the user need to press alert button once it send a message to trusted entities in the upper side a register button located were the functionality of register button is it allocate a new arrivals through contact are added by user in default way with the help of service providers get the location information. This button gets a SOS (Signal on one click) GPS.



Fig. 4. Default Settings

In figure 4 the default setting of numbers of trusted entities is added by clicking a add number a number is added from contact choose by user, Update is used to update any number to existing contact. Display work is to display the previous added contacts, Delete is to remove a record.

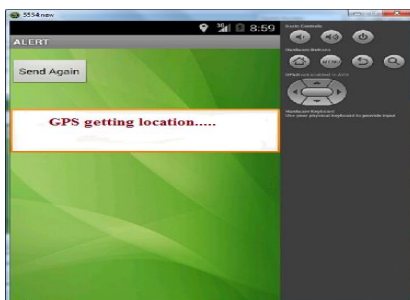


Fig. 5. Getting Location Co-ordinates

Figure 5 illustrate that location co-ordinates information here GPS is used to getting the spatial location from that area to pass the sms.



Fig.5. Trusted Person receive a message

Trusted person receives a message is depicted in figure 5 where the exact location is get from GPS and send a alert message to a concern contacts. Finally sms receive in safe mode without any interruption. Send repeated message until the user stop the GPS connection

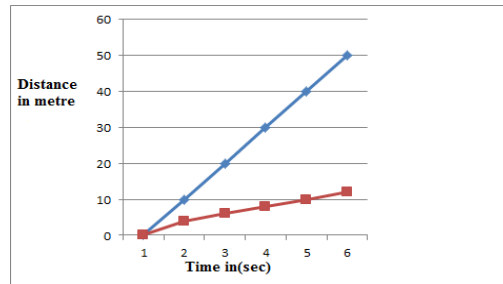


Fig. 2. Scanning Time

To ensure the quickest level of communication, we optimized the GPS capability of these devices. The result for average scanning and connection time is shown in Figure 5. The scan time of six to ten seconds is optimal to find trusted nodes within 50 meters of radius. As the emergency is relaxed, we can spend extra time in scanning and tracing the trusted nodes. We also define an efficient and useful Message format. We analyzed the connection and transfer time taken for a One Hop Transfer of message size of 184 bytes.

XI . CONCLUSION

In this work, a personal emergency notification application for mobile devices is designed using APP inventor. In the application, the position function of GPS and an easy used interface capable of sending emergency notification messages or images about the locations are included. Users can quickly push the designed button for help via sending sms location tag with images, both of the modules include location and position information, also send default emergency notifications to corresponding people or institutions.

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