Emergency Button Application - Android Systems

By

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

Information & Communication Technology Programme

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Approved by,

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(AP Dr. Dayang Rohaya Awang Rambli)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

JANUARY 2013

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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AHMED MAMDOUH ISMAIL AMER

ABSTRACT

The investigation of emergency situations is a complex field of study which involves different perspectives. Individual's and public's safety is a very important issue, the established emergency response system is the main core of resolving these emergency situations, we are already familiar with the normal emergency reporting system like calling 911 or using emergency phones, But this project aims to create an application that can assist users in emergency situations and provide users with instant details of their location to send to family, friends, or authorities in panic & emergency situations, another option other than public emergency phone systems and other forms of reporting in emergency situations for an easier and friendlier approach, thus improving public safety. The methodology used to complete this application is agile software development methodology which is based on iterative & incremental development that is rapid & flexible. The tools for this project include Eclipse Indigo which is a popular platform to develop Android Applications with the aid of a variety of software tools in design and user friendly software development such as Android ADT tools. In conclusion, the application's is successfully developed and met its main objective which is to help users broadcast their message in an emergency situation whenever they need help and can't easily get it or find it but with today's world mobile software development, public safety shall be more personalized.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND NOMENCLATURES

- App Smart Phone Application
- GPS Global Positioning System
- SMS Short Message Services
- E-mail Electronic Mail
- IDE Integrated Development Environment
- RFID Radio Frequency Identification
- NFC Near Field Communications
- CMS Career Management System

CHAPTER 1
INTRODUCTION

1.1 Background of study

There is a growing public interest in mobile technology, for many of us, life without a mobile is unimaginable, as technology advances day by day the relationship between users and their mobile devices continuous to evolve to take different forms of usage and we are on the very verge of mobilizing a lot of our daily life activities and routines such as (Clock Alarms, Radio, Video streaming, etc..) and the roof of expectations is getting higher every day. According to James Harkin (2003), the phenomenon of mobilization – "the process by which mobile technologies are folding themselves into the fabric of our economies, social lives and communities." (p.9). in the current time, more and more mobile applications are taking the lead to take social related problem and help users through the aid of mobile phones to replace older solutions. In an online article on mashable.com, Joann Pan (2012) discuss in a story whether mobile applications can replace public emergency phone systems, which leads us to the topic of this project where the aim is focused on developing a mobile application that can replace the public emergency phone systems.

1.2 Problem Statement

Humans are exposed to emergency situations any time, There are so many incidents where one is out late at night or out in a lone parking lot and walking around feeling unsafe, being lost in an unfamiliar area or in a deserted road with no one to call for help, one might have had a car accident and in need for an emergency phone call to alert their family and friends of their location and their need for help. If there is no public emergency phone, help might arrive late but if all what you need is on your phone application it's simple, just push the panic button and the app will take care of the rest through dialing emergency numbers and channeling your message via a wide range of communication channels.

1.3 Objectives

The aim of this project is to assist users in emergency & panic situations.

- Explore the use of mobile technology particularly smart phones in panic & emergency situations.
- Create an application that will assist users in emergency situations that provide users with instant details of their location that assists users to contact family, friends, or authorities in panic & emergency situations
- Test the application in designed test case scenarios to contact family, friends in panic situation.

1.4 Scope of study

The scope of study is flexible to match ages of which users are able to use and comprehend the usage of a smart phone and Android Systems specifically thus age group may range from 12-65 years old. This age group is more likely to be using the application in emergency and panic situations. There are many features that can suite different satisfaction criteria's for children, elderly, disabled, and ones with medical care conditions will find it very useful and easy to send panic messages via a wide range of communication channels.

1.5 The Relevancy of the Project

- Relevant to the children, adults and elderly who own a smartphone with android platform.
- They can access the mobile application even when they are on the move.
- Besides getting access to the emergency services, they can broadcast their message via Facebook & Twitter.

1.6 Feasibility of the Project

- This project is very feasible within the scope and time frame.
- Minimized scope to develop the mobile application for the specification of the Android OS platform.
- Hence, the objectives of this project based on the mentioned scope are achievable within the time allocated for FYP 1 and FYP 2.

CHAPTER 2
LITERATURE REVIEW

2.0 Chapter Overview

The main objective of the chapter is to present a discussion on the literature review concerning the project topic. It starts with the background on emergency alert, procedures and important definitions. Next, we propose classifications of emergency situations, systems, recent & previous methods of handling emergency situations. Later, we explain the mobilization history, systems, and platforms. Finally, the future direction of the alert service and system is presented. The chapter will contribute as a reference for the development of this project.

2.1 Emergency Situations

An emergency is a situation that imposes an immediate risk to health, life, property, or environment. According to Emergency Rescue World Society (www.erws.org), an emergency situation is “Immediately threating to life, health, property, or environment. Have already caused loss of life, health affected, property damage or environmental damage. Have a high probability of escalating to cause immediate danger to life, health, property, or environment." [8] Most emergencies require urgent intervention to seize the effect of the situation, While some emergencies are inevitable such as natural disasters that may threaten human lives, many smaller incidents require the subjective opinion of an observes in order to decide whether it qualifies as an emergency or not. In order to define a situation as an emergency it must include one of the following:

a) Immediately threating to life, health, property, or environment.

b) Have already caused loss of life, health affected, property damage or environmental damage.

c) Have a high probability of escalating to cause immediate danger to life, health, property or environment.

Dorland's Medical Dictionary defines an emergency as "an unlooked for or sudden occasion; an accident; an urgent or pressing need", while the American College Dictionary is more accurately descriptive of what most medical people have in mind when they think of an emergency; "an unforeseen occurrence; a sudden and urgent occasion for action.".

The key words in this situation are urgent and action. The need for prompt action, not a leisurely, disinterested attitude or approach is implied in the urgent aspect of the situation. Whether it was unforeseen or unlooked for, seems much less important from a clinical point of view than its sudden occurrence or it's urgency.

According to the Canadian Family Physician – November, 1968 on "What is an Emergency" to its journal article; "Regardless of how medical care is organized, delivered or paid for, the final decision on what really is an emergency will have to be a medical decision, and as such, guidelines for assessment of all situations must be laid down by physicians.".

Sir, -Mr E P Abson (21 June, p 1356) takes us to task for perpetuating the Platt Report's misconception of this word casualty.

The Platt Report first defines the word as meaning severe injury or death caused accidentally, and says it was so used by Shakespeare. This meaning is confirmed by the Oxford Dictionary. The report gives a second meaning as denoting a department in the hospital where a certain kind of outpatient is treated.

2.2 Types of emergency

- Dangers to life

Many emergencies cause an immediate danger to the life of people involved. This can range from emergencies affecting a single person, such as heart attack, strokes, and trauma to other sort of incidents that affect large numbers of people such as natural disasters including tornadoes, hurricanes, floods, and mudslides.

- Dangers to health

Some emergencies are not immediately threatening to life, but might have serious implications for the continued health and well-being of a person or more, although some health emergencies may escalate to be threating to life. The range of incidents is different than that cause a danger to life such as broken limbs, wounds from accidents, falls, etc.

- Dangers to property

Other emergencies do not threaten any people, but do threaten people's property. Like a fire in the attic, the situation is treated as an emergency as the fire may spread to other buildings, or may cause sufficient damage to make it unsafe to the people inside.

- Dangers to the environment

Some emergencies do not immediately endanger life, health or property, but do affect the natural environment and creatures living with it. It can have far reaching effects on animals and the long term condition of the land.

In this project we will focus on the first 3 types of emergencies mentioned above, more specifically those related to a single person's health & life emergencies.

2.3 Current methods in dealing with emergency situations

The current method dealing with emergency situations in most countries is dialing the emergency telephone number service such as 911, also known as the universal emergency number, which can be used to summon the emergency services to the civilians. Most of the developed countries operate on three core emergency services.

Police – who deal with security of person and property, which can cover two of the emergency situations of which mentioned earlier. They may also deal with punishing legally those who cause an emergency through their actions.

Fire service – who deal with potentially harmful fires, they help prevent loss of life, damage to health and damage to or loss of property.

Emergency Medical Service (Ambulance) – These services attempt to reduce loss of life or damage to health.

2.4 Mobilization

In today's world we are rapidly witnessing the huge leap in the relationship between users and their mobile devices continuous to evolve to take different forms of usage and we are part of the mobilization evolvement that is happening a lot in our daily life activities and routines and the use of new technologies specially that smartphone applications are taking a swift turn into assisting users to take care of daily activities & shores, In this project the objectives is to explore the use of mobile technology particularly smart phones in panic & emergency situations to create an application that will assist users to broadcast their panic message in emergency situations to their family and friends.

2.5 An Overview of Mobile Application Development

Mobile application development is the process by which application software is developed for small low-power handheld devices such as personal digital assistants, enterprise digital assistants or mobile phones. These applications are either normally pre-installed on phones during manufacture or downloaded by consumers from various mobile application distribution platforms.

Each of these platforms for mobile application also has an integrated development environment which provides tools to allow developers to write, test and deploy applications into the target platform environment. Despite the variation of these applications, the most platforms that are controlling the market nowadays are android and iOS. Android platform is for Android based smart phones and iOS is for Apple iPhones. Despite the popularity of both these mobile operating systems, mobile application developers are more prone towards android programming as the development tool is available on the internet for free.

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The android SDK provides the tools and APIs necessary to start developing applications on the Android platforms using the Java programming language. There are many reason to state that Android is the best mobile operating system for the moment. First of all, unlike iOS, android applications can be installed onto any android based mobile phones and as we all know there numerous brands of android phones in the market.

Android actually allows developers to develop android application in what is known as “application without borders”. The future of android is also very much in demand; do not be surprised that even our car dashboard is allowed to run the android operating system. This means, the android in your car will actually allow you to make calls, play music, GPS navigation, traffic updates and much more cool stuff. Android is indeed the best mobile operating system at the moment.

2.6 Solving the public’s concerns

The question of how can new emerging technologies help the users to solve their concerns is discussed on business level and to close the gap between the so called old way of solving public’s concern and the new approach that is offered by smartphone applications whether from Android, IOS, or Windows phones. Global firms are adopting such new technologies as part of their existing business environment and value chain, in the end those firms can’t resist change and they will need to transform their methods to cope with the new technology. Today, cities capture large amounts of information in real-time. Information that was previously unavailable is now being used to gauge quality of services, choose services, and report illegal and unethical behaviors (e.g. bribes). For example, there have been new emerging applications & tools that solve public’s health problems. According to Kevin C. Desouza* & Akshay Bhagwatwar (10 Aug 2012) there is some work done to develop apps that can facilitate & lower public transportation difficulties to improve public utilities and services management and even public safety.

2.7 Software and emergency situations

To Coulton, P., et al (2007) " mobile applications development have restrictions imposed on the user interface through reliance on the standard ITU-T keyboard essentially for dialing phone numbers. Regardless, with the convergence of the mobile phone with other sensing technologies, such as Radio Frequency Identification (RFID) and the associated Near Field Communications (NFC), Cameras, and 3D motion sensors, the opportunity to use new relational interfaces based on vision, touch, and movement to create new and exciting experiences for mobile application is now available. In accordance it is present here the technologies and the software Application Program Interfaces (APIs) associated with these sensors together with methodologies for their use."

In addition, walking through the discussion regarding managing emergency responses, Cosgrave, J., (2000) takes up a research to explain further about managing programs in response to humanitarian emergencies, as it deals with the response management itself. It supports UNHCRs Career Management System (CMS) as a training support for this specific competency category. Managing an emergency response is one of the competencies required for emergency handling. The main focus concentrates on management skills needed to be able to manage an emergency response.

In order to compare smart phone application versus landline, testing & results must take place, in theory it might have different classification but the silver lining is the successful rate of those who out lived any emergency or panic situation is definitely the most significant test. O Wu, et al (2012) discuss how important initial contact with emergency services via a smartphone in life-threatening situations, a study was carried out in which data from emergency dispatch lines, results show that smartphones has resulted significant reductions in the risk of death at the scene compared to landline reporting emergencies, statistical data evidence was

demonstrated as a result to show the difference in the use of smartphones to alert ambulance service in life threatening situations and improved outcome for patients.

Throughout the world, there are “SOS” emergency phone boxes spaced at 1.6 km or 2 km intervals on all major highway roads, in some counties, emergency phones are placed where people might be unsafe at night, they are commonly found along the way. Emergency phones are specifically provided for making calls to emergency services and it is more likely that there will be an emergency situation or someone in danger. But sometimes all the emergency phones on the highway are stolen or not working properly, the governments in question decided that emergency phone system is too difficult to maintain, and the cost of burying wires underground, maintaining the network, replacing the phones when it gets vandalized and so on is too much for the taxpayers & the government to bother with.

As cell phone use continues to increase, the need for emergency telephones declines and they are being phased out in many cities. However, it will remain vital for safety purposes in areas with poor cell phone coverage and in places of high danger. In today’s world there’s a more chance to find someone using a cell phone or a smart phone than using a tooth brush, that indicates how viral and numerous amount of mobile phone has spread over the years. According to Global mobile statistics 2012, a study says that at the end of 2011 there were 4.5 billion mobile subscribers in the developing world, and that mobile subscribers in the developed world has reached a saturation point with at least one cell phone subscription per person. Figure 2 shows the growing mobile phone subscribers.

Table 1: Global mobile statistics 2012, Source: http://mobithinking.com

Key Global Telecom Indicators for the World Telecommunication Service Sector in 2011 (all figures are estimates)									
	Global	Developed nations	Developing nations	Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas
Mobile cellular subscriptions (millions)	5,981	1,461	4,520	433	349	2,897	399	741	969
Per 100 people	86.7%	117.8%	78.8%	53.0%	96.7%	73.9%	143.0%	119.5%	103.3%
Fixed telephone lines (millions)	1,159	494	665	12	35	511	74	242	268
Per 100 people	16.6%	39.8%	11.6%	1.4%	9.7%	13.0%	26.3%	39.1%	28.5%
Active mobile broadband subscriptions (millions)	1,186	701	484	31	48	421	42	336	286
Per 100 people	17.0%	56.5%	8.5%	3.8%	13.3%	10.7%	14.9%	54.1%	30.5%
Fixed broadband subscriptions (millions)	591	319	272	1	8	243	27	160	145
per 100 people	8.5%	25.7%	4.8%	0.2%	2.2%	6.2%	9.6%	25.8%	15.5%
Source: International Telecommunication Union (November 2011)								via: mobiThinking	

And with the growing usage of mobile phone and smart phones, the need for applications and App stores has increased rapidly. There are tons of applications for everyone out there, ranging from different criteria's and target markets. The most popular categories are games, news, maps, social networking, and music. On average smartphone users have 10 apps. In 2011 ABI Research predicts that "there will be 29 billion apps downloaded in 2011, up from 9 billion in 2010. In Q2 Android overtook Apple in terms of app downloads with 44 percent of downloads, compared to Apple's 31 percent." That is why; building an application to assist users in emergency situations and to contact family, friends in panic situation using a smart phone application is vital and very encouraging to be used.

Table 2: Active mobile broadband subscriptions, Source: http://mobithinking.com

Active mobile broadband subscriptions by region in 2010 and 2011 (2011 figures are estimates)									
	Global	Developed nations	Developing nations	Africa	Arab States	Asia & Pacific	CIS	Europe	The Americas
Active mobile broadband subscriptions 2011 (millions)	1,186	701	484	31	48	421	42	336	286
Per 100 people 2011	17.0%	56.5%	8.5%	3.8%	13.3%	10.7%	14.9%	54.1%	30.5%
Active mobile broadband subscriptions 2010 (millions)	870	569	301	20	36	289	31	254	224
Per 100 people 2010	12.6%	46.2%	5.3%	2.5%	10.2%	7.4%	11.2%	41.3%	24.1%
Source: International Telecommunication Union (November 2011)								via: mobiThinking	

2.8 Smartphone software development

You can think of a smartphone as contemporary cellphone combined with a handheld computer, later models added the functionality of portable media players, low-end compact digital camera, pocket video cameras, and GPS navigation units to form one multi-use device. Now modern smartphones also include high-resolution touch screens and web browsers.

2.9 The Android platform

The project will be developed using Android platform, the reason of why choosing Android (over iOS) is because of the following reasons.

- ✓ Linux → Open Source
- ✓ Consumer-driven apps
- ✓ Hardware/software choice

The market share of Android over iOS depicted from the figure 1: Market Share Statistics, Android vs iOS. Clearly displays a growing trend towards Android, the number of users are increasing rapidly, there's also the fact that Android is not being monopolized by only one company Google vs Apple. Samsung, HTC, LG get to use the Android OS for their smartphones products.

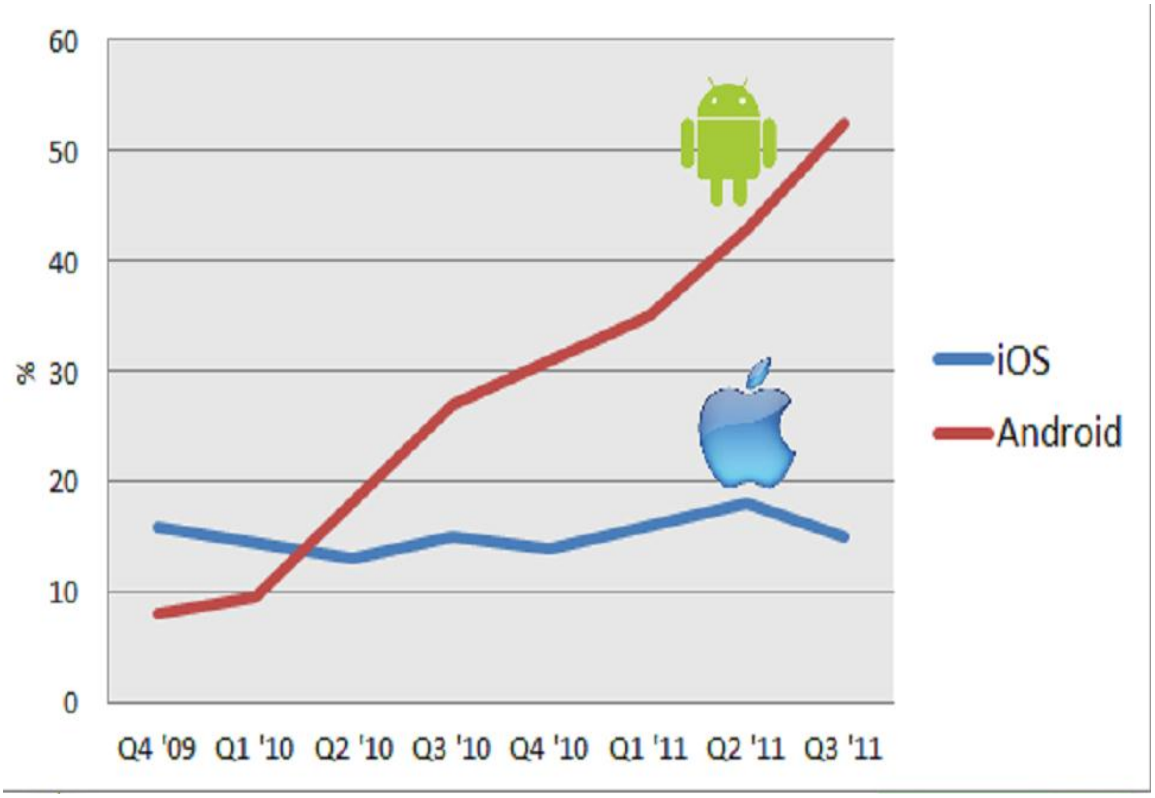


Figure 1: Market Share Statistics, Android vs iOS

History of Android:

- Google acquired the startup company Android Inc. in 2005 to start the development of the Android Platform. The key players at Android Inc. included Andy Rubin, Rich Miner, Nick Sears, and Chris White.
- In late 2007, a group of industry leaders came together around the Android Platform to form the Open Handset Alliance (http://www.openhandsetalliance.com).
- The Android SDK was first issued as an "early look" release in November 2007.
- In September 2008 T-Mobile announced the availability of the T-Mobile G1, the first smartphone based on the Android Platform.
- A few days after that, Google announced the availability of Android SDK Release Candidate 1.0.
- In October 2008, Google made the source code of the Android Platform available under Apache's open source license.

Figures (2, 3, and 4) show the history of Android versions.

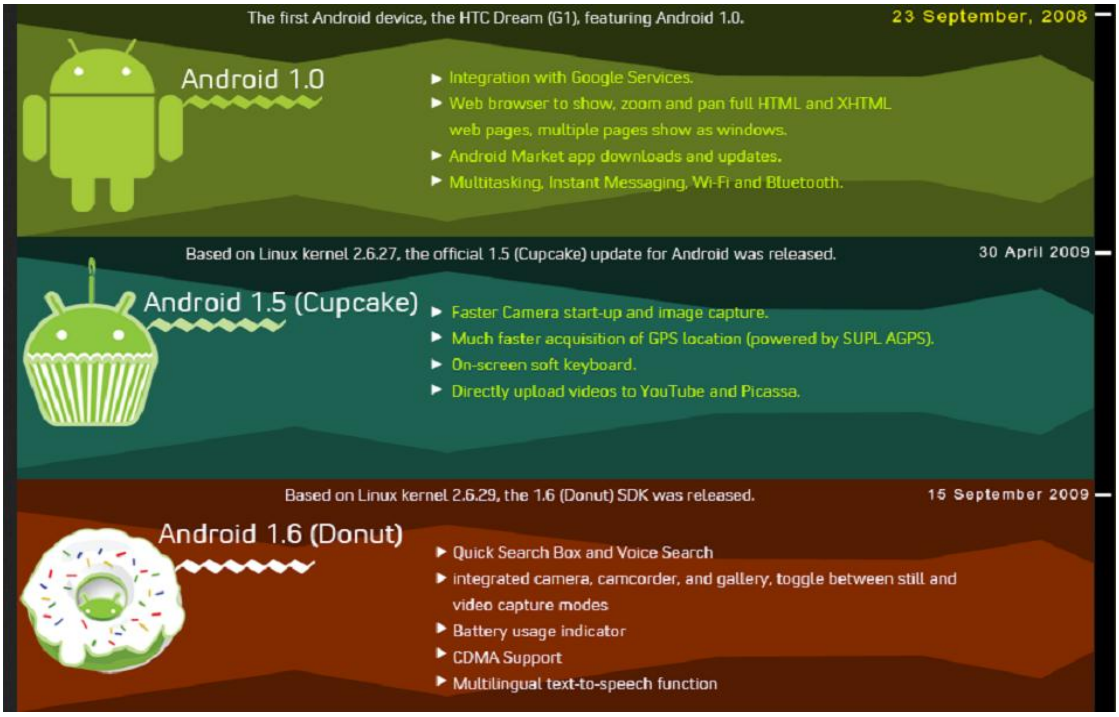


Figure 2: History of Android (1)

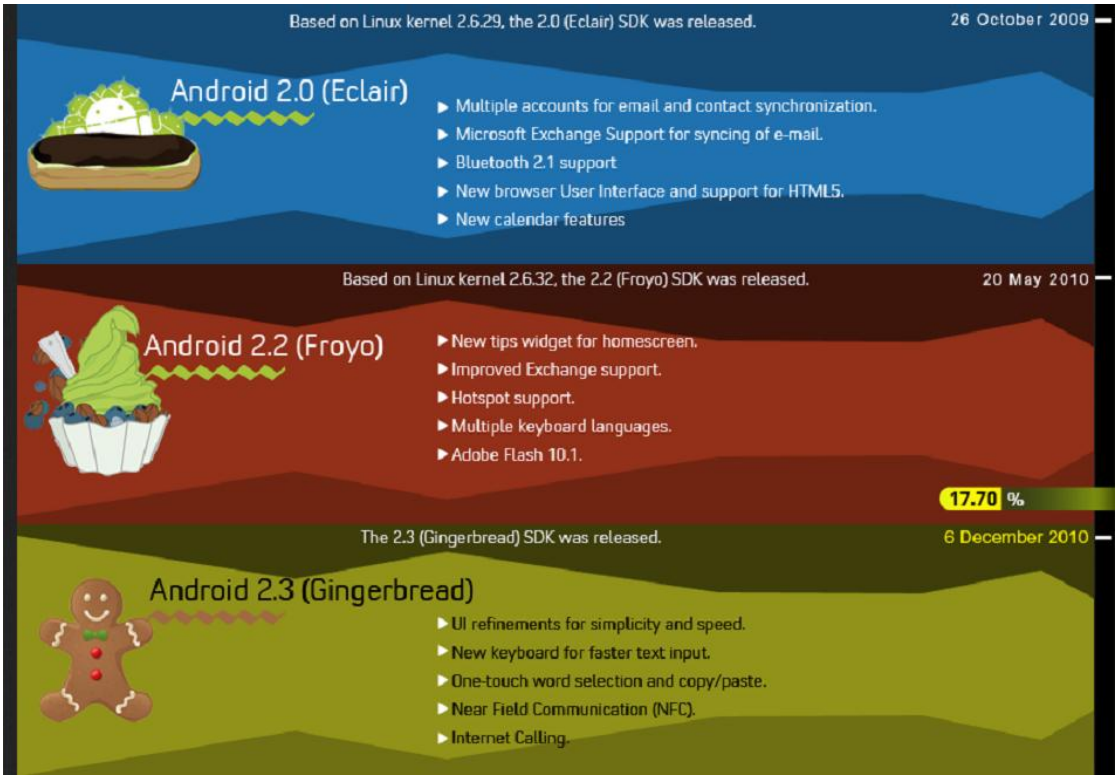


Figure 3: History of Android (2)

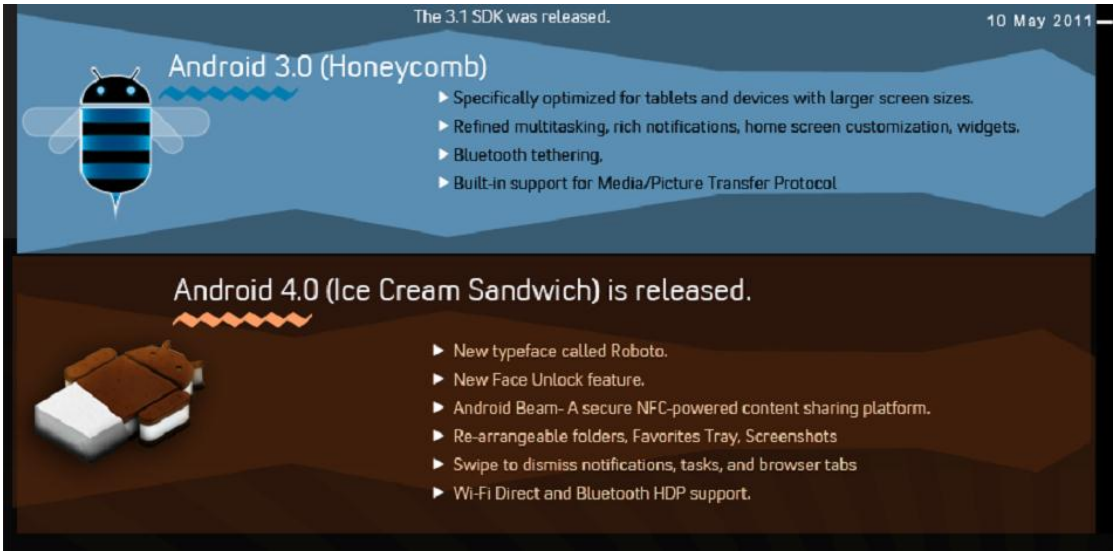


Figure 4: History of Android (3)

The latest Android release this year up until Dec 2012 is Android 4.2 Jelly Bean.

Android apps are written in Java. All Java programs are compiled into bytecode and then run in a virtual machine that's on the host OS. Technically speaking, Java programs aren't native to the OS so the Android platform includes the Dalvik virtual machine for running Android apps written in Java on Android devices.

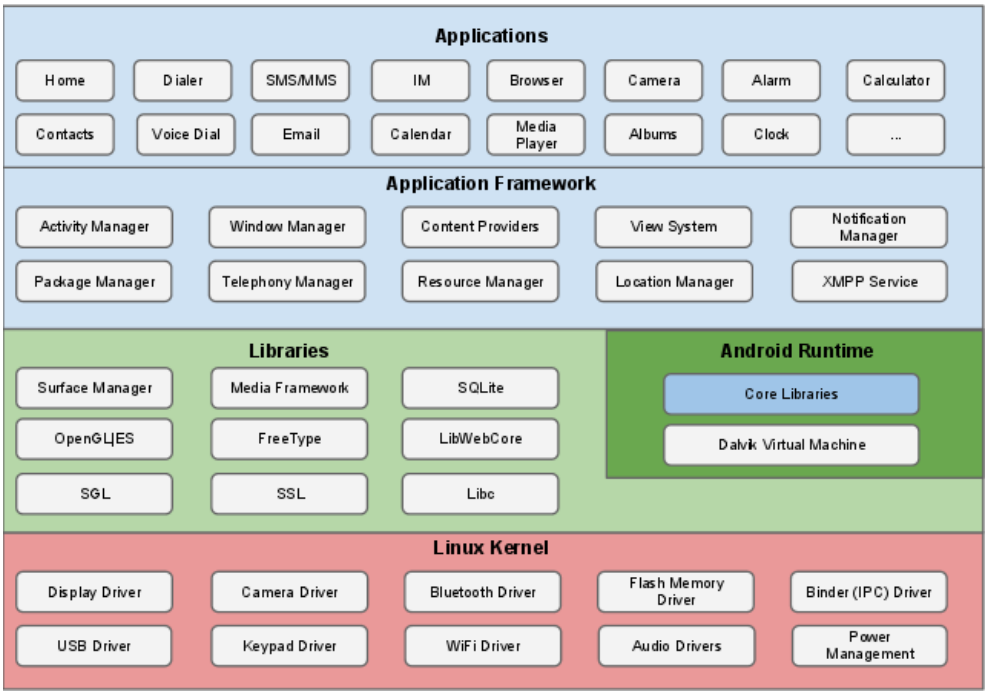


Figure 5: The Android application architecture

As figure 1 show, apps written operate at the same level as core apps on the device, phone, contacts, browsers, and so forth. Other platforms see these core apps as different from third-party apps and give core apps preference. The Android platform is built on the premise that all functionality at the application layer is the same.

Typically, Android apps use components in the application framework and library layers to provide new functionality. They're compiled into bytecode suitable for a virtual machine to run. The virtual machine is responsible for converting bytecode into instructions that run in the Linux OS, which is then translated into machine language the device understands.

Table 3: Android components

Component	Functionality
Activity	Represents a single screen with a user interface
Service	Runs in the background to perform long-running operations
Content Provider	Manages a shared set of application data
Broadcast Receiver	Responds to systemwide broadcasts

According to Thomas J. Duffy (2012) in assurance of Java as the main programming language apparently it has its benefits. As many developers already use it, it makes no need for them to learn a new one to create Android apps. In addition, these developers are familiar with the tools used to create Java programs so the pretty much don't need to learn new IDEs either.

2.10 Broadcasting emergencies

In this project, the main focus is to broadcast the user's emergency's message as fast, accurate location, and to a wide range as much as possible. By using a Google maps to locate the user's location via GPS, and through social media by sending their emergency message to their pre-assigned emergency contact list via phone contacts, Facebook, and Twitter to help them get help as fast as possible.

- ❖ Google Maps

"Google Maps (formerly Google Local) is a web mapping service application and technology provided by Google, free (for non-commercial." - Wiki

In 2006, Google introduced a Java application called Google Maps for Mobile, intended to run on any Java-based phone or mobile device. Many of the web-based site's features are provided in the application.

On November 28, 2007, Google Maps for Mobile 2.0 was released. It introduced a GPS-like location service that does not require a GPS receiver. The "my location" feature works by utilizing the GPS location of the mobile device, if it is available. This information is supplemented by the software determining the nearest wireless networks and cell sites. The software then looks up the location of the cell site using a database of known wireless networks and cell sites. The Cell-site location method is used by triangulating the different signal strengths from different cell transmitters and then using their location property (retrieved from the online cell site database) to aid My Location in determining the user's current location. Wireless network location method is calculated by discovering the nearby WiFi hotspots and using their location property (retrieved from the online WiFi database, in the same way as the cell site database) to further discover the user's location. The order in which these take precedence is:

- GPS-based services
- WLAN-, WiFi-based services
- Cell transmitter-based services

The software plots the streets in blue that are available with a yellow icon and a green circle around the estimated range of the cell site based on the transmitter's rated power (among other variables). The estimate is refined using the strength of the cell phone signal to estimate how close to the cell site the mobile device is. [11]

- Facebook

"In short, Facebook is not, in any sense, an online publisher. It does something related to, but distinct from, what such publishers do. (Online publishers aggregate audiences of individual users, viewers, and readers, and secondarily connect them, if they connect them at all.) Leave aside Goldman's $50 billion valuation, the major motion picture, and the fact that Facebook is growing faster than Google did in its early days: the company's usage data tell a story that transcends even those stunning facts. Connection is a human imperative. Technology that hyper-enables it should, logically, thrive. Because Facebook enables it better than any other social network, it has metastasized throughout the Web and beyond — into our mobile devices. (Install a Facebook app on your Blackberry, for example, and you'll see Facebook features integrating themselves mysteriously throughout the functions of your device.) As Facebook expands inexorably, perhaps we should focus less on the asset and more on the impact. By extending its seemingly endless tendrils online, Facebook is surely changing business; it's also changing *us* in ways that are arguably out of anyone's control — including that of the gifted entrepreneurs who actually run the "site" itself." [15]

- Twitter

Twitter is a social network and a micro blogging service that allows its users to send and receive other users' messages which are called tweets; tweet is a text post up to 140 characters. These tweets are displayed on the user's profile page and it's publicly visible by default, with the option of restricting access to one's page to their friend list. Users have the ability to subscribe to other users pages to get updates from this user, this is called following, subscribers are known as followers. All users are allowed to update and receive tweets via twitter website, third party applications or devices such as smartphones, or by using SMS but It's only available in certain countries so far. Twitter is free for all users but accessing using SMS isn't since it's decided by the mobile service provider. Twitter was created by Jack Dorsey, an American software architect and an entrepreneur in 2006, and it became one of the most used social networks on the planet with 100 million users worldwide so far.

Twitter grew from 400,000 tweets posted per quarter in 2007 to 55 million tweets per day in April 2010, it has 100 million registered users with a growth rate of new sign ups of 300,000 per day, the site itself is visited by 180 million unique visitors a month (worldwide) and 75% of the traffic comes from third party applications that are built based on twitter like tweetdeck. The usage of twitter spikes during major events like sports events, in 2010, twitter set the record for the most amounts of tweets during 2010 FIFA World Cup when fans tweeted 2,940 tweets per second in 30 seconds after Japan scored against Cameron, however the record was broken during the NBA Finals of 2010. According to Quantcast twitter.com is ranked 14th most popular site in US and during last year so far, Twitter recorded the highest amount of traffic which was 54.5M visitors from US in August 20th 2010.

2.11 What do we know before the study?

- Large amount of spending on medical information systems, but rarely is the success of these information systems formally evaluated.
- Emergency response medical information systems are a special type of medical information system that is used during high stress situations and on a no routine basis.
- DeLone and McLean developed a model of IS success that has been adopted in a variety of contexts, including medical information systems.

2.12 Comparing other emergency smartphone applications

Table 4: Emergency smartphone applications comparison

Application	Features	What's missing?	Comments
MyDistress	Communication to emergency services like Police. Registered for each user with name & cell phone number.	Doesn't notifying family members or friends. Limited to Selangor residents only	In Agreement. See Objectives.
MyForce	Using a special emergency call center dispatch to receive calls from users.	Uses hand phone calling instead of an emergency message alert. Doesn't reach the police directly. Can't be functional in difficult emergency situations.	Refer to Chp. 5

Personal Emergency Response Systems	Let you call for help in an emergency by pushing a button. A PERS has three components: a small radio transmitter, a console connected to your telephone, and an emergency response center that monitors calls.	Users need to buy a separate console. The device calls a limited number of Emergency numbers. No way to discover the location of the user.	
Wireless Emergency Response Systems	Offers a unique range of wireless emergency response systems to answer the needs of the growing senior populations who want to continue living independently in their own homes. These personal emergency response systems incorporates home safety and intrusion alarm, to ensure that emergency response, family member and health care provide are easily	Users need to buy a separate console. The device calls a limited number of Emergency numbers. Hard to spread the alert to friends & family.	Extra cost.

	summoned with just a button click.		
The National Emergency Response System	Provides the linkages between the federal, provincial and territorial emergency response systems for all hazards. Facilitates and expedites federal, provincial and territorial response coordination and decision making;	The system lacks sending an alert message. No wide broadcast to family and friends. Lacks mobility.	No mobility.

CHAPTER 3
METHODOLOGY

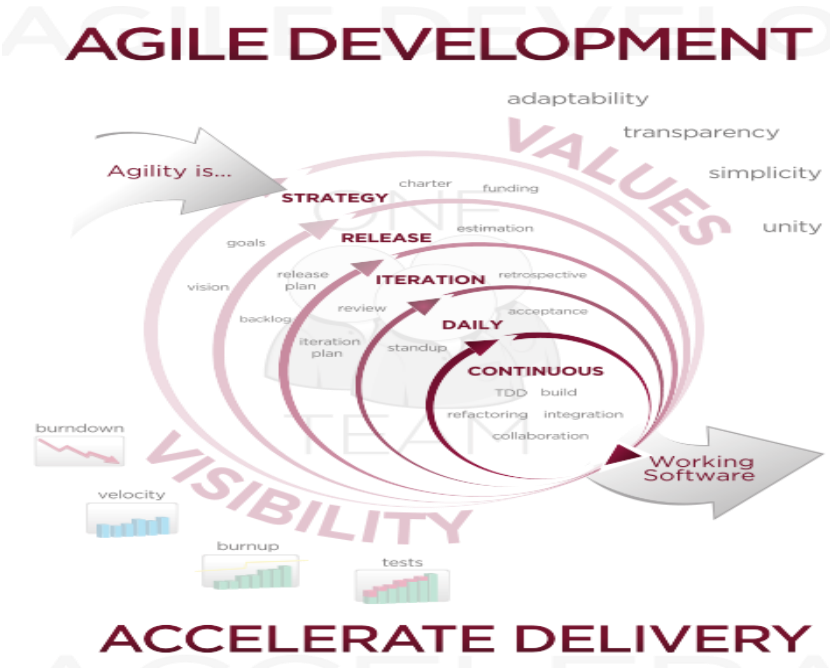


Figure 6: Agile Software Methodology

3.1 Overview of Research methodology

The methodology that will be used to complete this application is agile software development. Refer to Figure 4: Agile Software Methodology

Agile software development refers to the implementation of iterative and incremental development, where requirements and solutions evolve through collaboration between cross-functional teams. It promotes adaptive planning, creative development and fast & efficient delivery. It encourages rapid & flexible response to adapt to change. It is a conceptual framework that promotes foreseen interactions through the development cycle.

In evolutionary and adaptive development, it is not the case that the requirements are forever unbounded or always changing at a high rate. Rather, most requirements discovery and refinement usually occurs during early iterations, and the earliest attention is given to understanding the most architecturally significant or high value requirements.

3.2 Project Phases activities

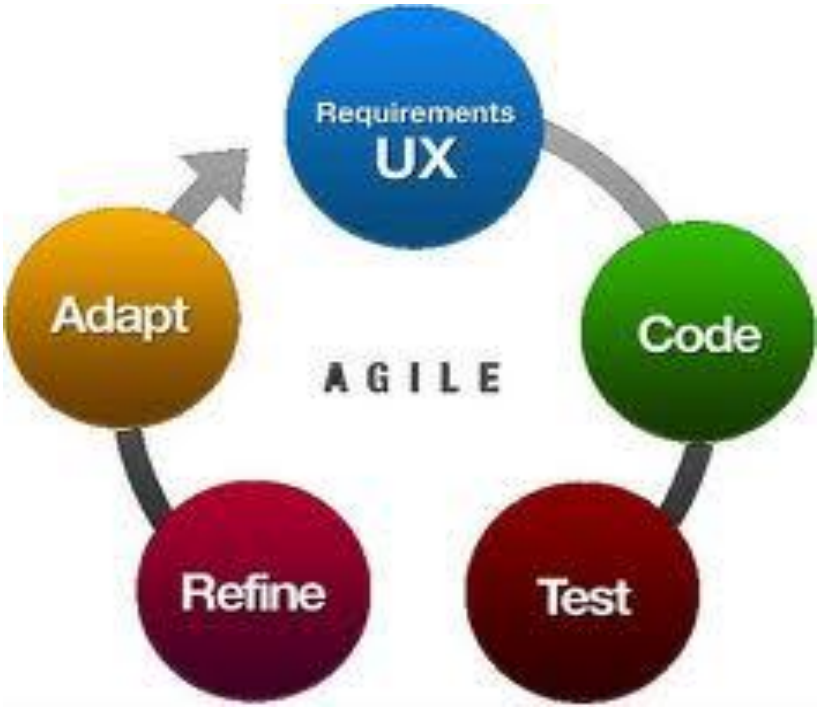


Figure 7: Agile Project Activities

The project is laid onto three main stages interchanging with each other, Refer to Figure 5: Agile Project Activities.

3.2.1 Gathering project requirements

- ✓ Gathering feedback from targeted users on emergency situations.
- ✓ Design on how the application should look like; i.e. layouts, pages, etc.
- ✓ Draw a rough sketch of the screen of the application.
- ✓ Decide on the software and the languages to be used to develop the application.
- ✓ Decide on how to execute and run the application.

3.2.2 Designing & coding the application

- ✓ Divide the entire program into separate, individual, smaller modules.
- ✓ Code the program module-by-module, debugging and improving the codes as per module as I go.
- ✓ Combine all the individual modules into a single program.
- ✓ Specify all the specifications; i.e. XML documents, etc.

3.2.3 Testing & implementation stage

- ✓ Testing the application in all possible devices; i.e. all Android smart phones with different OS versions.
- ✓ Checking and comparing prototype with other available similar projects.
- ✓ Asking a few users (randomly selected) to test the application to get their feedback regarding the user-friendliness of the application.

The refine & Adapt stages are interchanging throughout the whole project period until all requirements are met.

Figure 8: Agile Development

The first step is gathering system requirements, gathering data from the target market and from research conducted to analyze data. Gathering useful requirements is very useful in designing the application so that the application can be user friendly. Next stage is designing the code & the software development itself, i.e. coding translates requirements into actual software. During development, the project will focus on the development and video pitching. After that is Test and feedback stage where we obtain feedback from target market and targeted users testing the application and what is their feedback, if there are any changes needed in any of the phases, the activities will then interchange among themselves and re-adapt to the requirements. Refer to Figure 5: Agile Project Activities and Figure 6: Agile Development.

3.3 Development Challenges

Stage 1: Requirements gathering

Many projects still follow Waterfall SDLC. If the requirements are not very clear and exhaustive, then the project will find it difficult to proceed on schedule. That's why I decided to go for Agile SDLC, but then that again requires that the end-user involvement be high. Else, requirements gathering will suffer.

Stage 2: Development

1: Software fragmentation

Simply put, there are too many versions of the Android operating system in circulation. This means that developers can't just focus on the most recent versions of the OS; not everyone has upgraded. It's not easy for users to upgrade their operating systems, and carriers have little incentive to do so.

Workaround: Learned which operating systems are most popular and develop with the latest widely adopted version in mind. Get to know handsets that are popular among customers and get familiar with the carriers' upgrade schedules. Another alternative is the lowest common denominator approach: Don't make an app that won't work on the oldest OS that's still in wide circulation.

2: Google's lack of authority

Google has taken a deliberately hands-off stance when it comes to the Android OS. Open source code provides a low barrier to entry for app developers, which can be a blessing and a curse. A lot of developers (me included) would like to see Google police the ecosystem better, implementing more rigorous standards and an app review process. If Android provided more universal UI guidelines (and components) like Apple's, we might see better apps as a result.

Workaround: The good news is that Google seems to be moving in the right direction with the upcoming OS update. It claims that the new version will make it easier to produce attractive, user-friendly apps for Android.

3: Market research cost

As mentioned, understanding your customer is the key to getting an Android app right. This, of course, requires lots of research into how customers use the software and hardware on their phones. And, yes, that takes time and can therefore be an expensive endeavor for developers to undertake.

Workaround: If you're committed to developing on Android, just dig in. Google does provide some user statistics that can get you started. But the best thing you can do is to use focus groups and customer surveys to understand your user base's behaviors and then allocate development resources appropriately.

Stage 4: Testing

Due to the nature of the application, all testing requirements were only applied to Android smart phone users or providing them with one. It was not easy to do a step by step designed emergency scenario tests. The participants had to be briefed and debriefed to gain a general understand and an overall feedback from and about the system.

3.4 Key Milestones & Gantt Chart

3.4.1 Key Milestones

Table below shows the key milestone that the author needs to achieve during two semesters in final year project 1 (FYP1) and final year project 2 (FYP2).

Table 5: FYP 1 Milestones

Key Milestone	Week
Project Proposal	Week 3
Extended Proposal (10%)	Week 6
Proposal Defense (40%)	Week 9
Interim Report (50%)	Week 11

Table 6: FYP 2 Milestones

Key Milestone	Week
Progress Report (10%)	Week 7
Pre-SEDEX (10%)	Week 10
Dissertation (40%)	Week 12
VIVA (30%)	Week 13
Technical Report (10%)	Week 14

3.4.2 Gantt Chart

Final Year Project 1

Table 7: FYP 1 Gantt Chart

Activities/Week	1	2	3	4	5	6	7	8	9	10	11	12
Selection of Project Topic & Supervisor												
Submission of Proposal												
Extended Proposal Progress												
Research Activities												
Submission of Viva: Proposal defense and Progress Evaluation												
Interim Report Progress												

Final Year Project 2

Table 8: FYP 2 Gantt Chart

Activities/Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Programming Research														
Prototype Development														
Submission of Progress Report I														
Pre-SEDEX														
Submission of Dissertation - Softcopy														
Oral Presentation														
Submission of Final Dissertation														

3.5 Tools

For Android development, either using a Mac, a Windows PC, or a Linux machine.

All the tools needed are free and can be downloaded from the Web.

Typically, the following are the required tools:

- Java SE Development Kit (JDK).
- Eclipse IDE.
- Android SDK
    i. Contains a debugger, libraries, an emulator, documentation, sample code and tutorials.
    ii. Android Development Tools (ADT).
    iii. Create new Android application projects.
    iv. Access the tools to access the Android emulators and devices.
    v. Compile and debug Android applications.
    vi. Export Android applications into Android Packages (APK).
    vii. Eclipse Java Plugins.
- Paint.
- Photoshop.
- Smartphone with Android OS.

3.6 Pseudo code & Algorithms

1. Main Activity.java

```
public SettingActivity setting = new SettingActivity();

Button pressMeButton;

public static ImageView settingIcon;

public static TextView
emergencyNoValue,emergencyNoValue2,emergencyNoValue3,emergencyNoValue4,emergencyNoValue5,latV
alue,lonValue,currentLocValue;

public static EditText messageEditText;

public static String  latitude,longitude,currentLocation;

public static String emergencyNo =  "No Number Selected";

public static String emergencyNo2 = "No Number Selected";

public static String emergencyNo3 = "No Number Selected";

public static String emergencyNo4 = "No Number Selected";

public static String emergencyNo5 = "No Number Selected";
```

2. SettingsActivity.java

//Facebook

```
        Facebook mFacebook;

        static final String[] PERMISSIONS = new String[] {"publish_stream", "read_stream",
"offline_access"};

        static final String APP_ID = "126304534217072";

        private static ProgressDialog mProgress;

        private Handler mRunOnUi = new Handler();

        //Twitter

        public static  TwitterApp mTwitter;

        private static final String CONSUMER_KEY = "6JyIkj71ZqG4wk3YF0Y4hw";

        private static final String CONSUMER_SECRET =
"sJl9aRVqlEt7nxlKvpMVK6tLULz5FSQ2KUOW0yie4";

        public static  enum FROM {TWITTER_POST, TWITTER_LOGIN    };

        public static  enum MESSAGE {SUCCESS, DUPLICATE, FAILED, CANCELLED};
```

```
//Fetch current location & GPS coordinates

MyCurrentLocationListener mGPS = new MyCurrentLocationListener(this);

 if(mGPS.canGetLocation )

        {

          latitude = String.valueOf(mGPS.getLatitude());

          longitude = String.valueOf(mGPS.getLongitude());

          Geocoder gcd = new Geocoder(getBaseContext(),Locale.getDefault());

              List<Address> addresses;

          try

          {

        addresses = gcd.getFromLocation(mGPS.getLatitude(),mGPS.getLongitude(), 1);

               if (addresses.size() > 0)

           currentLocation = addresses.get(0).getLocality();

          }

          catch (Exception e)

          {

             e.printStackTrace();

          }

        }

        else

        {

Toast.makeText(getApplicationContext(), "GPS is not turned on...",Toast.LENGTH_LONG).show();


        }
```

3. MyCurrentLocationListener.java

```
/**
     * Function to show settings alert dialog On pressing Settings button will
     * lauch Settings Options
     * */
    public void showSettingsAlert()
    {
        AlertDialog.Builder alertDialog = new AlertDialog.Builder(mContext);

        // Setting Dialog Title
        alertDialog.setTitle("GPS is settings");

        // Setting Dialog Message
        alertDialog.setMessage("GPS is not enabled. Do you want to go to settings
menu?");
        // On pressing Settings button
        alertDialog.setPositiveButton("Settings",new DialogInterface.OnClickListener()
```

CHAPTER 4
DISCUSSION & RESULTS

4.0 Chapter Overview

The main objective of this chapter is to present a discussion on alert broadcasting services and systems, showing the elaborative development and the results. The following are the contents of the application, the system's GUI, it's flow chart and a discussion on what's the best interaction design, considering the user's needs. Emergencies caused by hazards are ubiquitous; in general we aim to create an application that will make the user experience satisfying, enjoyable, helpful, motivating, and rewarding to use the application every time for the same purpose.

4.1 The System Prototype

4.1.1 System's Description

Offering accurate information to those who can help you, the Emergency Red Alert is basically a user centered early warning & vulnerability alert system, a one-to-many mode of communication, a uniquely developed mobile phone application that provides users with rapid connection to police, relatives and/or close persons and friends, or the emergency services relevant to their predicament. The application enables users to push a red button and generate a security alert, activating immediate contact, providing instant details of location, as well as dialing emergency numbers and sending panic messages via a wide range of communication mediums and channels such as: SMS, and social networks like Facebook & Twitter.

The main objective of the alert is to draw attention of people facing imminent emergency. The alert contains an alarm, e.g. audio signal like a siren. Most of the times, the alert also includes information related to the emergency. We defined such information as “alert information.” Therefore, the “alert” consists of the alarm and the alert information.

The main objective of the “alert broadcasting services” is, using broadcasting networks, to effectively deliver the alert to the intended targets. The targets are the general public, a group of people, or special devices.

The simplest alert broadcasting service is news casting, where the alarm and the alert information are broadcasted in the format similar to a news program. In some cases, essential alert information is encoded into a message according to a predefined standard. We call this encoded alert information as “alert message.” The contents of the messages are composed of the type of emergency, issuing time, intended target, alert priority, and simple textual description of the emergency.

A. How does the Emergency Red Alert application work?

1. SMS Panic Message: sending the user’s current position and address (in the form of a Google Maps link), to all the numbers found in the panic contact list

2. Twitter Panic: posting a panic tweeter message to the user’s timeline, including the current address and a Google Maps link

3. Facebook Panic: similar to Twitter Panic with the panic message posted to the user’s wall

4. Address in message

5. Quick SMS: containing a customizable alert message

6. Remote access: any user that receives a panic SMS message can get the latest position of the device that sent the message

7. Five Emergency Contacts

B. Types of users

The Emergency Red Alert application is designed to improve the life of all citizens, especially those with disabilities and the elderly by offering them a higher degree of security in our society. As a mobile device, the application offers users safety guidance in unknown environments (using a GPS option) and helps people feel confident and safe when moving. These are the main types of users that can benefit from the application:

PERSONAL (Personal security)

Provides victims of domestic or urban violence with rapid connection to police. The application enables the user to push a central button and activate immediate contact with the emergency services, providing instant details of location.

FAMILY (Family security)

Special applicability for parents, children and parental organizations.

SECURITY (Professional security)

For police and security agents involved in conflict & emergencies prevention.

ELDERLY (Elderly Monitoring & Safety)

For the elderly users the application heavily impacts on their psychology, but also their everyday lives, as it counteracts the feeling they have that, faced with the dangers of urban and domestic violence, they have lost their freedom and independence.

MEDICAL (Medical Emergencies)

For medical emergencies & people with disabilities, in cases in which: 1. Emergency services are frequently inaccessible to people with sensory disabilities; and 2. assistive technologies, which are used by disabled people to access ICT products and services, are often not interoperable with software used in these products.

C. Emergency Red Alert Follows Android User Interface Best Practices

The application makes it easier for users to learn how to use the application by developing a user interface that complies with Android's standard interaction patterns, instead of creating our own or using interaction patterns from another platform. This consistency is especially important for many disabled users, as they may have less contextual information available to try to understand our application's interface. Specifically, we use the Options Menu as an alternative to complex touch screen tasks and make sure the BACK button correctly moves the user back one logical step.

The Technology behind (Emergency Red Alert)

Emergency Red Alert was designed specifically for the Android platform. The goal was to offer a solution compatible with all Android devices available on the market. With this in mind the Android platform level 4 targets SDK (Android 1.6) was the ideal choice to cover more than 99% of the users.

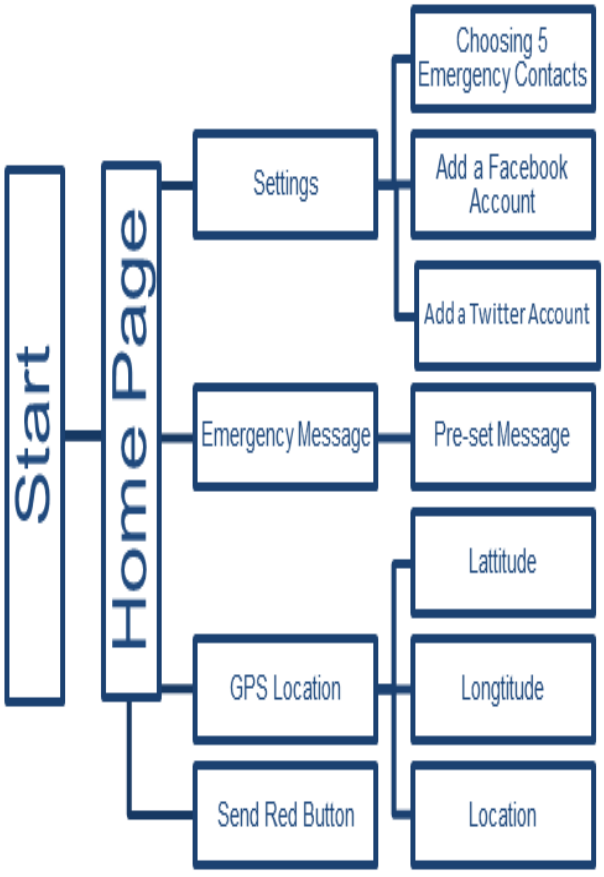
Accessing system services for retrieving GPS data and sending text messages are all covered by the Android system and proved to be really easy to implement and use. By stopping GPS requests when not necessary, the Emergency Red Alert development made sure that accessing location services (such as GPS data) will affect battery life as little as possible.

The panic messages sent with the application contain the location address of the person in trouble with the latest latitude and longitude coordinates. In the real word environment users who receive the panic message will first read the location address of the person in danger, then most likely they will reply or place a call and only at the end the link will usually be accessed. Using Google's geocoding services and a proprietary geocoding server for back-up ensures that the users always get the correct location address. This is a crucial piece of information when sending a panic message.

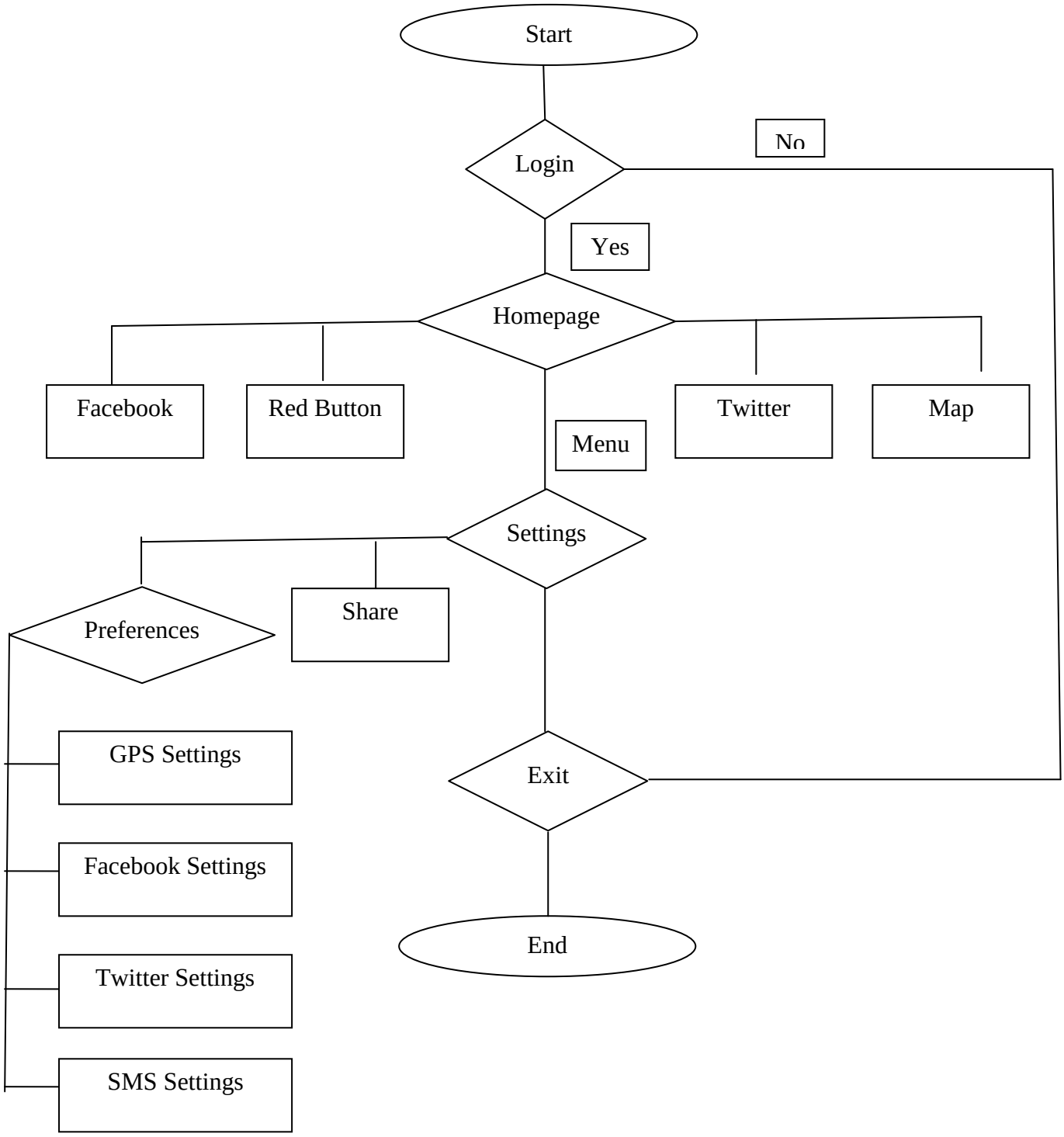
Connecting to social networks

Offering an application connected to social networks like Facebook and Twitter is a necessity in today's world. Emergency Red Alert offers users the possibility to connect their Twitter and Facebook accounts to be able to alert as many people as possible when they are in danger.

4.1.2 System's Architecture



4.1.3 Flow chart



4.1.4 System's GUI

- Main Page for the application (Homepage)

The application will ask the user to add an emergency contact on the first time to login & start using the application.

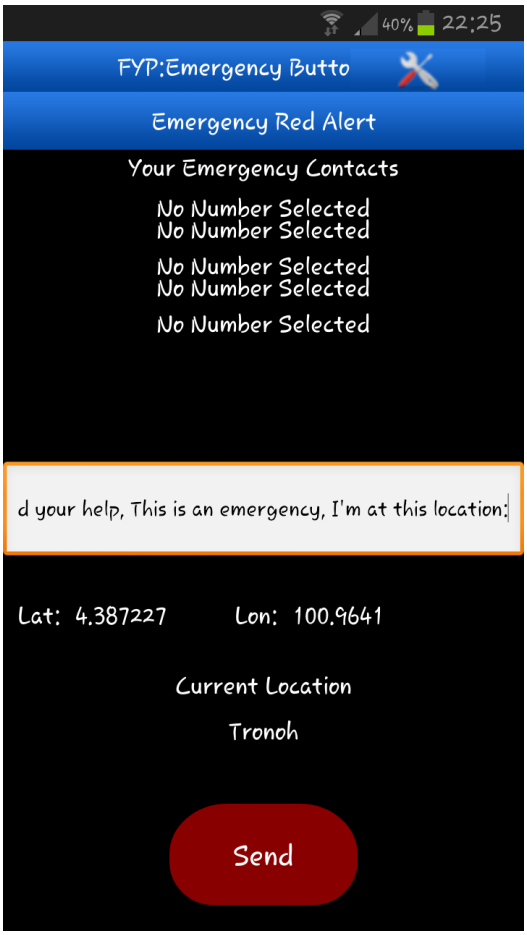


Figure 9: GUI (1)

- After Clicking on the Menu button, this group of options tab will show up.
- Choosing Emergency Contacts
- Going to Settings to manage (Facebook, Twitter, SMS Contacts) settings

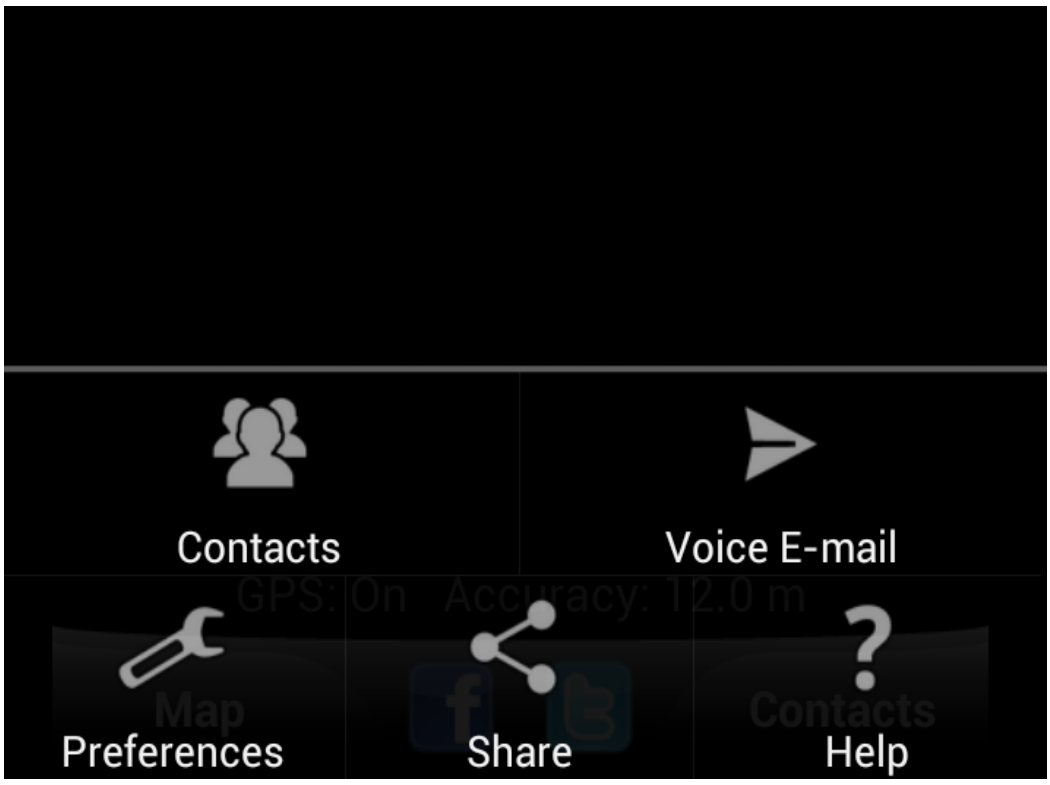


Figure 10: GUI (2)

- This page helps the users to choose 5 contacts from the user's phone book contacts.
- Adding a Facebook Account
- Adding a Twitter account

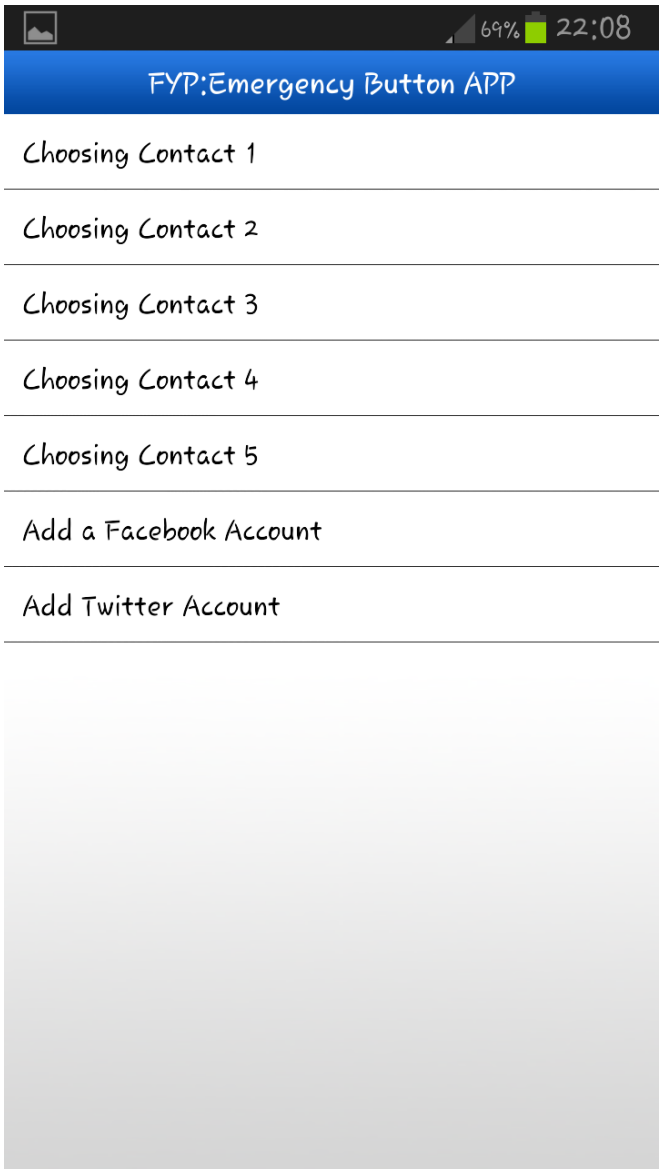


Figure 11: GUI (3)

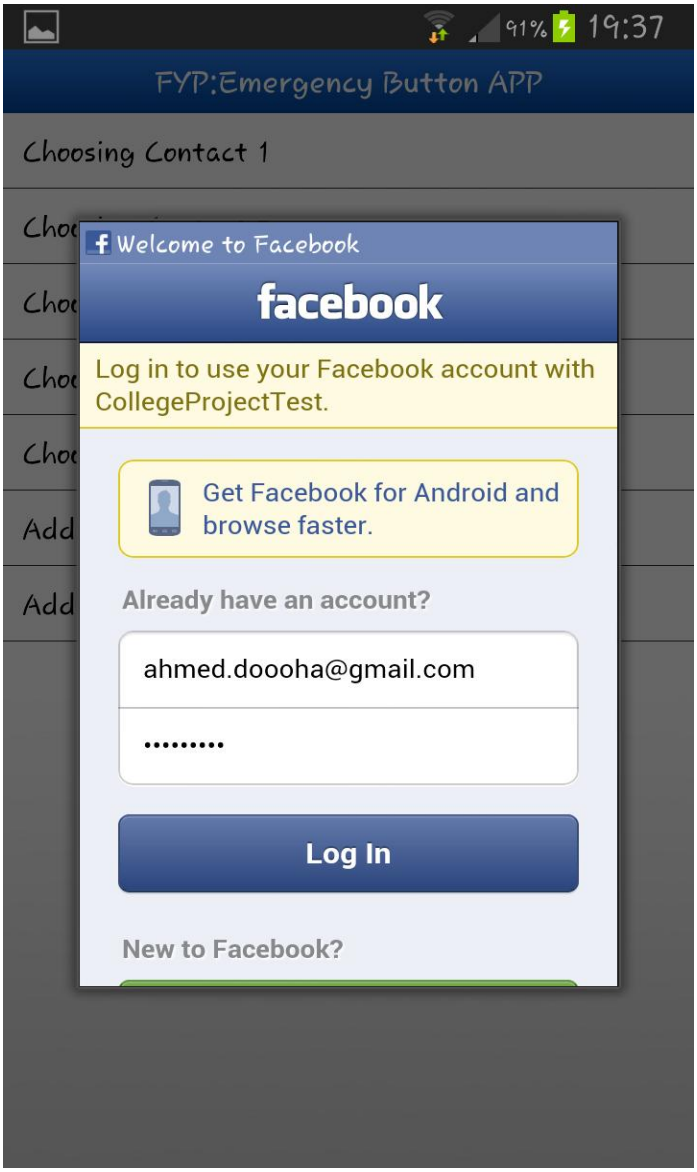


Figure 12: GUI (4)

- Users can add their Facebook account to broadcast their Emergency Alert message on their Facebook wall.
- After the user has run the facebook account setup from the application, at the push of the Red “Send” Button a panic status message will be posted to the user’s wall timeline, including the current address and a location coordinates.

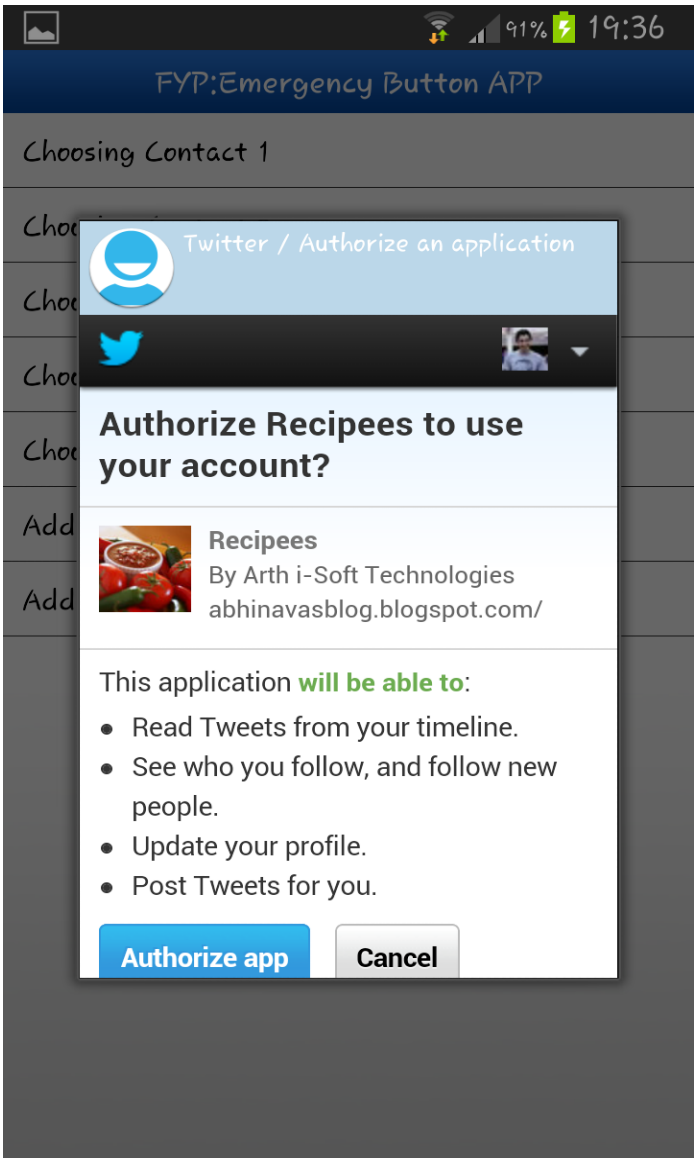


Figure 13: GUI (5)

- Users can add their Twitter account to broadcast their Emergency Alert message as a tweet.
- After the user has run the twitter account setup from the application, at the push of the Red “Send” Button a panic tweeter message will be posted to the user’s timeline, including the current address and a location coordinates.

Figure 14: GUI (6)

- As a caution step measure, Users might click on "Send" by mistake. Therefore, the "Are you sure" dialogue box is for a final confirmation before the application broadcasts the Alert message on all networks.

4.2 Overview of Testing Results

Through conducting usability test, 40 selected users were asked to install the application on to their devices, the application passed through an intense refinement process with feed-back help from users and Usability survey to evaluate the results of the project overall success.

4.2.1 Survey data collection and findings

To continue the development of this project, a survey and interview had been conducted during the system development process. After the prototype of the application completed, a usability test had been conducted. The result helps to support the develop application for further improvement and alteration to the application. The survey data were conducted with selected users from random backgrounds.

The user's survey results came out with good responses, Users were able to understand the functions and the technology behind the application, Users didn't have any problem navigating through it and were happy with the results from the application when conducted under supervised testing scenarios.

Based on the preliminary assessment through survey as well as interview with the users, the users felt that the mobile technology is important to them. The focus of their feedbacks was on the following:

- A touch-screen mobile phone is far more useful than the digital button mobile phone.
- Labeled icons and large display with fewer functions are important.
- The broadcasting system is far easier than normal emergency systems.
- The fourth interviewee, an elderly user aged 48 years old, stated that the interface is user friendly to them because the existing applications are not user friendly to them due to the buttons are confusing and are too small to push when using it.

4.2.2 Users feedback on useability

Survey results came in as following:

For the following analysis, Scale 1 represents Strongly Disagree, Scale 2 represents Disagree, and Scale 3 represents Neutral, Scale 4 represents Agree while Scale 5 represents Strongly Agree.

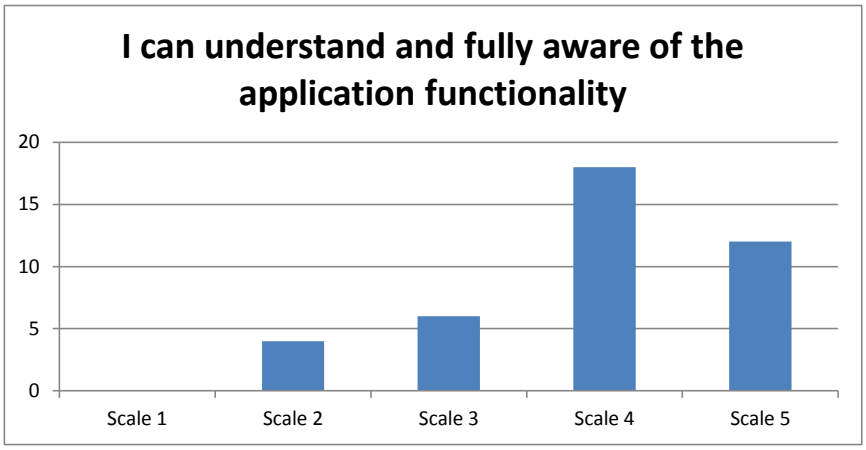


Figure 15: Understanding of the application's function

Figure 15 shows the graph conducted for the first question. The users were asked regarding their understanding on the application, and how they use it. Result shows 18 users rated with Scale 4 and 12 users rated Scale 5. This shows that majority of the users understand how the application works and know how to use it.

For the following analysis, Scale 1 represents Strongly Disagree, Scale 2 represents Disagree, and Scale 3 represents Neutral, Scale 4 represents Agree while Scale 5 represents Strongly Agree.

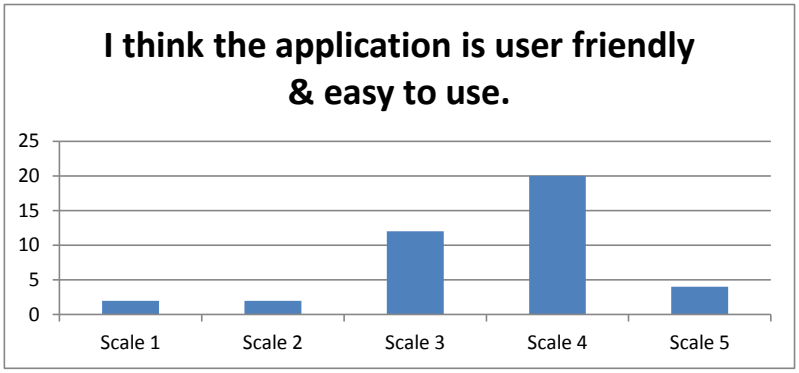


Figure 16: Ease of use an user friendly

Figure 16 shows that there are 20 of the users who rated for ease of use and user friendly at the Scale of 4. There are another 4 users rated it at Scale 5. This shows that over half of the users found the application is user friendly and easy for them to use even for the first time. Apart from that, around 12 users found the application moderately easy to use at the Scale of 3 and remaining 4 users find it difficult to use at first by scaling at Scale 1 and Scale 2 respectively.

For the following analysis, Scale 1 represents Strongly Disagree, Scale 2 represents Disagree, and Scale 3 represents Neutral, Scale 4 represents Agree while Scale 5 represents Strongly Agree.

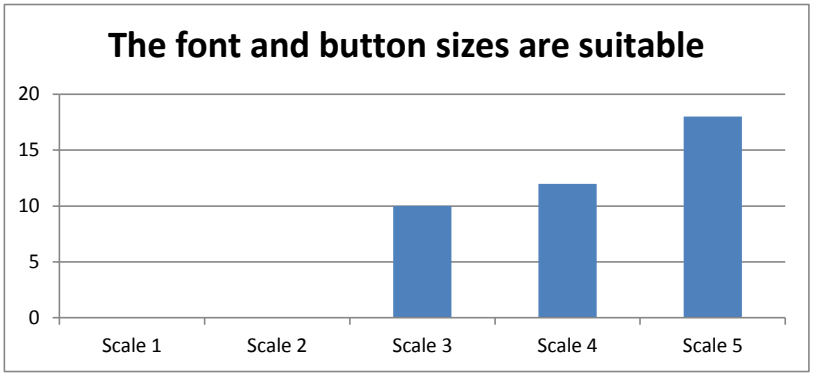


Figure 17: Suitability of font size

Figure 17 shows that there are 18 users feel the font size used in this application are suitable and comfortable for them. Another 12 users rate it on the Scale of 4 and the remaining of the users rated on Scale 3. Overall, users find that sizes of the fonts used are suitable and acceptable enough for them.

4.2.3 User perception's study

Some of the users added comments to the system, some of the user's comments are displayed as following:

User 1 – "I find the app easy to use, color friendly and clearly guiding me when I am lost on the road or chased by unknowns & in need for help"

User 3 – "User friendly, one touch away to getting help! Exactly what I need in emergencies"

User 9 – "My previous experience with 911 was hectic and long and I had no idea where am I"

User 16 – "The only part of the app I dislike was I can't use Facebook and Twitter to broadcast without internet"

User 25 – "I like the application but I think there are more options that can be added i.e. emails, voice message, etc."

CHAPTER 5
CONCLUSION & RECOMMEDNATIONS

5.1 Conclusion

In conclusion, The Emergency Button Application is designed to help users such like children, elderly, pregnant, disabled, people with medical situations, people facing violence or in security danger. Now with the aid of this Android application by pushing a button on the phone screen the app will send a message providing instant details of location via Global Positioning System (GPS), as well as dialing emergency numbers and sending alert messages via a wide range of communication channels such as: Short Message Service (SMS), emails, and social networks such as Facebook & Twitter The application aims to explore the use of mobile technology particularly smart phones in panic & emergency situations. The prototype has been successfully developed and tested not to replace but to complement. Lastly, the application main objective is to help users whenever they seek for assistance and can't easily access it or find it, but with today's world mobile software development, public safety shall be more personalized, friendly, one touch away to getting help.

5.2 Recommendations

It is recommended to add these features for the application in the future to make it better and enhance it for wider user types.

1. **Emergency dial:** the phone dials the emergency number, while at the same time sending the panic messages via SMS, e-mail, Twitter and Facebook

2. **Record voice:** 10 seconds sound file attached to an email message

3. Unlimited number of contacts

4. International prefix

5. Dynamic ambient contrast: using the phone ambient light sensor to enhance application readability

6. **Talk Back compatibility**: especially useful for disabled users, i.e. the blind and visually impaired, enabling an accessibility service that speaks as you move around the screen

The application can also make use of the media layer of Android, offering users the option to record an audio message and send it via e-mail as an attachment. Automatic dial of emergency numbers can also be supported.

For future work implementation, it is strongly agreed to introduce this mobile application to the suitable governmental officials who can grant their sponsorship to implement the application to a wider and a better service in responding to user's alerts when managed by monitoring personnel who are trained-professionals capable of handling a wide range of emergency situations and who can act as you or your loved one's personal advocate through the duration of an incident.

Of course, it's worth noting that there are some really good aspects of developing for Android. The open source nature of the Google operating system means developers have a good amount of leeway, for better or worse. Creative developers with good ideas may find that they can pioneer more interesting apps than they could on the closed iOS. Google also doesn't police apps entering its marketplace, so getting in is as simple as submission. If you can develop an Android app that works intuitively, looks great, and can be found in the marketplace, you stand a strong chance of capitalizing on this strong and growing market

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APPENDECIES

- **Technical Paper (Emergency Button Application – Android Systems)**

Emergency Button Application - Android Systems

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Abstract - The investigation of emergency situations is a complex field of study which involves different perspectives. Individual's and public's safety is a very important issue, the established emergency response system is the main core of resolving these emergency situations, we are already familiar with the normal emergency reporting system like calling 911 or using emergency phones, But this project aims to create an application that can assist users in emergency situations and provide users with instant details of their location to send to family, friends, or authorities in panic & emergency situations, another option other than public emergency phone systems and other forms of reporting in emergency situations for an easier and friendlier approach, thus improving public safety. The methodology used to complete this application is agile software development methodology which is based on iterative & incremental development that is rapid & flexible. The tools for this project include Eclipse Indigo which is a popular platform to develop Android Applications with the aid of a variety of software tools in design and user friendly software development such as Android ADT tools. In conclusion, the application's is successfully developed and met its main objective which is to help users broadcast their message in an emergency situation whenever they need help and can't easily get it or find it but with today's world mobile software development, public safety shall be more personalized.

Keywords-component: emergency, broadcast system, android, mobile.

I. INTRODUCTION

There is a growing public interest in mobile technology, for many of us, life without a mobile is unimaginable, as technology advances day by day the relationship between users and their mobile devices continuous to evolve to take different forms of usage and we are on the very verge of mobilizing a lot of our daily life activities and routines such as (Clock Alarms, Radio, Video streaming, etc..) and the roof of expectations is getting higher every day. According to James Harkin (2003), The phenomenon of mobilization – "the process by which mobile technologies are folding themselves into the fabric of our economies, social lives and communities." (p.9). in the current time, more and more mobile applications are taking the lead to take social related problem and help users through the aid of mobile phones to replace older solutions. In an online article on mashable.com, Joann Pan (2012) discuss in a story whether mobile applications can replace public emergency phone systems, which leads us to the topic of this project where the aim is focused on developing a mobile application that can assist the public emergency systems.

This main objective of this research project is to explore the use of mobile technology particularly smart phones in panic & emergency situations. Develop a new system; an assistive emergency broadcast system for emergency situations to assist users in emergency situations providing users with instant details of their location to contact family, friends, or authorities in panic & emergency situations.

II. LITERATURE REVIEW

The current method dealing with emergency situations in most countries is dialing the emergency telephone number service such as 911, also known as the universal emergency number, which can be used to summon the emergency services to the civilians. Most of the developed countries operate on three core emergency services.

Police – who deal with security of person and property, which can cover two of the emergency situations of which mentioned earlier. They may also deal with punishing legally those who cause an emergency through their actions.

Fire service – who deal with potentially harmful fires, they help prevent loss of life, damage to health and damage to or loss of property.

Emergency Medical Service (Ambulance) – These services attempt to reduce loss of life or damage to health.

As cell phone use continues to increase, the need for emergency telephones declines and they are being phased out in many cities. However, it will remain vital for safety purposes in areas with poor cell phone coverage and in places of high danger. In today's world there's a more chance to find someone using a cell phone or a smart phone than using a tooth brush, that indicates how viral and numerous amount of mobile phone has spread over the years. According to Global mobile statistics 2012, a study says that at the end of 2011 there were 4.5 billion mobile subscribers in the developing world, and that mobile subscribers in the developed world has reached a saturation point with at least one cell phone subscription per person. Figure 2 shows the growing mobile phone subscribers.

And with the growing usage of mobile phone and smart phones, the need for applications and App stores has increased rapidly. There are tons of applications for everyone out there, ranging from different criteria's and target markets. The most popular categories are games, news, maps, social networking, and music. On average smartphone users have 10 apps. In 2011 ABI Research predicts that "there will be 29 billion apps downloaded in 2011, up from 9 billion in 2010. In Q2 Android overtook Apple in terms of app downloads with 44 percent of downloads, compared to Apple's 31 percent." That is why; building an application to assist users in emergency situations and to contact family, friends in panic situation using a smart phone application is vital and very encouraging to be used.

What do we know before the study?

- Large amount of spending on medical information systems, but rarely is the success of these information systems formally evaluated.
- Emergency response medical information systems are a special type of medical information system that is used during high stress situations and on a no routine basis.
- DeLone and McLean developed a model of IS success that has been adopted in a variety of contexts, including medical information systems.

Related work, similarities and differences

Recently, many systems are trying to solve this public concern, and ways of introducing new methods and technologies into making a user friendly, that requires less effort on the user side and provides a better help in emergency situations.

System	Review
MyDistress (Mobile App)	• The application serves as a communication medium between user and emergency services such as Police through calling. • Registration for each new user in the system. • Limited to Selangor residents only • It doesn't notify friends or family.
MyForce (Mobile App)	• The app is also based on calling for help, but connecting through a special call center dedicated for the app users. • It doesn't connect to the police directly; the call must go through the call center first to evaluate the emergency situation first. • During emergency situations, it is strongly recommended for fast response which the app doesn't really do
Wireless Emergency Response System (Software System)	• Users need to buy a separate console. • The device works as a beeper to notify emergency contacts but it lacks map location of the user. • Hard to spread the alert to friends & family

III. METHODOLOGY

A. *Research Methodology*

This section focuses on giving the insights on how the research is carried out. This includes the mode of data collection, how the data is analyzed and the research tool design. Vital information for this research work is collected through primary and secondary sources with the combination of Survey technique by forming a systematically drafted questionnaire. This is where; questionnaires and surveys are used as an instrument in gathering and collecting the primary data.

The questionnaires given after the system prototype has been completed tested on users who volunteered for test the project functionality.

Figure 18: Agile Development

B. *Tools and Equipment*

For this project, ADT tools will be used as a developing tool for eclipse program that will assist in coding the application. In the development phase, a personal computer & Smart phone of Android OS will be used as a workstation.

The main platforms for development are:

- Eclipse IDE
- Adobe Photoshop CS3

C. *System* Methodology

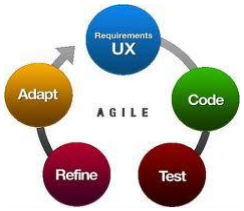

Figure 19: Agile Methodology

The Agile is usually used when the process is likely to be changed as the project proceeds or when the stakeholder has little idea of what system to be built. All the Analysis, Design, and Coding phases performed at the same time and on each cycle in producing a ***system prototype***. The cycle repeated continually based on the comments until the system prototype successfully meets the requirements. The last prototype will then be called the system. Prototyping development needs only initial basic analysis and design. Thus there is a possibility to revise the initial design decision and start all over again from the beginning.

D. *System Architecture*

In order to start using 'Emergency Red Alert', user needs to install the application's apk file on their smart phone Android OS which allows you to use the application. Below is the application's architecture:

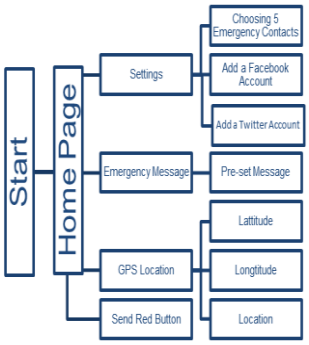

Figure 3: System Architecture

IV. RESULTS & DISCUSSION

Offering accurate information to those who can help you, the Emergency Red Alert is basically a user centered early warning & vulnerability alert system, a one-to-many mode of communication, a uniquely developed mobile phone application that provides users with rapid connection to police, relatives and/or close persons and friends, or the emergency services relevant to their predicament. The application enables users to push a red button and generate a security alert, activating immediate contact, providing instant details of location, as well as dialing emergency numbers and sending panic messages via a wide range of communication mediums and channels such as: SMS, and social networks like Facebook & Twitter.

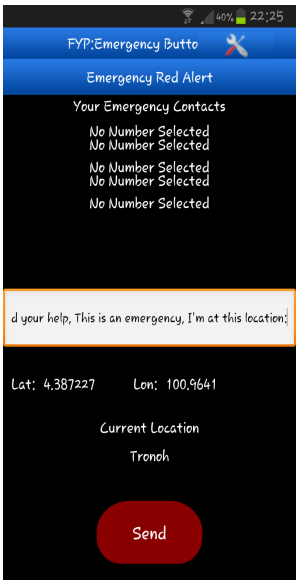

Figure 20: Main Page

Figure 3 illustrates the main page also home page design of the application. It contains a display for the Emergency contact numbers chosen by the user, a customized message box for the user to edit accordingly depending on what they want the text message to be like describing the emergency situation in hand, Latitude & Longitude details along with the exact current location of the user, Red "Send" button, and lastly the Settings page button.

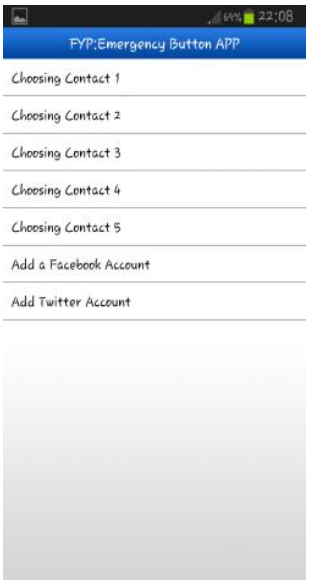

Figure 22: Settings Page

Figure 4 shows the settings page which has 3 main components, 1) Choosing the main 5 emergency contacts numbers from the user's phone phonebook contact list, 2) Adding user's Facebook account, a onetime login that will serve purpose when users click the "Send" button", 3) Adding user's Twitter account if applicable, which will let the application access it to post tweets of user's emergency message and their location details.

Figure 21: Adding Facebook Account

Figure 5 is showing the next step when users attempt to add a Facebook account, the Facebook api will lead the users to login their username/password for authorization and then ask the users for confirmation to let the application access their wall page.

Emergency Red Alert was designed specifically for the Android platform. The goal was to offer a solution compatible with all Android devices available on the market. With this in mind the Android platform level 4 targets SDK (Android 1.6) was the ideal choice to cover more than 99% of the users.

The panic messages sent with the application contain the location address of the person in trouble with the latest latitude and longitude coordinates. In the real world environment users who receive the panic message will first read the location address of the person in danger, and then most likely they will reply or place a call. Using Google's geocoding services and a proprietary geocoding server for back-up ensures that the users always get the correct location address. This is

a crucial piece of information when sending a panic message.

Accessing system services for retrieving GPS data and sending text messages are all covered by the Android system and proved to be really easy to implement and use. By stopping GPS requests when not necessary, the Emergency Red Alert development made sure that accessing location services (such as GPS data) will affect battery life as little as possible.

Offering an application connected to social networks like Facebook and Twitter is a necessity in today's world. Emergency Red Alert offers users the possibility to connect their Twitter and Facebook accounts to be able to alert as many people as possible when they are in danger.

To continue the development of this project, a survey and interview had been conducted during the system development process. After the prototype of the application completed, a usability test had been conducted. The result helps to support the develop application for further improvement and alteration to the application. The survey data were conducted with selected users from random backgrounds.

The user's survey results came out with good responses, Users were able to understand the functions and the technology behind the application, Users didn't have any problem navigating through it and were happy with the results from the application when conducted under supervised testing scenarios.

Based on the preliminary assessment through survey as well as interview with the users, the users felt that the mobile technology is important to them. The focus of their feedbacks was on the following:

- A touch-screen mobile phone is far more useful than the digital button mobile phone.
- Labeled icons and large display with fewer functions are important.
- The broadcasting system is far easier than normal emergency systems.
- The fourth interviewee, an elderly user aged 48 years old, stated that the interface is user friendly to them because the existing applications are not user friendly to them due to the buttons are confusing and are too small to push when using it.

V. CONCLUSION & FUTURE WORK

In conclusion, The Emergency Button Application is developed and successfully tested, Assisting users to broadcast their message and location during emergency situations using SMS text messages and Social Network. Now with the aid of this Android application by pushing a button on the phone screen the app will send a message providing instant details of location via Global Positioning System (GPS), as well as dialing emergency numbers and sending alert messages via a wide range of communication channels such as: Short Message Service (SMS), and social networks such as Facebook & Twitter The application aims to explore the use of mobile technology particularly smart phones in panic & emergency situations. The prototype has been successfully developed and tested not to replace but to complement. Lastly, the application main objective is to help users whenever they seek for assistance and can't easily access it or find it, but with today's world mobile software development, public safety shall be more personalized, friendly, one touch away to getting help.

For future works, this application can be made to be compatible in other platform, not just limited to Android but also in iOS. Operating system such as Android, and iOS, will create portability to this application. Further studies also needs to done to improve the current modules to really cater and help dyslexic children to improve their learning abilities.

It is recommended to add these features for the application in the future to make it better and enhance it for wider user types.

1. **Emergency dial:** the phone dials the emergency number, while at the same time sending the panic messages via SMS, e-mail, Twitter and Facebook

2. **Record voice:** 10 seconds sound file attached to an email message

3. Unlimited number of contacts

4. International prefix

5. Dynamic ambient contrast: using the phone ambient light sensor to enhance application readability

6. **Talk Back compatibility**: especially useful for disabled users, i.e. the blind and visually impaired, enabling an accessibility service that speaks as you move around the screen.

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