

**DEVELOPING A REAL TIME DIGITAL EMERGENCY PERSONAL SAFETY  
APP TO ASSIST IN EMERGENCY SITUATIONS USING BEST TIME**

BY

ONG JUN KAI

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

**BACHELOR OF INFORMATION SYSTEM (HONS) INFORMATION SYSTEM  
ENGINEERING**

Faculty of Information and Communication Technology

(Kampar Campus)

JAN 2019

## REPORT STATUS DECLARATION FORM

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DEVELOPING A REAL TIME DIGITAL EMERGENCY PERSONAL SAFETY  
APP TO ASSIST IN EMERGENCY SITUATIONS USING BEST TIME

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SAFETY APP TO ASSIST IN EMERGENCY SITUATIONS USING BEST  
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## DECLARATION OF ORIGINALITY

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## **ABSTRACT**

People nowadays are concerning about their personal safety issues which will often be threatened. It is important to develop a real time digital emergency personal safety app to assist in emergency situations using best time. This mobile application is called “One Tap” emergency personal safety app which is mainly designed in android-based operating system and target on android version 5.0 or above. One Tap provides a lot of features that can assist in emergency situation such as sending an emergency message to the selected contacts by pressing a button. The emergency message contained personal information such as name, home address and current location will send to the particular contacts. Besides, this application has designed a widget button that display in the device’s home page where it can be accessed quickly without launching the app. There is also a feature that tracking the location of nearby hospital, pharmacy and police station in the map displayed. Some of the users may unfamiliar with the places, hence they can find the nearby hospital, pharmacy and police station easily in the case of emergency. In order to provide additional information of the accident happened, the eyewitnesses or the users can capture the photo and share in the app where all the users can view and assist the victim if they are around the places. Towards the end, the people who received the help request can response to the accident within best time, and finally rescue them in an effective and efficient ways. Therefore by using this app, people are able to manage their personal safety and reduce the risk of death when they are involved in an accident.

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## LIST OF ABBREVIATIONS

<i>APP</i>	Application
<i>GPS</i>	Global Positioning System
<i>XML</i>	Extensible Markup Language
<i>HTML5</i>	Hypertext Markup Language revision 5
<i>CSS</i>	Cascading Style Sheets
<i>WIFI</i>	Wireless Fidelity
<i>IT</i>	Information Technology
<i>SMS</i>	Short Message Service
<i>OS</i>	Operating System
<i>UI</i>	User Interface
<i>APK</i>	Android Package Kit
<i>API</i>	Application Programming Interface
<i>SDK</i>	Software Development Kit

## CHAPTER 1 INTRODUCTION

### 1.1 PROBLEM STATEMENT AND MOTIVATION

- Currently, people are concerning about personal safety issues which will often be threatened.

Personal safety refers to both physical safety and psychological safety which indicate that an individual is freedom from victimized by aggression and harassment. In this case, road accidents and car safety issues are more emphasized among the personal safety issues as car accidents often occur and cause serious injuries or death. According to Ruxyn (2017), Malaysia has the ranking of the world top three road deaths in the accident. She also stated that in the population amount of Malaysia around 30 million, 7,000 to 8,000 of people was died in the road accidents every year (Ruxyn 2017). Based on the study of Ritchie and Roser (2018), road accident has been identified as the eighth major cause of death in the world. Therefore, it is important to solve these issues to prevent more people from being involved in the road accidents.

- The problem of road accident has aroused my motivation to come out with a solution by developing a real time digital emergency personal safety app to assist in emergency situations within the best time.

As stated in Gilmore (2015), communication technologies which included mobile tools and social play an important role in rescue efforts and emergency response as well as personal safety. The personal safety app is a mobile application which can be used to ensure personal safety by providing the users an effective way to report their current situation. It is important because no one can expect or think of the possibility of running into trouble or getting caught in an emergency situation. As this application uses the technologies such as real time GPS tracking and alerts, it allows the users to alert nearby first aider, family, friends or the rescue team in an emergency situation. The reason why I choose to develop an emergency personal safety app is that phones are people constant companions and they use phones to do everything such as check email, monitor bank balance, take pictures and even save lives due to technology advancement in the mobile devices. Hence, development of an emergency apps for smart devices is the best way to monitor the personal safety issues especially for the road accidents.



### 1.2 PROJECT SCOPE

This project is focused on using mobile application to assist in emergency situation which mainly for the car accidents rather than crime. This mobile app is called “One Tap” emergency personal safety system which able to identify the contacts of the users and send the emergency message to them when the alert is issued. It is important to send out the emergency notifications and deliver the critical information during life threatening events (Gulum & Murray 2009). The alert can tell the victim’s name, contact data and current location. However, the users are not recommended to send out the alerts if there is no any emergency situation in order to protect their privacy, and they must agree to the terms and policies before using this application. As mentioned above, this application can create an emergency contact list which allow the victims to request help from them in the best time. In addition, the users can press One Tap button to send an emergency message included current location through the apps to update with the selected contact. However, the application of GPS service in the apps is compatible with a stable network connectivity and sufficient battery of the devices. In other words, if the devices are having a poor network connectivity or under low battery condition, the GPS function may not perform well and the current location of the users may not be accurate or delay.

On the other hand, the eyewitnesses of an accident who are also the user of this app can provide additional information by capturing the real scene of the accident happened. After captured, they can upload to the app and share to other users with the purpose of assisting the victim if any users are around the place. Besides, user can view their own current location on the map as well as track the nearby hospital, pharmacy and police station if they are unfamiliar with the places. In this case, user can save the time by just pressing the hospital, pharmacy or police station button unlike they are searching around the places. In the aspect of time to save lives, One Tap is considering on how to send the emergency message in the best time by implementing a fast launch widget. According to Mazumder (2017), golden hour is when an accident happened and caused a traumatic injury, it has to perform the medical treatment within an hour to prevent the chance of death. Therefore, One Tap has to send the emergency message in an effective and efficient way within the best time.

**The scope for One Tap Button app**

1. This mobile app is only target on android 5.0 or above
2. Internet connection is required to run some of the features of this app
3. Camera, read contact, SMS, location and write storage permission are required to run some of the features of this app
4. Camera is required to capture the real accident scene
5. GPS is required to access the device current location
6. SMS is required to send the emergency message to the selected contact
7. Read contact is required to access the device contact and save to the emergency contact list
8. Write storage is required to save the photo in the Firebase and retrieved by all the users
9. This mobile app require the user personal information such as name and address
10. This mobile app has a sign in method that require the username and password to protect unauthorized access
11. This app has designed a One Tap button that can send the emergency message to the selected contact
12. This app has designed a map that can track the nearby hospital, pharmacy and police station

### 1.3 PROJECT OBJECTIVES

The objectives are as following:

- i. To propose an emergency personal safety apps that could be used to assist in an emergency situation within the best time.
- ii. To research more function or improvement on the existing personal safety apps.
- iii. To let users to understand the type of emergencies and actions that should be taken to prevent tragedy scene happen.
- iv. To reduce the steps for documentation and time of reporting when there is an emergency happen.

The first project objective is to propose an emergency personal safety apps that could be used to assist in an emergency situation within the best time. Currently, people are increasingly worry and concern about their safety due to the incidents of natural and unanticipated disaster. By using emergency personal safety apps, it can quickly get the users help when they are fall in danger even if they are unable to call for help (Gonzalez 2017). As accidents are happen frequently, this app can mitigate or reduce the safety risks by immediately sending the emergency message to the selected contact during an emergency, hence they can react faster towards the victims. Users can update the accident location by using the real time GPS location tracking, therefore the responders can track it easily. In order to send the message using best time, One Tap has to implement a fast launch widget that can send the message without launching into the app. This app is essential because no one can expect or think of the possibility of running into trouble.

The second objective is to research more function or improvement on the existing personal safety apps. In this case, I am going to make some innovation on the existing problem or limitation of the personal safety app. I try to find out some problems in the existing system and apply my own idea on it to make the app more reliable, useful and convenience for the users. As I realized there are many emergency apps on the market, some are disaster preparedness, disaster relief and many at emergency care and first aid. My project is more emphasized on how to deal with the car accidents, as well as to assist an emergency situation within the best time. I will combine the functions such as capture the image of accident scene and a panic button call “One Tap Button”, yet most of the existing system only consists one of the functions. The idea of combining the One Tap button with one touch or longer touch to send the emergency message to the selected contact or share it via social apps can create greater benefits to the users.

Other than that, the third objective is to let users to understand the type of emergencies and actions that should be taken to prevent tragedy scene happen. There is a welcome screen introduce to the first time user about the general details of the app. Besides, the app will recommend the first time user to read through the tutorial before start using the app. Hence, user can obtain some knowledge on how to run the app more fluency. This paper intents to build a literature by considering how respondents perceive the potential of personal safety apps through a survey. It investigates their willingness to purchase such a personal safety app and their perspectives towards personal safety app against other technologies which used to improve user's safety. Finally, I would like to know their first impression on the features of the app that might include a function such as showing their current location. In fact, it can alert the users about the importance of personal safety by developing such a personal safety apps.

The last objective is to reduce the steps for documentation and time of reporting when there is an emergency happen. It is found that the verification process of an accident that reported by mobile caused a delay in resolving the accidents (Nagappan 2016). The reason is the cellular calls are routed through tower making it hard to detect the smartphone's location (Nagappan 2016). When a reporter make an emergency call to the hospital, it may cause a misunderstanding between two parties, and it is time consuming as the hospital need to follow the procedure to ask for further information. This method is inconvenience and it always cause a delay problem when using mobile. In fact, it is suggested to use a mobile apps to solve the delay problem in reporting an accident as the mobile apps is able to send the victims' personal information and current location to the hospital which could reduce the asking process. Hospitals will collect the data from the users without taking their personal information as it is generated from the app, thus the hospital can assist immediately and save time. The hospital may need to filter out the duplicate reports made by different users and it is important to identify the truth of an accident. Moreover, the users can search nearby hospitals by clicking a button that provided in the app in order to reach the selected hospital in a more effective way. They can know the location of hospital, therefore it can reduce the time for them to search the location of nearby hospitals.

## 1.4 IMPACT, SIGNIFICANCE AND CONTRIBUTION

The project is called “One Tap” emergency personal safety app which will benefit the public as the mobile app market continues to grow at a huge rate. This is considered as an android app which is free of charge and will mainly release in Google Play Store. For the users of Android-powered devices, they can download the app from Google Play Store which is a Google’s official store and portal for Android apps. Although the app might not be accessed daily, it will be useful to the users when there is an emergency happen. The following are the reasons why this project is worth and benefit to the users.

Let’s imagine if this project can reduce the risk of dying as the car accident happen frequently? Now, the victims can even rescue themselves by only pressing one tap in the application as it will send the distress signal to the the selected contacts. Apart from that, when the victims press the one tap button, it will also send their current location to the contact, hence when the responder send the details to hospital which can react faster without the process of asking the location and details through the phone calls. According to Pandiyan (2015), there was a research showed that Malaysia was included in the top 25 most dangerous countries for road users. At the same time, Malaysia’s roads were also ranked the 17<sup>th</sup> most dangerous for drivers in the world. The road infrastructure in Malaysia are in poor condition which has led to many accidents (Murad 2014). Besides, Malaysia drivers’ attitude were also bad as most of them who had witnessed a car accident choose to pass by without giving help to the victims. In this case, the introduction of the emergency personal safety app may change the driver’s attitude because they can simply press the “one tap” button to help the victims.

On the other hand, the users are able to know the location of the nearest hospital by only clicking on a button and the hospital logo will appear on the map. Then, it will show additional information of the hospital such as the hospital name and address to allow the users to approach the hospital easily. This function is effective to the users who are unfamiliar with the areas to quickly locate the nearest hospital. However, it will only show a marker on the map rather than show the routes on the direction to the destination. Nevertheless, users can link to the google map for the guidance of the routes because the navigation is not the primary part in this project. Moreover, eyewitnesses of the accident can capture the picture and share to the app. The other

users who received the notification will react to the accident and assist the victim if they are around the place. The nearby user are able to save a life in an emergency when the ambulance is delay or unable to reach on time. Additionally, the user may reach early before the arrival of ambulance, therefore they can perform any necessary action towards the victim. At the same time, this app can reduce the burden of the hospital as they can take less effort to deal with the accidents with the help of nearby users.

### **1.5 BACKGROUND INFORMATION**

According to Budi (2013), mobile applications are divided into three types which are native, web and hybrid apps. Native apps are developed for a single platform of operating system such as Android, iOS and Windows phone. In other words, a native app developed for android operating system will not work at iOS and conversely. The programming language used to build for android applications are normally Java and XML. Native apps can have a high performance and good user experience. Besides, web apps are software application that are similar to native apps but web apps are normally written in HTML5, CSS and JavaScript and it run on a browser. Hybrid apps are built using multi-platform web technologies and contained both native and web apps. Based on the various types of mobile application, the One Tap emergency personal safety app developed is a native app as it is developed on a specific operating system which is android OS, and it can access all the features in the app itself. Yet, as this project is based on android OS, the users can only download it from Google Play Store rather than other operating system and app store.

On the other hand, users need to agree to the terms and policies of One Tap emergency app before using the app because it requires and contains personal information. During the emergency, these information will send to other users such as the emergency contacts that are pre-set or pre-determined by the user. Besides, there will have a tutorial as a guidance for the first time users on how to use the app and introduce some useful features to them. After login to the app, users need to allow the app access to the devices' location in order to retrieve the devices' current location. When the app is successfully show the users' current location on the map, they can share their current location to other users when they encounter any emergency especially for car accident. Furthermore, users also need to allow the app access to the contacts and photo media

## CHAPTER 1 INTRODUCTION

as they need to send emergency message to the selected contact and share the photo in the app. The users need to ensure that their devices are always connected to the internet to allow the app to work properly as emergency may happen in anytime and anywhere. The users are strongly recommended to use cellular data than the WIFI because the coverage of cellular data is large and WIFI only works within the range of router.

There are six main categories of mobile apps such as lifestyle, social media, utility, games and entertainment, productivity and information based apps. Apart from that, there is an important app that should be concerned by the users is an emergency personal safety app. One Tap emergency app can provide a good user experience in interface design and features. The most important is it mainly focus on the user safety and users can request assistance immediately when they get involve in an accident. The idea of One Tap is come from how the user should react to an accident if they are busy with driving and panic. Therefore, I have design a One Tap button that will appear in the home screen of the app. When user press on the button, the app will send his or her current location to the selected contacts. When the victim is involved in an accident, they can press the button and it will send the current location and emergency message to the selected contacts. At the same time, users who witnessed the accident can make report to the hospital by sharing the current location if the victim is unable to control on his or her phone.

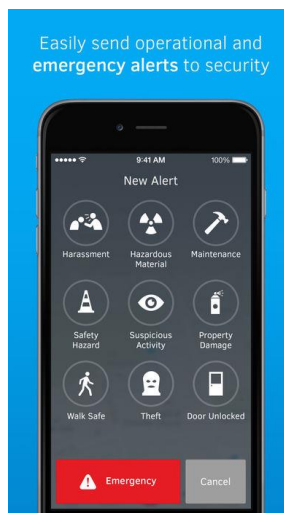
The widespread adoption of mobile apps are opening new and innovative ways to improve the personal safety. The evolution of technology has impacted the industries across the world from different fields. The mobile apps are actually developed by the mobile apps developers which come from the IT field and the interesting part is how the IT can work with the medical field in this project. The hospitals which come from medical field can give a huge impact on this emergency personal safety app by showing their proficiency in rescue the victims. Therefore, the technology used in personal safety can save countless lives to avoid any death.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 LITERATURE REVIEW

#### 2.1.1 Guardly Mobile

Guardly Mobile is a mobile app that can save life and more focus on workplace and organization. Throughout the app, enterprise employees, staffs, workers, guards and other users may able to take advantage of improve alerts and communications, security policies and safety. Besides, security can use this app to send the alert to the staff and employee in a crisis and this can connect to the security's operation instantly (Alba 2016). For example, if there are a shooter in a mall, a security operator can send an emergency alert to all staff so they can beware form it. Emergency alerts can also be used for fires, theft and even weather patterns. Moreover, users can simply press a button in the app and the response team will notice their situation. It can send the personal information and the current location to the rescue team by just pressing a single button and now it can add more specific info making the emergency call effective (Etherington 2013).



**Figure 2.1.1 Overview of Guardly's interface**

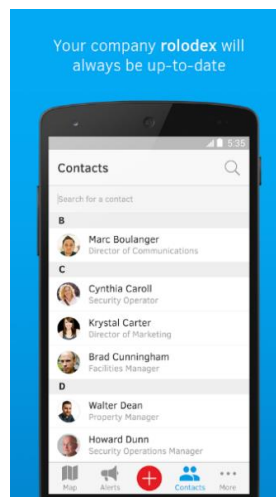
According to Figure 2.1.1, it shows the simple and user-friendly interface of Guardly Mobile. Users can understand easily what are the functions of every components with the support of icon and function name.



## CHAPTER 2 LITERATURE REVIEW

In the event of specific use cases or emergency situations, Guardly allows its users to contact a group of contact list. The group of contacts will receive a text message, phone call and email informing that the user is in emergency situation. They will also receive notification which may contain essential information and the real time location of the user. In addition, Guardly mobile applications are available on App Store and Play Store. However, users need to pay for the premium features that goes beyond notifications and instantly connects to their contacts through SMS, conference call, instant messaging and real time location tracking in the case of an incident. There are some extra built in features and functions such as capture photo and share it, as well as trigger a loud whistle to seek attention from the public. (Greenlee et al. 2011).

In term of privacy, it was really important to Guardly as tracking and sharing of real time location data will only be allowed in the case of emergency incident and when triggered specifically by a user. Users are able to decide the person to be alerted in case of emergency which mean only those contacts granted access will receive the personal information shared by the user. According to Figure 2.3.6, there are 86.7% of respondents concerned about their privacy when using the personal safety apps. However, Guardly will only provide their data and personal information during emergency situations.



**Figure 2.1.2 Up-to-date contact lists**

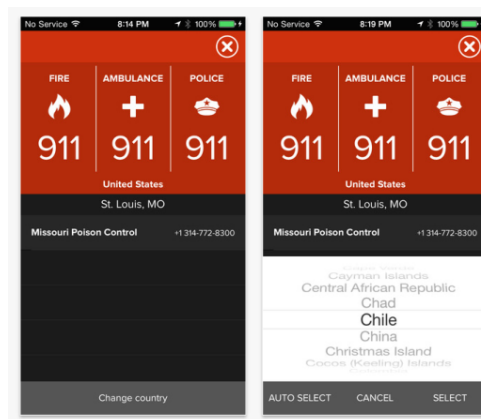
Based on Figure 2.1.2, Guardly provides up-to-date contact lists for users which enable them to contact their friends in emergency time.

### 2.1.2 SirenGPS



SirenGPS is a GPS-based app that can provide SOS service with a single button click. It allows the users to communicate effectively and efficiently. During the emergency situation, it connects everyone in a community to share information among each other in a single platform. Users can always keep the app open, and they can press one of the three emergency buttons which are Fire, Ambulance and Police if they are run into trouble. The rescue team will receive help request and location from the users by creating a profile with their personal information. SirenGPS also integrates mass notification, enhanced emergency management solutions for public safety, healthcare, education and business.

According to Brouhard (2011), the National Emergency Number Association (NENA) reports that in 2011, there were 146 million and 70% of all 911 calls from mobile phones. It is inconvenient to call 911 using cell phone as the owner need to provide their information step by step through cell phone and it takes time. The emergency responders can only track the victim location to the nearest cell phone tower, if the victims are using cell phone to make 911 calls. SirenGPS is the first mobile application that identifies user's location to first responders in real time. Users can share their information to the first responders such as emergency contact, medical history, allergies and current medications that can save the precious time during emergency. According to appendix 3, SirenGPS has a good review from the users saying that this is an amazing and great app which can provide for their children to use in case of emergency. But, another user complaint that it need to create a username and password.



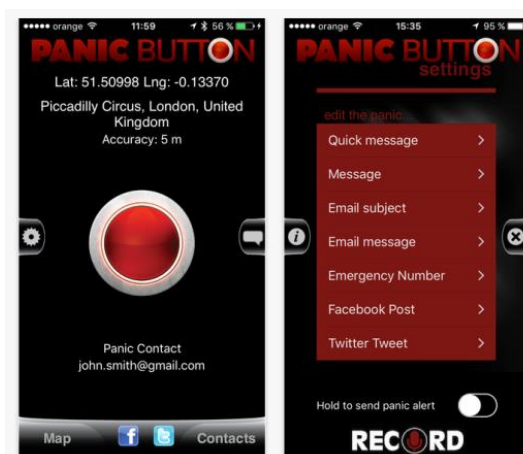
**Figure 2.1.3 SirenGPS interface that includes three button**



### 2.1.3 Red Panic Button

Red Panic Button is an emergency app that can send out emergency message to the list of people by pressing the button to any email or number instead of calling each family members and friends individually. Users can reset the emergency message and contact frequently based on their requirement. Besides, if users press the button, the app will send to first responder an alert with current location. It is a GPS-based app and it will send the GPS coordinator and a link to Google Maps through SMS or email to the selected contacts. Based on Figure 2.3.5, the survey result that was collected from the respondents showing that there are 76.7% of them never download or purchase a personal safety app. This result shows that people are not beware from the existence of personal safety app which could help them to prevent tragedy incidents happen.

If the users are unable to speak, the app allow the users to snap a photo or video that send together with a message. If users are unable to reach on the phone, the app also allow them to trigger the emergency functions on the smartwatch. We cannot prevent the tragedies, violent attacks or car accidents from happening, but at least we have a tool such as Red Panic Button to alert your loves one or authorities to get you help faster (Matthews 2014). User can send the message to the entire emergency contact lists which can ensure the user is going to receive an assistance even if the message is not read by everyone because there are someone is going to see the message and get to the victims right away. Besides, users can have another option such as sending the panic tweet to your followers or writing a message on the Facebook wall.



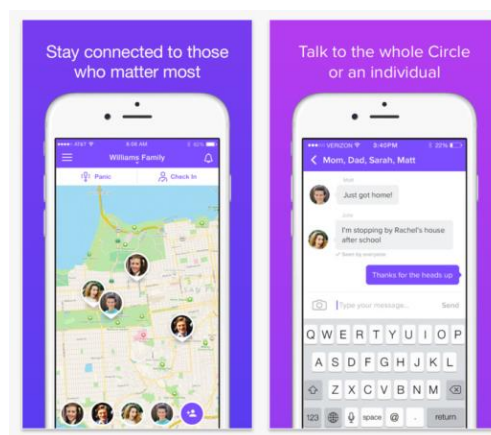
**Figure 2.1.4 Red Panic Button interface**

### 2.1.4 Family Locator



Family Locator is a tracking app that especially keep in touch with friends and family members. This app allows a family to set up private network so they can let each other know where they are and their safety with a click of button. There are records of location of friends and family in this location-sharing app which shows their profile icon on the map to enable every users know where their family and friends are. However, users can choose to turn off their location-sharing within a certain area. Family members can send automatic alerts to their Circle when they arrive to their destination. This app can let someone know when the user has arrive or leave a predefined location such as home or school.

According to Zahra (2018), although the crime and violence are declining but it is still unpredictable and the technology has given the advantage to ensure the safety of family members. As a simplification, Family Locator allows users to create a group whoever matters most, check on a private family map to know the real-time location and alerts when family members arrive or leave the destination. This app also can track the stolen phone or lost phone. It can find out the location of registered phone via the app's website 24hours a day and 7 days a week. Besides, this app has also included a full location history which can have an overview of recent activities. This app has also a simple and nice interface which is user friendly. Although Family locator provides a lot of functions but it still need fee to purchase it. Maybe this app can offer users more discount to satisfied their needs and wants.



**Figure 2.1.5 Real time GPS location of members and the chat room**

## 2.2 CRITICAL REMARKS OF PREVIOUS WORKS

<b>System name</b> <b>Criteria</b>	<b>My system (OneTap)</b>	<b>Guardly Mobile</b>	<b>SirenGPS</b>	<b>Red Panic Button</b>	<b>Family Locator</b>
<b>Send alerts</b>	✓	✓	✓	✓	✓
<b>Contact list</b>	✓	✓	✗	✓	✓
<b>Real time GPS location sharing</b>	✓	✓	✓	✗	✓
<b>Chat room</b>	✓	✓	✗	✗	✓
<b>Notification</b>	✓	✓	✓	✗	✓
<b>Panic button</b>	✓	✗	✓	✓	✗
<b>Live camera / photo</b>	✓	✗	✗	✗	✗
<b>Nearby first-aider &amp; hospital</b>	✓	✗	✗	✗	✗
<b>Premium features need to pay</b>	✗	✓	✗	✓	✓

Table 2.2.1 Comparison of systems

## CHAPTER 2 LITERATURE REVIEW

Based on Table 2.1.1, Guardly Mobile provides a lot of benefits such as access latest organizational contacts lists, get time-sensitive alerts about threats nearby, quickly reach security in the case of emergency and floor location accuracy indoors. It will determine the location using GPS to ensure first responders that may need to assist as soon as possible. However, this app requires the activation of location detect function, transferring real-time GPS location and indoor positioning within the buildings, while providing two-way communication with private security, 911 authorities and safety groups. Connection to a cellular network and a data connection through WIFI or mobile networks are required on some features of Guardly Mobile. In the case of an emergency situation, continuous using of GPS running in background can reduce the battery life. According to appendix 1, Guardly has a positive review from the user and it tends to have a future growth and demand on personal safety apps.

SirenGPS has a panic button on the phone and when touch it will connect immediately to 911. SirenGPS is also a first mobile application that identify the user location in real time. User can also send a predefined list of contact to share with the information such as medical history, allergies and current medications to save the precious time during emergency. However, if the community does not subscribe to Siren 911 or Siren Alert first responders will not receive the location or profile but panic button still works. Using the GPS in background can decrease the battery life as well. According to appendix 3, SirenGPS has a good review from the users saying that this is an amazing and great app which can provide for their children to use in case of emergency. But, another user complaint that it need to create a username and password.

Red Panic Button is compatible with TalkBack accessibility service, it able to send automatic panic emails and dynamic contrast. Besides, there are some free features provided in this app which are send panic SMS or email, one touch panic via widgets, share panic to twitter and support for Pebble smartwatch. However, there are some features that need to pay such as remote access to phone location, emergency call, photo / audio /video panic email and so on. This paid features may make the users burden for those with low financial ability. According to appendix 2, Red Panic Button has a bad review claiming that the app does not work at all. One of the user complaint that it need an emergency calling instead of panic SMS. So, I am going to fix this problem using emergency call that can direct contact to the response team.

## CHAPTER 2 LITERATURE REVIEW

Last but not least, Family Locator simplifies the life in digital world as it is easier to connect to the family members. Basically, user can create their own group, view the real time location, receive the real time alerts, track stolen phone and locate both Android phones and iPhone. Although this app contained a lot of advantages but it still need fee to purchase some features. According to appendix 4, Family locator has both good and bad review. The good was saying that this app is totally work that put all the people in the circle. However, the bad was saying that the app need large battery consumption and someone commented that the GPS location sometime is not working for no reason. So, it is essential to implement the GPS service in my project to provide real time location sharing.

### **2.3 FACT FINDING**

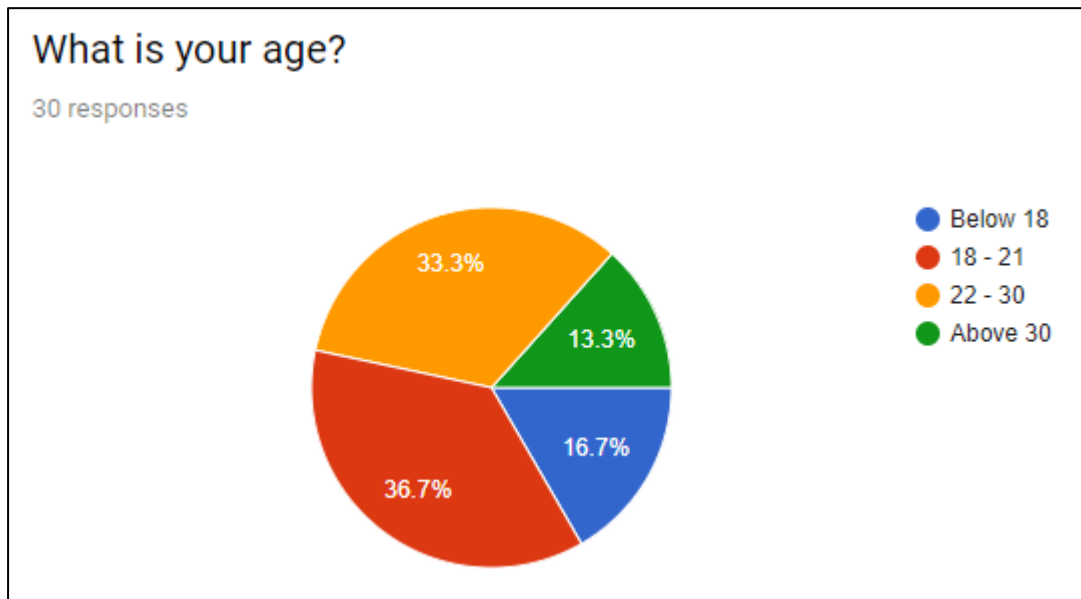
As a developer for One Tap Emergency personal safety app, it is important for me to determine the actual requirement for this app. But, sometimes we will make mistake on finding out the requirements and trying to analyse a problem. As a result, fact finding is important to assist me in gathering useful information for the app development.

Fact finding is the process of collection data based on the techniques such as questionnaires, observation and interviews. I choose questionnaires as the fact finding technique to assist in developing the app because it is easy to collect the data from large number of users. I use Google Forms in designing the questions and distribute to the users through online as it can reach the target users effectively and efficiency. I have set several questions regarding the opinion of the users in emergency personal safety app and they are required to answer all the questions. The reason why I choose questionnaire in fact finding is because it can save time without interview each of the users. It is an inexpensive technique unlike interviewing is time consuming and costly mechanism in fact finding techniques. Besides, the response can be calculated quickly and it can generate the results to the graph so that it can be analysed and reviewed.

I choose the close-ended format question to get the expected answer from users among the selected answer. The question format such as multiple choice question and checkboxes that allow users to choose more than 1 answer. In order to collect a more accurate data from the users, this survey is only target the users who have the mobile smartphone and the survey is distributed to the private or public area where I get the email of the user and send the survey through online. This questionnaire survey can be divided into two section. The first section is the demographic characteristics of the users such as age, income and gender. The second section is more concern about the feedback of the emergency personal safety app based on user opinion and experience. The overall questions are whether the user downloaded a personal safety app before, privacy concern issue, whether they have encounter an accident before which make them helpless and the expected functions of the app. Hence, the app can be developed based on the user requirement and the survey result analysis.

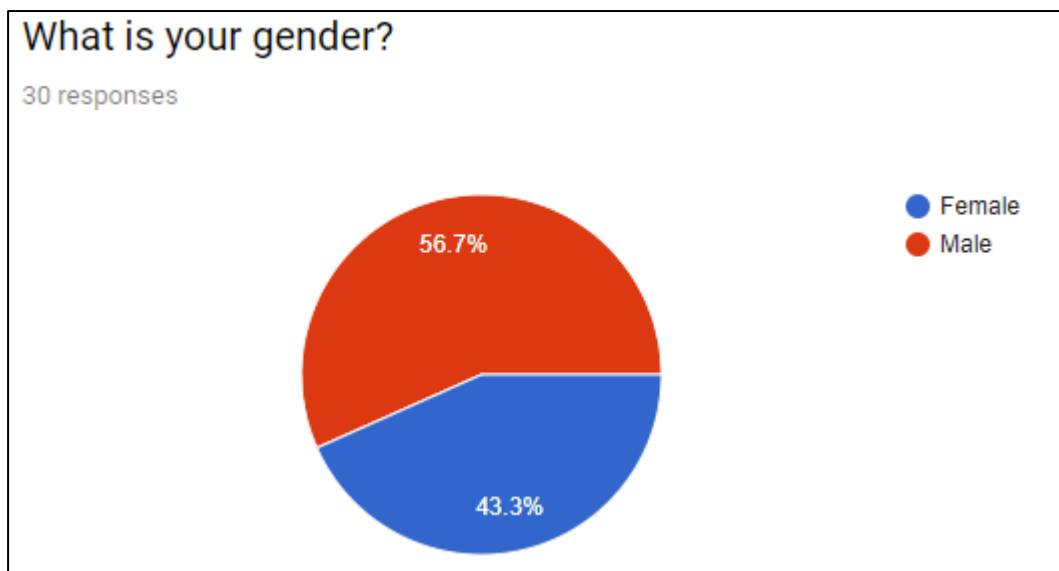


## 2.4 DATA COLLECTION



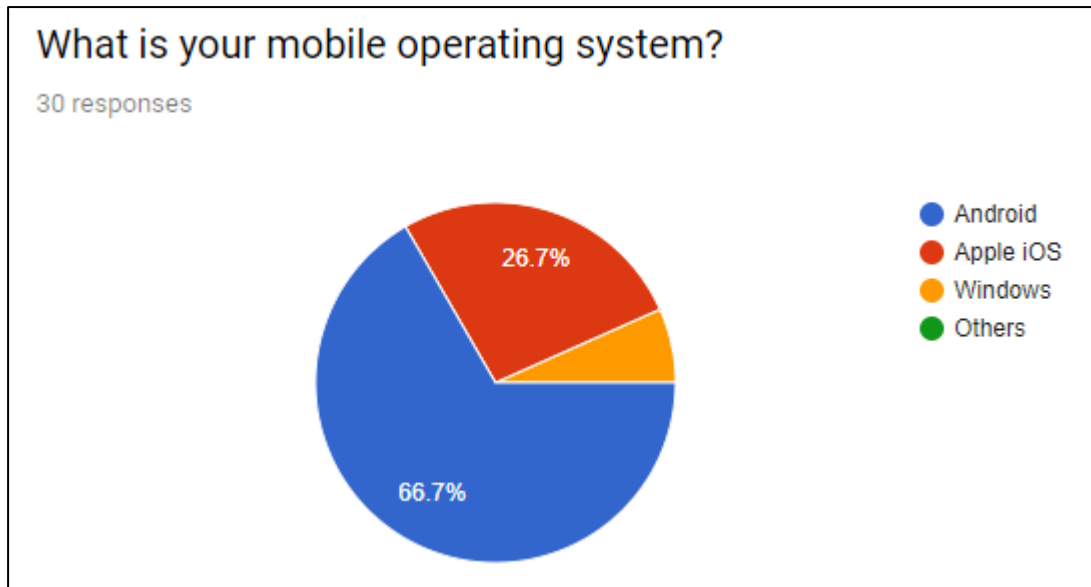
**Figure 2.4.1 Percentage of age**

According to Figure 2.4.1, there are 36.7% of target users who aged from 18 to 21, 33.3% of them aged from 22 to 30, 16.7% of them aged below 18 and 13.3% of them aged above 30. I distributed the survey around the private and public area such as university and a restaurant. My targeted respondents are those people who have a mobile phone as the remaining questions are more related to mobile apps.



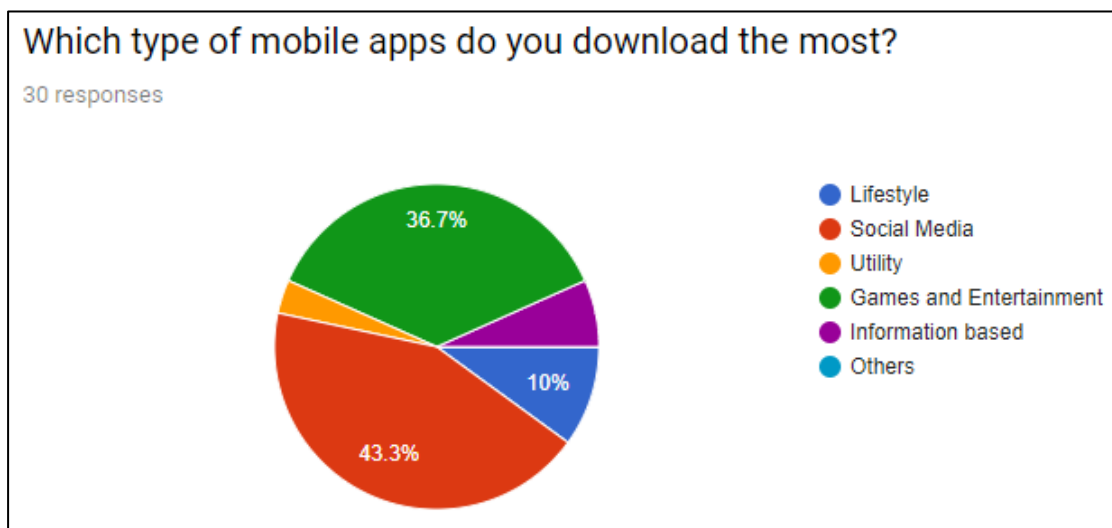
**Figure 2.4.2 Percentage of gender**

According to Figure 2.4.2, there are 56.7% of target users who are male and the remaining 43.4% are female.



**Figure 2.4.3 Percentage of mobile OS**

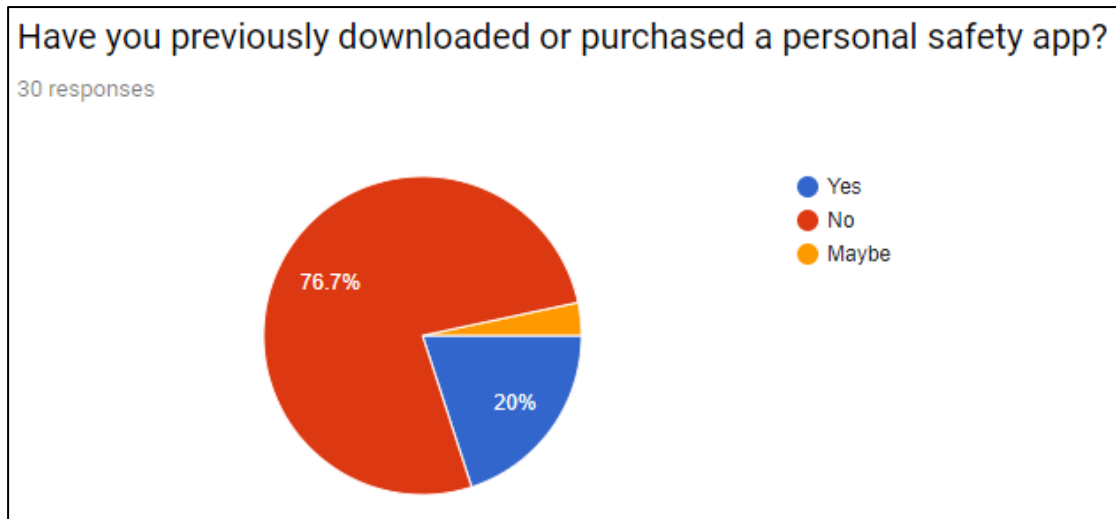
According to Figure 2.4.3, there are 66.7% of users who were using the Android OS, 26.7% of them who were using Apple iOS and the remaining 6.6% were using Windows OS. As a result, most of the users are using Android OS as this is free and open platform and most of the phones are android based. Therefore, I have decided to develop the emergency personal safety app based on Android OS.



**Figure 2.4.4 Percentage of mobile apps download**

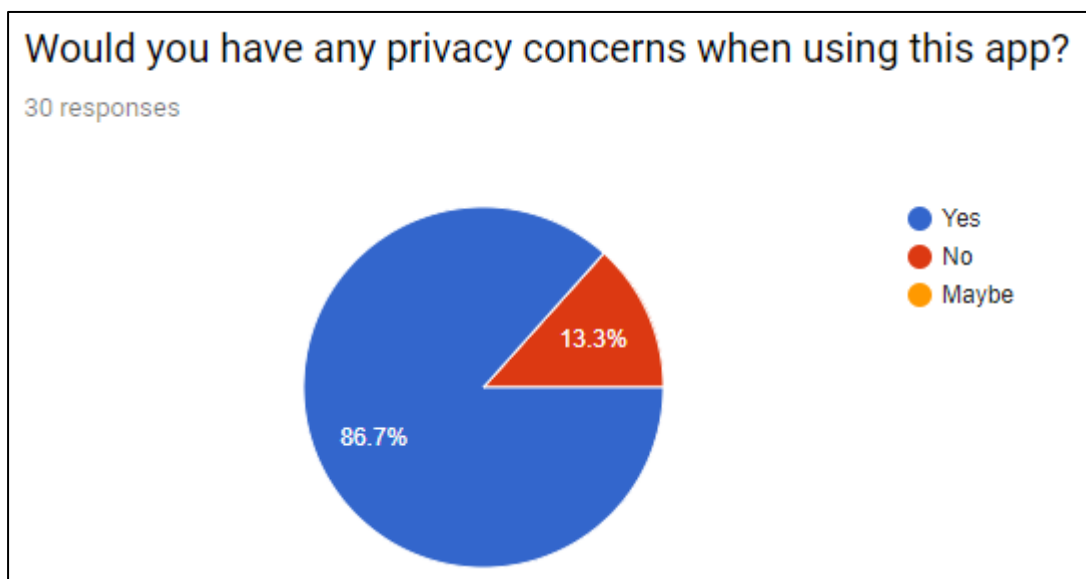
Based on Figure 2.4.4, social media contributes the most as 43.3% which is a type of mobile app that people downloaded. This is following by games and entertainment for 36.7%, lifestyle for 10% and utility and information based contribute the less. As a result, people are lack of awareness on the existence of emergency personal safety app.

Hence, this app is needed and essential as it could assist in emergency situation.



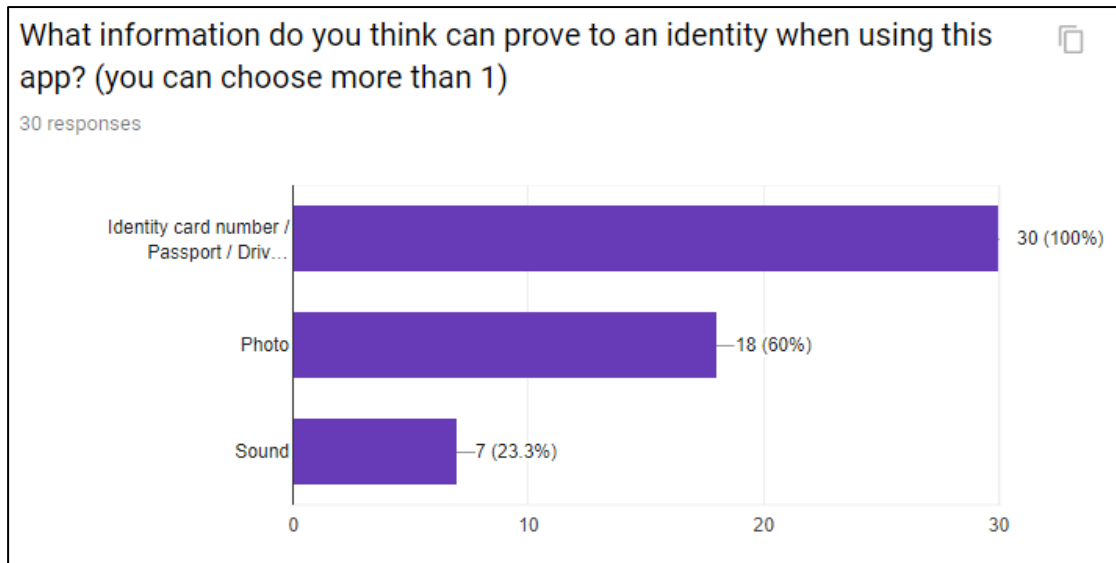
**Figure 2.4.5 Percentage of previously downloaded app**

There are 76.7% of users did not downloaded or purchased a personal safety app previously, while 20% of them have downloaded before and the remaining is not sure whether they have downloaded it before or not as stated in Figure 2.4.5. Hence, it is important to promote the app to the public in order to raise their awareness on the personal safety issues.



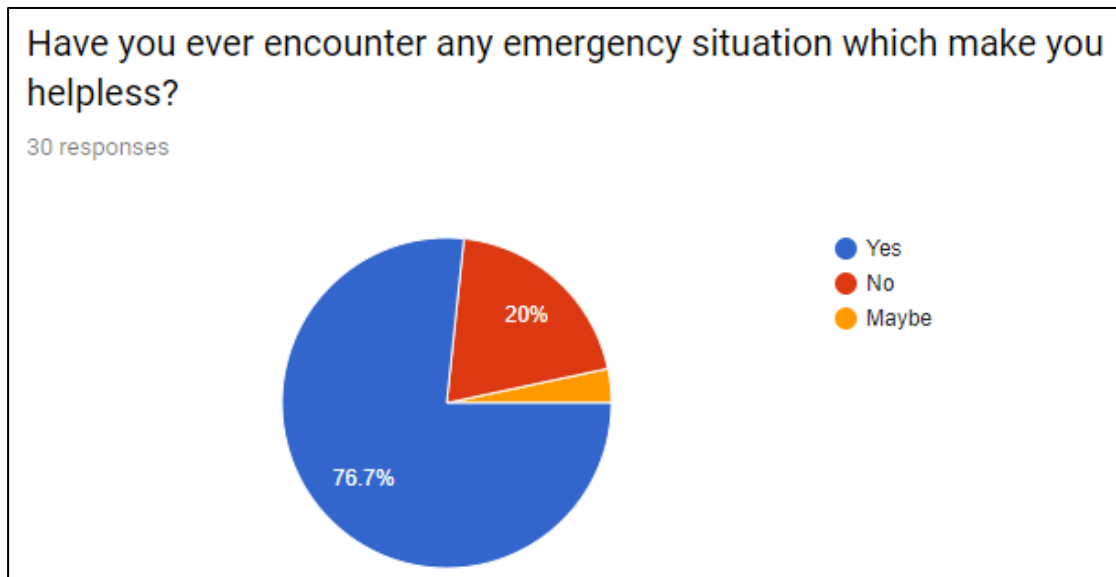
**Figure 2.4.6 Percentage of privacy concerns**

According to Figure 2.4.6, there are 86.7% of respondents have the privacy concerns while 13.3% of them did not have privacy concerns when using the app. The privacy such as personal information to be shared with other when facing an emergency. In order to use the functions of the app, user must first agree to the terms and policies of the app.



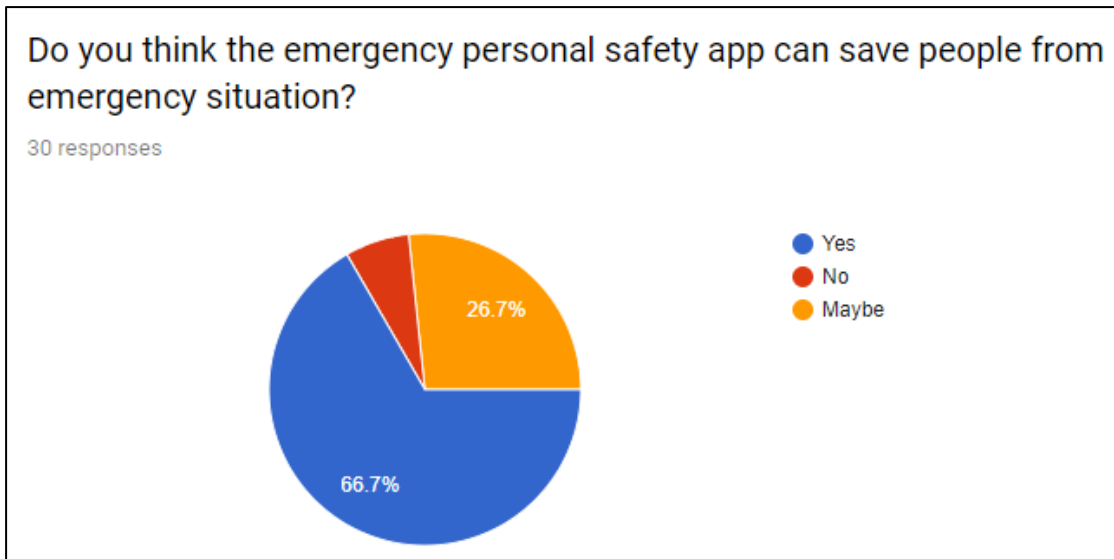
**Figure 2.4.7 Percentage of information to prove identity**

There is an issue when the user send the request to the hospital or their relatives, how can they prove the person identity is true? According to Figure 2.4.7, all of the respondents think that identity card, passport or driver’s license is a persuasive information to prove the person identity. This is following by photo (18 respondents) and sound (7 respondents) respectively.



**Figure 2.4.8 Percentage of emergency situation encountered**

Based on Figure 2.4.8, there are 76.7% of the respondents have encountered an emergency situation before which make them helpless. Fortunately, 20% of them never encountered any emergency situation. Each of us could not expect when the emergency will happen, but we can have a better way to deal with it by using emergency app.



**Figure 2.4.9 Percentage of app that can save people**

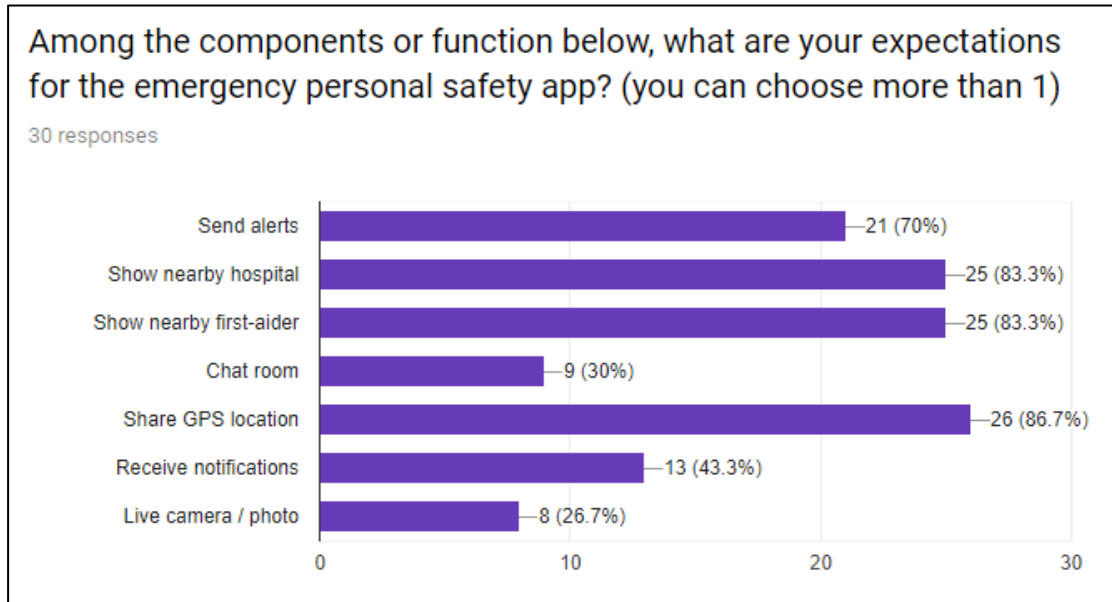
According to Figure 2.4.9, there are 66.7% of respondents think that the emergency personal safety app can save people from emergency situation while 26.7% of them did not think so and the remaining of the respondents are not sure about it. Normally, people will use phone call to seek help from hospitals but it is time consuming. It is better to use a convenience app which able to send the personal details and the current location immediately to hospital, thus the ambulance will able to reach on time.



**Figure 2.4.10 Percentage of first person called**

Based on Figure 2.4.10, 50% of the respondents will contact the hospital first if they involved in an emergency. It is following by family (26.7%), first-aider (16.7%), and the friends and lover have an equal percentage which contribute the less. It is clear that

hospitals play an important role in rescuing the victims because they have sufficient knowledge and equipment in performing the rescue. In this case, the app has included some features called nearby hospital and nearby first-aider. These two features indicates that the first-aider can assist the victim before the arrival of ambulance while the pass-by drivers can bring the victims to the nearest hospital.



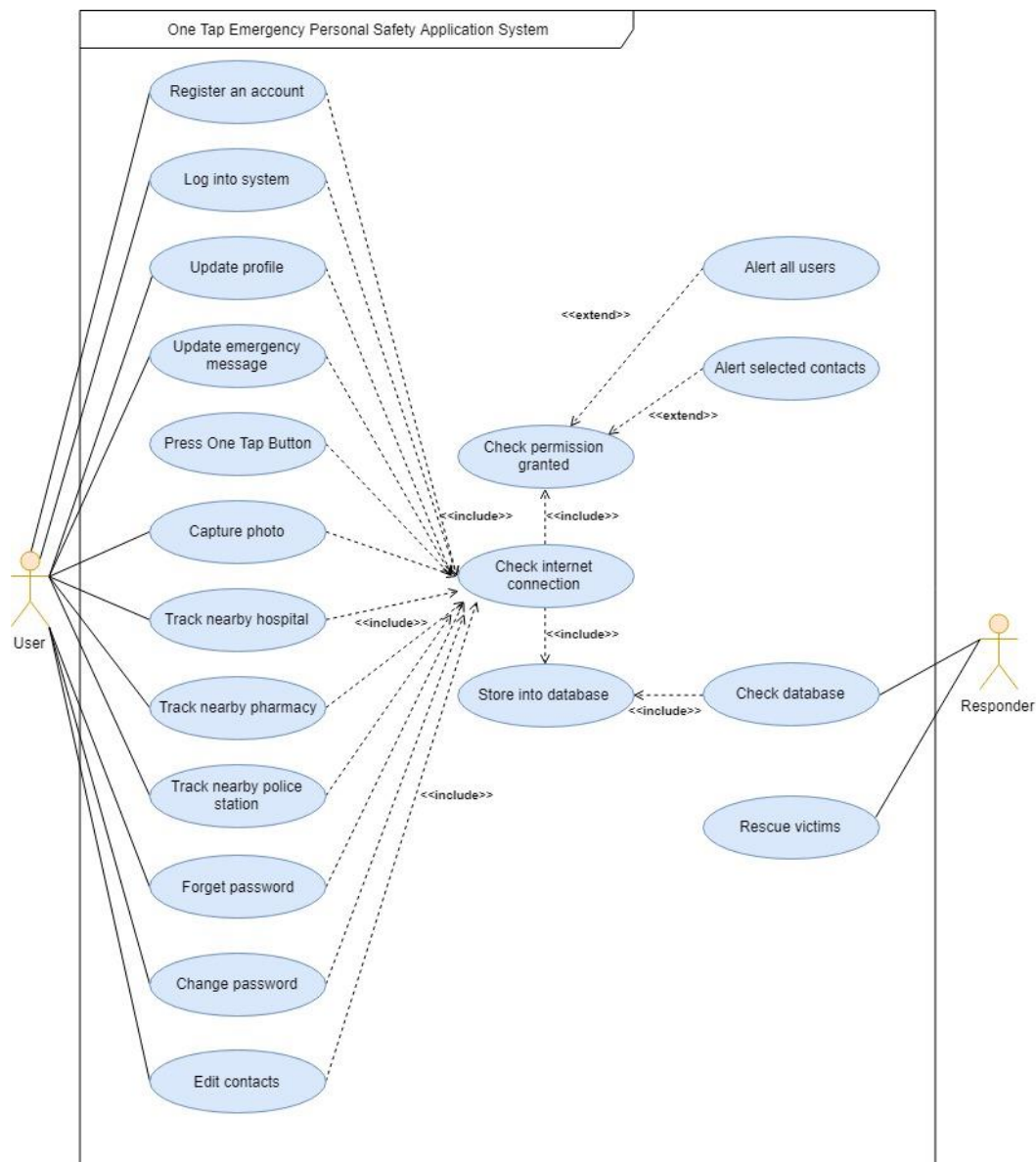
**Figure 2.4.11 Percentage of expectation functions**

According to Figure 2.4.11, the share GPS location function contribute the most respondents which is 26 respondents. The show nearby hospital and show nearby first-aider have an equal rate which are 25 respondents. This is follow by send alerts function (21 respondents), receive notifications function (13 respondents), chat-room function (9 respondents) and live camera/photo function (8 respondents). The sharing of GPS location between the users is very useful for other parties to detect their current location. Besides, I will try to implement all the functions as stated in the Figure 2.4.11. `

## CHAPTER 3 SYSTEM DESIGN

### 3.1 SYSTEM DESIGN

#### 3.1.1 USE CASE DIAGRAM

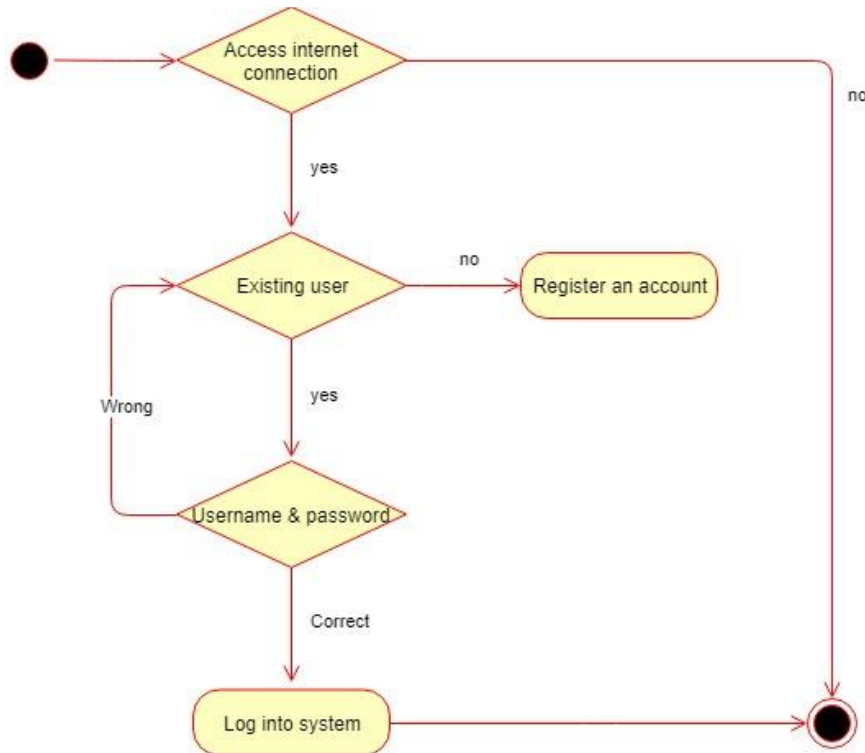


**Figure 3.1.1 Use case diagram**

Use case diagram above is referred as a behaviour diagram that used to describe a group of actions done by the user and responder. User can perform the actions such as register for an account, log into system, update profile, update emergency message, press one tap button, capture photo, forget or change password, edit contacts and track nearby hospital, pharmacy and police station. User must ensure to have an internet connection in order to access to the application. Besides, user must allow the permission request such as access the camera, SMS, read contact, location and write storage permission in order to use the app. User can press the

One Tap Button to decide whether to send the emergency message to the selected contact or share the message to the social apps. Last but not least, the responder can rescue the victims and also check for system database to retrieve the data from user such as their name, address and current location.

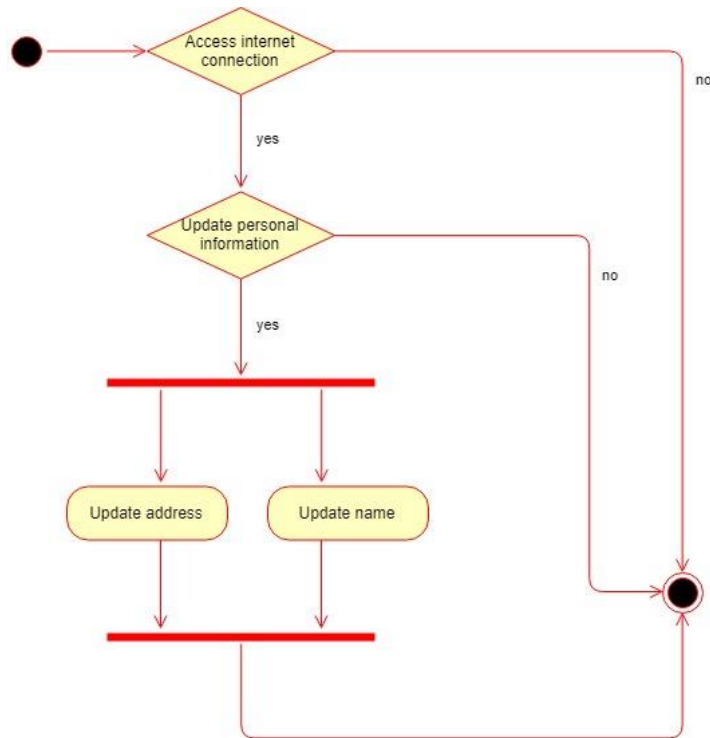
### 3.1.2 ACTIVITY DIAGRAM



**Figure 3.1.2 Activity diagram of login and register**

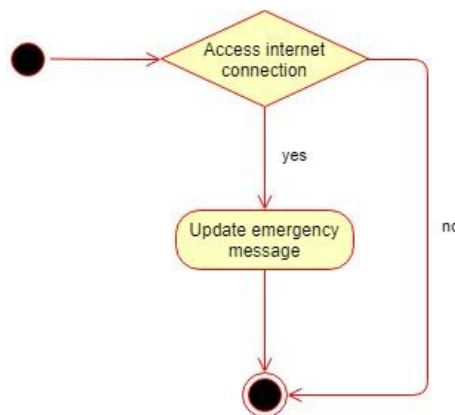
The login and register activity start by identifying the access to an internet connection. User need to register an account if he or she is not an existing user and the user can log into the system if they enter a correct username and password that have been registered.





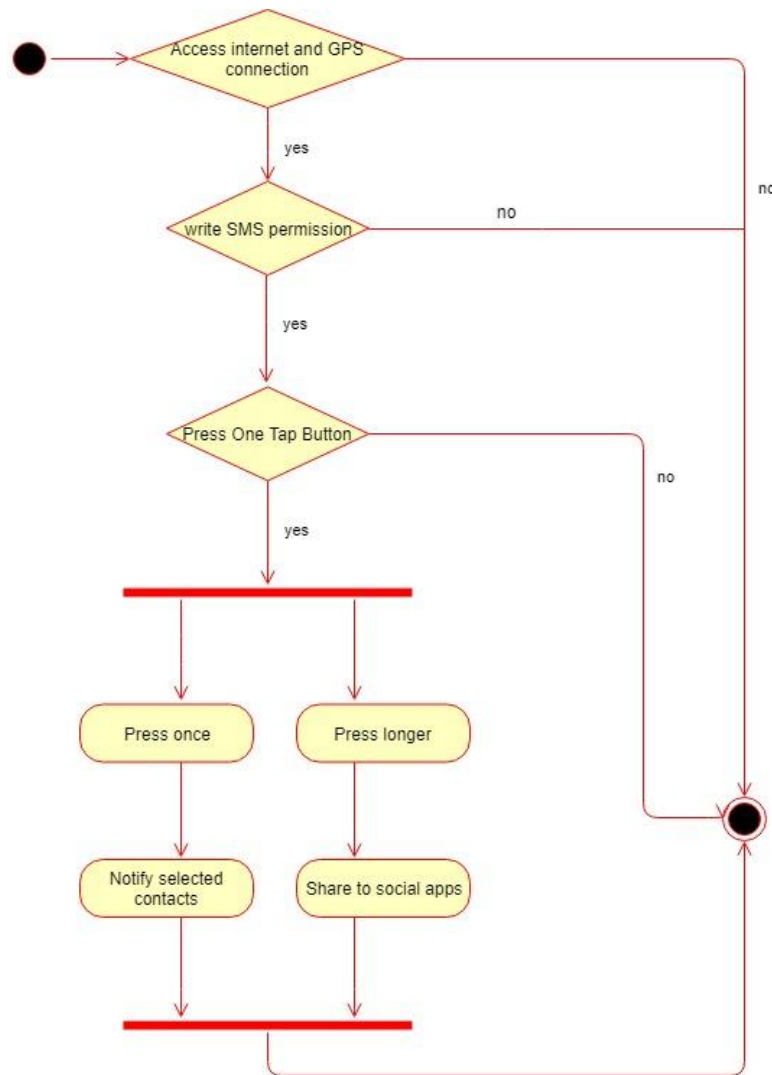
**Figure 3.1.3 Activity diagram of update personal information**

The update personal information activity start by identifying the access to an internet connection. User has to insert their name and address for first time login. However, they can update it in the profile setting. It will successfully updated if the user never left both the name and address empty.



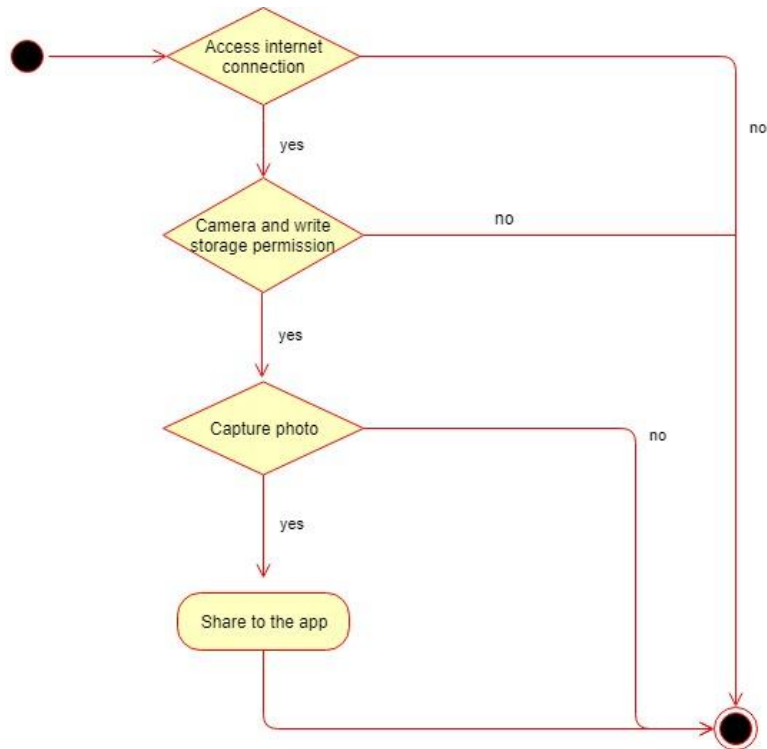
**Figure 3.1.4 Activity diagram of update emergency message**

User can update an emergency message to modify the pre-set content that send to the selected contacts if there is an internet connection. If the user left the message blank, it will send a default message “I’m in emergency, please come ASAP”



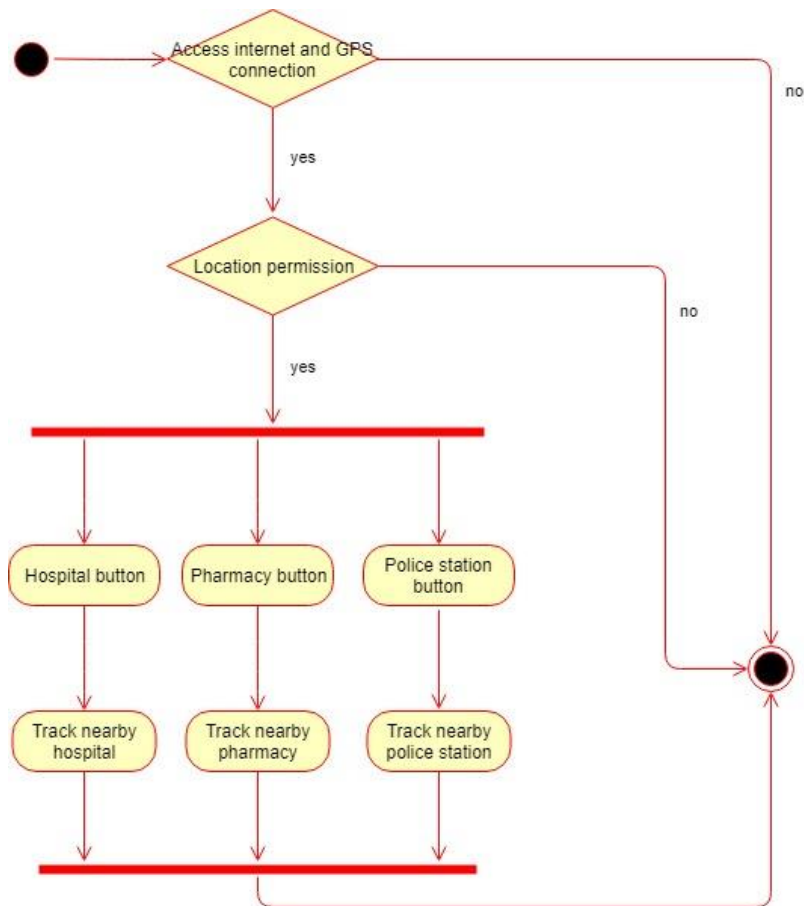
**Figure 3.1.5 Activity diagram of pressing One Tap button**

Pressing One Tap button activity start by identifying the access to an internet and GPS connection. User must allow the SMS permission in order to send the emergency message, else there is no response when pressing the One Tap button. Besides, user has two options to send the emergency message. One is through the SMS by pressing once and another one is through social apps by pressing the button longer. After pressing the button, the emergency message will send to the selected contact. The message included text entered from user, name, address and current location. The responders will perform the actions towards the victims based on their current location.



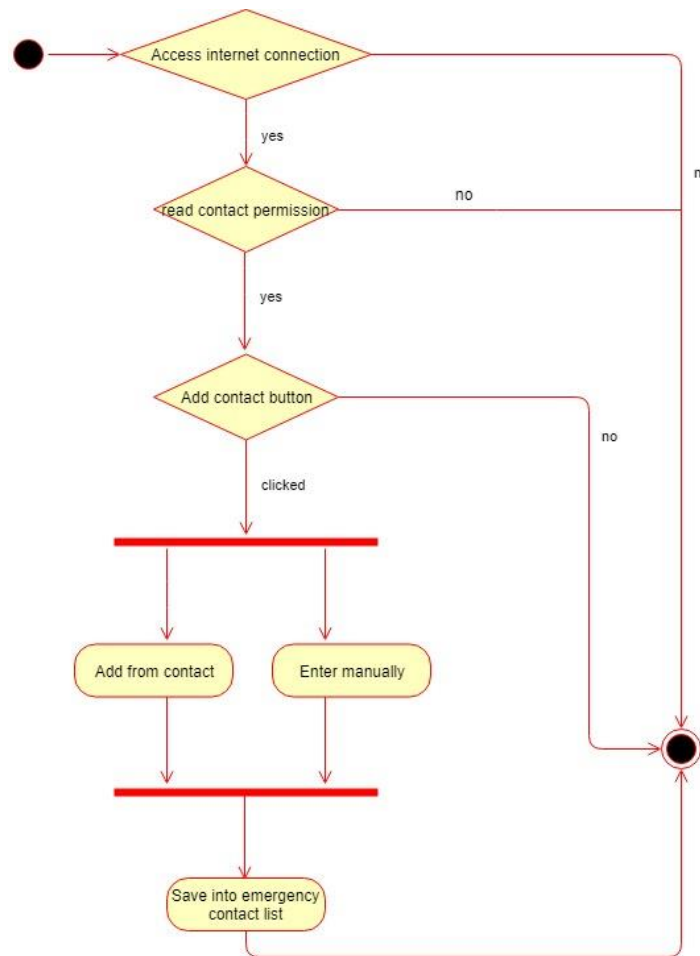
**Figure 3.1.6 Activity diagram of capture photo**

The capture photo activity starts by identifying the access to an internet connection. Then, the user must allow the access to the camera and write storage on the device. In this case, user can capture photo of the real accident scene and share it to the app.



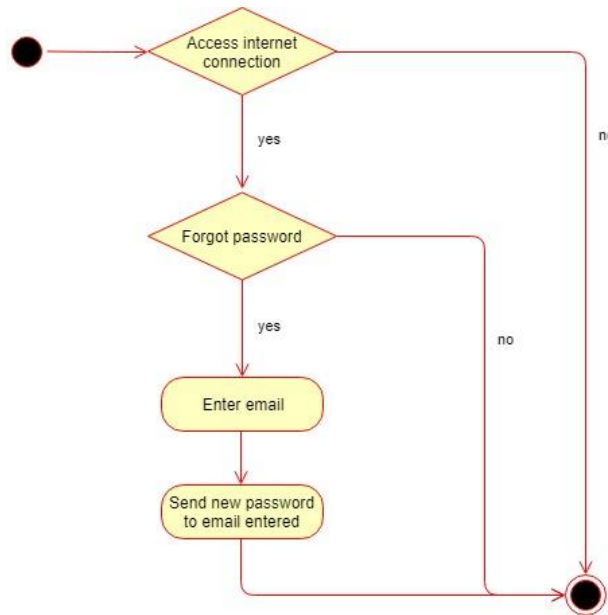
**Figure 3.1.7 Activity diagram of tracking nearby hospital, pharmacy and police station**

The user need to access to the internet and GPS connection in order to track nearby hospital, pharmacy and police station. Besides, user need to allow the access of device location to prevent the error of displaying current location. There are three options for the user to select such as hospital, pharmacy and police station button. If the user select the hospital button and it will show the nearby hospital on map. The result is same as the remaining pharmacy as well as police station button.



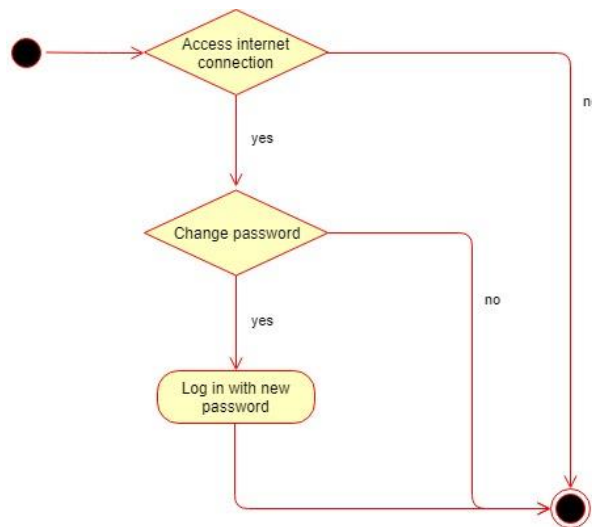
**Figure 3.1.8 Activity diagram of update contact list**

At the beginning, user must ensure that there is an internet connection and allow the access to the read contact permission. If user click on the add contact button, there is two options for the user to choose. The first is add the contact from the device’s contact list and another one is add the emergency contact manually. When the user did either one of the options, it can successfully save the person into the emergency contact list. In other words, once the user is pressing the One Tap Button, it will send an emergency message to the selected contact.



**Figure 3.1.9 Activity diagram of forgot password**

First, user must access to the internet connection. There is a probability that the user will forget about their password when they are trying to login. One Tap design forgot password link that allow user to enter their email and a verification email will send to the email entered. Hence, user can reset the new password in the link.



**Figure 3.1.10 Activity diagram of change password**

This is almost similar with the forgot password activity where the user must make an internet connection. Besides, user can change their password in the profile setting and they can try to login with new password.

3.1.3 SEQUENCE DIAGRAM

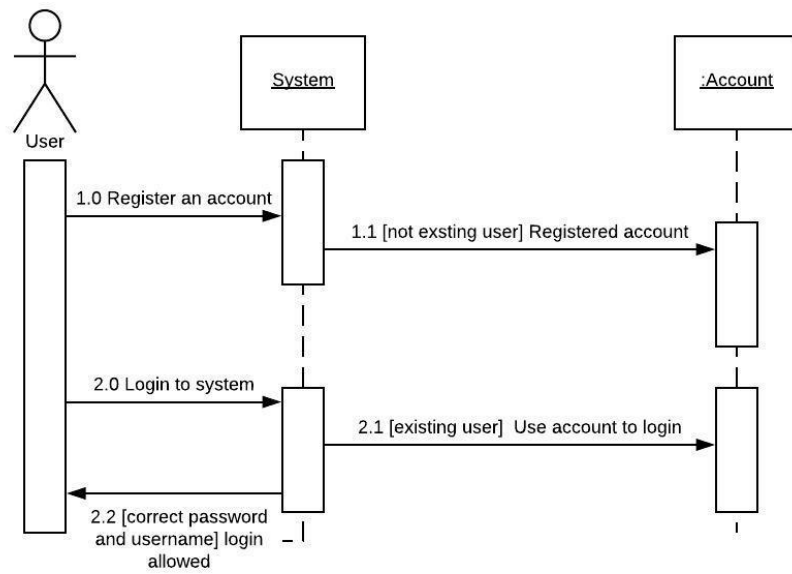


Figure 3.1.11 Sequence diagram of login and register

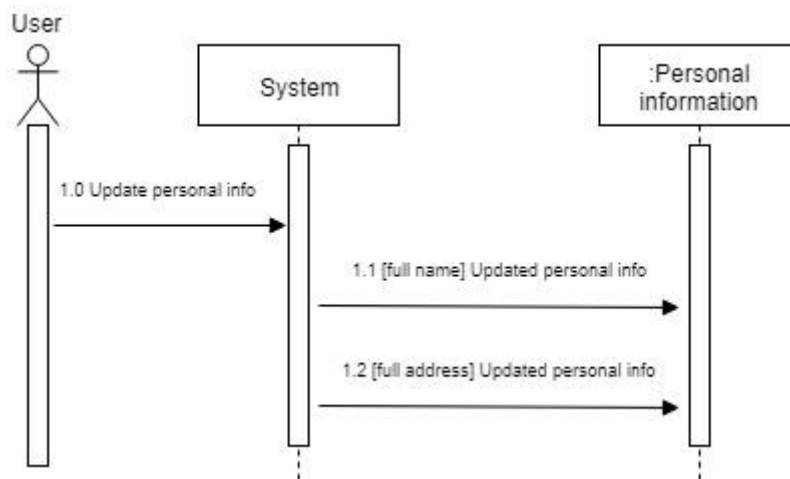
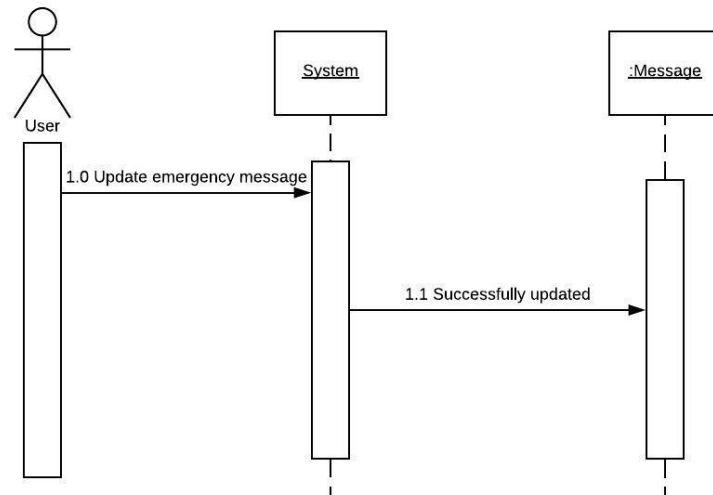
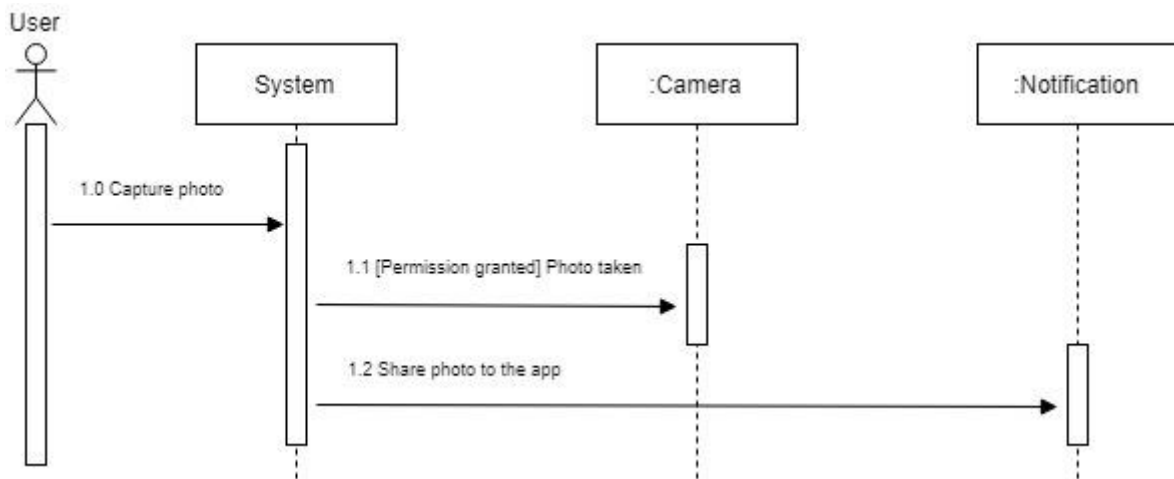


Figure 3.1.12 Sequence diagram of update personal information

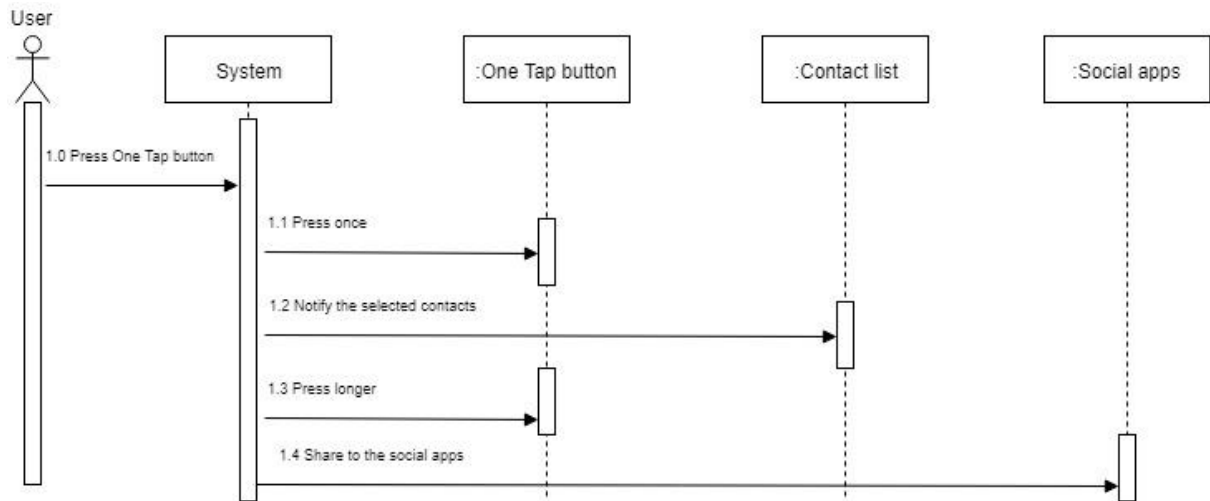


**Figure 3.1.13 Sequence diagram of update emergency message**

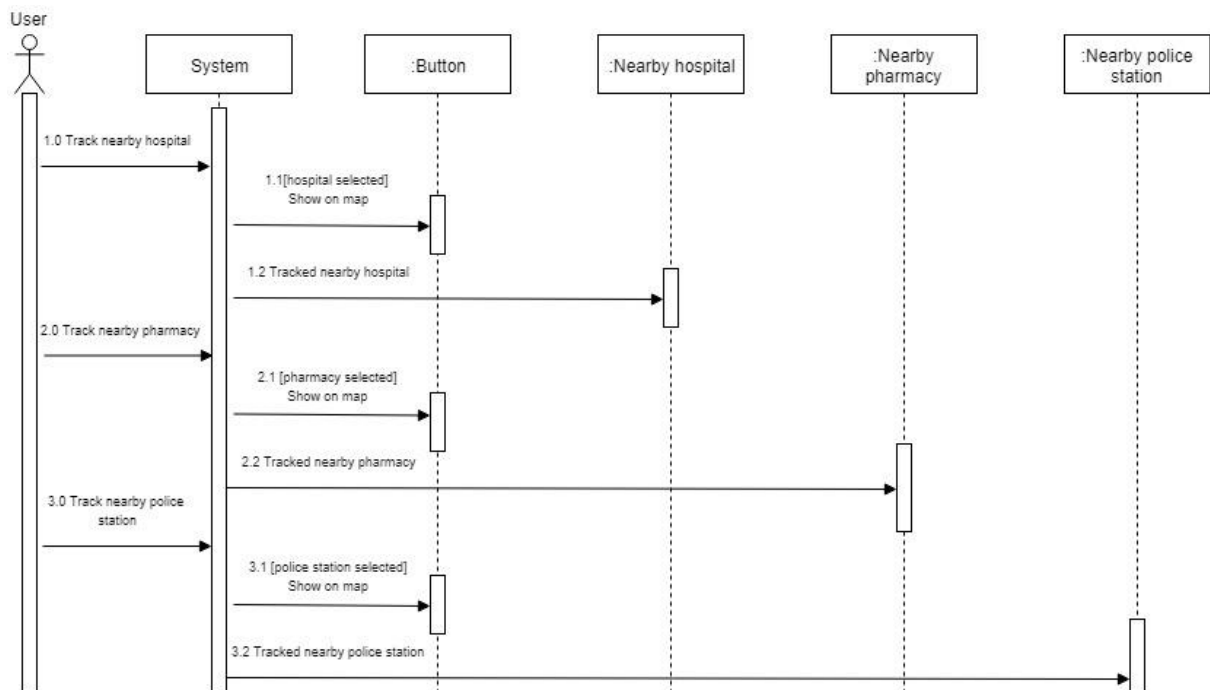


**Figure 3.1.14 Sequence diagram of capture photo**

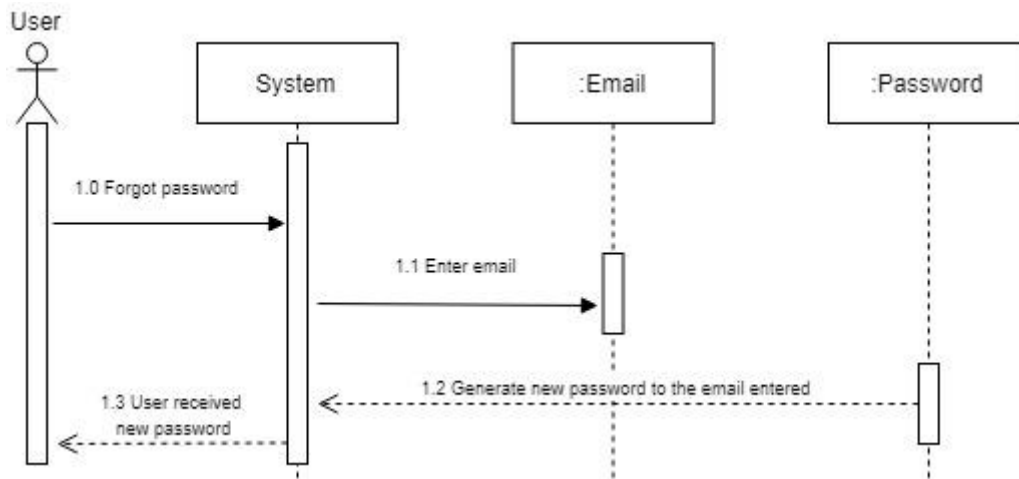




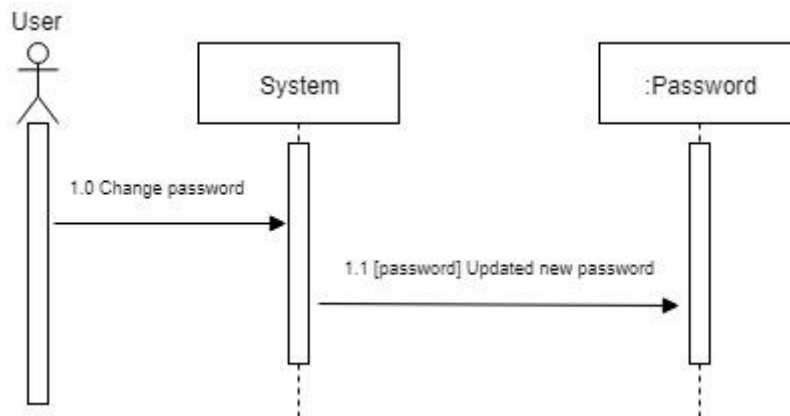
**Figure 3.1.15** Sequence diagram of pressing One Tap button



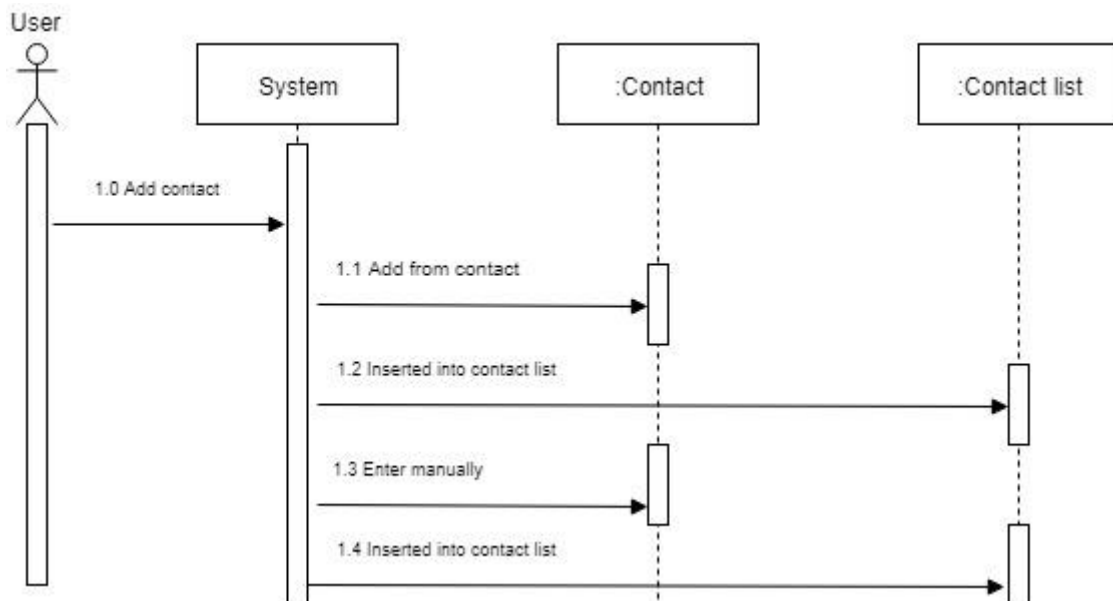
**Figure 3.1.16** Sequence diagram of tracking nearby hospital, pharmacy and police station



**Figure 3.1.17 Sequence diagram of forgot password**



**Figure 3.1.18 Sequence diagram of change password**



**Figure 3.1.19 Sequence diagram of update contact list**

3.1.4 BLOCK DIAGRAM

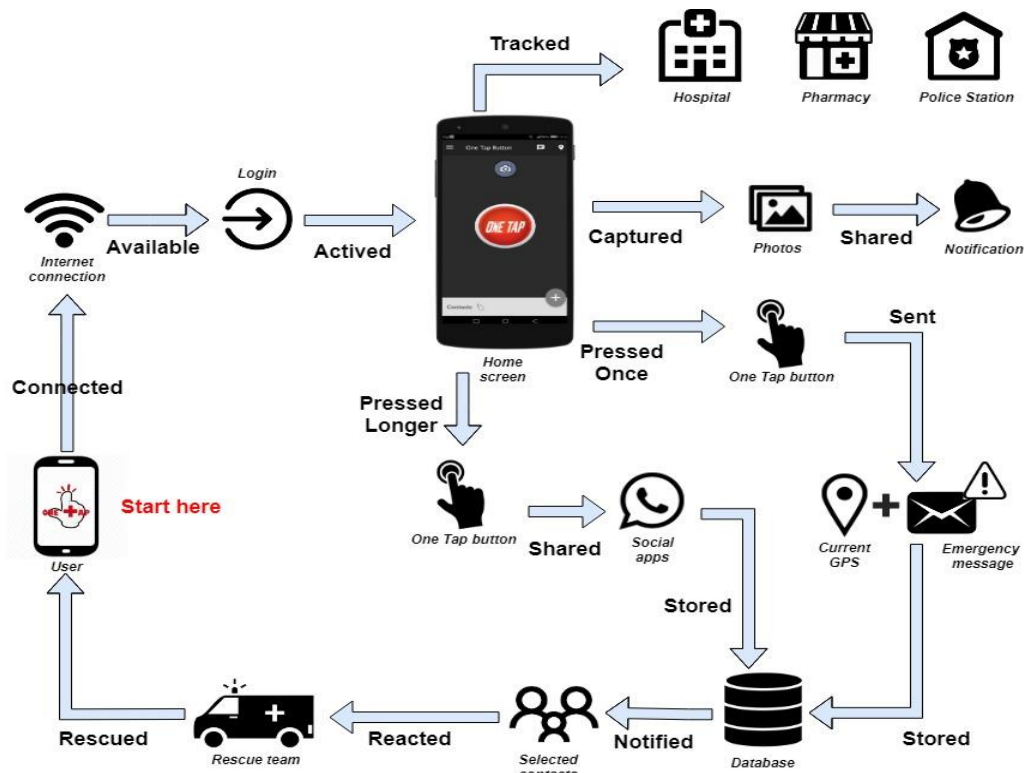
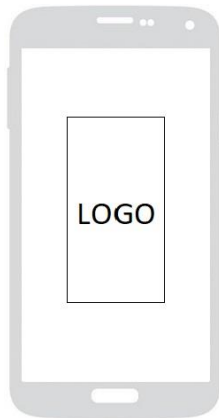


Figure 3.1.20 Block diagram of One Tap emergency personal safety app

Block diagram is a diagram presenting a system in which the principle parts of functions are represented by blocks that connecting by line to show the relationship between blocks. First of all, One Tap application users need to connect to an internet connection in order to run the app properly. They are available to login to the application with the username and password registered. Once they log in, a simple home screen will be appeared with One Tap button in the middle of screen. Besides, user can track the nearby hospital, pharmacy and police station on the map when the particular button is clicked. They are able to track the hospital name and address if the user is not familiar with the places. Moreover, user can capture an image on the real scene of accident happened to provide additional information and share it to the app. The most important feature is users are allow to press a One Tap button if they involved in an emergency. If the user press once on the button, it will send an emergency message to the selected contacts with the information such as emergency text, current GPS location, name and address. However, user can choose to long press the button to share it to the social apps. All of these data will store into database and retrieved by the targeted users. The rescue team will be notified by the parent and friends of victim and finally they can perform the actions to rescue the victims.

### 3.1.5 STORYBOARD

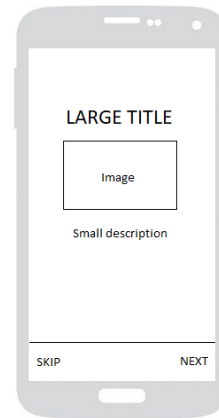


**Figure 3.1.21 Splash Screen**

*Logo:* One Tap button *Logo type:* PNG

*Splash screen duration:* 3 seconds

*Function:* To show the app is loading

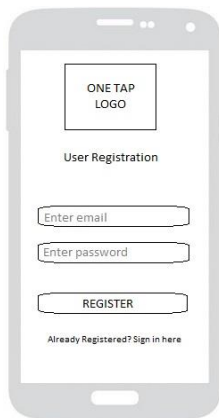


**Figure 3.1.22 Welcome Screen**

*Image:* Function Icon *Image type:* PNG

*Button:* Next, Skip

*Function:* User can click next or skip to navigate around the pages



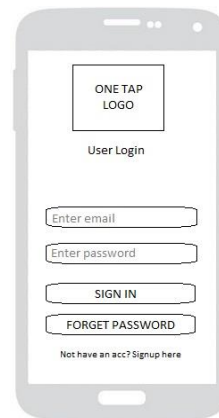
**Figure 3.1.23 User Registration**

*Logo:* One Tap button

*Input data:* Email, Password

*Button:* Register, Sign in here

*Function:* User enter their email and password to register an account



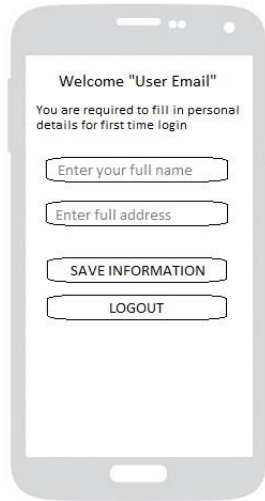
**Figure 3.1.24 User Login**

*Logo:* One Tap button

*Input data:* Email, Password

*Button:* Sign In, Forget Password, Signup

*Function:* User enter their email and password to sign in

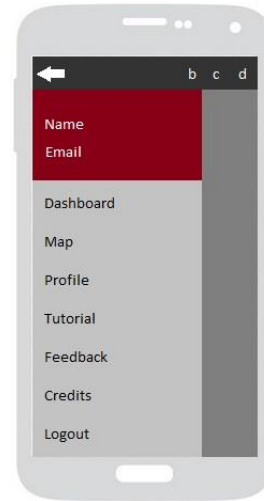


**Figure 3.1.25 User Details**

*Input data:* full name, address

*Button:* Save Information, Logout

*Function:* To save the user information to access later in the app



**Figure 3.1.26 Side Drawer**

*Text display:* Name, Email

*Button:* Dashboard, Map, Profile, Tutorial, Feedback, Credits, Logout

*Function:* To display additional features



*Button:* One Tap, Add Contacts

*a:* Side Drawer

*b:* Notification

*c:* Message

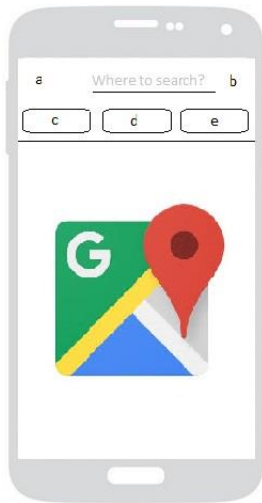
*d:* Map

*e:* Camera

*Function:* To display the important features in the home page.

User can check notification, reset the emergency message, access the map, capture camera, press button and edit emergency contact

**Figure 3.1.27 Home Page**



*Map:* Google API Map

*Input data:* Search location

*a:* Home button

*d:* Pharmacy button

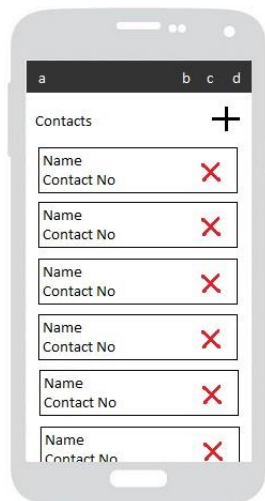
*b:* Search button

*e:* Police station button

*c:* Hospital button

*Funtion:* User can track the nearby places such as hospital, pharmacy and police station by pressing a button

**Figure 3.1.28 Map**



**Figure 3.1.29 Contact List**

*Text display:* Name, Contact No

*Button:* Add Contact, Remove Contact

*Function:* User can add or remove the emergency contact in the list



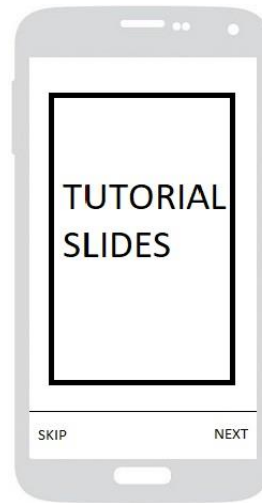
**Figure 3.1.30 Profile Page**

*Input data:* New Password

*Text display:* Name, Address

*Button:* Edit, Change

*Funtion:* User can edit their name, address and password



**Figure 3.1.31 Tutorial Page**

*Button:* Skip, Next

*Image:* Tutorial Slide

*Function:* User can click the next or skip button to navigate and view around the different tutorial pages

### 3.2 SYSTEM FUNCTIONALITY OF LATEST VERSION

One Tap Button system functionality shows every feature and function of the app with given examples. Besides, it provides the steps and description on the demonstration to let the users to understand deeply about the app. The name of this app came from the concept of pressing once at the button to send the emergency message.

#### 3.2.1 APPLICATION STARTUP AND ACCOUNT SIGN UP

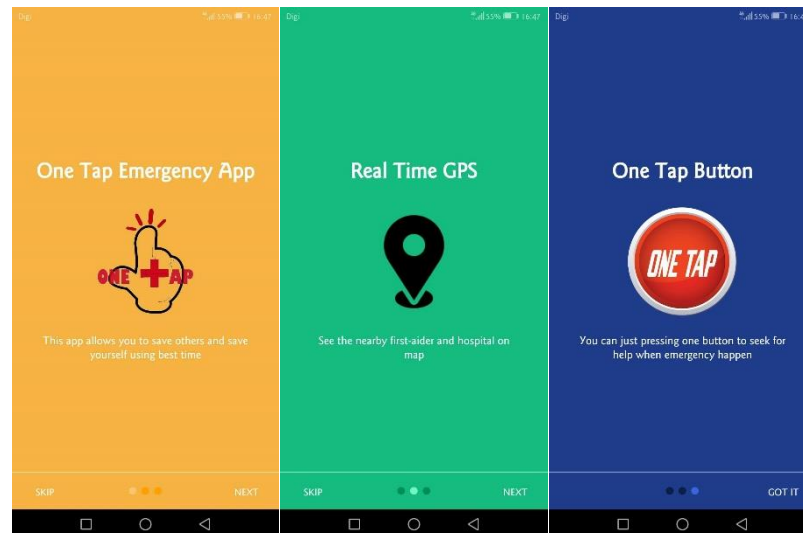


This is the splash screen of One Tap Button application that will appear when the app is launched. This will cover the entire screen and stay a duration of 3 seconds with a fade in effect. The purpose of splash screen is to notify the user that the app is in the process of loading. The main page will come after the splash screen.



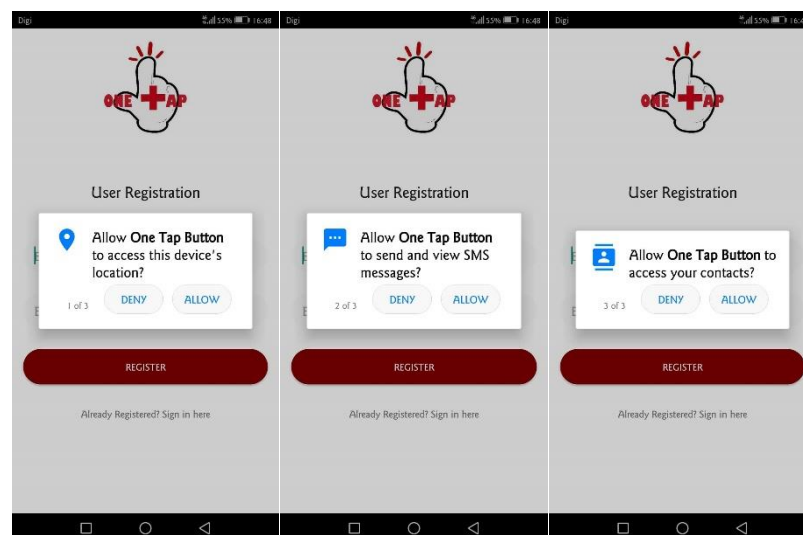
**Figure 3.2.1** Splash Screen





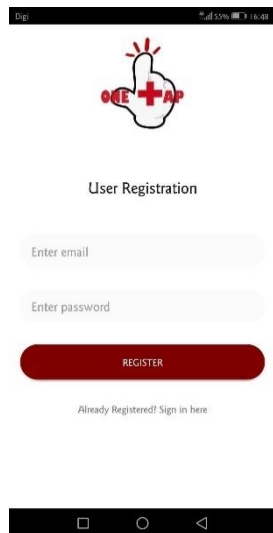
**Figure 3.2.2 Introduction Slides**

After the splash screen disappeared, a series of introduction slides will prompt out to the users. All the slides contain a brief introduction on the app to provide some background information to the users. Besides, it will provide the scope of the app which is mainly related to the emergency personal safety matters. This series of introduction slides will only appear for the first time launch.



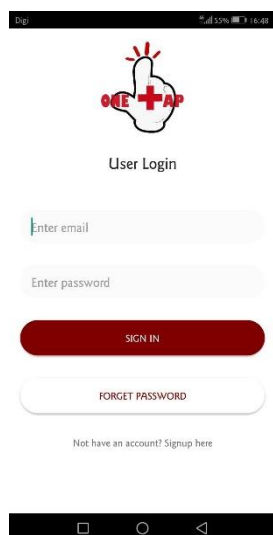
**Figure 3.2.3 Request Permission**

Based on figure 3.2.3, the app will request permission for device's location, SMS and contacts access from the users of android version 6.0 or above. This app needs to access to the user's current GPS location, send out SMS and select the emergency contact numbers from the contacts.



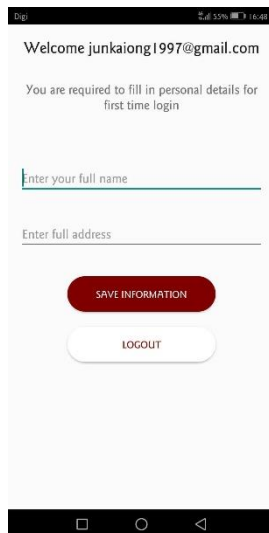
Once the users have allowed access to the permission, they can make a user registration to enjoy the app functions and features. They must enter a valid email address and password to have an authorised access to the app. For the users that have already registered, they can click on the link “Sign in here”.

**Figure 3.2.4 User Registration**



Login is the process to have a valid access to the app by identifying an authenticating the users. If it is existing user, they can login with the registered email and password. The user login allow the user to access to own personal data such as name, email and home address. In the case that if the user forget about their password, they can click on the button of “Forget Password”, then enter their email in order to generate a new password. The new generated password will send to the registered email of the user.

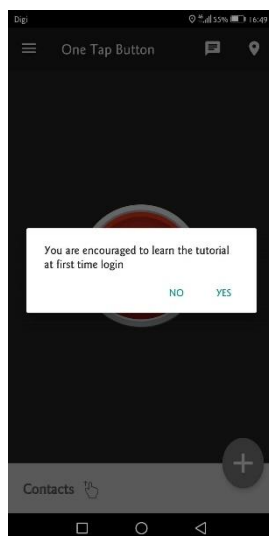
**Figure 3.2.5 User Login**



After successfully login, the app will ask the users to enter some of their personal information such as full name and home address. Users must enter both full name and address in order to proceed. These information will store to the Firebase database and will be retrieved whenever necessary. This page will only show for first time login and the following time will direct prompt to the main page. In other words, the existing users will not see this page again when they launch into the app.

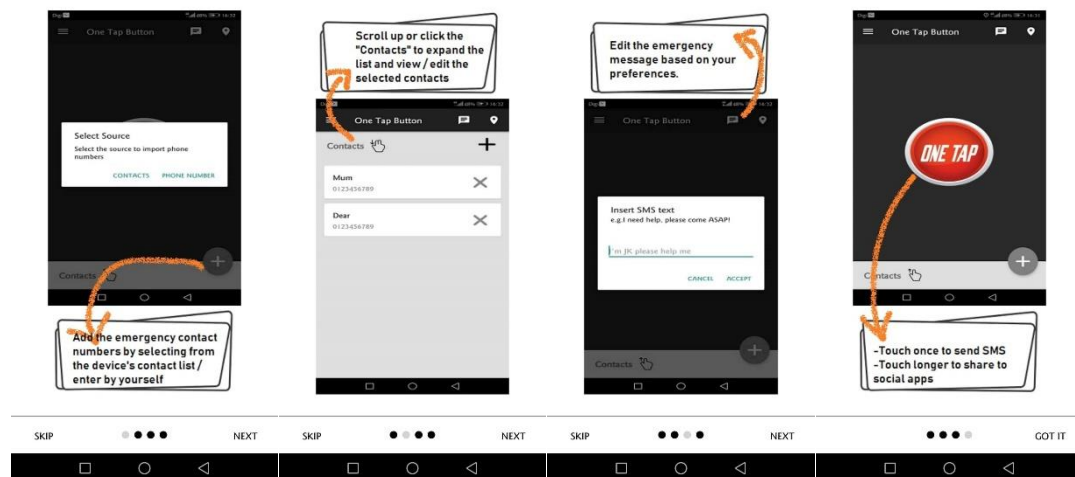
**Figure 3.2.6 Save User Information**

### 3.2.2 USER GET STARTED



The app will detect whether the user is first time login. For first time user, it will prompt a dialog message to encourage the user to learn on the tutorial. The users will have a better understanding on how to navigate around the app and use the features after they learnt the tutorial.

**Figure 3.2.7 Tutorial Dialog**



**Figure 3.2.8 Tutorial Slides**

The purpose of tutorial slides is to deliver the knowledge and instructions on using the features of the app. Users can either skip the tutorial process. However, they are highly recommended to go through all the slides to have a clearer understanding about the functions of app. The first slide guides the users to select emergency contacts and store in the contact list. While the second slide mentions that users are able to view and edit their contact list. The following slide guides the users to edit the emergency message according to their preferences and this will be the message to be send when the emergency button is clicked. The last slide shows that the user can either click once to send out the emergency message, or click longer to share via social apps.

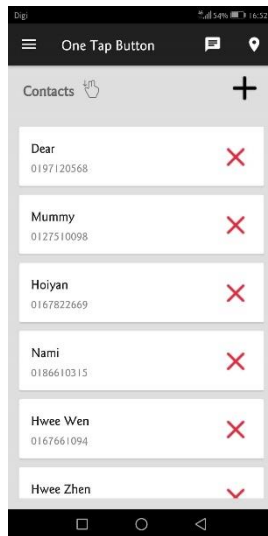
### 3.2.3 ONE TAP BUTTON



This is the main page of One Tap app which has a simple yet understandable user interface. The button and background has a high colour contrast and the button is large in size. Hence, the button is obvious and it enables the users to differentiate the button easily. Before click the button, users must make sure the GPS location is turn on and internet connection is available to run the app smoothly. Users can try on other functions by pressing the icon at the toolbar or swipe up the contacts to view the selected contact list. Users can either click the One Tap button once or longer to send the message.

**Figure 3.2.9 One Tap Home Page**

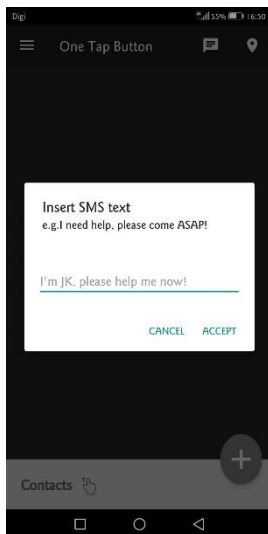
### 3.2.4 VIEW AND EDIT SELECTED CONTACT



**Figure 3.2.10 Contact List**

This is the contact list that store the emergency contacts selected by the users. When there is emergency happen, the message will send to all the selected contacts. Users must select at least one contact in order to send out the emergency message via button click. Further, the users can either select more emergency contacts by pressing the plus icon, or delete the selected contact by pressing the red-cross icon. Users can swipe down the contact list to back to the home page.

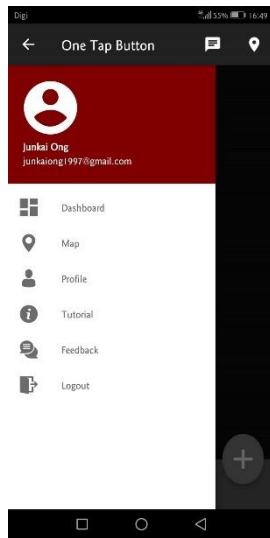
### 3.2.5 EDIT EMERGENCY MESSAGE



**Figure 3.2.11 Message Dialog**

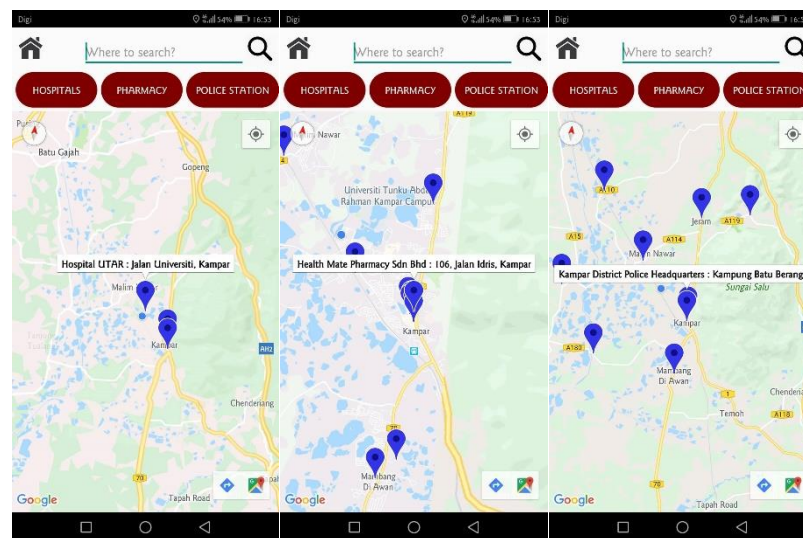
Based on Figure 3.2.11, it is a SMS text dialog that allow the users to enter the predefined emergency message. If the column of text dialog is empty, it will send out the default emergency text which is “I am in emergency now, please come ASAP”. If the users have enter and save their preferred messages, it will store in the Firebase Database and show a hint at the text box. Therefore, the selected emergency contacts will receive the message based on the message entered by the user.

### 3.2.6 MORE FEATURES



Implementing a side menu can enhance the navigation experience when using the app. If putting all the icon and features at the main page, it will lead to the information and page overload which causing the users has less engagement throughout the app. Therefore, a side menu not only can save the space display in the main page, but also can categorise the features in a manner way. Besides, it allows the users to focus on the essential functions in the main page with good scalability. When the user clicks the icon in the side menu, it will bring the user to the targeted page.

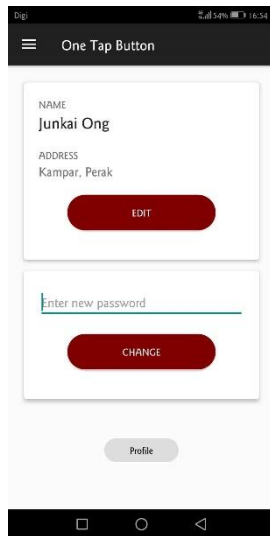
**Figure 3.2.12 Side Menu**



**Figure 3.2.13 Map**

When the users click on the map, they are able to detect their own current location by the displayed marker. Besides, users are allowed to track the nearby hospitals, pharmacy and police station by pressing the particular button in case they are unfamiliar with the places. This will be more time-saving when emergency happen as they can direct click on the place button instead of searching for the place manually. The map is the additional feature included in the app that helping the users to seek for place by clicking on the marker, and it can redirect to road navigation through Google Map.

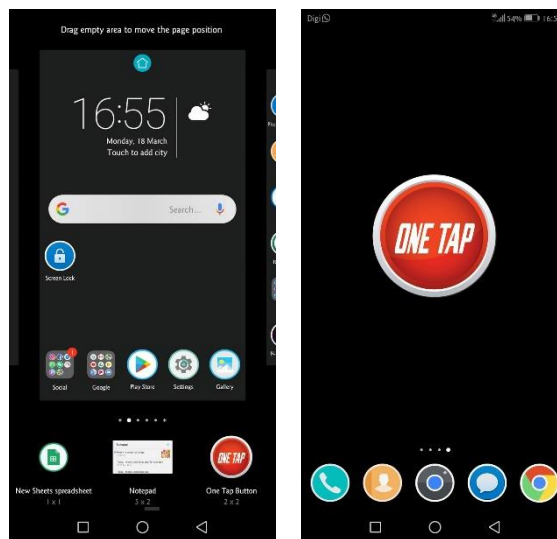
### 3.2.7 EDIT USER PROFILE



When the users click on the profile at the side menu, it brings them to another page that enable them to edit their profile or change password. After done editing the name and address, it will change in real time where the Firebase will handle the updated data in the backend.

**Figure 3.2.14 User Profile**

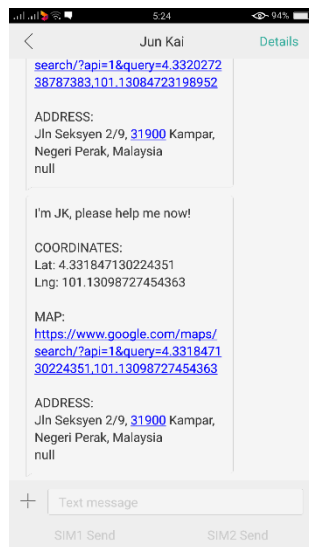
### 3.2.8 FAST LAUNCH WIDGET



**Figure 3.2.15 One Tap Widget**

In order to achieve faster speed of sending the emergency message, the app is also provided a fast launch widget with a large One Tap button showing at the phone's home display instead of launching the app. This will definitely reduce the time of sending the emergency message. However, user can setting and back to the app after the widget is click.

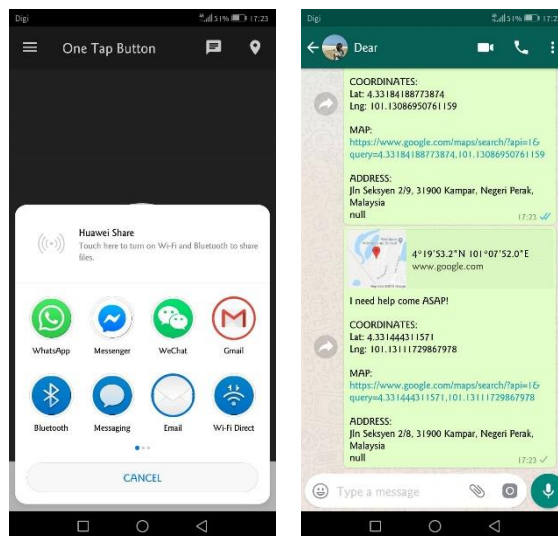
### 3.2.9 MESSAGE RECEIVED EXAMPLE



After the One Tap button is click, the selected contacts will receive an emergency message as shown in Figure 3.2.16. The first row of the message is showing the emergency text entered by the users, then followed by an accurate coordinates and a google map link of the user's current location. The current address of the users will be provided at the end of the message.

**Figure 3.2.16 Emergency Message**

### 3.2.10 SEND MESSAGE VIA SOCIAL APPS



**Figure 3.2.17 Send Message via Social Apps**

User has another option to send the message which is through social apps. This required the user to click the One Tap Button longer in order to share via app. User can choose from a variety of social app and select the specific contacts to send. However, this process will take longer time and it is not efficient enough to send the message in emergency situation. This feature is optional, hence it is highly recommended to send the emergency message via SMS.

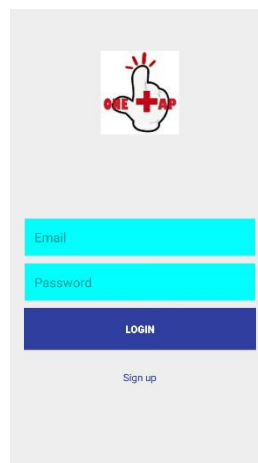


### 3.3 SYSTEM FUNCTIONALITY OF OLDEST VERSION



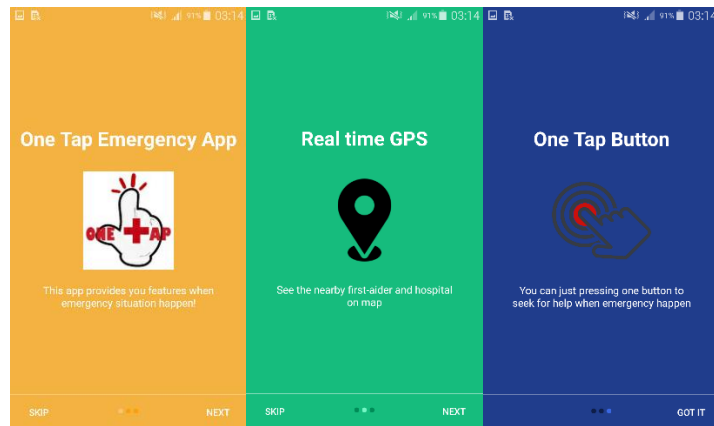
**Figure 3.3.1 Splash Screen**

The splash screen will appear first if the user launch the One Tap emergency personal safety app. This is important to notify the user that the application is in the process of loading.



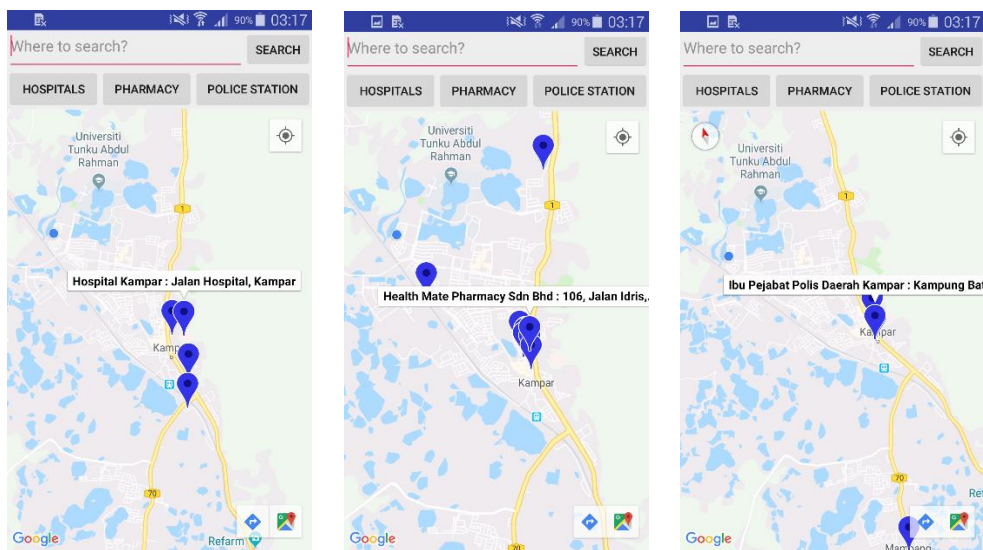
**Figure 3.3.2 Login page**

The users then login to the app by inserting the registered email and password if they are existing users. If it is new users, they need to sign up for an account first before login to the app.



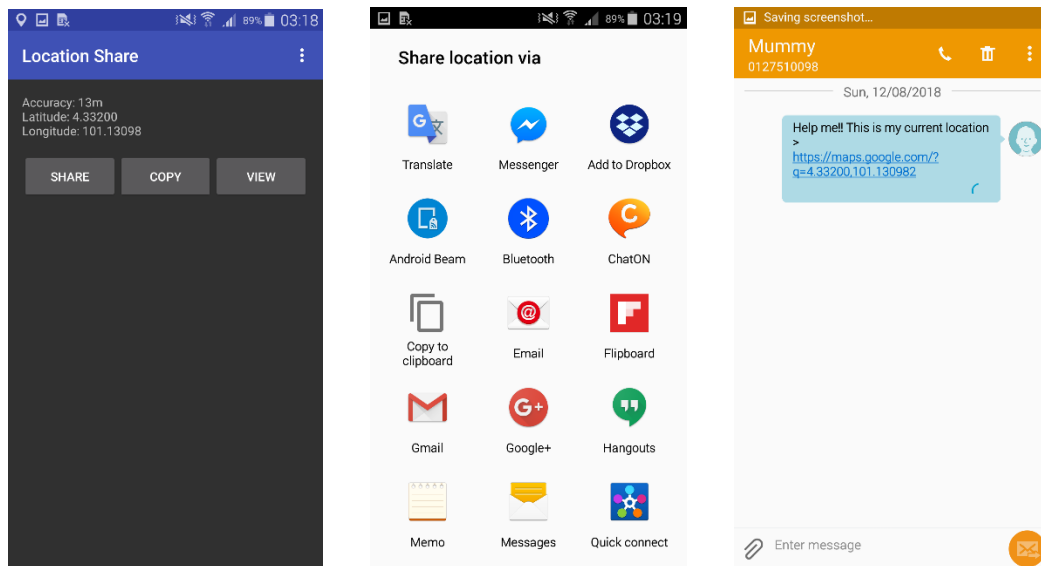
**Figure 3.3.3 Introduction Slides**

After the users successfully login to the app, an introduction slides are provided the users with basic information related to the app. The user can choose to skip the slides or read until finish. It is only active once if the users first time launch into the app. In other words, the existing user will not see the introduction slides again if launch into the app.



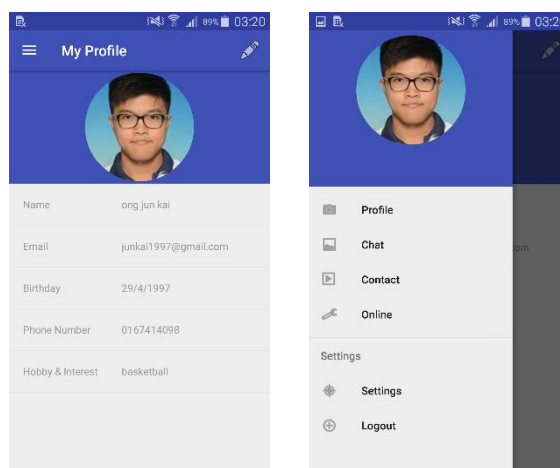
**Figure 3.3.4 Home Page Map**

When the app successfully launched, it will appear a home page with map that can detect the current location of the user. Besides, user are allowed to track the nearby hospitals, pharmacy and police station by pressing the particular button in case they are unfamiliar with the places. Users are also allowed to search the location manually.



**Figure 3.3.5 Emergency Message**

In case of emergency situation, user can share their current location that is available in this application to request for help. User can share the location via various type of social and messaging apps. If the user choose the default messages that is built in the devices, they can send the emergency message to the selected contacts that contained the current GPS information. However, I am still working with how to send the emergency message effectively by pressing a button that will send to the predefined contacts and message app.



**Figure 3.3.6 Personal Information**

This app provides a flexible way for the user to edit their personal profile based on their need to update the latest information. In fact, I am still finding way to allow the users to view the other user’s profile.

### 3.4 COMPARISON BETWEEN SYSTEM FUNCTIONALITY OF LATEST AND OLDEST VERSION

Features & Functions	Latest Version	Oldest Version
1. Splash Screen	Yes	Yes
2. Introduction Slides	Yes	Yes
3. Request Permission	Yes	No
4. User Registration	Yes	Yes
5. User Login	Yes	Yes
6. User Forget Password	Yes	No
7. Save User Information	Yes	Yes
8. Tutorial Slides	Yes	No
9. One Tap Button	Yes	No
10. View and Edit Predefined Contact List	Yes	No
11. Set and Edit Emergency Message	Yes	No
12. Side Navigation Drawer	Yes	No
13. Map	Yes	Yes
14. Edit User Profile	Yes	Yes
15. Fast Launch Widget	Yes	No
16. Send Emergency Message Through SMS	Yes	Yes
17. Send Emergency Message Through Social apps	Yes	Yes
18. Send Emergency Message with current GPS location	Yes	Yes
19. Take Photo Action	Yes	No
20. Firebase Authentication	Yes	Yes
21. Firebase Database	Yes	Yes
22. Firebase Storage	Yes	No

**Table 3.4.1 Comparison between System Functionality of Latest and Oldest Version**

Based on table 3.4.1, there are updates and amends from oldest to latest version of system functionality as this is an iterative and incremental process. Although some of the features and functions in the oldest version has a similarity as the latest version, but the interface layout and backend implementation has been changed to best suit the user

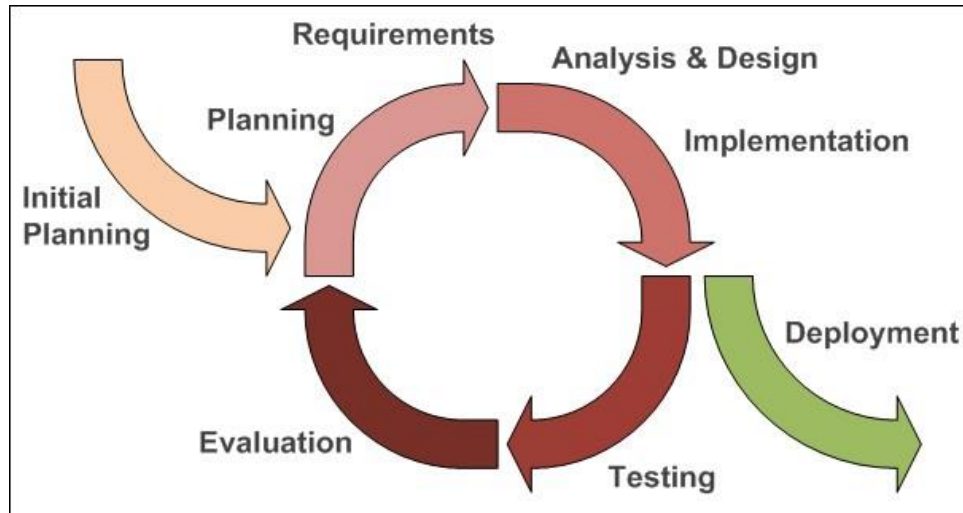
and system requirements. For example, the user registration and user login page has changed to a more consistent layout as the button colour and text box are same in different pages. Besides, the oldest version can still send the emergency message through SMS and social apps with the current GPS location, but this is without the One Tap button feature where it will send to the predefined contacts in a shorter time. Moreover, the oldest version will access the Firebase authentication and database in order to allow user registration, user login and edit profile which is same as the latest version.

On the other hand, the differentiation between the latest and oldest version indicates that the latest version has implemented some of the necessary functions where it do not existed in the oldest version. For instance, the request permission manually in the system is necessary because android version 6.0 or above require the permission access in order to work well on the features. Else the permission will be denied and will cause the app crashing and work improperly. Besides, the latest version included a forget password function in case the user is forgot about their password. If the user is new signup and login to the app, system will identify and prompt a tutorial dialog to new user to suggest them learn the tutorial before using the app. The most significant function in the latest version of this app is implementing an emergency button to send the message to predefined contact with current GPS location in a more effective way. The emergency button is also called “One Tap Button” is designed in a large size to display in the home page. The button has a high colour contrast meaning that the user can easily press the button if emergency was happened.

The latest version has implemented a side navigation drawer that display the additional functions such as viewing the dashboard, map, profile, tutorial and feedback. Meanwhile, the important functions will only display at the home page and it will save the space in the layout to make it more simplify. Besides, the latest version allow the users to set the emergency text to be displayed in the message and let the user to decide the selected contact list to receive the message. The latest version is also emphasized on implementing a capture photo on the real scene as extra information that can request help from other. This is implemented using the advantage of Firebase storage to store and retrieve the photo and display to all the users. Last but not least, the latest version is also implemented a fast launch widget that can press the One Tap button in device’s main page instead of loading into the app for easier access.

## CHAPTER 4 METHODOLOGY AND TOOLS

## 4.1 METHODOLOGIES



**Figure 4.1.1 Iterative and incremental development**

The methodology that applied in this project is iterative and incremental development which is a fundamental part of the agile approaches. The iterative is to perform repeatedly while the incremental is develop a series of version (Baker 2005). By using this methodology, I can work through iterations where the development of the application is split into smaller chunks. The development is based on the idea of developing an initial implementation, exposing it to user comment and changing it through several versions until a final system has been developed. The features of the application can be designed, developed and tested with each iteration and it must fully developed before proceed to next iteration. Most of the systems are developed using waterfall model which is also known as traditional approach. This model will have the difficulty of adapting the changes after the process is ongoing and the problem of implementation time is too long. Besides, it is mostly used for large systems. Hence, iterative and incremental development is the most suitable methodology used in this project because it can reduce the cost of accommodating changing customer requirement and collect customer feedback on the development work that has been done in an easier way. Furthermore, it allows more rapid delivery and development of the system and normally applied for small system such as mobile application.

Iterative development is a methodology of software development that divides a project into many release and create a small project that have well defined scope and constantly do the update as soon as possible. Hence, I can build my project into many release with

different features and updates based on customer requirements and finally achieve the project objective.

Incremental development refer to several versions are complimentary to each other and the project is finished when all the complements are completed. Every increment provides input to the next increment and it must be done before proceed to next increments. For example, I have separated the project into several parts and I do each part at a time and finally combine all the parts I have done.

The following has shown the seven stages of iterative and incremental development:

### 1. Initial Planning

- To plan an overview idea of the project such as defining its objective, scope, purposes and deliverables

The problem of Malaysia as the world top eight car accident happened has aroused my motivation to come out an emergency personal safety app to assist in emergency situations. I have collected all the necessary information on the project development from reviewing the existing systems and improve some of the features. I have downloaded the software required to develop the project such as android studio and emulator. I have also prepared the hardware such as mobile smartphone and laptop to run the program. Lastly, I have sign up the platform account such as Firebase and Canva design.

### 2. Planning & requirement

- Using the Gantt chart to achieve the plan
- Define user and system requirements

I have come out a schedule that listing the work to be done to achieve the final goals of the project. For example, I have followed the timeline that list in the project guideline to prevent the late submission of the project. I have gathered the user requirement from what the problem faced by the user and to propose an app that can satisfy the user's needs. Besides, system requirement has also been listed to include all the features that can run the program.

### 3. Analysis and design

- Analyse the data collected from the questionnaire
- Design the overall view and function of the app using the supporting tool and diagram such as case diagram and block diagram

I have analyse the survey feedback and result that collected from the targeted users before the project implementation. All the questions are related to the development of the app such as the problem faced and what is the expected features to be included. Besides, I start design the system by using different methods and approaches such as block diagram to describe the overall process of the app. I have also designed the User Interface of different pages of the app by using the storyboard.

### 4. Implementation

- Create the project based on user requirement

I have start implement the project based on the planning, user and system requirements. Besides, I have followed the storyboard to design the user interface of the different pages and based on the activity diagram, sequence diagram and block diagram to implement the specific features. Moreover, I have used the android studio to start coding the app on the system design and functionality and to see the result on the emulator.

### 5. Testing

- Testing is a must before implement it such as testing bugs and errors

I have tested the latest version of the app for the purpose of testing the usability, functionality and consistency of the app. I have distributed the apk file for the targeted users to install before testing. After using the app, user can redirect the feedback form in the side navigation drawer of the app and rate it. I can immediately get the feedback result from the Google Form and start fixing the bugs and improve the app features that are suggested from the user. Lastly, I have come out various test cases to check whether the actual output and features meet the expected results.



### 6. Evaluation

- To determine the quality of the system

Before the project deployment, I have to evaluate the final output of the app to judge the quality on different aspects such as UI design and system functionality. The priority concern is to think whether the deployment of this app will benefit the social and targeted users to solve the existing problem on the personal safety issues.

### 7. Deployment

- Release the completed system to the public

If the evaluation result is not good, we will implement and testing again on the app to improve the system functionality. Once the evaluation is fulfilled and satisfied with the result, I will officially deploy the app to the public.

4.2 TIMELINE

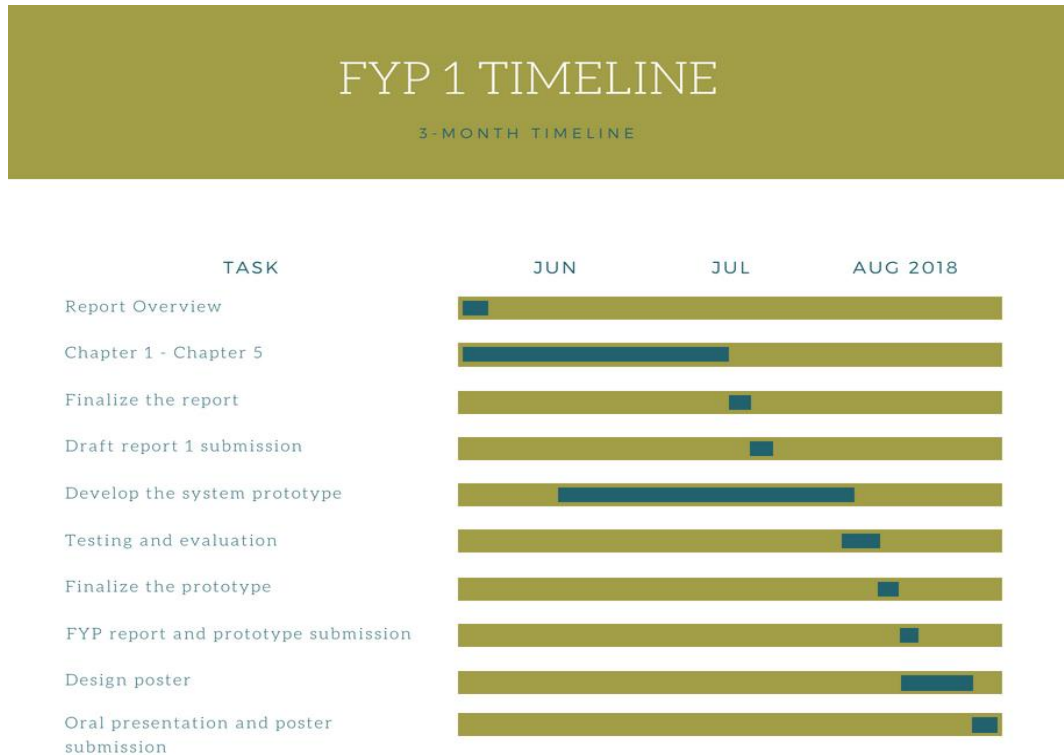


Figure 4.2.1 FYP1 Timeline 1

Task Name	Duration	Start	Finish
Report Overview	4 days	1/6/18	4/6/18
Chapter 1 – Chapter 5	60 days	1/6/18	30/7/18
Finalize the report	3 days	31/7/18	2/8/18
Draft report 1 submission	1 day	3/8/18	3/8/18
Develop system prototype	52 days	15/6/18	5/8/18
Testing and evaluation	3 days	6/8/18	8/8/18
Final prototype	2 days	9/8/18	10/8/18
FYP report and prototype submission	1 day	17/8/18	17/8/18
Design poster	5 days	18/8/18	22/8/18
Oral presentation and poster submission	1 day	30/8/19	30/8/19

Figure 4.2.2 FYP1 Timeline 2

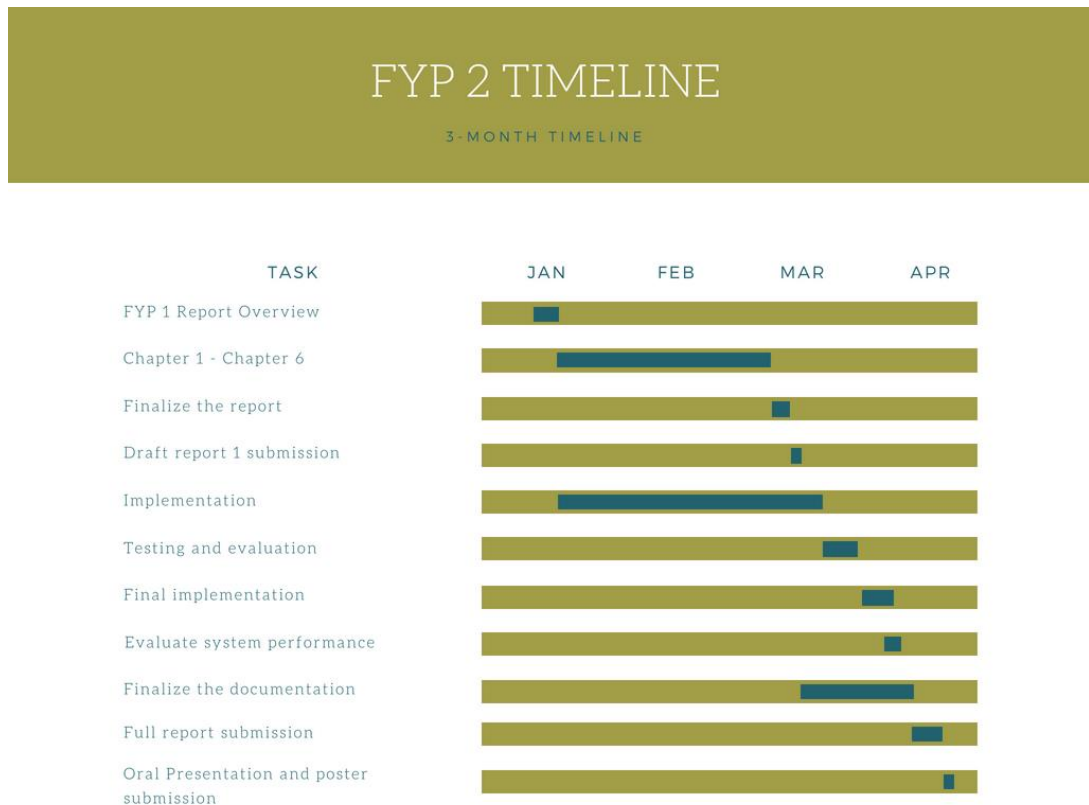


Figure 4.2.3 FYP2 Timeline 1

Task Name	Duration	Start	Finish
FYP 1 Report Overview	4 days	12/1/19	15/1/19
Chapter 1 – Chapter 6	60 days	16/1/19	17/3/19
Finalize the report	3 days	18/3/19	20/3/19
Draft report 1 submission	1 day	21/3/19	21/3/19
Implementation	72 days	16/1/19	28/3/19
Testing and evaluation	5 days	29/3/19	2/4/19
Final implementation	3 days	3/4/19	5/4/19
Evaluate system performance	1 day	6/4/19	6/4/19
Finalize the documentation	17 days	22/3/19	7/4/19
Full report submission	1 day	8/4/19	8/4/19
Oral presentation and poster submission	1 day	18/4/19	18/4/19

Figure 4.2.4 FYP2 Timeline 2

**4.3 TOOLS TO USE**

<i>Type of OS</i>	Android
<i>Minimum Requirement</i>	Android version 6.0 or above
<i>Advantage</i>	<ul style="list-style-type: none"> <li>• Diverse phone options</li> <li>• Open source operating system</li> <li>• Easy and affordable app development</li> <li>• Google Play is user-friendly</li> </ul>

<i>Type of Software</i>	Android Studio
<i>Version</i>	3.3.2
<i>Advantage</i>	<ul style="list-style-type: none"> <li>• Instant run</li> <li>• Intelligent code editor</li> <li>• Fast and feature-rich emulator</li> </ul>
<i>System Requirement For Windows</i>	<ul style="list-style-type: none"> <li>• Microsoft Windows 7/8/10 (32 or 64 bit)</li> <li>• 3GB RAM</li> <li>• 1GB for android emulator</li> <li>• 2GB for available disk space</li> <li>• 1280 * 800 minimum screen resolution</li> </ul>

<i>Type of Programming Language</i>	Java, XML
<i>Advantage of Java</i>	<ul style="list-style-type: none"> <li>• Easy to learn</li> <li>• Object-oriented feature</li> <li>• Platform-independent feature</li> </ul>
<i>System Requirement for Java 8 (Windows)</i>	<ul style="list-style-type: none"> <li>• Microsoft Windows Vista/7/8/10</li> <li>• 128MB RAM</li> <li>• 124 MB for JRE, 2MB for Java update (Disk Space)</li> <li>• Processor: minimum Pentium 2 266 MHz processor</li> </ul>
<i>Advantage of XML</i>	<ul style="list-style-type: none"> <li>• Compatible with Java</li> <li>• Easy for UI design</li> </ul>

<i>Type of Database</i>	Firestore
<i>Minimum Requirement</i>	Android API level 16 or later, Gradle 4.1 or later
<i>Advantage</i>	<ul style="list-style-type: none"> <li>• Store and synchronize data in real time</li> <li>• Easy to manage</li> </ul>
<i>System Requirement</i>	<ul style="list-style-type: none"> <li>• As long as able to install android studio</li> </ul>

CHAPTER 4 METHODOLOGY AND TOOLS

<i>Type of Devices</i>	Samsung Galaxy S5 (Model no: SM-G900F) Huawei Nova 2i (Model no: RNE-L22) ASUS A555 laptop		
<i>Samsung Galaxy S5 Specification</i>	Processor - Snapdragon 801 RAM - 2GB Size - 5.1" 1080x1920 pixels Storage - 16GB OS - Android 5.0	<i>Huawei Nova 2i Specification</i>	Processor - HiSilicon Kirin 659 RAM - 4GB Size - 5.9" 2160x1080pixels Storage - 64GB OS - Android 7.0
<i>ASUS A555 Specification</i>	Processor - Intel i5-5200U@2.20Ghz RAM - 8GB Hard Drive - 1TB OS - Windows 10 64-bit		

### 1. Type of OS / Platform

The platform that will be used in this project is Android based operating system. The reason why I choose Android is because the Android has dominated most of the phones in the market are and Android is a free and open platform (Chadha 2018).

### 2. Type of Software

The software that has used in this project is Android Studio in order to develop the project. This is an integrated development environment that make the tools needed available to the developer to build the application based on Android OS.

### 3. Type of Programming Language

Java and XML will be the main languages used to develop the application. Java is the most used application development language that is able to create Android apps. Besides, XML stands for extensible mark-up language and also is a software and hardware designed to store and transport data. By using XML, this is very convenient for me to just simply drag and drop the button and layout in the Android Studio and this will increase the development process.

### 4. Type of Database

Firebase is the main database to store the data in real time. This is a NoSQL cloud database and the data is accessed all the time in real time and it will remain available in the offline as well. I can connect and link to Firebase using the Android Studio and these are all the tools designed and offered by Google.

### 5. Type of Devices

The mobile devices that are used in this project are Samsung Galaxy S5 (Model no: SM-G900F) with Android version 5.0 and Huawei Nova 2i (Model no: RNE-L22) with Android version 8.0. This project is required at least two devices with different Android version for the testing purpose.

ASUS A555 laptop will be used to develop this app with the following specifications:

Processor – Intel i5-5200U@2.20Ghz, RAM – 8GB, Hard Drive – 1TB,

OS – Windows 10 64-bit

## 4.4 REQUIREMENTS

### 1. User Requirement

- User should be able to register for an account
- User should be able to login to the system
- User should be able to change password
- User should be able to update the contact list
- User should be able to send an emergency message to alert the selected contacts, by pressing one tap button
- User should be able to edit and update their personal information
- User should be able to track the nearby hospital, pharmacy and police station
- User should be able to take a picture to provide additional information and share to the app
- User should be able to get notification when receive a request message

### 2. System Requirement

- System should provide the user with the register function as a valid user
- System should provide the user to login to the system
- System should provide the user with the ability to change password
- System should provide the user with the function of update contact list
- System should provide the user with the ability to send an emergency message to alert the selected contacts, hospitals and nearby first-aider by pressing one tap button
- System should provide the user with the function of edit and update their personal information
- System should provide the user with the ability to track nearby hospital, pharmacy and police station
- System should provide the user with take picture function
- System should provide the user with the notification function when receive a request message from other users

#### **4.5 SYSTEM PERFORMANCE DEFINITION**

The timing is the important part to enhance the system performance and this will be emphasize in the One Tap emergency personal safety app. From now, people can request help by just pressing a one tap button and this will send an emergency message included personal information and the current location to the response team when facing any emergency situation. Unlike before, people need to call help using cellular phone and this will take time in the process of dialling to the emergency department and they need some time to handle the process such as asking the current location and the situation of the victim in step by step. Fortunately, One Tap will activate the application by pressing the specific button of the phone such as home button or volume button that is pre-set by the users and it can access to the application immediately. This application considers the effective use and user friendliness of design by aiming the simple layout interface in order to make the user easy to understand what is the purpose and the function of the specific button or layout.

On the other hand, One Tap also emphasize on the accuracy of the GPS current location. There are some of the existing applications sending the user current location in term of the data of longitude and latitude or the address number to the particular receiver. However, this will make the receivers confuse about the accuracy of the location as they need to search for the address manually. Nevertheless, One Tap will show the user's current location on the map instead of the data representation and when the user is facing any emergency, the selected contacts will be received an emergency message included the user personal information and the address of current location. One Tap will be developed based on the part of Google Map and the map will appear on the home page when user log into the application. According to Miller (2014), Google Map is using the algorithms as a bigger role in extracting information from high resolution satellite to improve the accuracy of its map.



#### 4.6 IMPLEMENTATION ISSUES AND CHALLENGES

The first implementation issue and challenge is related to how the One Tap application works with hospital system to make it standardize. Meanwhile, hospitals must have self-monitoring system to receive any emergency report from the users who calling for help using One Tap application. Hospital is not suitable to use a mobile application to monitor the emergency daily report because hospital is a large organization that should has its own system which can accessible by its staffs. Besides, mobile application can only support for lightweight users and it has the limitation of screen to display information. Moreover, phones are not as powerful as desktop in term of processing power. Hence, it is important for me to find a way to make the One Tap application collaborates with hospital system.

The second implementation issue and challenge is that it is hard to implement all system functionalities in one project activity in Android Studio editor. If I work all the implementation of system functionalities in one project activity, it is hard to debug if there is an error. Therefore, I have separated the project into several parts and different activities based on the system functionalities. For example, one of the system functions is to detect the current location of user and I have implemented this in one project activity. The challenge is that after done all the implementation of different functionalities, it is difficult to combine all the parts in one system that should have a close relationship between every functions to make the whole system works as expected.

The last implementation issue and challenge is to get familiar with the type of programming language and the method of implementation in the area of mobile application. The Android Studio is used to build the project using XML and Java language, however I am not familiar with the XML language. It takes me some time to get familiar with it and understand how the programming works. The XML is mainly used in design the user interface and I have to learn this in order to make a simple yet user friendly interface. There is a problem when I am not familiar with the programming language and exist an error, it could spend me few hours to look for the solution to solve the bugging. Hence, I have to improve my knowledge on the programming languages and the method of implementation in this project.

## CHAPTER 5 SYSTEM IMPLEMENTATION AND TESTING

### 5.1 SYSTEM IMPLEMENTATION

After design and finish the coding for all the parts of the application, now come to the release phase and generation of an “.apk” format file. This is a very important process to ensure that every user can install the app and start to use it. So far the application does not uploaded in the google play store because the user amount is limited and it have to wait until all the features and process have been tested successfully. Therefore, user have to ask the permission from the developer to download the app through android APK file. The minimum android version that is required to run this app is Android 5.0 or above (API level 21). The targeted and compiled SDK version were Android 8.1 (API level 27). The pre-requisite to ensure the app functioning well is to make sure it has available internet connection and GPS function. Below are the process describing on how a new user can run the app:

1. When the user first install the app, they have to allow all the permission required to run this app such as GPS location access, send SMS, and contacts access.
2. User can register a new account by using a valid email address and password.
3. Fill in the personal details such as full name and full house address.
4. Go to the home page after submitting the personal details, a tutorial dialog message will prompt out to suggest the user to learn on the tutorial.
5. If user click yes, they will go through all the tutorial slides guiding on the features and necessary parts of the app.
6. They can insert an emergency text to be displayed in the message together with the GPS location and address that will be retrieved by the system.
7. User must select at least one emergency contact and turn on the GPS location in order to send out the message after clicking on the One Tap button.
8. There are two ways to send the message, user can either click once at the button to send SMS, or click longer at the button to send via social apps.
9. After completing the process, user can navigate around the app to explore more features such as navigation drawer menu and a map displayed.

**5.2 VERIFICATION PLAN**

Test Name	Description	Expected output	Actual output	Status
Nearby hospital	By pressing a button to search for nearby hospital instead of typing manually	The marker displayed on the map	The marker displayed on the map not related to hospital	Need to be improved

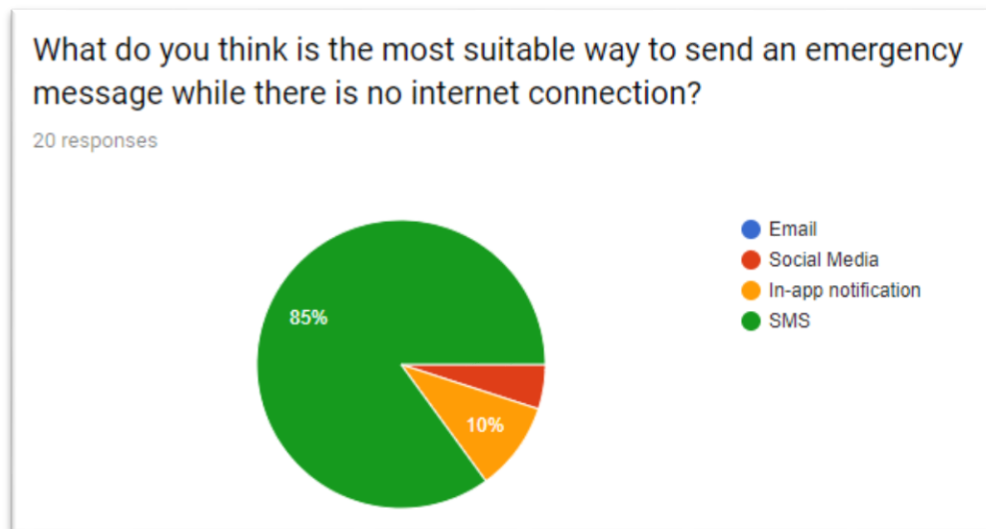
**Table 5.2.1 Example of verification plan**

Verification plan is the process of verifying the function requirements really meet the expected results. According to Maropoulos and Ceglarek (2010), the verification plan is the engineering design which is important as it will directly influence the performance of a product and customer perception. I will go through the verification plan using Table 5.2.1 to verify the output that is conforms the input. There are various functions need to be tested such as log in and sign up function, real time current location tracking function, tracking nearby hospital function, sending emergency message function and update profile function. It is important to verify the correctness of a function design and take the corrective action if needed. Besides, the verification plan can detect the error and predict the output of a product to further improve and meet the expectation of users.

### 5.3 SYSTEM TESTING

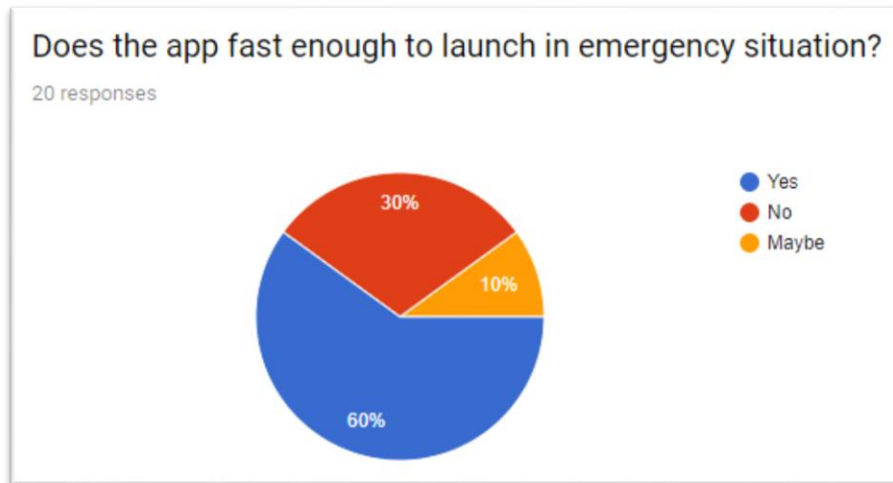
#### 5.3.1 TESTING QUESTIONNAIRE

After the app has been implemented, it comes to the first phase of testing which is the user feedback on the app through questionnaire.



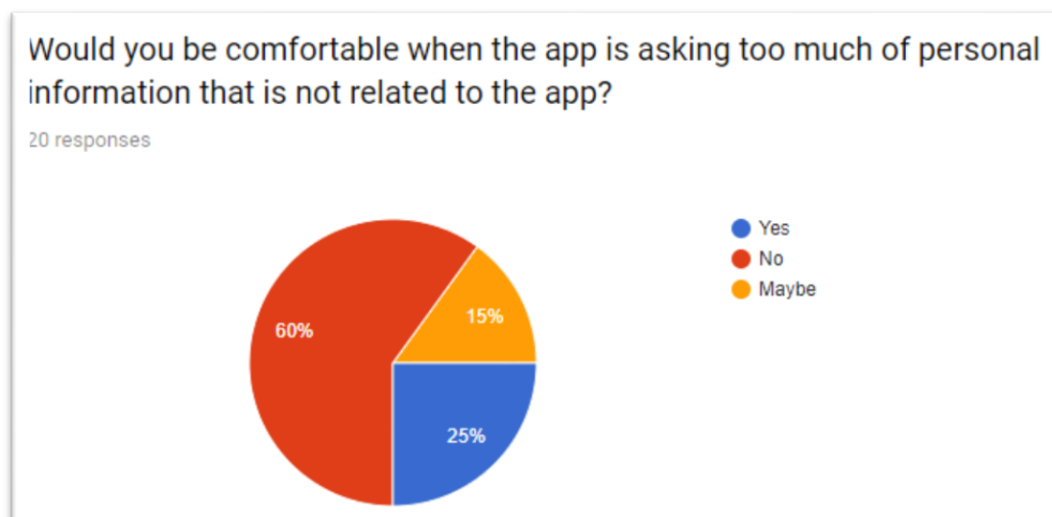
**Figure 5.3.1 Testing of way to send message**

Based on the figure above, there are alternative ways to send an emergency message, yet this question is focus on how to send the message without internet connection. Majority of the users suggested that SMS is the most suitable way to send the message compared to email, social media and in-app notification that required the internet connection. Based on the result, none of the responder chose the email because this is the slowest response method. In this case, One Tap has used SMS as the way to send the message and is considering to use the social media and notification.



**Figure 5.3.2 Testing of launch speed**

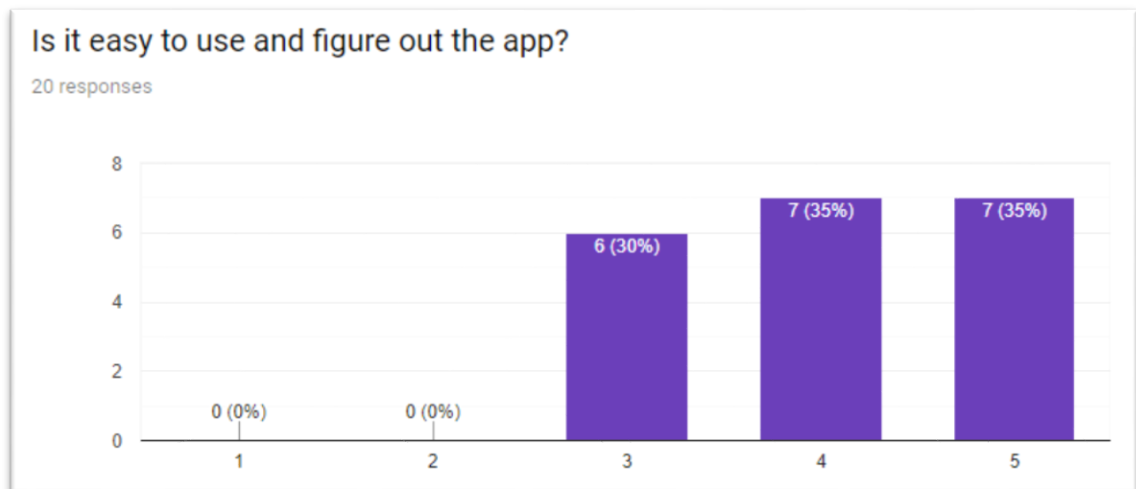
According to figure 5.3.2, there are 60% of the users claimed that the app is fast enough to launch when emergency happen. Unfortunately, there are still 30% of the users dissatisfied with the speed and duration when launching the app. As what have implemented now, the app will have a splash screen design when launch and it take up to 3 seconds to load the home page. Therefore, it is necessary to think an effective and efficient way after getting the feedback from users reporting that the app is still slow to launch. In this case, a fast launch widget may be a faster way to send the message.



**Figure 5.3.3 Testing of asking personal data**

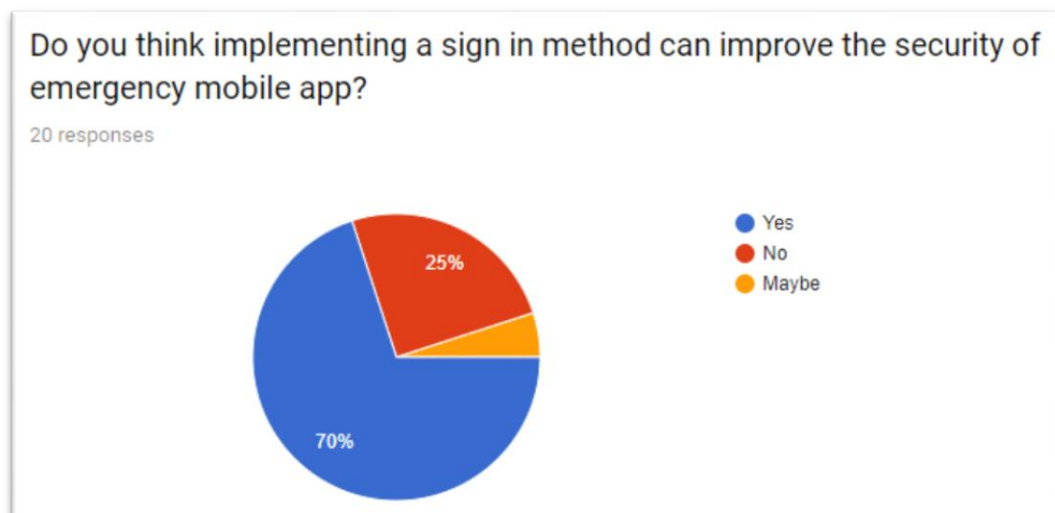
Most of the users are concern about the personal data required to fill in that is not related to the app. They may curious why the app needs the unrelated data and how the app is going to store and process their data. Asking too much of the personal details may lead to less user engagement as they will reluctant to use the app. As stated in Charlton BIS (Hons) Information Systems Engineering Faculty of Information and Communication Technology (Kampar Campus), UTAR

(2016), too many fields in the form will lead a group of users to get away and abandon the process.



**Figure 5.3.4 Testing of ease of using the app**

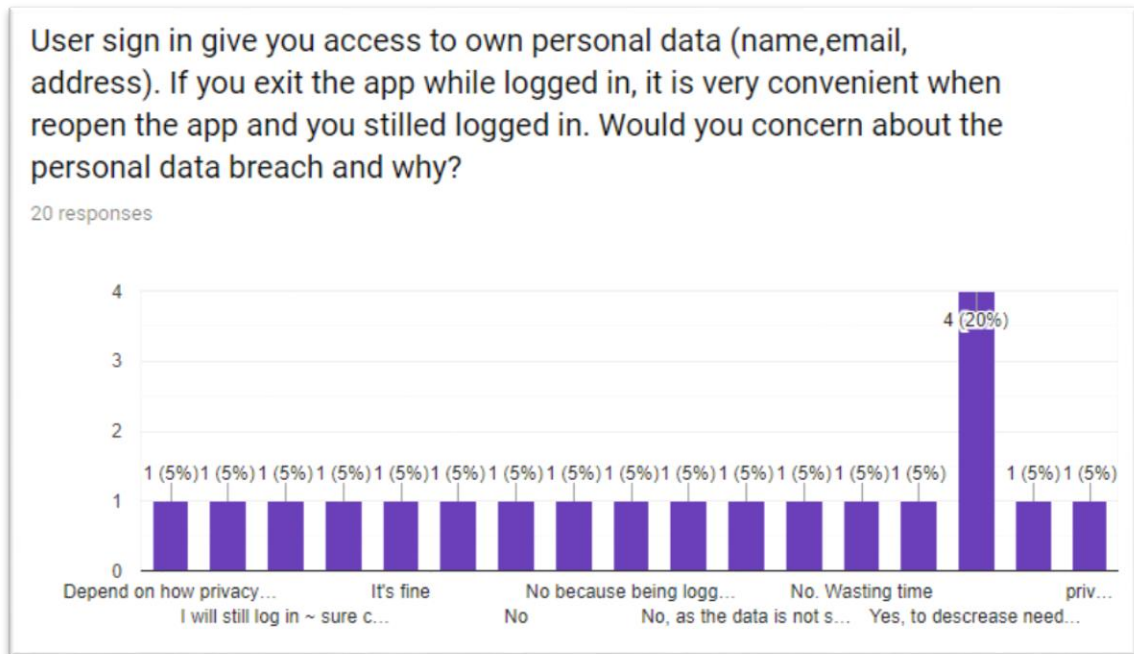
This question is proposed that 1 is strong disagree to 5 is strongly agree about how easy to use and figure out the app. All the responders choose at least 3, and there are equal of 7 responders choose 4 and 5 which indicated that the app is easy to use. The reason probably is the app is provided the new users with the tutorial slides that guiding them on the steps on using the app. Another reason could be the UI of this app is quite simple and it is easy to navigate around the pages.



**Figure 5.3.5 Testing of sign in security**

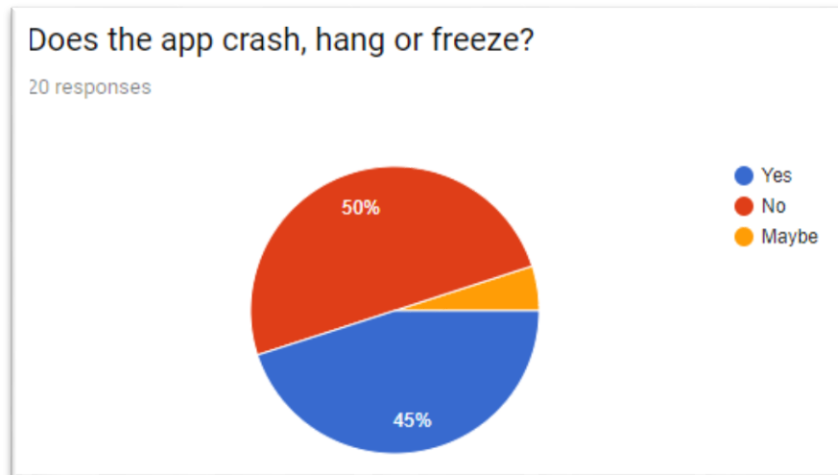
According to figure 5.3.5, majority of the users (70%) claimed that implementing a sign in method can improve the security of the app to prevent any unauthorised login.

However, there are 25% of responders still think that the method is not sufficient to enhance the security. In this case, it may still need to depend on the device security method such as iris scanner, fingerprint scanner and face scanner.



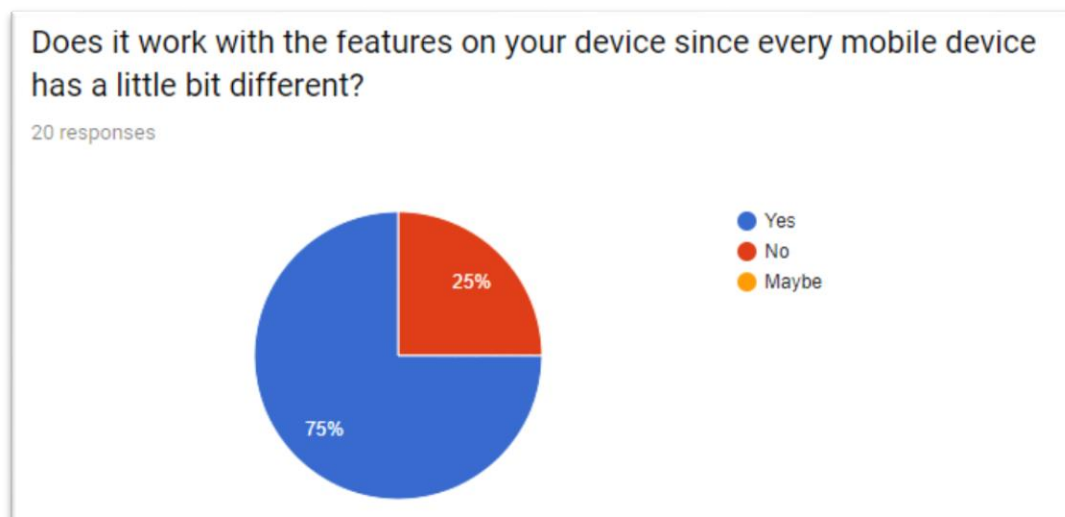
**Figure 5.3.6 Testing of personal data concern**

This is an open ended question to get the feedback from users on the data privacy issue. This question asking about the users' concern if they did not log out and close the app, then it is still logged in when the next time they reopen the app. This bring convenience to the users as they are not required to keep log in. From the results, there are 65% of the responders did not care the privacy breach as the personal data is just too common. However, there are 35% of responders are concerned about the data privacy. Therefore, One Tap must ensure the data collected from the users always be safe and protected.



**Figure 5.3.7 Testing of app crash, hang or freeze**

There are half of the responders are working well with the app without any technical or performance issues. Unfortunately, there are 45% of the responders would face the problem of app crash, hang and freeze. After finding out the fact, when user click on the insert message text dialog, the process will return to the main page without any exception. This is because the firebase database is null where it cannot show the saved message text to display. This problem has been solved when put a condition before loading the dialog.

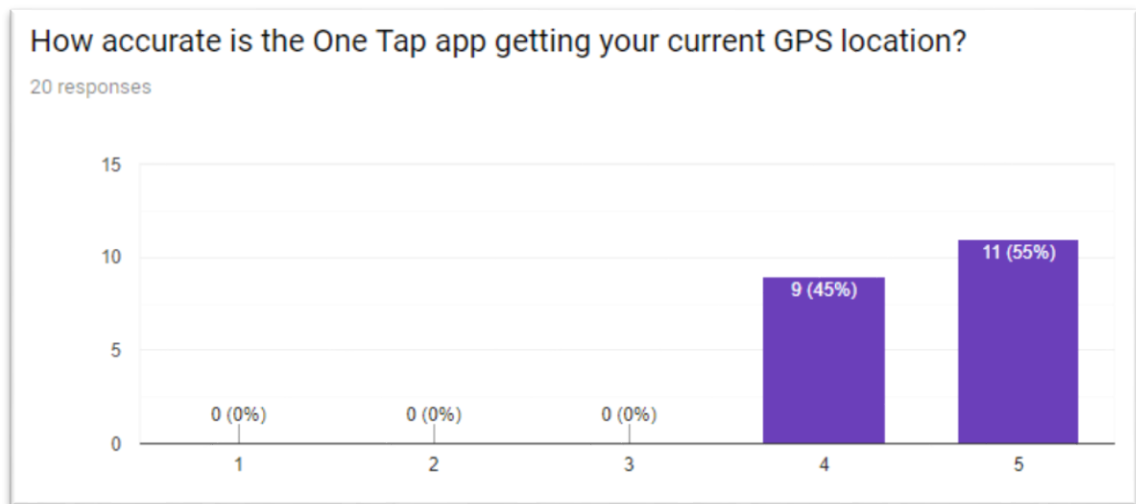


**Figure 5.3.8 Testing of function well on devices**

This question is to make sure that every devices can work well with the features such as GPS connectivity and internet connectivity. This app is only support for android 5.0 or above. In other words, any user with devices below android version 5.0 are unable

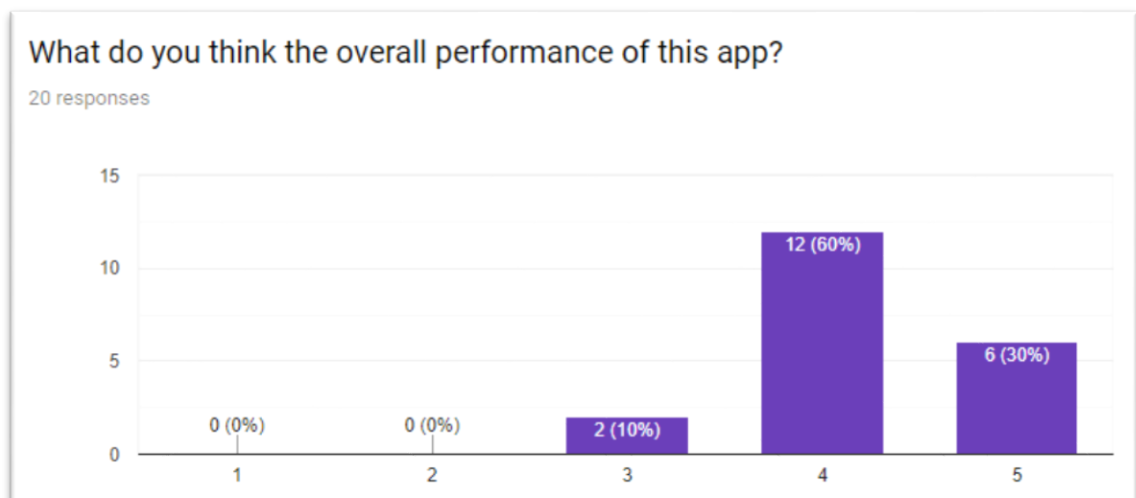


to use it. Based on figure 5.3.8, there are 75% of users are worked well with the features. However, there are 25% of users are facing the problem when using the features. After the investigation, I found out that sometimes the users can send the message successfully but sometimes cannot. This is because the SMS logic function is wrong when handle the message. This problem has been solved after receiving these user feedback.



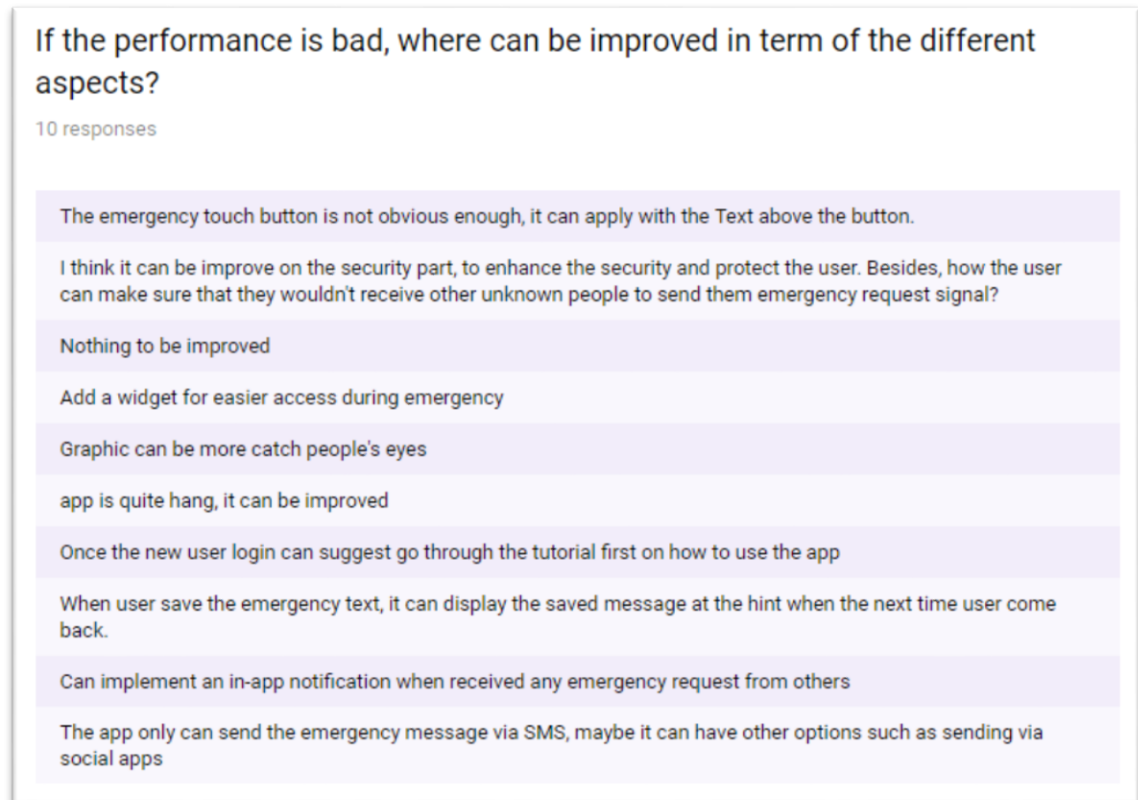
**Figure 5.3.9 Testing of accuracy of GPS location**

From the horizontal line of question showing that 1 is not precise to 5 is very precise when the app is getting the user current GPS location. All of the responders have rated at least 4 and 5 which mean the app is successfully getting the current location in the form of full address, latitude, longitude and a google map link.



**Figure 5.3.10 Testing of overall performance of the app**

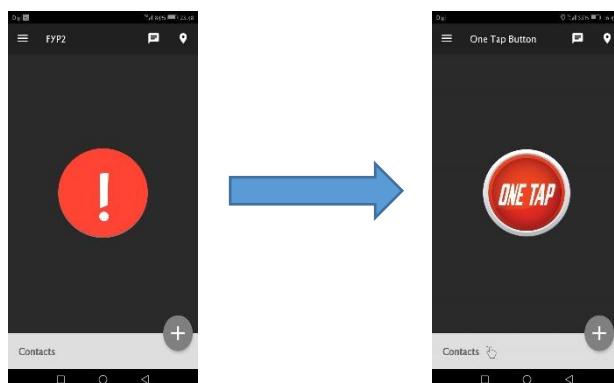
According to figure 5.3.10, there are 2 of the responders rated 3 which has a moderate performance, 12 of them rated 4 which has a good performance and the remaining 6 of them rated 5 which has an excellent performance. Although the overall user feedback on the app performance is considered good, yet One Tap will still working hard to improve the app in a more advance and updated version.



**Figure 5.3.11 Testing of suggestion on app improvement**

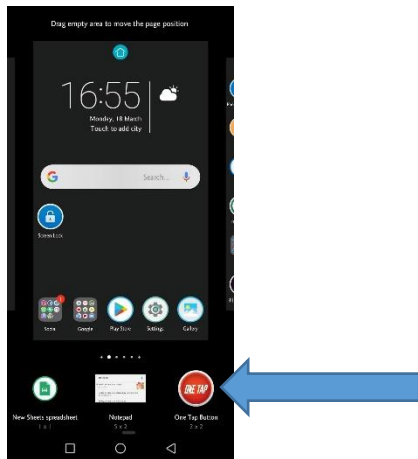
Based on the user suggestions on how to improve the app, One Tap has implemented an updated version to cope with the changes from below:

- The plain button is changed to text apply “One Tap” button

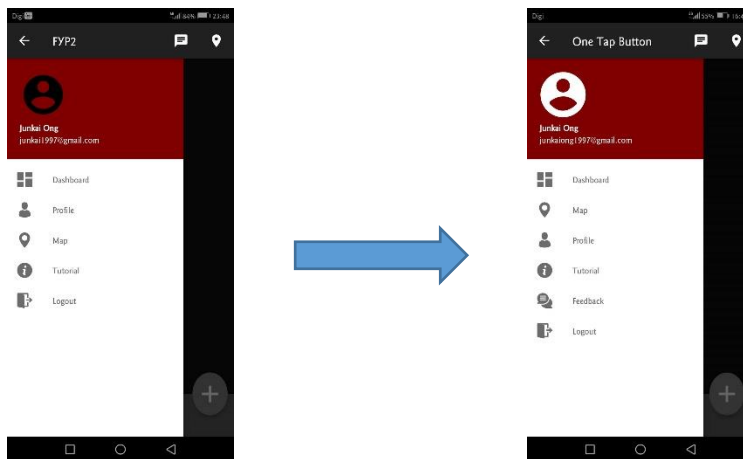


## CHAPTER 5 SYSTEM IMPLEMENTATION AND TESTING

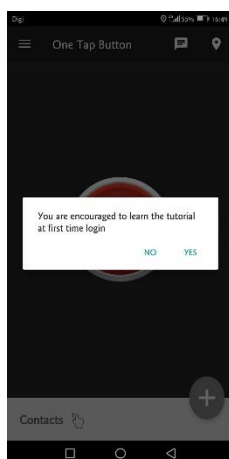
- Add a widget for fast access



- Implement more side menu functions

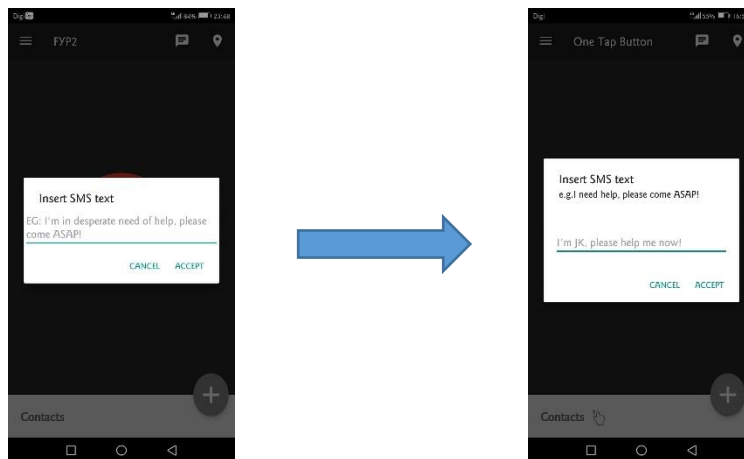


- Learn tutorial alert when new user login

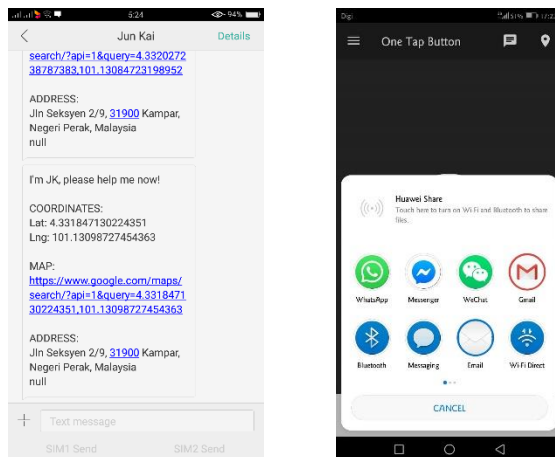


## CHAPTER 5 SYSTEM IMPLEMENTATION AND TESTING

- Save the emergency text enter by the user and display at the textbox hint



- Send message using SMS or social apps



**5.3.2 TEST CASES**

After the improvement from the user feedback done in questionnaire, it comes to the second phase of testing which is to test the various cases or functions to see whether the actual output meet the expected results.

## a) User account signup section

User Input	Expected Results	Actual Output
Function: Create account  User enter their email and password, then click “Register”	User account is successfully created.  Exception: If the user left either the email or password blank, dialog will prompt to ask user enter again.	User account is successfully created.  Exception: If the user left either the email or password blank, dialog will prompt to ask user enter again.

## b) User account log in section

User Input	Expected Results	Actual Output
Function: Account login  User enter their email and password, then click “Sign In”	User account is successfully signed in.  Exception: If the user left either the email or password blank, dialog will prompt to ask user enter again.	User account is successfully signed in.  Exception: If the user left either the email or password blank, dialog will prompt to ask user enter again.

<p>Function: Forget password</p> <p>User enter their email, then click “Send New Password”</p>	<p>New password is successfully generated to the email entered.</p> <p>Exception: If the user left the email blank, dialog will prompt to ask user enter again.</p>	<p>New password is successfully generated to the email entered.</p> <p>Exception: If the user left the email blank, dialog will prompt to ask user enter again.</p>
<p>Function: Setup personal information</p> <p>User enter their full name and full address, then click “Save Information”</p>	<p>User information is successfully saved into the database.</p> <p>Exception: If the user left the name and address blank, dialog will prompt to ask user enter again.</p> <p>If this is first time install, the setup profile page will only display</p>	<p>User information is successfully saved into the database.</p> <p>Exception: If the user left the name and address blank, dialog will prompt to ask user enter again.</p> <p>If this is first time install, the setup profile page will only display</p>
<p>Function: Display tutorial</p> <p>After user click “Save Information”, a tutorial dialog will prompt out</p>	<p>User is successfully read the tutorial if they click ok</p> <p>Exception: If this is first time install, the tutorial dialog will only display</p>	<p>User is successfully read the tutorial if they click ok</p> <p>Exception: If this is first time install, the tutorial dialog will only display</p>

## c) Edit emergency message section

User Input	Expected Results	Actual Output
<p>Function: Edit emergency text</p> <p>User enter the emergency text, then click “Accept”</p>	<p>Emergency text is successfully saved into the database.</p> <p>Exception: If user did not enter any emergency text, the system will set the default message to “I need help come ASAP”</p>	<p>Emergency text is successfully saved into the database.</p> <p>Exception: If user did not enter any emergency text, the system will set the default message to “I need help come ASAP”</p>

## d) Edit emergency contact section

User Input	Expected Results	Actual Output
<p>Function: Add emergency contact</p> <p>User click the add button, then select the source to input</p>	<p>Emergency contact is successfully added into the list</p>	<p>Emergency contact is successfully added into the list</p>
<p>Function: Delete emergency contact</p> <p>User select which contact to delete, then click the delete button</p>	<p>Selected emergency contact is successfully deleted from the list</p>	<p>Selected emergency contact is successfully deleted from the list</p>

## e) Edit profile section

User Input	Expected Results	Actual Output
<p>Function: Edit name and address</p> <p>User click edit and a dialog box will prompt out, then user enter new name and address, then click "Update"</p>	<p>New name and address are successfully updated in the database</p> <p>Exception: If the user left the name and address blank, dialog will prompt to ask user enter again.</p>	<p>New name and address are successfully updated in the database</p> <p>Exception: If the user left the name and address blank, dialog will prompt to ask user enter again.</p>
<p>Function: Change password</p> <p>User enter a new password and click "Change"</p>	<p>New password is successfully updated in the database</p> <p>Exception: If the user left the password blank, dialog will prompt to ask user enter again.</p>	<p>New password is successfully updated in the database</p> <p>Exception: If the user left the password blank, dialog will prompt to ask user enter again.</p>

## f) One Tap emergency button section

User Input	Expected Results	Actual Output
<p>Function: Click once to send via SMS</p> <p>User click once at the One Tap button</p>	<p>Emergency message is successfully sent to the selected contacts with the predefined text and current GPS location</p>	<p>Emergency message is successfully sent to the selected contacts with the predefined text and current GPS location</p>



	<p>Exception:</p> <p>If the GPS location is off, system will prompt to ask user to enable it.</p> <p>If the contact list is null, which mean none of the contacts are selected, system will prompt to ask user select at least one contact</p>	<p>Exception:</p> <p>If the GPS location is off, system will prompt to ask user to enable it.</p> <p>If the contact list is null, which mean none of the contacts are selected, system will prompt to ask user select at least one contact</p>
<p>Function: Click longer to send via social apps</p> <p>User click longer at the One Tap button, then choose which social apps and contact to select</p>	<p>Emergency message is successfully sent to the selected contacts with the predefined text and current GPS location</p> <p>Exception:</p> <p>If the GPS location is off, system will prompt to ask user to enable it.</p>	<p>Emergency message is successfully sent to the selected contacts with the predefined text and current GPS location</p> <p>Exception:</p> <p>If the GPS location is off, system will prompt to ask user to enable it.</p>

## CHAPTER 6 CONCLUSION

The personal safety issues had arose in the daily life among the people as it will always be threatened. This topic has become the concern of the people especially in the road accidents because it has been identified as the eight leading cause of death in the world. Therefore, the problem of the road accidents has aroused the motivation to come out with a solution by developing a real time digital emergency personal safety app to assist in emergency situation using best time. The emergency personal safety app which is called One Tap can be used to provide the users with an effective way to report their personal safety. There are various type of features that are provided in this app which included a real time GPS that show the current position on the map. In addition, it allows the user to track the nearby hospitals, pharmacy and police station. Eyewitnesses is able to capture the real accident scene and share to the app. Hence, the nearby users could reach the victims and perform any necessary actions towards the victims before the ambulance reach the destination. However, the most important part in this app is that it provided the user to send an emergency message by pressing a button and it will send to the predefined contact numbers with the additional information such as current location, name and address.

At the end of the project development, the app should achieve the project objectives and the user requirements to meet the expected goals and results. This app is aim to reduce the safety risk by contacting the selected contact in an effective way so that they can react faster towards the victims. There are both strengths and weaknesses of the existing applications, One Tap is going to explore more improvements on the existing applications to correct their weaknesses and also maintain the strengths to apply in this app. For example, there are lack of existing systems to have the features of tracking nearby hospital and also more emphasize on the real time GPS location with the map provided. Moreover, it is essential to alert the users about the importance of existence of this emergency personal safety app. Last but not least, the emergency personal safety app can reduce the time of reporting when there is an emergency happen. It has been proven that the verification process of the accidents reported by mobile phone caused a delay in resolving the accidents. Hence, the response team can save time to deal with the accident because all the victim's status and the emergency message were reported effectively by using this application. In brief, this application can reduce the death risk of the user by reporting the accident within best time.

### **6.1 PROBLEM DURING PROJECT DEVELOPMENT**

The first problem that I encountered is to launch the app with the device's physical button such as volume and power button to activate the app. This solution can solve the issue of process to send an emergency message is too long. Unfortunately, I am unable to develop the function as this requires the permission to access the device security to remap the physical button. However, there is a third party app that can assist to deal with this method and I am fully utilizing the app to work with One Tap app. After I study and research some of the alternative solutions to send the emergency message within the best time, I have successfully developed a fast launch widget that can display at the device home page and user can press the One Tap button instead of launching into the app. After user pressed the button, it will send the emergency message automatically to the selected contact. Another problem is when I faced any issues related to the application development such as bug, logic and runtime error. I will try to find the solution at the online resources and post my error to the community and request help from the professional and expert.

### **6.2 OBJECTIVE ACHIEVED**

After the application development, One Tap has successfully achieved the objectives that set in the initial stage of the project. The first objective is to propose an emergency personal safety app that could be used to assist in an emergency situation within the best time. The second objective is to research more functions or improvements on the existing personal safety apps. This has been achieved since One Tap implemented some new features such as tracking the nearby hospital and combining the capture camera and send emergency message button. Besides, the third objective is to let users understand the type of emergencies and actions that should be taken to prevent tragedy scenes from happening. One Tap provided the tutorial and welcome pages to guide the user on how to manipulate the app with the correct way when an emergency happens. Last but not least, the objective is to reduce the steps for documentation and time of reporting when there is an emergency happen. By using One Tap, user can simply press a button and send the emergency message including the name, address and current location to the selected contact instead of calling for help.

### 6.3 FUTURE WORK

One Tap can be further improved by adding some advanced features such as includes GPS function which able to track the nearby certified or qualified first-aider to assist help in an accident as they have sufficient knowledge and qualification to perform first aid before the arrival of the rescue team. All the users can register themselves as a certified first-aider if they are qualified, thus the app will display their current status and location to other users on the map. The user can detect the nearby first-aider on the map by differentiating the colour of marker or different logo to indicate the user identity. Nearby first-aider will be noticed if the user send an emergency message and the icon of the user that display on map will keep twinkling in order to make the tracking easily. On the other hand, hospitals have system that is different from this app for receiving the accidents' report. It is necessary to ensure this mobile app and hospitals' system can work well together. Since there will have a possibility of more than one user sending the same report to the hospital, it is essential for the hospital to filter and organize the duplicate report in the database. Hospital is responsible to analyse the authenticity and the truth of case reported from the users by observing the user details and the number of report. In order to assist the hospitals, the eyewitnesses of an accident who are also the users of this apps can record on site using live camera or taking photo to provide additional information to the hospital or particular rescue team. Moreover, there can be a chat room created in this application either in the private or public status between the users to enable them to communicate and share information to each other. Therefore, they are able to know each other's current location through real time GPS location sharing. Last but not least, One Tap can collaborate with the car manufacturer by implementing a sensor in the car. The sensor will detect the crash happened and automatically send a signal to the One Tap app to activate the send emergency message. Hence, the response team will know exactly the location and details of an accident happened.

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## APPENDIX A FEEDBACK ON EXISTING SYSTEMS

### REVIEWS



Callum Moffat ★★★★★  
*Great app for security and operations*

### A.1 Guardly Mobile Feedback

### REVIEWS



shubham bhardwaj ★★★★★  
*Need emergency calling instead of panic sms. People often cant read sms when they*



Raymond du Plessis ★★★★★  
*You have to first unlock your phone to initiate an emergency. Other similar apps you can use*



Martin Davies ★★★★★  
*Doesn't work at all. Set up an emergency contact but all SMS fields are greyed out and can't*



Puma Socat ★★★★★  
*Great all, but. I work in kind of a toxic environment. Is there an option of a custom CHECK IN?*

### A.2 Red Panic Button Feedback

## REVIEWS

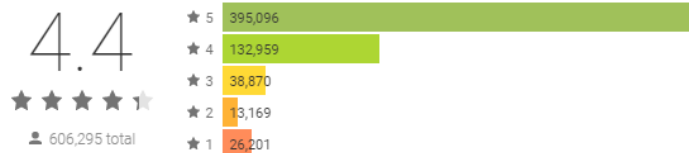


### Helpfulness ▾

- M** Michael solazzo June 2, 2015 ★★★★★  
**Feel safer** Great app! I have three girls and all of them have the app on there phones. Any extra safety i can provide for my children i do. Thank You!!!!
- Jesse Campbell** March 21, 2015 ★★★★★  
**This app could save lives** My only question is, why has it taken so long for someone to think of this? Amazing idea and great app!
- A.B Jenkins** March 21, 2015 ★★★★★  
A+++ Great app!
- Aaron Blile** April 4, 2015 ★★★★★  
**Siren gps** I am giving three stars because it won't download but believe it is an amazing product. I have recently invested with hdsi who has signed a strategic agreement with siren gps, and am hoping you guys are a huge success, not only will it make you millions, it will give me some cash! Haha
- Victor Gotthardt** March 3, 2016 ★★★★★  
**must register and log in** must create username and password / totally disliked and deleted it super quick

## A.3 Siren GPS Feedback

### REVIEWS



- Debbie Mitchell** ★★★★★  
*This app totally works for all the people you put in your circle. All they need to do is*
- Donna Vasquez** ★★★★★  
*This app gives me peace of mind. My son now lives 5 states away from me and when*
- Rich Desilets** ★★★★★  
*Battery life is terrible. They've updated the app however after 1 hour of being unplugged my*
- Anonymous can** ★★★★★  
*Mostly app is great. Sometimes it says unable to locate for no reason. But mostly it is great*

## A.4 Family Locator Feedback



## APPENDIX B FYP 1 WEEKLY REPORT

### FINAL YEAR PROJECT WEEKLY REPORT

(Project 1)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 2
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

#### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Report overview
- Enhance the proposal writing report
- Start writing report Chapter 1

#### 2. WORK TO BE DONE

- Remaining chapters of report
- Develop the prototype
- Design poster

#### 3. PROBLEMS ENCOUNTERED

- Installing the android studio and start learning deep about the Java language
- Need to explore more functions that I have never learn before

#### 4. SELF EVALUATION OF THE PROGRESS

- Slow progress as I require more time to find the solution
- Need improvement on time management & programming skills

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 4
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Chapter 1 done
- Start writing the report Chapter 2
- Start design the prototype from the easier part
- Splash screen is a loading screen when launching the app

## 2. WORK TO BE DONE

- Remaining chapters of report
- Develop the prototype
- Design poster

## 3. PROBLEMS ENCOUNTERED

- The plugin error that leads to unsuccessful build.

## 4. SELF EVALUATION OF THE PROGRESS

- Moderate performance

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 6
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Chapter 2 done
- Start writing the report Chapter 3
- User login and registration page done

## 2. WORK TO BE DONE

- Remaining chapters of report
- Develop the complete prototype
- Design poster

## 3. PROBLEMS ENCOUNTERED

- Finding way on how to implement a map in a mobile application

## 4. SELF EVALUATION OF THE PROGRESS

- Need to catch up the time flow

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 8
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Chapter 3 done
- Start writing the report Chapter 4 & 5
- User edit profile page done
- Implement a simple map and display user current location done

## 2. WORK TO BE DONE

- Remaining chapters of report
- Develop the complete prototype
- Design poster

## 3. PROBLEMS ENCOUNTERED

Finding way on how to send an emergency message

## 4. SELF EVALUATION OF THE PROGRESS

Have to spend more time and patient to develop the prototype

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 10
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Chapter 4 & 5 done
- Start finalize the report
- Submit report draft
- Welcome screen that introduce the app to first time user DONE
- Share the emergency message with the user current location by selecting the particular messaging / social apps and enter the contact manually

## 2. WORK TO BE DONE

- Develop the complete prototype
- Design poster

## 3. PROBLEMS ENCOUNTERED

Finding way on how to detect the nearby hospital, pharmacy and police station

## 4. SELF EVALUATION OF THE PROGRESS

Have to spend more time and patient to develop the prototype

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 12
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Start finalize the prototype
- Submit the completed report with the right format
- Poster DONE
- Map that can detect the nearby hospital, pharmacy and police station

## 2. WORK TO BE DONE

- Develop the complete prototype

## 3. PROBLEMS ENCOUNTERED

Thinking of more features that can be added in the FYP2

## 4. SELF EVALUATION OF THE PROGRESS

Able to submit the report on time

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Supervisor's signature

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# FINAL YEAR PROJECT WEEKLY REPORT

(Project I)

<b>Trimester, Year:</b> 1, 3	<b>Study week no.:</b> 14
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Done the oral presentation
- Done the demonstration of the prototype
- Displayed the poster while presentation

## 2. WORK TO BE DONE

- Planning the FYP 2 final project

## 3. PROBLEMS ENCOUNTERED

So far no problem

## 4. SELF EVALUATION OF THE PROGRESS

Able to present on time and finish the FYP 1 schedule

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Supervisor's signature

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Student's signature

## APPENDIX C FYP 2 WEEKLY REPORT

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 2
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP 1 Report overview
- Enhance the FYP 1 report
- Start writing FYP2 report Chapter 1
- Combine the Splash screen and welcome screen

### 2. WORK TO BE DONE

- Remaining chapters of report
- Remaining features of project
- Redesign poster

### 3. PROBLEMS ENCOUNTERED

### 4. SELF EVALUATION OF THE PROGRESS

Moderate performance

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Supervisor's signature

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Student's signature



# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 4
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP2 report Chapter 1 done
- Start writing FYP2 report Chapter 2
- Redesign the User Interface of user login and registration in FYP1
- Request permission manually as android 5.0 and above require that

## 2. WORK TO BE DONE

- Remaining chapters of report
- Remaining features of project
- Redesign poster

## 3. PROBLEMS ENCOUNTERED

Associate the project data to firebase

## 4. SELF EVALUATION OF THE PROGRESS

Need more accurate time management

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 6
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP2 report Chapter 2 done
- Start writing FYP2 report Chapter 3
- User information page for first time user DONE
- Tutorial page that teach the user on how to using the app DONE

## 2. WORK TO BE DONE

- Remaining chapters of report
- Remaining features of project
- Redesign poster

## 3. PROBLEMS ENCOUNTERED

Finding way on how to develop a button that can send the emergency message to selected contacts

## 4. SELF EVALUATION OF THE PROGRESS

Manage to complete the project on time

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 8
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP2 report Chapter 3 done
- Start writing FYP2 report Chapter 4 & 5
- User able to select and edit the emergency contact list DONE
- User able to enter and edit the emergency message DONE
- User able to press the One Tap Button that send the emergency message with current location to the selected contact DONE

## 2. WORK TO BE DONE

- Remaining chapters of report
- Remaining features of project
- Redesign poster

## 3. PROBLEMS ENCOUNTERED

Sometime user is unable to send the message BUG

## 4. SELF EVALUATION OF THE PROGRESS

Manage to complete the project on time

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 10
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP2 report Chapter 4&5 done
- Start writing FYP2 report Chapter 6
- Finalize the report
- Implement a side navigation drawer DONE
- Redesign the map layout DONE
- User is able to edit the profile DONE

## 2. WORK TO BE DONE

- Remaining chapters of report
- Remaining features of project
- Redesign poster

## 3. PROBLEMS ENCOUNTERED

Finding way on how to implement a fast launch widget for user to send the message in an effective and efficient way

## 4. SELF EVALUATION OF THE PROGRESS

Overall performance is good

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 12
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- FYP2 report Chapter 6 done
- Submit the report draft
- Get the user feedback after using the app
- Testing the usability and functionality of the app
- Finalize the report
- Fast launch widget DONE
- User can long press the button to share on social apps DONE
- User is able to capture the photo as extra information DONE

## 2. WORK TO BE DONE

- Redesign poster
- Prepare the oral presentation and product demonstration

## 3. PROBLEMS ENCOUNTERED

## 4. SELF EVALUATION OF THE PROGRESS

- Can submit the draft report on time
- Able to finish the development of the application

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Supervisor's signature

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Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year:</b> 3, 3	<b>Study week no.:</b> 14
<b>Student Name &amp; ID:</b> Ong Jun Kai 15ACB04447	
<b>Supervisor:</b> Mr Lim Jit Theam	
<b>Project Title:</b> Developing a real time digital emergency personal safety apps to assist in emergency situations using best time	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Redesign the poster DONE
- Oral presentation DONE
- Product demonstration DONE

## 2. WORK TO BE DONE

- Project future development

## 3. PROBLEMS ENCOUNTERED

## 4. SELF EVALUATION OF THE PROGRESS

- Able to finish the whole project, oral presentation and product demonstration on time.
- Overall performance is good

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Supervisor's signature

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Student's signature

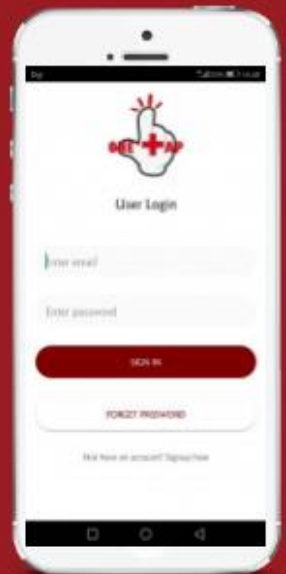
# POSTER

Developing A Real Time Digital Emergency Personal Safety App To Assist In Emergency Situations Using Best Time



## ONE TAP, SAVE LIVES

You can request help effectively and efficiently when involved in an emergency situation



### Problem Statement & Motivation

- People are concerning about personal safety issues which will often be threatend
- Malaysia has been ranked as the world top three road deathc In the accident
- Development an emergency safety app is the besy way to monitor the personal safety issues

### Objectives

- To propose an emergency personal safety app that could be used to assist in an emergency situation within the best time
- To research more function or improvement on the existing personal safety apps
- To let users to understand the type of emergencies and actions that should be taken to prevent tragedy scene happen
- To reduce the steps for documentation and time of reporting when there is an emergency happen

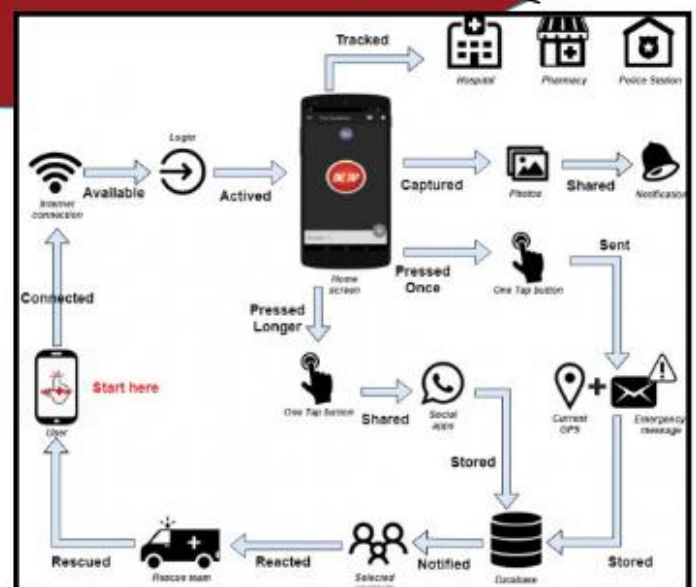


### Results

### System Design

### Awesome Features

- One Tap Button**  
Send an emergency message included current GPS to the selected contact
- Capture Real Scene**  
Eyewitnesses or passby user can capture the photo of accident happened and share to the app
- Track Nearby Places**  
Track the nearby hospital, pharmacy and police station by pressing a button



# Plagiarism Check Summary

**DEVELOPING A REAL TIME DIGITAL EMERGENCY PERSONAL SAFETY  
APP TO ASSIST IN EMERGENCY SITUATIONS USING BEST TIME**

BY  
ONG JUN KAI

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