POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

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SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

A Thesis Proposal
Presented to the
Department of Engineering Technology
Institute of Technology
Polytechnic University of the Philippines

In Partial
of the Requirements for the Degree
Diploma in Computer Engineering Technology

By

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POLYTECHNIC UNIVERSITY OF THE PHILIPPINES

CERTIFICATION

This thesis entitled **SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students** prepared and submitted **by Buenabajo, Nakia Jr. D., Guinalan, Kem D., Macaraig, Kristelle Joy M.,** and **Martos Jaimee M.** in partial requirements for the degree **DIPLOMA IN COMPUTER ENGINEERING TECHNOLOGY** has been examined and recommended for **Oral Examination**.

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CERTIFICATION OF ORIGINALITY

This is to certify that the research work presented in this thesis entitled SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students for the degree Diploma in Computer Engineering Technology at the Polytechnic University of the Philippines embodies the result of original and scholarly work carried by the undersigned. This thesis does not contain words or ideas taken from published sources or written works that have been accepted as basis for the award of a degree from any higher education institution, except where proper referencing and acknowledgement were made.

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ABSTRACT

This study is about design, development, and initial implementation of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. It identifies the problem encountered securing the safety of the students within outside the school premises and outside the school premises, the challenges identifying the current location of the students and the respondent's level of a acceptance towards the Emergency Tracking Device in terms of functionality, reliability, usability and performance. The researchers used efficient instruments/devices that meet the requirements on the development of the study such as survey and interview guide. The study used weighted mean to determine the value of response the respondents give to assessment of the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. The respondents of the study are the parents and students at Polytechnic University of the Philippines. The problems encountered in securing the safety of the students within the school premises the respondent mostly answers that the problem encountered in location detection is none, while there is a harassment in terms of students in need police assistance and unexpected accidents in terms of medical assistance. For the problems outside the school premises the respondent's answers that the problems encountered in securing students outside the school premises in terms of location detection is student being lost and hard to locate. In terms of Police assistance, the problem encountered is student getting robbed, encountering a kidnapper and a suspicious person stalking and in terms of medical assistance outside

school premises accidents and health problems are the problems they encounter. For the respondent's level of acceptance in SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students in terms of functionality (4.54); reliability (4.5); usability (4.59); performance (4.01). The researcher proposes the following recommendations to the project. The device should retail cheaper than others so that many families can afford to buy it in the market. It is better to use this device outside the school premises than inside the school premises. The researchers should do some test in the performance of the device for the buyers to see how effective the device works.

Keyword: SMS-Based, Tracking Device, Location Tracker

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CHAPTER I

THE PROBLEM AND ITS BACKGROUND

Introduction

Along with the sudden growth of technology in the world there comes the improvement of various devices that helped us in having different kind of communication to our family, friends, co-workers, students or even the distinct people across the country. Years had passed and different kinds of devices are already in the market, technology never stops from enhancing. Thus, giving birth to one of the essential tools that helps us vastly in the most situations the Global positioning System or also known as GPS.

GPS commonly used by the military in their operations due to its capability of tracking an object or personal movements, giving them the best possible location in term of strategic plans. Scientist also use this device to track movements and habits of some animal species giving them more information for further studies. As time goes GPS has now been innovated to be used by the civilians and now been a common peripheral to our smart phones. GPS today has been utilized by the innovators to provide help to different branches of health and security.

As crime rates differ widely across different times and different places, for variety of reasons, it is obvious the crime rate is increasing day by day in our society. In fact, based on the data statistics of the Crime and Research Analysis Center given by the crime incidents gathered by the reporting police officers from the period of January to May 2018, there are an average of 84.43 crimes that occurs every month

in the National Capital Region. As the crime rate increases and the new technologies emerge, GPS is now often used in law enforcement operations due to its capability to locate a person, a criminal or a victim whenever a crime or an emergency occurs to provide a faster assistance by finding a best possible route to take that can be seen by mapping and surveying positions in the shortest time. Technologies like this when used properly this would help thousands and millions of lives, especially nowadays crime had been occurring in our country it became a very alarming issue throughout the country.

As faster growth of the technology specifically the Global Positioning System (GPS) a technologically sophisticated navigation system that broadcast location information. GPS was originally designed for military use it was later declassified and released to the public in the year 2000. Much like personal computers, the technology quickly became faster, smaller, and cheaper. In less than a decade, GPS technology has spread like wildfire and is used in a wide array of applications. The most common applications have been land, air and marine navigation, and surveying. It has become an integral part of daily life for many individuals and geographic information systems, as well as businesses, construction, resource, environment, and agriculture. This implication has greatly impacted the transportation field by creating a novel and rich source of traffic data on the road network. Although the promise offered by GPS devices to overcome problems like underreporting, respondent fatigue, inaccuracies and other human errors in data collection is significant; the technology is still relatively new that it raises many issues for potential users.

GPS technology has been embedded into portable, low-cost electronic devices nowadays to track the movements of mobile objects. An electronic tracking device (also called a transponder) is a 'one-way radio communication device that emits a signal on a specific radio frequency, which can be received by special tracking devices and enables the user to track the transponder's geographical location. Electronic tracking can be distinguished from electronic surveillance equipment because the subject's location is the primary objective of tracking. Surveillance involves seeing the subject or hearing it. Tracking meant following the trail of evidence left behind by the subject: its smell, fingerprints, footprints, etc. (Thomas Gale 2013).

In this study the researcher aims to use the Global Positioning System (GPS) as an innovative peripheral for a signaling devices that will be used for law enforcing and health emergency response for a faster tracking of the locations of a victim, a patient and a lost person specifically in the barangays of the Philippines. The researcher decided to target barangays in the Philippines because it is most likely the best possible portion of a community to for a small-scale study, in addition barangay is most likely to respond first in a possible crime or provide help to a health emergency.

This research is conducted to statistically observe the effect of the GPS based signaling device to the rate of the crime related acts and missing persons inside the barangays. The research also aims to lessen the crime rate in every barangay and provide the best possible way to respond in emergency situations. Lastly the researcher also has the intention to recommend a GPS based signaling device to every barangay to provide a better security assurance of every person inside the

barangays and to avoid the fear of missing person. The study will be supported by a statistical presentation treatment in gathering data to provide a better accuracy.

Theoretical Framework

The researcher used the Input Process Output (IPO Model). The model is based on a context input process output model that originated in systems thinking and has been widely used in school effectiveness research (scheerens 2000).

In the IPO model a process is viewed as a series of boxes processing elements connected by inputs and outputs. The inputs represent the flow of data and materials into the process from the outside. The processing step includes all tasks required to effect a transformation of the inputs. The outputs are the data and materials flowing out of the transformation process.

Conceptual Framework

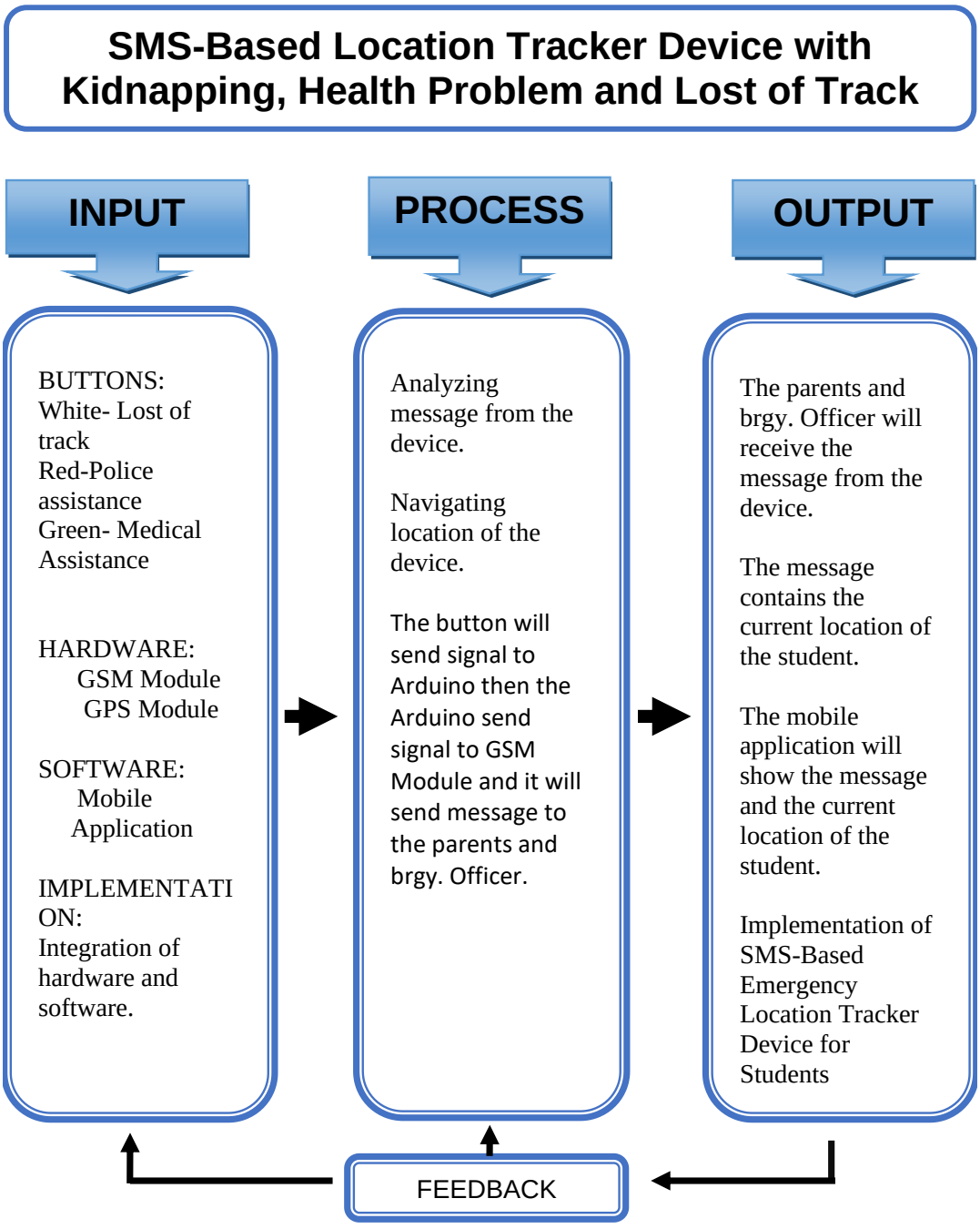


Figure 1

Statement of the Problem

The aim of the present study is to develop an SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. Specifically, this study sought to answer the following sub-questions.

1. What is the profile of the respondents in terms of;

    A. Age;

    B. Sex; and

    C. Household Income?

2. What are the problems encountered in securing the safety of students in terms of;

    A. School premises

        A.A. Location Detection;

        A.B. Police Assistance; and

        A.C. Medical Assistance;

    B. Outside the School Premises;

        B.A. Location Detection;

        B.B. Police Assistance; and

        B.C. Medical Assistance?

3. What are the challenges in identifying the current location of the student in terms of;

    A. Accuracy;

B. Reliability; and

C. Ease of use?

4. What is the respondents' level of acceptance towards the Emergency Tracking Device with Location Sender to Parents and Barangay Office in terms of:

A. Functionality;

B. Reliability;

C. Usability; and

D. Performance?

Significance of the Study

This study focused on securing the welfare of the students by sending an SMS to the barangay officials and their parents if they are in danger or need of a medical assistant. Moreover, the results of the study will be beneficial to the following:

Students. The proposed study can help the students to secure their safety by using this device. They can convey the message if they are lost or they are needing ambulance or police, asking for help according to what situation they are in.

Parents. This study can help the parents monitor, the whereabouts of the students and be informed if they are in danger.

Barangay Officials: This study can help the officials to know if there are students who are in need. They can immediately report to the police officers if there are students who are abducted or missing, and if the students need medical assistant, they can call an ambulance.

Police Officers: This study can help police officers do their job easily. Having a tip where the students are, they can make an action immediately to save the student.

Future Researchers. The findings of the study will serve as reference material and a guide for future researchers who wish to conduct the same experimental study or any study related to GPS Tracking Devices and SMS technology.

Scope and Limitations

The study focused on designing an SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students in the Institute of technology of Polytechnic University of the Philippines. This device is designed to send a message to the parents and barangay office the location of the student and what kind of emergency they are in. A device that will help the students to tighten their security and avoid kidnapping cases.

This study focuses to the students that are prone to emergencies with the age of 12-17 years old. Students who have disease that always need a medical assistance. Students that is prone to bad guys specially when they are going home alone. They will need police assistance. And the students that is more likely to be lost.

This Device has the following features: (1) It has three buttons for being kidnapped, health problem and students is lost. (2) The parents can locate the student’s whereabouts. (3) The device can send an alert message to the parents and barangay. (4) Android app for the parent and barangay office to easily locate the

students. (5) GSM module that responsible for sending the location of the device to Android Application.

This study is limited to: (1) the device is implemented for students use only. (2) can be used to locate the student's location. (3) The proponent would only bring one device for used as demo sample on the final defense.

Definition of Terms

Abducted - to seize and take away (a person) by force.

Amber Alert System - a public alert system that spreads information about missing persons by using the broadcast media and electronic billboards on highways.

Global System - include the environmental, political, legal, economic, financial, and cultural systems that help to make and remake the world.

GPS- Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object.

Lack of Security - insufficient security.

Lack of Trust - a feeling that someone or something cannot be trusted.

Mobile Communication - is the use of technology that allows us to **communicate** with others in different locations without the use of any physical connection (wires or cables).

Mobile Device - A mobile device is a handheld tablet or other device that is made for portability and is therefore both compact and lightweight.

Personal Locator - an emergency radio locator beacon with a two-way speech

facility carried by crew members, either on their person or in their survival equipment, and capable of providing homing signals to assist search and rescue operations.

Psychological Trauma - is damage to the mind that occurs because of a distressing event.

SMS - stands for "Short Message Service." SMS is used to send text messages to mobile phones.

System Developer - is a type of software developer. They develop and implement applications and programs for the backend processing systems used in businesses and organizations.

Tighten Security - to become stricter in security or effective or to make (something) more strict or effective.

Tracking device - an electronic or mechanical device which permits the tracking of the movement of a person or object.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter discusses significant literature and studies that have born to this current study. This part is intended to place in proper context and to review previous researches that are relevant to this study.

In the article, "The Emerging Ethics of Human Centric GPS Tracking and Monitoring" stated that the concept of tracking and monitoring is far from novel. Many researchers conduct experimental studies about the control aspect of GPS tracking and its intrusive method of supervision.

One of its control aspects is, parents tracking their child. Because of a huge record of kidnapping cases, the parents tracking their child become more and more popular each day. The child who has lost or kidnapped has a better chance of being found if they are using a GPS device that has features in alert of emergency. But according to this study (Mcname, The Emerging Ethics of Humancentric GPS Tracking and Monitoring, 2006) tracking the child can cause an unhealthy relationship with their parents if the child has no record of kidnapping or being lost. The child might get the wrong idea of being monitored, thinking that their parents are replacing their trust in technology than trusting their child. The truth is, parents are tracking their child because of safety purposes, not for spying.

In the study of "Ethical Issues Arising from the Real-Time Tracking a Monitoring of People Using GPS-based Location Services" the article "Four Ethical Issues of the Information Age" develops an understanding of ethics with relations to IT. The

GPS location data can only consider as a viable data source if the data is accurate. So, the four issues in the article have a huge role in the encryption of geographical data. Securing the privacy, accuracy, property, and accessibility.

A. Location Detection

Technologies nowadays, helps us to easily locate every device or users of the devices' whereabouts. Commonly devices that are easily located are the computers, smart phones, laptops, personal digital assistance, and gaming console. Location technologies, such as GPS are included as the standard feature in many new mobile phones. (AUSTRALIAN GOVERNMENT, 2010)

The accuracy of location information varies depending on the location detection technology used. For example, the GPS is a network of 24 satellites established and operated by the United States Department of Defense. Each satellite emits a signal that can be detected by a receiver. The satellites are positioned so that a minimum of four can be detected simultaneously by a receiver anywhere on the Earth's surface. A receiver can determine its location with a high degree of accuracy by calculating the amount of time it takes for the signals emitted by the satellites to reach it. Alternatively, the location of a mobile telephone can be determined with a moderate degree of accuracy by calculating the time a signal takes to receive three or more base stations. Geo-location technologies can determine the location of an individual's IP address with a degree of accuracy that, depending on source

and circumvention factors, ranges from country to city to street level. (AUSTRALIAN LAW REFORM COMISSION, 2010)

B. Tracking System

According to LPU-Laguna Journal of Engineering and Computer Studies, "tracking has become a part and parcel of almost everyone's lives in this century" because our world seems so busy and getting a control in locating our processions' like cars, valuable things and our love ones helps us to feel at ease. The Global Positioning System gives tracking units the sense of power and modification, it helps to identify the exact location, the speed of a vehicle and the time of its arrival, or the other things including one's assets to which the unit is attached to. And because we are in a technological era, GPS today has more features. Now the GPS can also implement in mobile phones and computers with the Internet.

Generally, Tracking System is used to observe the persons or objects moving in such an area. In the study of "Real-Time Cost-Effective of People Tracking System", People tracking system is one of the various useful applications caused by the wide coverage of mobile and satellite networks. Using mobile technology, encountering precise information when it is used in some urban areas are normal because of populated antenna towers, however, in rural areas with few inhabitants can contain fewer base stations.

According to this research (Adwan, 2015), Mrunmayee, proposed using two technologies of GPRS and GPS where it is a cost-effective method of

tracking a human's mobility. The mobile phone can be an alternative to have a cheap cost of device because it has an inbuilt GPS receiver. The mobile phone application is in charge of tracking the GPS location and send it to a remote location by creating a GPRS packet.

Mobile phones with embedded GPS receiver used integrated with GPRS can design and develop solutions cost-effectively which could be reduced the overall cost and make it available for common people. (Adwan, 2015)

C. Relation to Health and Crime

According to International Journal of Health, there are important relationship between our health and the places where we are that is why they focused on designing a wearable GPS data logger for the purpose of examine such relationship between health-related outcomes and patterns of mobility (Rainham, 2008)

The notion of the places where you work, live and play in health research has a spatial analysis and context that compromises your social relation, exposures and physical resources that can affect in your health status. As spatial unit, place is a space with boundaries commonly used for categorizing and discretizing predictors of health status. As context, places can be defined by the significance and meanings people attach to locations where health promoting, or health suppressing activities occur. The idea of place as a determinant of health status has recently become a crucial

focus of national population health initiatives. An increasing number of empirical studies in medical geography and epidemiology have determined that characteristics of place are associated with variations in health-related behaviors and outcomes, even after individual-level attributes and behaviors are considered. (International Journal Health Grapics, 2008)

In the 25th Revolution, Egypt suffered from the phenomenon of child abduction for money ransom. This dilemma became "the terrible nightmare "of every parent in Egypt. They became more worried and terrified for the safety of their child. That is why Dra. Ayman Mohamed Afifi proposed the study of "Using of Tracking systems for devices designing to face children Kidnapping Phenomenon (GSM –GPRS -GPS)". So, the research is concerned not only to the security of the children but also to the mental tranquility of the parents in the Egyptian community.

In this study (Afifi, 2013), the researcher can design shoes connected to a belt containing the GPS tracking system with cellphone and motion-detector capabilities. By alarming the button, the smart GPS shoes can easily track the location of your child. You will be informed where the exact location of the child is, confirm the position of it and can keeps track the children 24/7.

Synthesis and Relevance of the Reviewed Literature and Studies

The related literature and studies we have gathered give additional concepts related to the statement of the problem which help to know the effectiveness of “SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students” and how it will be helpful in the community and to the lives of human being. The researcher wants to know a solution that can help human being in case of emergency to protect them in situation like kidnapping or medical emergency.

The government and communities want to take an action to the rising cases of kidnapping around the country. Gathering different ideas on how to lessen these criminal cases to prevent the rising and the effect of this to human being. Like the amber alert system that helps to search the abducted children by broadcasting the information related to the children who is being abducted.

But like what the article “The Emerging Ethics of Human Centric GPS Tracking and Monitoring” said the child who is being monitored can be misunderstood the idea of being monitored. They can think that their parents have more trust in the device than their own daughter or son. So, the idea of Afifi that designing a shoe connected to a belt containing the GPS tracking system with cellphone and motion-detector capabilities is somewhat amusing. Because it can divert the thinking of a child by being not to be trusted to having a cool device with them.

Tracking has become a part and parcel of almost every person in the world. Being on control of something nowadays is giving an assurance that what you have

ordered or what you possess is in a good shape. Because of this, mobile phones with built in GPS became popular but the problem on this, it has a poor signal in rural areas. It is not convenient to use if it has no signal.

Chapter 3

METHODOLOGY OF THE STUDY

This chapter presents the methods that will be used for the study and the procedures that will be taken as well. The topics explained in the foregoing paragraphs are the methods of the research to be used, population, description of respondents, research instrument, data gathering and statistical treatment of data.

Methods of Research

This study is an educational research and development project that used the combination of Developmental and Descriptive Scheme in qualitative methods of research. Developmental research is a systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet criteria of internal consistency and effectiveness. (Richey, 1994) This methodology focuses more on the “what” of the research subject than the “why” of the research subject. In other words, it “describes” the subject of the research, without covering “why” it happens. (Question pro, 2021)

Descriptive research involves the collection of data to test hypothesis and to answer questions concerning current status of the subject of the study.

The researchers conducted a survey and interview with the used of google forms because of pandemic, to avoid being prone and infected of the corona virus. They prepared a list of topics and questionnaires to be used in the discussion with the respondents. They also sought over the web for additional information that is relevant

to the study. The published experimental study, documentary analysis, organizational information, organizational literature, and relevant publications. The researcher used this kind of data gathering because it is inexpensive and easy to access information.

Population, Sample Size, and Sampling Technique

Before the sample was collected, the researcher had to determine the population. According to Scribbr (knowledge base, n.d.) population is the entire group that the researcher wants to draw conclusions about. They are the complete set of elements that possess common characteristics by the sampling criteria.

The target population for this research defined to include the parents and the students at Polytechnic University of the Philippines. The total number of respondents will be used as a medium in measuring the effectiveness of the proposed device.

Table 1

Population of the Study

Respondents	Number
Parents	**30**
Students	**70**
Total	**100**

The proponent's total number of respondents surveyed are 100. The researcher used non-probability sampling technique which involves non-random selection based on convenience and subjective judgement, allowing the researcher to easily collect data.

It is carried out by methods of observation and is widely used in qualitative research. (Qestion pro, 2021)

The purposive sampling technique is used by the researcher as one way basis to achieve a manageable amount of data.

Description of the Respondents

The potential respondents were the parents and students in Polytechnic University of the Philippines. Those persons have been invited to participate in a particular study and have taken part in the study. A survey questionnaire was given to the respondents to know what they think about this study with their point of view and opinion. And conducting an interview to the parents of the students in PUP to know their stand about this study.

Research Instrument

Researcher used efficient instruments that met the requirements of the development and effectiveness of the study such as:

1.Survey- This research instrument consists of set of questions that aims to collect information from a respondent. It is a closed question type of survey

questionnaire. Conducting survey is one form of primary research. And in the future, it this survey can be used on secondary research.

2.Interview- It is the interaction where verbal questions are posed by an interviewer to elicit verbal responses from an interviewee. The researcher used video call to conduct online interview to the respondents. Furthermore, researcher prepares a topic list related to the study which can be used in a flexible manner before the start of the interview. The skills of the researcher are of importance to develop a sense of trust to obtain valid responses.

Data Gathering Procedure

Data collection is the procedure of collecting, measuring, and analyzing accurate insights for research using standard validated techniques. The researcher can evaluate their hypothesis on the basis of collected data. (Qestion pro, 2021)

There are two types of data, first is Primary data which is a type of data that is collected by researchers directly from main sources through interviews, surveys, experiments, etc. And usually collected from the source—where the data originally originates from and are regarded as the best kind of data in research. Second is the Secondary Data which is the data that has already been collected through primary sources and made readily available for researchers to use for their own research. It is a type of data that has already been collected in the past. (Formplus, 2021)

Statistical Treatment of Data

The study used weighted mean to determine the value of response the respondents give to assessment of the SMS-Based Emergency Location Tracker Device for Students. The statistical formula for the weighted mean is:

$$Wm = \frac{TwF}{N}$$

Where:

Wm = weighted mean

TwF = total of the products of the weight, multiplied by the -corresponding Frequencies

N = number of raters or total frequency

Likert Scale

The researcher used a Likert Scale, this type of rating scale used to measure attitudes or opinions. With this scale, respondents are asked to rate items on a level of agreement. These items are called Likert Scale Response Anchors. Once the respondents have answered, numbers are assigned to the responses as shown in table below.

Table 2 shows the rating for the types of pieces of equipment, factors to consider on purchasing, and properties of pieces of equipment to be used in evaluating the SMS-Based Location Tracker Device with Kidnapping, Health

Problem and Lost of Track Emergencies for Students in terms of functionality, reliability, usability, efficiency, and performance.

Table 2

Rating and Interpretation

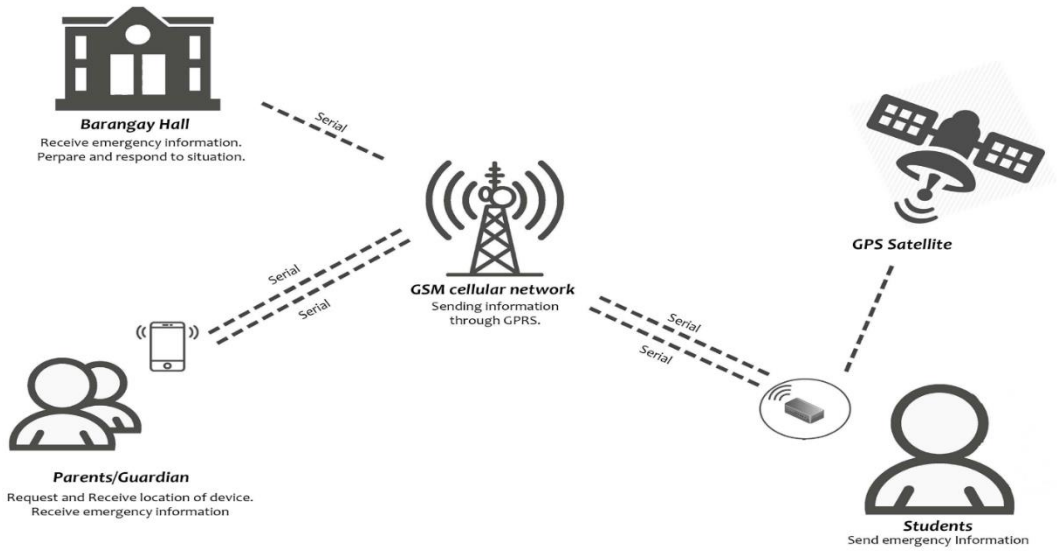
Types of Materials preferred for SMS-Based Emergency Location Tracker Device for Students	Most Appropriate Pieces of Equipment to Use on SMS-Based Emergency Location Tracker Device for Students	Factors to Consider on Purchasing the Pieces of Equipment for Emergency GPS SMS-Based Emergency Location Tracker Device for Students	Properties of Pieces of Equipment for SMS-Based Emergency Location Tracker Device for Students	Ratings
Very Much Effective	Very Much Effective	Very Much Effective	Very Much Effective	1
Highly Effective	Highly Effective	Highly Effective	Highly Effective	2
Effective	Effective	Effective	Effective	3
Less Effective	Less Effective	Less Effective	Less Effective	4
Not Effective	Not Effective	Not Effective	Not Effective	5

Data Flow Diagram of the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

To have a better view of the proposed system process and development, the researcher includes two diagrams: The Context Diagram and the Block Diagram.

The system is composed of two modules: Parents Android Application and Barangay Android Application. Parents has a corresponding access to monitor and receive SMS from the device while the Barangay Office can only receive an SMS.

The proposed device enhances the security of the students and the effectiveness of technology.



Context Diagram

Figure 2

The figure shows a context Data Flow Diagram for the proposed SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. It contains the process that represents the system to model. It also shows the tools which will interact with the device, called the external entities.

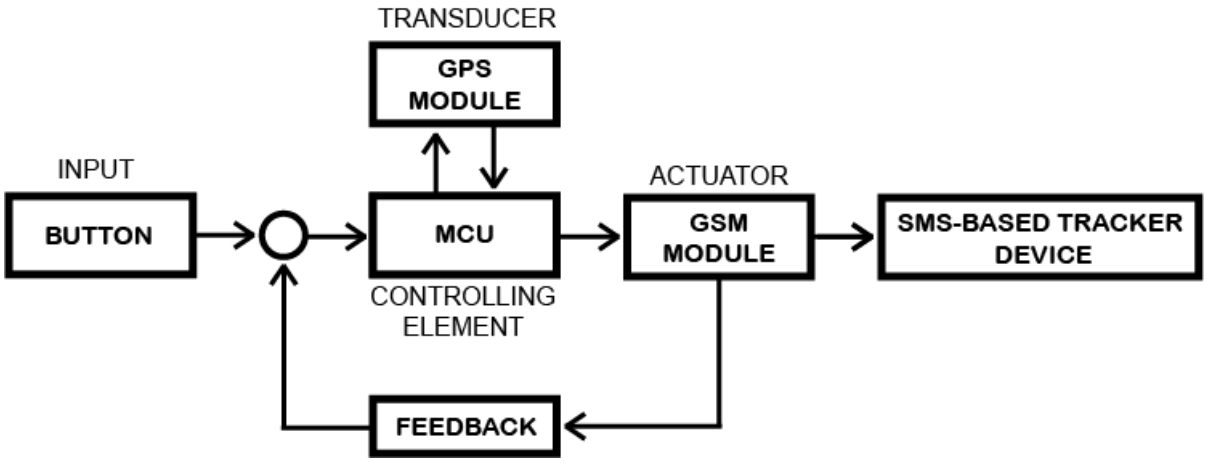
In this sample the Emergency GPS Tracking Device System are based on tracking GPS location and sending emergency information. Tracking GPS location are made possible by the GPS module inside tracking device that act as a receiver that is constantly listening for a signal from satellites. The receiver figures out how far away

they are from some of them. Once the receiver calculates its distance from four or more satellites, it can now identify the location.

In the Emergency GPS Tracking Device System there are three buttons for three kinds of emergency whether student need a police assistance because the student is being abducted, medical assistance because the student has a serious health problem and lastly if the student were lost and can't find its way home. When a button is pressed by a student an information that will be converted into a serial will be passed to GSM cellular network.

GSM cellular network will pass those serials into two different locations, the first SMS location is to parents/guardian for them to be informed of what emergency situation their son/daughter undergo. The second location that the SMS will be passed is to the Barangay Hall informing them what type of emergency encountered and the location of the person. Barangay Officials will communicate to the parents/guardian and will prepare the needed equipment's and officials to handle the emergency and by knowing the location they can prepare the route to respond as quickly as possible.

Emergency GPS Tracking Device System also have an SMS features if the parent/guardian just want to know the location of his/her student. The parent will send an SMS with a code that will be handled by the tracking device for it to send the location of the student.



Block Diagram

Figure 3

The Emergency GPS Tracking Device is the device that is held by the students that acts as GPS receiver and SMS sender and receiver, it consists of a GSM module, microcontroller board which is an Arduino pro mini and a GPS module. The GSM module is hardware device that uses GSM mobile telephone technology to provide data link to a remote network. When the GSM module receive an SMS, the SMS will be transferred into the Arduino pro mini.

Arduino pro mini a microcontroller board based on the ATmega328 will process the SMS received, it will identify if the SMS contains the code needed by the Arduino pro mini. If the SMS contains the code the Arduino pro mini will send serial to GPS Module and the GPS module will get its current location, date, and time this information will be sent as a serial to the Arduino pro mini. When the Arduino pro mini collect the required information needed it will compose a SMS message, after composing the Arduino pro mini will pass it to the GSM module for it to send the information.

The buttons in the Tracking Device are for three different situations medical, crime incident and the student being lost. When one of those buttons is pressed the Arduino pro mini will receive its serial, after the serial is receive the Arduino pro mini will send a serial to the GSM module, the GSM module will calculate the current location, date and time and pass back the information to the Arduino pro mini. After the Arduino pro mini obtain the information from GSM module it will now compose a message that contains what type of emergency by processing the serial from the pressed button and the information obtained from GSM module. When the composition was done the SMS message will be forwarded to the GSM module and will try to send the information though GPRS. After the GSM module try to send the SMS message it will send a serial to the Arduino pro mini if the message was sent successfully or not and the Arduino pro mini will send an output through the LED.

CHAPTER 4

PRESENTATION, ANALYSIS, AND RESULTS

For this chapter, presentation, and analysis of results of the project where identified. It composed of all the components needed in the manufacturing of the project. It also includes the system flowchart, layout of the program, and the source code for the software itself. For the hardware side, it also illustrates the block diagram, schematic diagram and foil layout for the circuit used. Moreover, it explains on how the project is being implemented.

Components of the Proposed System

Table 3 shows the hardware components used in the Design Project.

TABLE 3

Hardware Components for the Design Project.

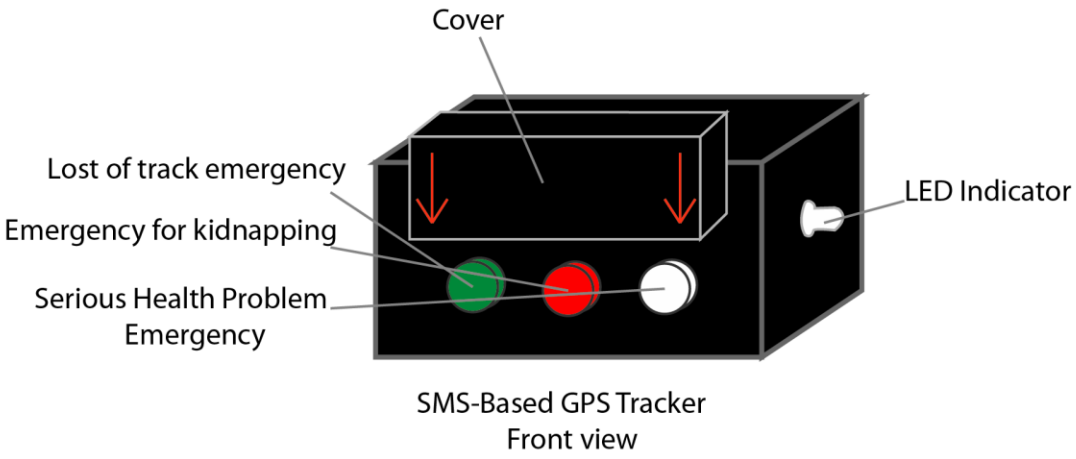
HARDWARE USED	DESCRIPTON
Arduino Pro Mini	The Brain of the system. Where all the components are connected to it
SIM800L Module	Where the SMS messages send and receives.
GPS Module	Provides the coordinates of the device location.
Tack Switch	It serves the button of the device that operates what emergency the user need.
Smart 5G Sim card	Network service provider of the prototype.

3000mAh Battery	Provides power to the device.
Boost converter	It converts the 3.75V of the battery to 5V power supply. It can protect the battery to overcharge.
LED Indicator	Shows what emergency was pressed to the prototype.
Universal PCB	Provides wireless transactions across devices.

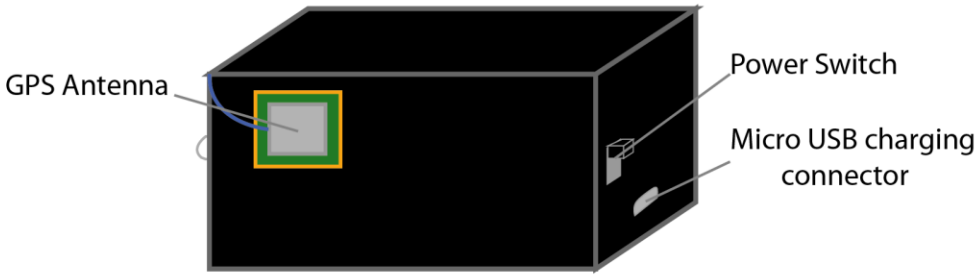
Below picture shows the device of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students.

The image shows the Tracker device's case is made up of aluminum sheets It also shows the front view and back view of the Tracker device. It measures 2 X 2 X 4 inches. At the front side view of the Tracker device shows the 3 tactile switches with specific color: Green button for medical assistance when the student has serious health problem, Red button for police assistance when the student has been abducted and White button if the user is lost. It also shows the indicator LED.

Furthermore, the Tracker is made up of aluminum sheet to make sure the heat temperature inside the device is low to prevent damage the Arduino Pro Mini. The antenna of the GPS Module is exposed outside of the prototype to get a signal for the GPS Module. And most importantly, the button has a cover to prevent pressing the buttons unintentionally.



SMS-Based GPS Tracker
Front view



SMS-Based GPS Tracker
Back view

Figure 4.1

TABLE 4

Software Components of the Design Project

SOFTWARE USED	DESCRIPTION
Arduino IDE	Used to codes and program the Arduino Pro MIni
Android Studio	Use to create a mobile app supported by android phone.

4.2 Hardware System Implementation

In order for this project to be implemented, it must undergo functionality testing. The researcher goes to every place and test if the GPS module of the device is working properly and if the button is working. The SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students will be implemented to the barangay office and for the parents that want to monitor their child.

4.2.1. Procedures in the Design & Fabrication of the Circuit or Device

After so, the proponents evaluate all the existing projects gathered by the researchers. The block diagram and designing different circuitry is then created using an express schematic program. In order to place the components of the device correctly. The proponents use universal PCB to connect all the components in the way it is properly place. After connecting it, the proponents use a soldering iron to fix the connected components to the PCB.

4.2.2. Detailed Procedures

The following general processes should be accomplished:

1. Research and Data Gathering.
2. Analyzing and Planning.
3. Circuit Designing and Programming.
4. Testing.
5. Debugging.
6. Implementation.

4.2.2.1. Research and Data Gathering

The first step in developing a plan for the project is to research similar projects. The proponents also gathered feedback information from student, parents and experts.

4.2.2..2. Analyzing and Planning

In this point, the gathered data and ideas of various people will be analyzed. The following phase is planning, which includes deciding on a design project. At this stage, the proponents consider a technology-based initiative that will primarily and most likely assist individuals in their growth. As a result, the proponents devised a project to create a more practical device that would have an effect on individuals and stimulate their interest.

4.2.2.3. Circuit Designing and Programming

After doing extensive research and analysis, the next step is to design the circuit with all of the hardware components. After designing the circuit, the next step is to put it into practice. This section applies circuit diagram compression such that

when the schematic is printed, it can result in a compressed and informative circuit design.

4.2.2.4. Testing

All projects can encounter various issues, ranging from the simple to the complex, and functionality checking and debugging on a regular basis is a good practice to follow. The proponents recognize the accuracy of the GPS module progress as well as the input and output from the device.

Several tests are carried out after the development of hardware and software materials in order to achieve the desired result. And although there were several concerns during the experiments, the proponents were able to consider multiple possibilities. One of the problems that proponents encountered is the signal of the GPS module where the signal of the GPS module is low when inside the premises. So the proponents place the antenna of the GPS module outside of the casing of the prototype.

Figure 4.5 presented above shows the GPS Antenna is placed outside of the prototype's casing. Due to the required signal of the GPS module, the GPS module can't get a signal when the antenna is inside of the prototype circuit and causing it not to work properly.

After several research have been done, the proponents finally come up with the working circuit diagram containing proper placing of the components which can provide the right signal of the GPS module.

The project would be considered a success if and only if the planned performance was achieved when proper interfacing, a functioning database software, readers, and computers were taken into account.

4.2.2.5. Debugging

Debugging will take place if a problem happens during the application or software testing. After a purely finished program, some problems occurred on the System. To cite a few, one of the issues that arise during the testing phase is the display of specific location of the prototype to the android program. As more details to be describe the program that the proponent uses to the device is when receiving the text message from the prototype the location that received is not accurate. The cause of this problem can be the codes in the android program or codes in the Arduino. After some changes and the improvement of current codes, the location that detects the prototype has been accurately correct showing in the android program.

4.2.2.6. Implementation

Along with all of the hard work of studying and testing, the next step will be to integrate the hardware and software and include them in the project's execution, including the prototype, to ensure that all of the objectives are met.

4.2.3. Schematic Diagram and Component Analysis

In designing the circuit for device, it is a must that the portability and concise circuit design and lay-out must be observed. Since some of the tools would be handheld, the circuit configuration must take into account that the modules are close together but do not conflict with their functionality.

4.2.3.1. Schematic Diagram of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

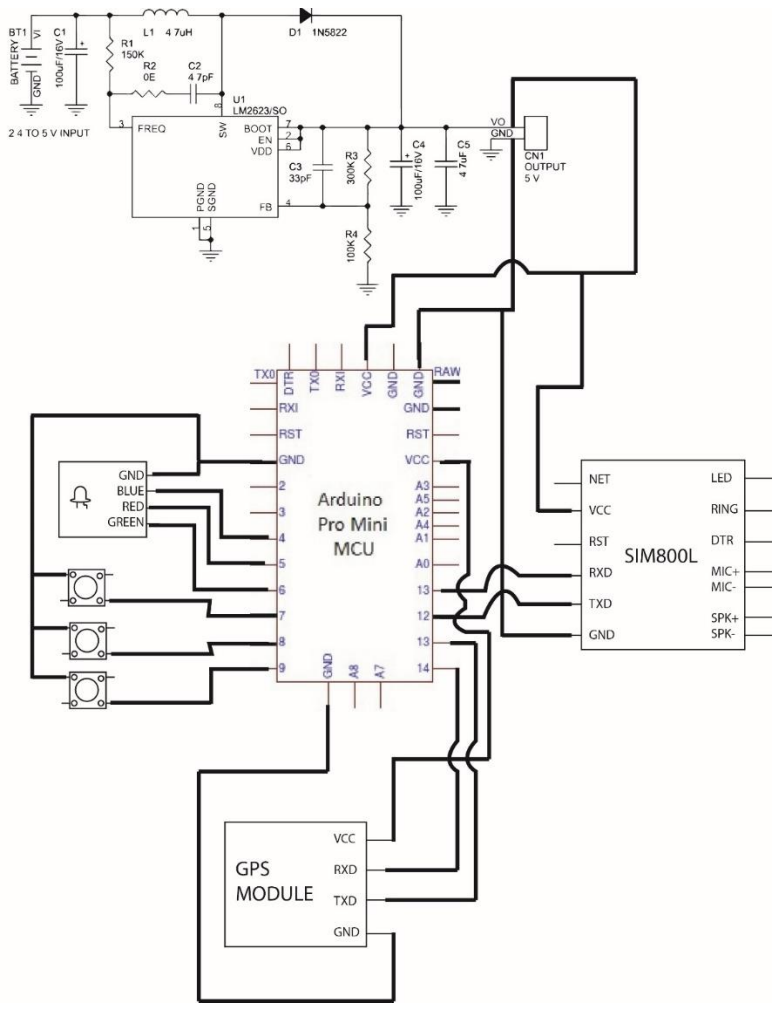


Figure 4.2

Schematic Diagram of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

4.3. Fabrication of the Devices

In fabricating the devices, the proponents follow certain steps and procedures.

Designing of prototype of the device

The proponents first created a measurement of the prototype's casing and cutting the aluminum sheets and drilling it with holes to attach them with screws.

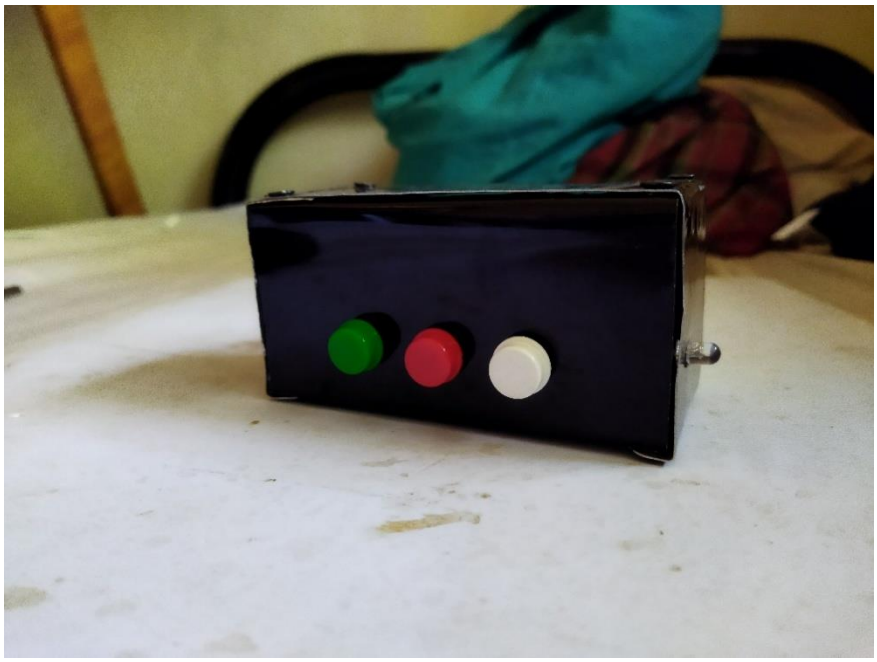


Figure 4.3

Front view image of the prototype

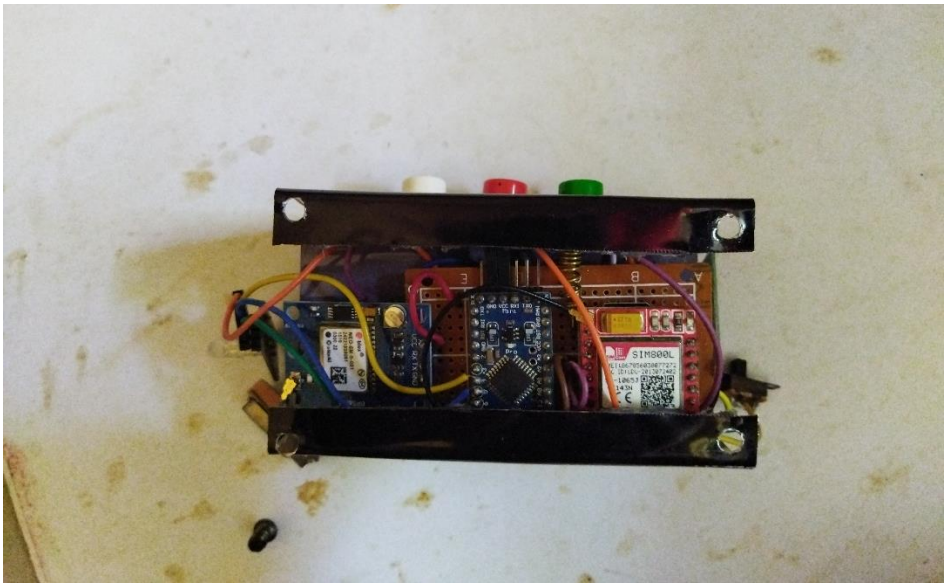


Figure 4.4

Image of the circuit design

Putting and fixing circuit components

Many of the circuit components must be laid out with caution. To achieve the desired flexibility of the circuit, proper polarity, pin positions, and part displacement must be followed.

Implementing the Program

In this case, it is the source coding part for the prototype. To get the desired features out of the applications, advocates do multiple studies in order to develop a program that the computer can comprehend.

Manufacturing of the Customized Enclosures

This shows the customizing the enclosure and the presentation of the prototype. The proponents used aluminum sheets as the main for the enclosure of the prototype to prevent the IC of the Arduino pro mini to overheated. Figure 4. shows the image of cutting the aluminum sheets into its correct size for the prototype. The proponents used measuring tool to obtain the right size of the enclosure to be cut out.

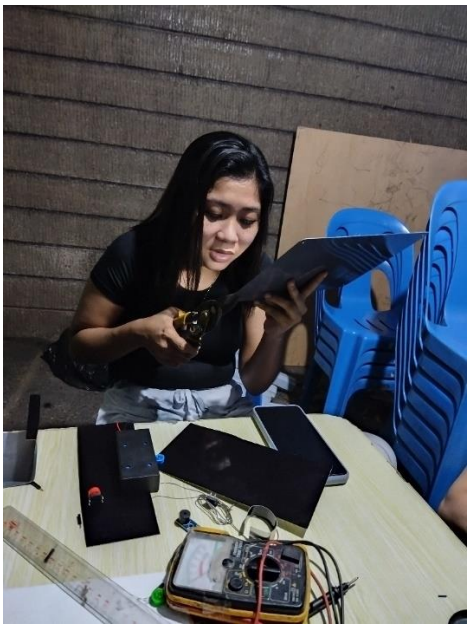


Figure 4.5

Image of cutting the aluminum sheet

Figure 4.6

Image of cut-out and drilled enclosure

Testing the Accuracy and Functionality

This part is the accuracy and functionality test. The proponent test the accuracy and functionality of the prototype by going different places outside the premises.

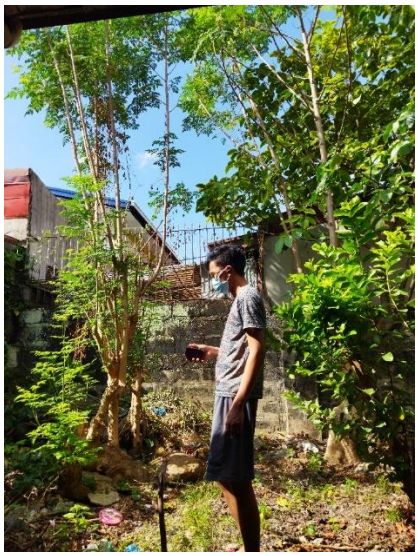


Figure 4.7

Image of testing the Tracker Device outside the premises

4.4. Block Diagram

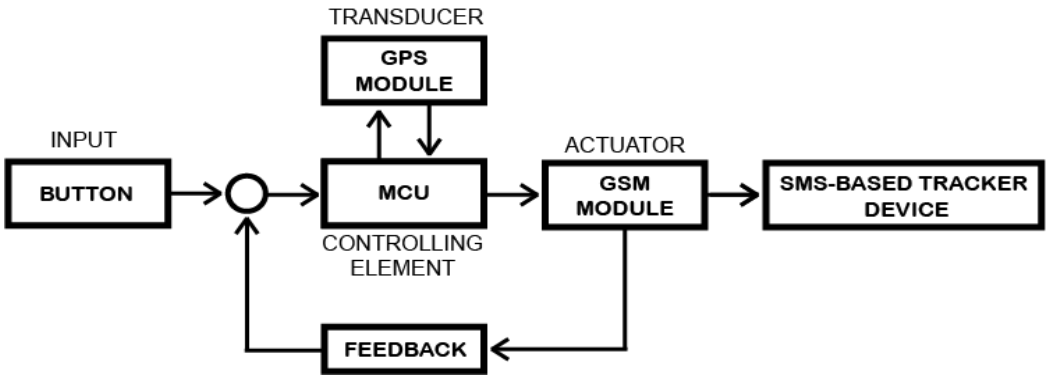


Figure 4.8

Block Diagram of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

4.5. Software System Implementation

The proponents created an android software to receive the location of the tracker device and can operate the tracker device to send its location to the software. And when the location received the coordinates in the receive message will automatically convert it to the google maps to make the project user-friendly to anyone and easy to operate. The proponents created two android program which is Parent's app and Barangay app. In this case, the proponents make sure that there's a confidentiality protection for the student who use this prototype and the parent's app can only operate the tracker device to send its current location. And the Barangay's app can only access the current location of the student when the emergency came and presses the button on the tracker device.

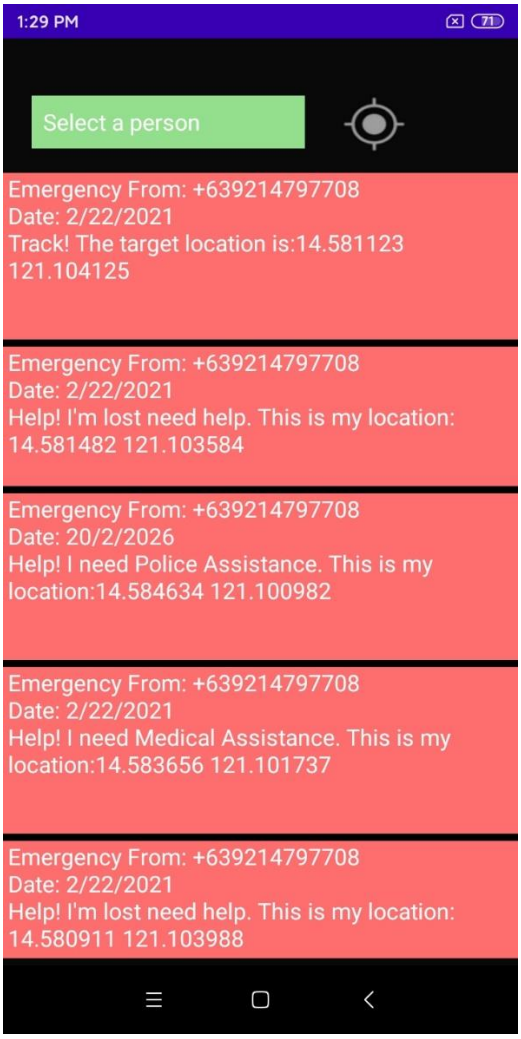


Figure 4.9

Image shows the Parent's App

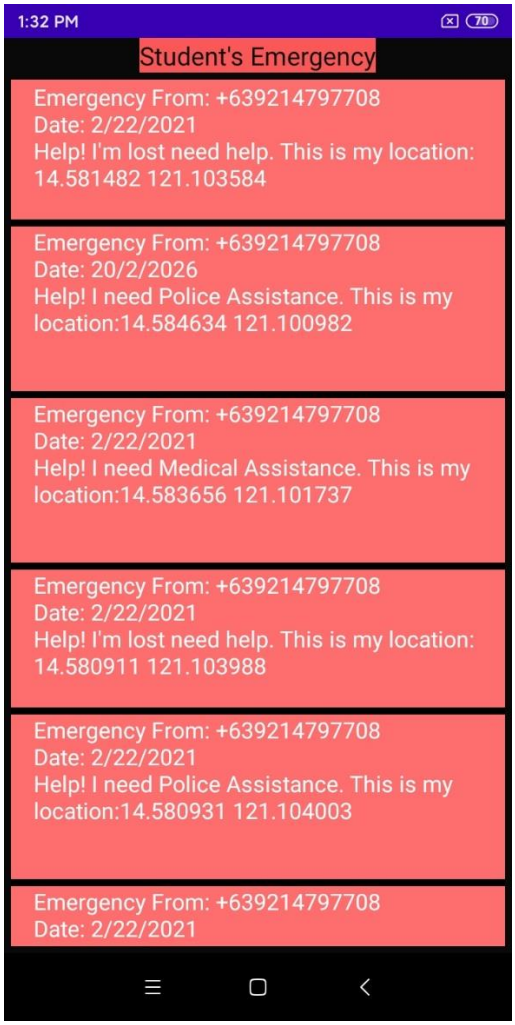


Figure 4.10

Image shows the Barangay's App

Cost Benefit Analysis

The table below shows the breakdown of expenses of the project including the materials that the researcher purchased.

Table 5

	Materials	Quantity	Unit Price	Amount
Prototype	GPS Module	1	PHP 475.00	PHP 475.00
	SIM800L	1	PHP 249.00	PHP 249.00
	Arduino Pro Mini 5V	1	PHP 250.00	PHP 250.00
	Tactile Button	3	PHP 5.00	PHP 15.00
	LED indicator	1	PHP 5.00	PHP 5.00
	3000mAh 3.75V Rechargeable Battery	1	PHP 45.00	PHP 45.00
	Aluminum sheets	2pcs. 20x30 cm	PHP 150.00	PHP 300.00
	Smart 5G simcard	1	PHP 50.00	PHP 50.00
	Jumper wire	10cm 40pcs	PHP 57.00	PHP 57.00
	Universal PCB	7x9 cm	PHP 33.00	PHP 33.00
	Boost converter	1	PHP 96.00	PHP 96.00
	TOTAL			**PHP 1,575.00**

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This part presents, analyze and interprets the findings of this study based on the problems presented at the beginning of the study. The first part describes the respondents' profile in terms of: A. age, B. sex, and C. household income. Most of the respondents in our survey are females with ages 20 – 22 yrs. old and the household income is 12,000 below.

The second part presents the respondents' response for the problems encountered in securing the safety of the students in terms of: A. School premise, A.A. location detection, A.B. police assistance, and A.C. medical assistance. B. Outside school premise, B.A. location detection, B.B. police assistance, and B.C. medical assistance. Most of students get lost, robbed and have health problems.

Next part is level of acceptance by the respondents on the developed SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. Functionality, Reliability, Usability and Performance.

Additionally, the features of the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students as evaluated by the respondents that will address the creation of the proponents.

1. **Profile of the respondents in terms of: A. age, B. sex, and C. household income.**

   Mostly of the respondents is female with 54% while the male is only 46%. The ages of our respondents ranges 16-54 but most of it ages 20-22 yrs. old. The household income range is 12,000-20,000 above there are 47%

respondents respond in 12,000 below household income, 25% respondents in 12,000-15,000, 16% respondents in 15,000-20,000, and 12% in 20,000 above.

2. Problems encountered in securing the safety of students in terms of:

2.1 A. School premises

2.1.1 Location detection.

There is no problem encountered in securing the safety of students in School premises in terms of location detection

2.1.2 Police assistance.

The problem encountered in securing the safety of the students inside school premises in terms of location detection is: harassments.

2.1.3 Medical assistance.

The problem encountered in securing the safety of the students inside school premises in terms of medical assistance is: unexpected accidents during school activities.

2.2 B. Outside the school premises

2.2.2 Location detection.

The problem encountered in securing the safety of the students outside school premises in terms of location detection is: student got lost, and difficult to locate the student.

2.2.3 Police assistance.

The problem encountered in securing the safety of the students

inside school premises in terms of police assistance is: student got robbed, student encounter kidnapper, late response of the student, and suspicious person stalking to student.

2.2.4 Medical assistance.

The problem encountered in securing the safety of the students inside school premises in terms of medical assistance is: student encounter accidents, and student have health problem.

3. **The challenges in identifying the current location of the student in accuracy, reliability, and ease of use.**

The survey shows that most of the respondents answers No Challenges were encountered when identifying the current location of the students in terms of accuracy, reliability and ease of use when using a tracker device.

4. **Respondent's level of acceptance towards the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students.**

The respondents' level of acceptance in SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students is as follows: 1.) Functionality = 4.54, 2.) Reliability = 4.5, 3.) Usability = 4.59, 4.) Performance = 4.01,

4.1 On Functionality

Table 6 indicates the respondents' level of acceptance in terms of the functionality in SMS-Based Location Tracker Device with Kidnapping, Health

Problem and Lost of Track Emergencies for Students. The level of agreement is Highly Acceptable. As shown on the table, the system is highly acceptable by the respondents when it comes to the level of acceptance in terms of the functionality of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. This was obtained from the overall mean assessment of 4.54.

Table 6

Respondents' Level of Acceptance in terms of the Functionality of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

Statement	Mean Response	Interpretation	Rank
The LED bulb works well and accurately in accordance with the green button once pressed in the device.	4.64	Highly Acceptable	1
The LED bulb works well and accurately in accordance with the red button once pressed in the device.	4.63	Highly Acceptable	2
The LED bulb works well and accurately in accordance with the white button once pressed in the device.	4.56	Highly Acceptable	3
The device delivers SMS information with a considerable amount of process time.	4.45	Highly Acceptable	6
The information and location provided in the SMS is accurate and easy to understand.	4.52	Highly Acceptable	4
The system works properly and accurately in providing information and location towards the barangay and parents mobile application.	4.46	Highly Acceptable	5
Overall Mean	**4.54**	**Highly Acceptable**	

4.2 On Reliability

Table 7 describes the respondents' level of acceptance in terms of the reliability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. The level of agreement is Highly Acceptable. As shown on the table, the system is highly acceptable to the respondents when it comes to the level of acceptance in terms of the reliability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. This was obtained from the overall mean assessment of 4.5.

Table 7

Respondents' Level of Acceptance in terms of the Reliability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

Statement	Mean Response	Interpretation	Rank
The device sends accurate alert message to the parents and barangay office.	**4.52**	Highly Acceptable	2
The SMS provides accurate date and location.	**4.56**	Highly Acceptable	1
The SMS is sent on time.	**4.43**	Highly Acceptable	3
Overall Mean	**4.5**	**Highly Acceptable**	

4.3 On Usability

Table 8 describes the respondents' level of acceptance in terms of the usability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. The level of agreement is Highly Acceptable. As shown on the table, the system is highly acceptable to the respondents when it comes to the level of acceptance in terms of the usability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. This was obtained from the overall mean assessment of 4.59.

Table 8

Respondents' Level of Acceptance in Terms of the Usability of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students.

Statement	Mean Response	Interpretation	Rank
The prototype is user-friendly.	4.58	Highly Acceptable	2
The device is easy to use and operate.	4.58	Highly Acceptable	2
The message provided by the device is helpful.	4.6	Highly Acceptable	1
Overall Mean	**4.59**	**Highly Acceptable**	

4.4 On Performance

Table 9 describes the respondents' level of acceptance in terms of the performance of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. The level of agreement is Highly Acceptable. As shown on the table, the system is highly accepted by the respondents when it comes to the level of acceptance in terms of the performance of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students. This was obtained from the overall mean assessment of 4.01.

Table 9

Respondents' Level of Acceptance Regarding the Performance of SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students.

Statement	Mean Response	Interpretation	Rank
There is acceptable processing time of sending and receiving message to the parents and barangay office.	4.47	Highly Acceptable	1
Delay in locating the student's location.	3.84	Acceptable	3
Delay in receiving alert message.	3.86	Acceptable	2
Overall Mean	**4.01**	**Acceptable**	

Summary

Table 10 shows the summary of the respondents' level of acceptance for SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

Criteria	Mean Response	Interpretation	Rank
Functionality	4.54	Highly Acceptable	2
Usability	4.59	Highly Acceptable	1

Reliability	4.5	Highly Acceptable	3
Performance	4.01	Highly Acceptable	4
Overall Mean	**4.41**	**Highly Acceptable**	

Chapter 5

SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

This chapter includes the summary of the project and summary of the findings, conclusions, and recommendations.

Summary

The project intended to provide an SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students that will help to secure their safety. It is composed of automated devices like Arduino Pro Mini, GSM module, SIM800L Module, Boost converter and Universal PCB. The user can push any buttons on the device, and it will send a message to parents and barangay office seeking for help.

Coming up with the design and development of the study, it identified the respondent's profile; the problems encountered in securing the safety of students, inside and outside of school premises; the challenges in identifying the current location of the student in accuracy, reliability, and ease of use; and the respondent's level of acceptance towards the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students in terms of Accuracy, Reliability, Usability and Performance.

This study is a descriptive research, where it describes the characteristics of the population or phenomenon studied. This methodology focuses more on the “what” of the research subject than the “why” of the research subject. In other words, it “describes” the subject of the research, without covering “why” it happens. (Question pro, 2021)

The researchers conducted a survey and interview with the used of google forms because of pandemic, to avoid being prone and infected of the corona virus. They prepared a list of topics and questionnaires to be used in the discussion with the respondents. They also sought over the web for additional information that is relevant to the study. The published experimental study, documentary analysis, organizational information, organizational literature, and relevant publications. The researcher used this kind of data gathering because it is inexpensive and easy to access information.

The proponent’s total respondents surveyed are 50. All of them were selected through random sampling as said to be the most efficient sampling procedure. Non-probability sampling was used as our sampling technique. This technique selects the subjects based on particular purpose of the research.

Findings

After the conducted interview, surveys and evaluation of the study, the researcher came up with some findings based on the previous chapter. The proponent’ findings include:

1. **Profile of the respondents in terms of: A. age, B. sex, and**

C. household income.

Mostly of the respondents is female with 54% while the male is only 46%. The ages of our respondents ranges 16-54 but most of it ages 20-22 yrs. old. The household income range is 12,000-20,000 above there are 47% respondents respond in 12,000 below household income, 25% respondents in 12,000-15,000, 16% respondents in 15,000-20,000, and 12% in 20,000 above.

2. Problems encountered in securing the safety of students in terms of:

2.1 A. School premises

2.1.1 Location detection.

There is no problem encountered in securing the safety of students in School premises in terms of location detection.

2.1.2 Police assistance.

The problem encountered in securing the safety of the students inside school premises in terms of location detection is harassments.

2.1.3 Medical assistance.

The problem encountered in securing the safety of the students inside school premises in terms of medical assistance is unexpected accidents during school activities.

2.2 B. Outside the school premises

2.2.1 Location detection.

The problem encountered in securing the safety of the students outside school premises in terms of location detection is: student got lost, and difficult to locate the student.

2.2.2 Police assistance.

The problem encountered in securing the safety of the students inside school premises in terms of police assistance is: student got robbed, student encounter kidnapper, late response of the student, and suspicious person stalking to student.

2.2.3 Medical assistance.

The problem encountered in securing the safety of the students inside school premises in terms of medical assistance is: student encounter accidents, and student have health problem.

3. **The challenges in identifying the current location of the student in accuracy, reliability, and ease of use.**

The survey shows that most of the respondents answers No Challenges were encountered when identifying the current location of the students in terms of accuracy, reliability and ease of use when using a tracker device.

4. **Respondent's level of acceptance towards the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students**

The respondents' level of acceptance in SMS-Based Emergency Location Tracker Device for Students is as follows: 1.) Functionality = 4.54, 2.) Reliability = 4.5, 3.) Usability = 4.59, 4.) Performance = 4.01,

Conclusions

The following are the generalizations made based on the findings:

1. The profile of respondents is mostly females, ranging 16-54 years old and most of its ages in 20-22 years old. With a majority monthly income of 12,000 below.
2. The problems encountered in securing the safety of the students inside the school premises; they are being harass and facing unexpected accidents during school activities. On other hand, the problems encountered of securing the safety of the students outside the school premises are student's being lost and difficult to locate, they are prone of bad guys. And student's encounter accidents on the way home or has a health problem.
3. In terms of accuracy, reliability of the device it has no problems encountered. The device is also easy to use for respondent's preference.
4. The respondents' ratings at SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students were highly acceptable in terms of functionality, reliability, usability, and performance.

Recommendation

For the improvement of the device considerations must be taken. The researcher proposes the following recommendations to the project.

1. The device should retail cheaper than others so that many families can afford to buy it in the market.

2. It is better to use this device outside the school premises than inside the school premises.

3. The researchers should do some test in the performance of the device for the buyers to see how effective the device works.

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- https://ro.uow.edu.au/cgi/viewcontent.cgi?article=1003&context=thesesinfo
- https://www.semanticscholar.org/paper/Mobile-Emergency-Response-Application-Using-for-Guzman-Guzman/b4aec0c14cf7298cb6c111268aa8dd8f7e5ebfd7
- https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/research-congress-proceedings/2013/HCT/HCT-I-008.pdf
- https://www.researchgate.net/publication/303687944_Online_Day_to_Day_Monitoring_System_for_Lyceum_of_the_Philippines_University_-Batangas
- https://patents.google.com/patent/US20040266389A1/en
- https://www.researchgate.net/publication/317040174_A_RESEARCH_ON_MOBILE_APPLICATIONS_FOR_LOCATION_TRACKING_THROUGH_WEB_SERVER_AND_SHORT_MESSAGES_SERVICES_SMS
- http://www.bookrags.com/research/electronic-tracking-devices-woi/
- https://www.creditdonkey.com/kidnapping-statistics.html

- https://news.mb.com.ph/2019/11/28/police-probe-suspicious-disappearances-in-pasay/
- https://l.messenger.com/l.php?u=https%3A%2F%2Fwww.saferspaces.org.za%2Fbe-inspired%2Fentry%2Fmemeza-community-alarm-system&h=AT3RoLL1rvMZxEz_lAbJShB_5aXNXlfOCSRY1A085fm07wEXs7SG9sOHjv_eYUwc2BKwGEhYwnMgcG4qj49uU5oGgOU4Y9KPwFkYMbGL8_9RNPr8GrVR8HZ_s2jCBxNVc7B00A
- https://www.scribbr.com/methodology/sampling-methods/
- https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-019-0665-4
- https://www.formpl.us/blog/secondary-data
- https://pujckaytda.webgarden.cz/rubriky/acknowledgement-for-thesis-doc
- https://ihelptostudy.com/acknowledgement-sample-for-group-thesis-writing.html
- https://www.researchgate.net/publication/317040174_A_RESEARCH_ON_MOBILE_APPLICATIONS_FOR_LOCATION_TRACKING_THROUGH_WEB_SERVER_AND_SHORT_MESSAGES_SERVICES_SMS
- http://bth.diva-portal.org/smash/get/diva2:830717/FULLTEXT01
- https://core.ac.uk/download/pdf/61807216.pdf
- https://www.ftms.edu.my/journals/pdf/IJISE/Nov2015/61-72.pdf
- http://www.apjmr.com/wp-content/uploads/2017/06/APJMR-2017.5.2.2.15.pdf
- https://ij-healthgeographics.biomedcentral.com/articles/10.1186/1476-072X-7-59
- https://www.sciencedirect.com/science/article/pii/S1532046418300054
- https://www.alrc.gov.au/publication/for-your-information-australian-privacy-law-and-practice-alrc-report-108/9-overview-impact-of-developing-technology-on-privacy/location-detection-technologies/

Appendix 1

Survey Questionnaire and Interview Form

Directions: Kindly provide honest answers to the questions. Please read each question carefully and check the box provided that best describes your notion about the question.

I. Respondent's Profile

Name (Optional): _____

Age: _____

Sex:

☐ Male ☐ Female

Household Income:

☐ 12,000 below ☐ 12,001 – 15,000 ☐ 15,001 – 20,000 ☐ 20,001 above

1.What is the respondents' level of acceptance towards the SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students in terms of:

Direction: Rate the following statements, 5 is the highest and 1 is the lowest. Put a check in the provided box for your answer on how you agree to the statement.

5 - Strongly Agree
4 - Agree
3 – Neither Agree nor Disagree
2 – Disagree
1 – Strongly Disagree

1.1 Functionality	**5**	**4**	**3**	**2**	**1**
The LED bulb works well and accurately in accordance with the green button once pressed in the device.					
The LED bulb works well and accurately in accordance with the red button once pressed in the device.					
The LED bulb works well and accurately in accordance with the white button after pressed in the device.					

The device delivers SMS information with a considerable amount of process time.					
The information and location provided in the SMS is accurate and easy to understand.					
The system works properly and accurately in providing information and location towards the barangay and parents mobile application.					
1.2 Usability	**5**	**4**	**3**	**2**	**1**
The prototype is user-friendly.					
The device is easy to use and operate.					
The message provided by the device is helpful.					
1.3 Reliability	**5**	**4**	**3**	**2**	**1**
The device sends accurate alert message to the parents and barangay office					
The SMS provides accurate date and location.					
The SMS is sent on time.					
1.4 Performance	**5**	**4**	**3**	**2**	**1**
1.4.1 There are acceptable processing time of sending and receiving message to the parents and barangay office.					
1.4.2 Delay in locating the students' location					
1.4.3 Delay in receiving alert message					

Suggestion for Improvement:

Polytechnic University of the Philippines
Institute of Technology
Diploma in Computer Technology

INTERVIEW FORM

Name of Interviewee	
Name of Interviewer	
Date Interviewed	
Time Interviewed	

SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students is a device that helping the students to secure their safety by sending a message to the parents and barangay office of what kind of emergency they are in. This device has three buttons which is for Lost button, Police Button and Ambulance button. If the student presses any buttons here the device will send a message to the parents and barangay office with the date, type of emergency, and the location of the student. The parents can also monitor the whereabouts of the student to make sure that they are safe.

Is there a problem encountered in securing the safety of students in school premises?

☐ Yes ☐ No

If yes, please specify the problem in terms of;

Location Detection:

_____

Police Assistance:

_____

Medical Assistance:

_____

Is there a problem encountered in securing the safety of students in outside school premises?

☐ Yes ☐ No

If yes, please specify the problem in terms of;

Location Detection:

_____

Police Assistance:

_____

Medical Assistance: _____
Does the tracker device have the problem in assessing the current location of student in terms of Accuracy? ☐ Yes ☐ No If yes, please specify the problem_____
Does the tracker device have the problem in assessing the current location of student in terms of Reliability? ☐ Yes ☐ No If yes, please specify the problem_____
Does the tracker device have the problem in assessing the current location of student in terms of Ease of use? ☐ Yes ☐ No If yes, please specify the problem_____

Appendix 2

REQUEST LETTER TO CONDUCT SURVEY

February 28, 2021

Dear Sir/Madam:

Greetings of peace!

The undersigned is currently doing a research paper entitled **"SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students"** as a final requirement for the course Diploma in Computer Engineering (DCET).

The research is focused on the problem encountered of the students inside and outside the school premises as perceived by the respondents. The target respondents are parents and students.

In view hereof, the undersigned would like to request your help by answering the survey attached herewith. Your contribution on this research would greatly pave way for the realization of the study.

Thank you very much in advance and May the good Lord shower you more of His blessings in the coming years.

Sincerely yours,
Buenabajo, Nakia Jr. D.
Guinalan, Kem D.
Macaraig, Kristelle Joy M.
Martos, Jaimee M.
Researchers

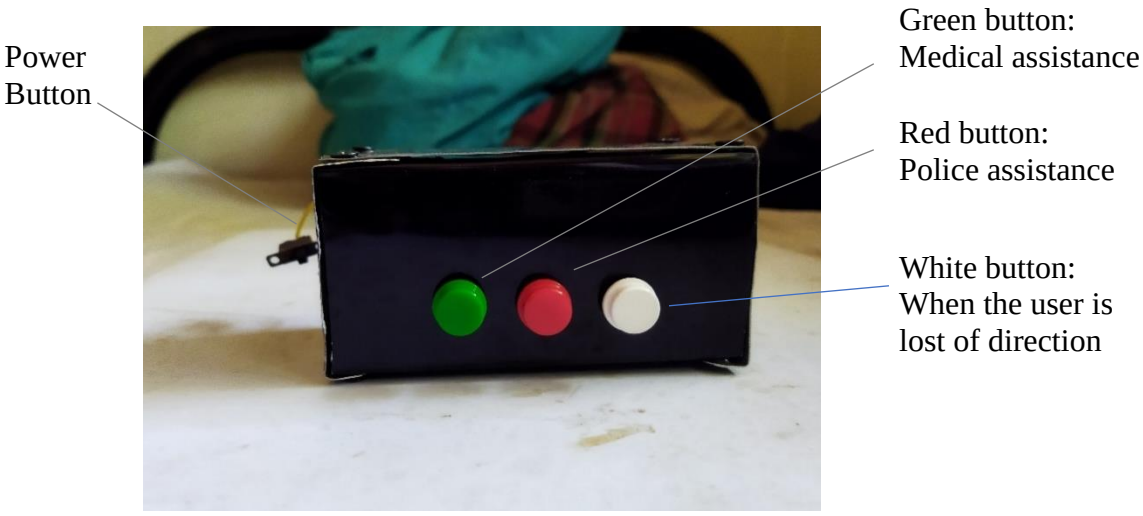
Noted by:
Engr. Jose Marie B. Dipay
Thesis Advisers

Appendix 3

User's Manual

Operating the tracker device

The tracker device has three buttons: the green button is for medical assistance, red button is for police assistance and white button is when the user is lost of direction. The image will show the tracker device.



Figure

In using this tracker device, first the user must power it up by levering the switch in the right side. When the tracker device is successfully power up the tracker device will glow blue and ready to send the emergency. By pressing the button, the LED indicator will show what emergency that the user pressed. Green button pressed and the LED indicator will light green for 3 second and it will light off that means the location is sent to the Parents and Barangay. Red button pressed and the LED indicator will light red for 3 second and it will light off that means the location is

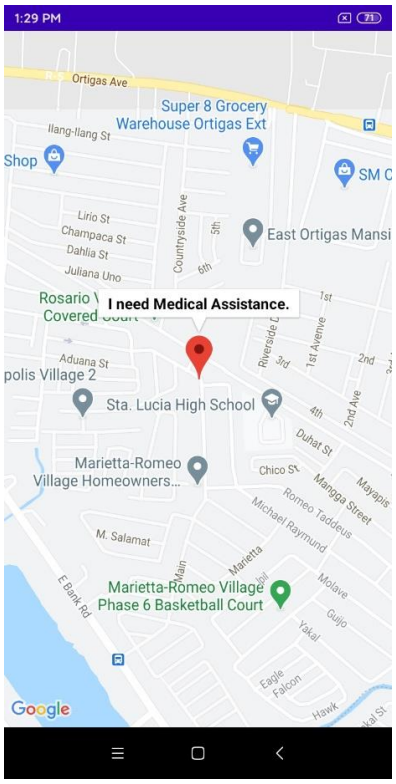
sent to the Parents and Barangay. White button pressed and the LED indicator will light blue for 3 second and it will light off that means the location is sent to the Parents and Barangay.

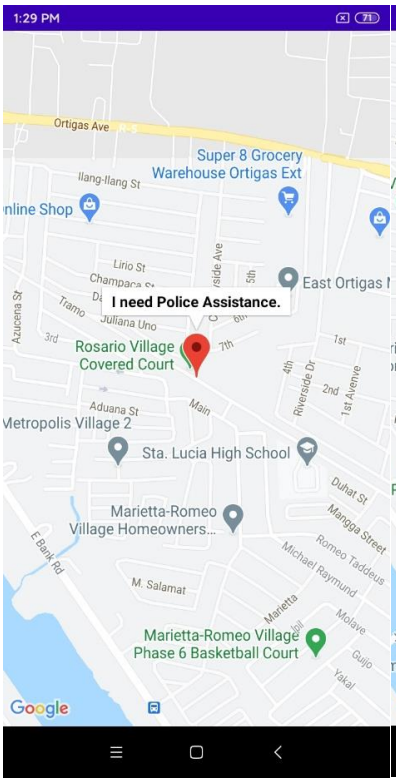
The image will show the messages receive by the parents and Barangay.

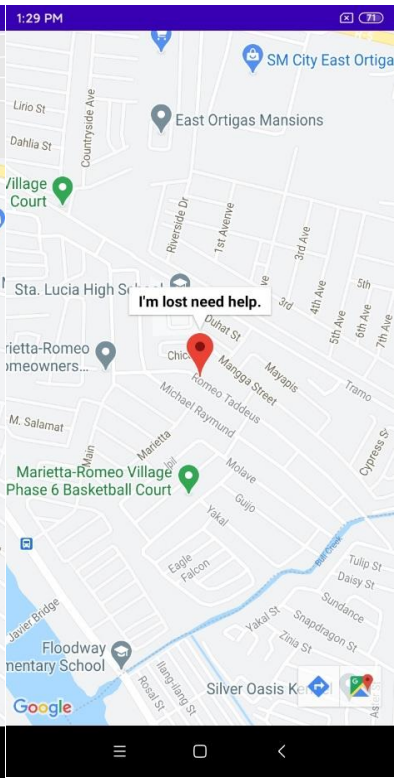
Barangay Inbox Parents inbox

This shows the android program that use by the parents and barangay when receiving the location of the user's tracker device when they need emergency assistance.

To convert the message in actual location of the user's tracker device just click on the message. The image will show the actual location when pressing the message.



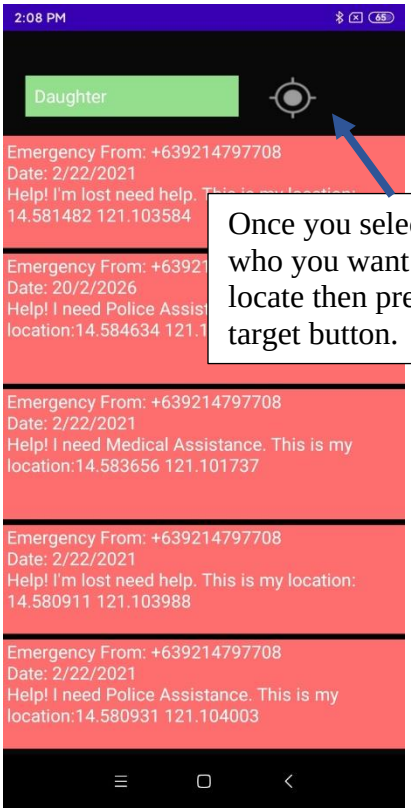




Using the Parent's App

To monitor and operate the tracker device. The parents app has the ability to operate the tracker device to send its current location even the button is not pressed. The image will show on how to know the current location of the tracker.

Choose here on who you want to locate it's current location.


2:08 PM
Daughter
Emergency From: +639214797708
Date: 2/22/2021
Help! I'm lost need help.
14.581482 121.103584
Emergency From: +63921
Date: 20/2/2026
Help! I need Police Assis
location:14.584634 121.1
Emergency From: +639214797708
Date: 2/22/2021
Help! I need Medical Assistance. This is my location:14.583656 121.101737
Emergency From: +639214797708
Date: 2/22/2021
Help! I'm lost need help. This is my location: 14.580911 121.103988
Emergency From: +639214797708
Date: 2/22/2021
Help! I need Police Assistance. This is my location:14.580931 121.104003
Once you selected who you want to locate then press the target button.

Then the application will receive the current location of the tracker device.

Appendix 4

CURRICULUM VITAE

BUENABAJO, NAKIA JR. D.

17R Thaddeus st. Marietta Romeo Village
Barangay Santa Lucia, Pasig City
09227190907

SUMMARY:

I am an organized and hard-working person who knows how to manage and use time and can work under pressure driven to meet strict deadlines.

PERSONAL INFORMATION:

Height	:	5'9"	Weight	:	45 kg.
Birth Date	:	March 20, 1999	Birthplace	:	Pasig City
Citizenship	:	Filipino	Religion	:	Christian
Civil Status	:	Single			

EDUCATIONAL BACKGROUND

College:	**POLYTECHNIC UNIVERSITY OF THE PHILIPPINES** Diploma in Computer Engineering Technology Anonas, Santa Mesa, Manila	2018-Present
Senior High	**RIZAL TECHNOLOGICAL UNIVERSITY** Science Technology Engineering Mathematics 1600, 510 Eusebio, Pasig, 1600 Metro Manila	2016-2018
High School:	**SANTA LUCIA HIGH SCHOOL** 30 Tramo, Pasig, Metro Manila	2012- 2016
Elementary:	**DE CASTRO ELEMENTARY SCHOOL** De Castro Subdivision,, Everlasting St, Pasig, Metro Manila	2007- 2012

SKILLS:

- Has good understanding in math and science
- Proficient with Microsoft Office
- Basic knowledge in Adobe illustrator and Photoshop
- Hard worker and fast learner
- Has good communication skills
- Has good understanding logics

SEMINARS AND TRAININGS ATTENDED:

- **Internship**
  Soundcheck Inc.
  08 F. Pasco Ave, Pasig, 1610 Metro Manila
  April 22, 2019 – June 21, 2019

CHARACTER REFERENCES:

Mr. Jose Marie B. Dipay
Polytechnic University of the Philippines
0947-6254-937
jmdipay@gmail.com

I hereby certify that the above facts and information are true and correct to the best of my knowledge and belief.

Buenabajo, Nakia Jr D.
SN: 2018-12356-MN-0

GUIANALAN, KEM DUPILAS

Phase 10-A Package 4 Block 59 Lot 34
Bagong Silang, Caloocan City
09455800852

SUMMARY:

Dedicated student of Computer Engineering Technology currently in 3rd year passionate in Software Development. Proficient in a range of modern technologies including python and java, having led multiple senior class project to completion.

PERSONAL INFORMATION:

Height	:	5'2"	Weight	:	45 kg.
Birth Date	:	April 21, 2000	Birthplace	:	Caloocan City
Citizenship	:	Filipino	Religion	:	Christian
Civil Status	:	Single			

EDUCATIONAL BACKGROUND

College: **POLYTECHNIC UNIVERSITY OF THE PHILIPPINES** 2018-Present
Diploma in Computer Engineering Technology
Anonas, Santa Mesa, Manila

Senior High **UNIVERSITY OF CALOOCAN CITY** 2016-2018
Accountancy Business and Management
UCC Congressional North Campus
1400 Congressional Rd Ext, Novaliches, Caloocan

High School: **SAMPAGUITA HIGH SCHOOL** 2012- 2016
Sampaguita Subd., Camarin, Paraiso St,
Caloocan City North, Metro Manila

Elementary: **SAMPAGUITA ELEMENTARY SCHOOL** 2007- 2012
Sampaguita Subd., Camarin, Paraiso St,
Caloocan City North, Metro Manila

SKILLS:

Have basic to intermediate knowledge in Scripting Languages such as:

- HTML/HTML5
- CSS
- JavaScript
- PHP
- Python

Have capability to use Microsoft Office Tools such as:

- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

Have a fair knowledge using the following programs:

- Adobe Photoshop
- Adobe InDesign

Have skills on Assembly/Disassembly of System Unit, Operating system installation and Computer troubleshooting.

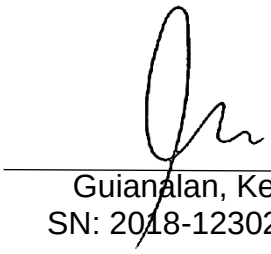
SEMINARS AND TRAININGS ATTENDED:

- **Internship**
  RGS Recovery Management and Collection Services, Inc.
  4th Floor, Anonas LRT City Center, No. 968 Aurora Blvd. Project 4, Quezon City, 1109 Philippines
  April 22, 2019 – June 21, 2019

CHARACTER REFERENCES:

Mr. Jose Marie B. Dipay
Polytechnic University of the Philippines
0947-6254-937
jmdipay@gmail.com

I hereby certify that the above facts and information are true and correct to the best of my knowledge and belief.



Guianalan, Kem D.
SN: 2018-12302-MN-0

Macaraig, Kristelle Joy M.

Home Address: 334 Pureza St. NDC Compound Sta. Mesa, Manila
Contact Number: 0917-969-2076
Email Address: kristellejoymacaraig@gmail.com

PERSONAL PROFILE:

Sex	:	Female
Date of Birth	:	August 21, 1999
Place of Birth	:	Batangas City
Civil Status	:	Single
Religion	:	Roman Catholic
Father's Name	:	Randy Macaraig
Occupation	:	Deceased
Mother's Name	:	Edralin Macaraig
Occupation	:	Online Seller

EDUCATIONAL BACKGROUND:

College Level:
Polytechnic University of the Philippines
Institute of Technology
Anonas Street, Mabini Campus Sta. Mesa, Manila
Diploma in Computer Engineering Technology
June 2018 - Present

Senior High School:
Polytechnic University of the Philippines
Institute of Technology
Anonas Street, Mabini Campus Sta. Mesa, Manila
General Academic Track
June 2016 – March 2018

Junior High School:
Anselmo A. Sandoval Memorial
National High School
Pulong Balibaguhan, Mabini, 4202 Batangas
June 2012 – March 2016

Elementary Level:
Sintorisan Elementary School
Sintorisan San Antonio Quezon
June 2006 – March 2012

SKILLS AND HOBBIES:

- Knows Adobe Photoshop and Illustrator
- Basic Programming (HTML, C, Java, Python)

- Basic Network Designing
- Knowledge in Microsoft Word, PowerPoint and Excel
- Watching television programs and movies
- Fashion Designing

ACHIEVEMENTS:

COLLEGE

- ❖ Dean's Lister 2nd Sem (AY 2019-2020)
- ❖ Dean's Lister 1st Sem (AY 2019-2020)

SEMINARS AND TRAININGS ATTENDED:

- **Internship**
  SYSTEMS TRACKSTAR GPS CORPORATION
  U704 Semicon Corporate Building, Marikina-Infanta Hwy, Pasig
  April – June 2018

- **Instrumentation and Control Servicing II**
  Technical Education and Skills Development (TESDA)
  Anonas Street, Mabini Campus Sta. Mesa, Manila
  November 2018

CHARACTER REFERENCES:

Mr. Jose Marie B. Dipay
Polytechnic University of the Philippines
0947-6254-937
jmdipay@gmail.com

I hereby certify that the above facts and information are true and correct to the best of my knowledge and belief.

kmacaraig

Kristelle Joy M. Macaraig
SN: 2018-12472-MN-0

JAIMEE MABBAYAD MARTOS

1048-A New Antipolo St. Tondo,Manila
Mobile Numbers: 09451540046
E-Mail Address: martosjaimee@gmail.com

OBJECTIVE

To enhance my knowledge and skills in an organization that is open for more challenging opportunities that will lead my career to become successful.

SKILLS:

- Computer Hardware Servicing
- Work-Disciplined
- Responsible
- Sociable
- Time Management
- Computer Literature
  MS Word, PowerPoint and Excel

PERSONAL DATA

Age:	22
Height:	160 cm.
Weight:	53 kg.
Religion:	Roman Catholic
Nationality:	Filipino
Civil Status:	Single
Language:	Filipino and English
Birthday:	January 6,1999
Father's Name:	Guillermo D. Martos Jr.
Occupation:	Car Accessories Installer
Mother's Name:	Jocelyn M. Martos
Occupation:	Janitress

EDUCATIONAL ATTAINMENT:

TERTIARY **POLYTECHNIC UNIVERSITY OF THE PHILIPPINES - INSTITUTE OF TECHNOLOGY** (2018 to present)
Diploma in Computer Engineering Technology
Sta. Mesa, Manila

SENIOR HIGH **POLYTECHNIC UNIVERSITY OF THE PHILIPPINES** (2016-2018)
Information and Communications Technology (ICT)
379 Pureza, Sta. Mesa, Manila

SECONDARY **Lakan Dula High School** (2006-2012)
Junior High School
Graduated with Honors
2252 Juan Luna St. Gagalangin Tondo, Manila

ELEMENTARY **Lakan Dula Elementary School** (2006-2012)
Graduated with Honors
154 Solis St. Tondo, Manila

OJT EXPERIENCE:

- **Accounting Department**
  LTS Luminex Corp. Quezon City (April - June 2019)

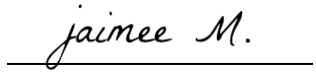
SEMINAR / TRAININGS ATTENDED:

- **TESDA NCII**
  Instrumentation and Control Servicing
- Computer Servicing by TESDA

REFERENCE:

Engr. Jose Marie B. Dipay
Proffesor
Polytechnic University of the Philippines
09476254937

I hereby certify that the above facts and information are true and correct to the best of my knowledge and belief.



Martos, Jaimee M.
SN: 2018-12302-MN-0

Appendix 5

INDIVIDUAL ACCOMPLISHMENTS

"SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students"

Daily Activities

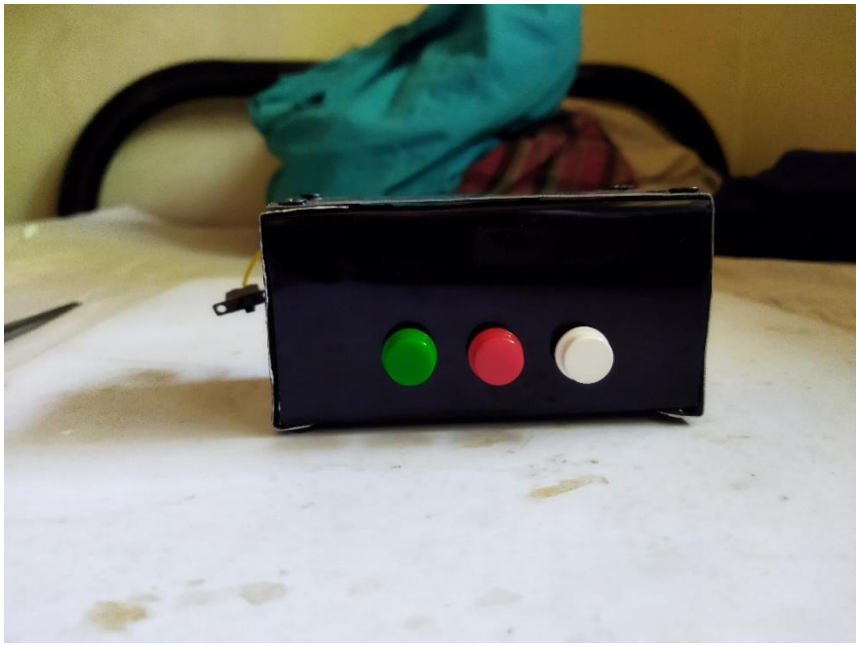
TASKS	DATE	MEMBERS
Initialization of the Project	February 17, 2020	Buenabajo, Guianalan, Macaraig, Martos
Planning with the Group for Title	February 19, 2020	Buenabajo, Guianalan, Macaraig, Martos
Sorting and Gathering of Data	February 20, 2020	Buenabajo, Guianalan, Macaraig, Martos
Composition of Title Proposals	February 22, 2020	Buenabajo, Guianalan, Macaraig, Martos
Title Defense	March 7, 2020	Buenabajo, Guianalan, Macaraig, Martos
Writing and Revisions of Chapters 1 to 3	March 25, 2020	Buenabajo, Guianalan, Macaraig, Martos
Group Meeting (Online)	August 11, 2020	Buenabajo, Guianalan, Macaraig, Martos
Canvassing of components	October 20,2020	Buenabajo
Sorting GSM Module/ SIM800L Module/ Arduino Pro Mini	November 30, 2020	Buenabajo, Guianalan, Macaraig
Sketching the Prototype	December 01,2020	Buenabajo
Coding of Arduino Pro Mini	December 1, 2020	Buenabajo
Connecting the GSM Module to the Google Maps	December 02, 2020	Buenabajo, Guianalan
Starting to do the Coding for Prototype	December 02, 2020	Buenabajo, Guianalan
Finding Aluminum Sheet	December 09, 2020	Macaraig, Martos
Canvasing of aluminum sheet	December 10, 2020	Macaraig, Martos
Creating Prototype	December 15, 2020	Buenabajo, Guianalan, Macaraig, Martos
Trial and Error of Coding for Prototype	December 16, 2020	Guianalan

SOP and Questionnaire	December 30, 2020	Macaraig
Create SOP and Instrument	December 31, 2020	Martos
Revision of chapters 1-3	February 12, 2020	Macaraig, Martos
Revision of Synthesis	February 12, 2020	Macaraig
Creating the Android app for prototype	February 19,2020	Buenabajo
Revision of SOP	February 21, 2020	Macaraig, Martos
Finishing the Prototype	February 21, 2020	Buenabajo
Revision of Survey Questionnaire	February 22, 2020	Macaraig, Martos
Testing the prototype/ Video	February 22, 2020	Buenabajo, Macaraig, Guianalan
Finishing the video presentation of the prototype	February 22, 2020	Buenabajo
Revision of Chapter 3	February 25, 2020	Macaraig, Martos
Scope of Limitations	February 26, 2020	Macaraig, Martos
Revision of Title	February 26, 2020	Buenabajo, Guianalan, Macaraig, Martos
Request Letter for Survey	March 03,2020	Martos
Final Revision of Survey Questionnaire and Interview forms	March 11, 2020	Buenabajo
Transferring the Survey Questionnaire and Interview Forms in Google forms	March 17, 2020	Buenabajo
Conducting a Survey and Interview	March 20, 2020	Buenabajo, Guianalan, Macaraig, Martos
Analyzing the Result of the Survey and Interview	March 21, 2020	Buenabajo, Martos
Creating Chapter 4	March 22, 2020	Buenabajo, Martos
Creating Chapter 5	March 23, 2020	Macaraig
Acknowledgement	March 23, 2020	Macaraig
Curriculum Vitae	March 25, 2020	Buenabajo, Guianalan, Macaraig, Martos
Creating Abstract	March 25, 2020	Guianalan, Martos

Creating Appendix	March 25, 2020	Buenabajo, Guianalan, Macaraig, Martos
User's Manual	March 25, 2020	Buenabajo

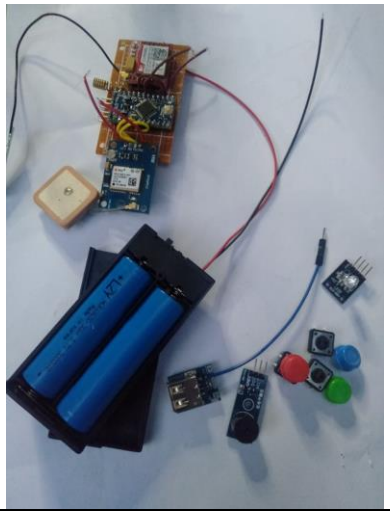
Appendix 6

Documentation

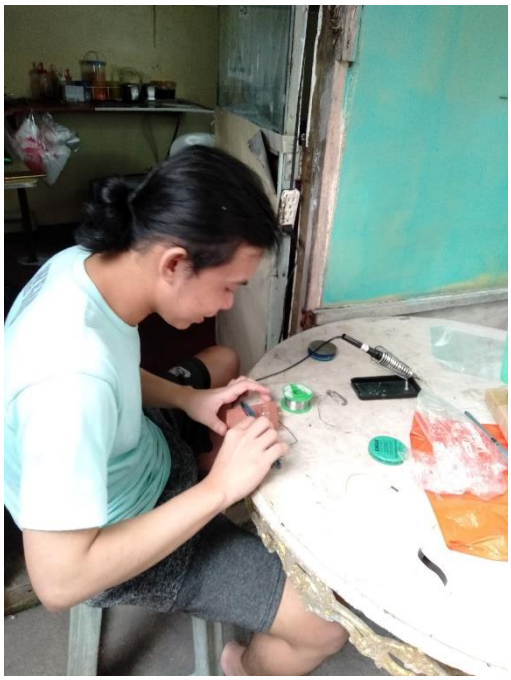


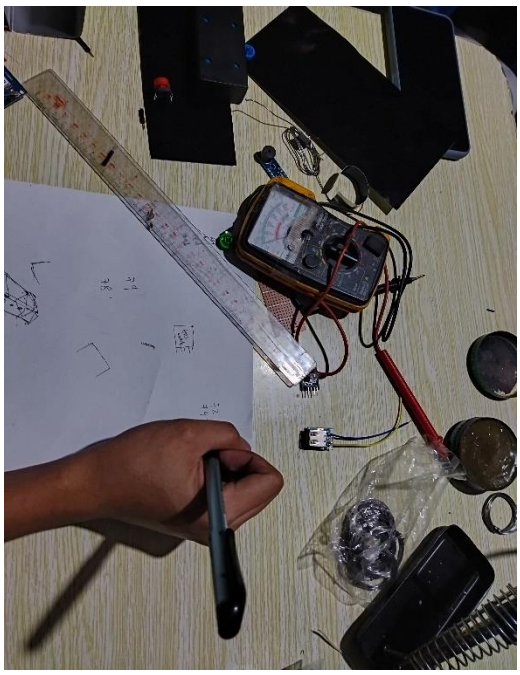
SMS-Based Location Tracker Device with Kidnapping, Health Problem and Lost of Track Emergencies for Students

(Prototype Output)

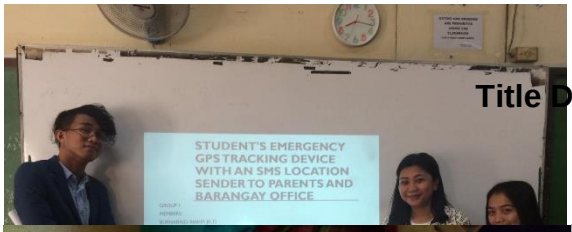


Components of the Prototype

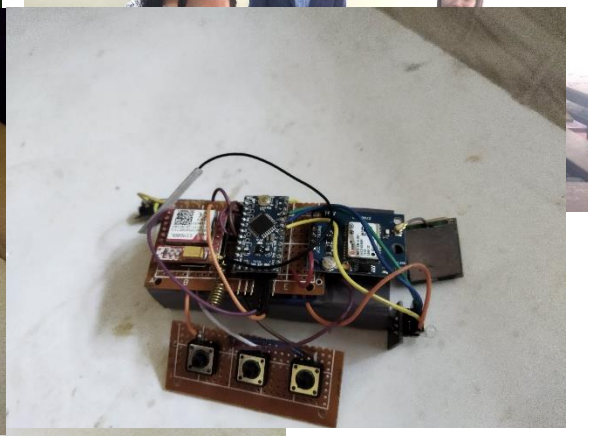


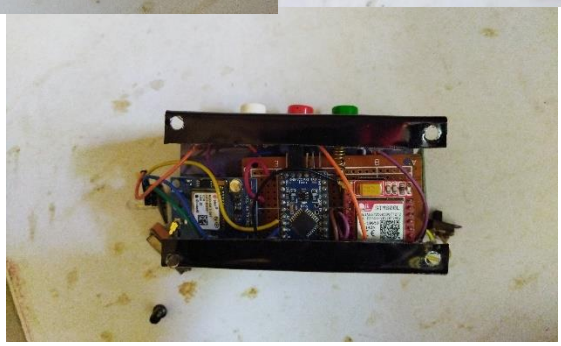


Creating the Prototype

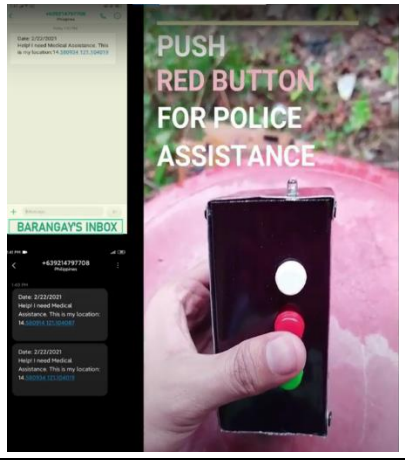


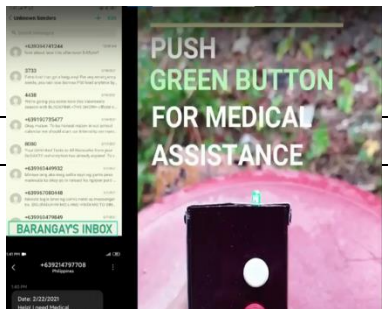
Title Defense

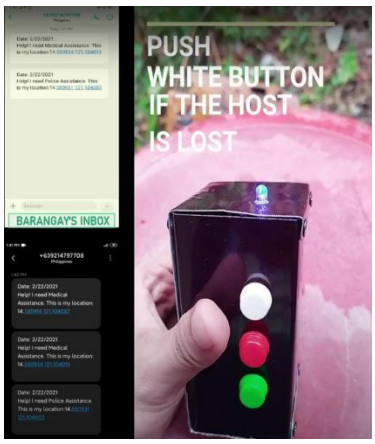


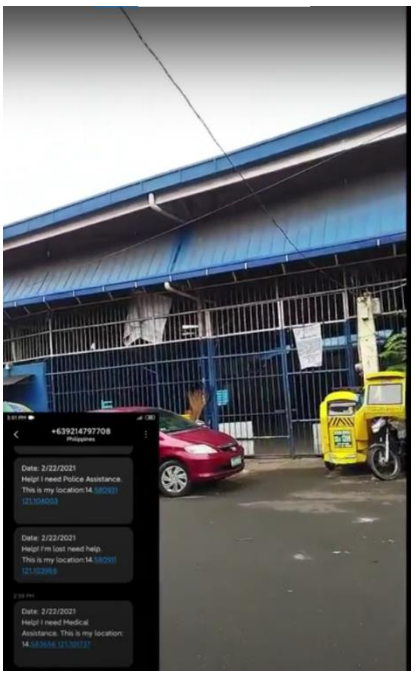


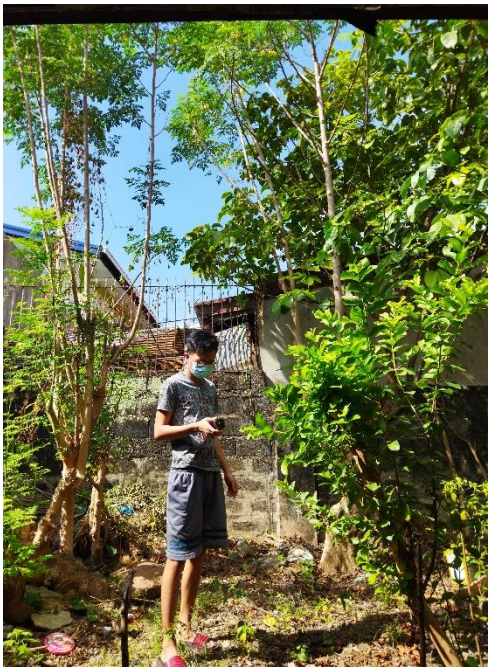
Final Construction of the Prototype











Testing of Prototype