

# **Personal Emergency Alert Device with Notification System**

Undergraduate Thesis Presented to the  
College of Engineering, Architecture, and Technology  
De La Salle University –Dasmariñas  
City of Dasmariñas

In Partial Fulfilment of the Requirements for the Degree  
Bachelor of Science in Computer Engineering

del Mundo, Thyrone V.

Mandario, Augustine V.

December 2018



## ABSTRACT

The researchers observed the increasing crime rate in the Philippines, specifically in Dasmaringas. The researchers also noticed that the most number of victims are kids and women.

These problem urged the researchers to pursue this study entitled Personal Emergency Alert Device with Notification System. The goal of this study is to minimize the crime rate and help police or investigators obtain clues and hints about the crime.

The research output is an emergency alert device composed of a transmitter and a receiver. The user is required to save contact numbers of family into the device using a desktop application. The two devices are designed to be triggered when the two devices attain a specific distance from each other. After the devices are triggered, a loud sound will be started to grab the attention of people nearby the device. After several seconds without interruption, the device automatically sends a text message to the pre-saved contact numbers stating that the device holder is in danger and needs help with a URL in the message itself. The URL is redirected to the specific coordinates of the device to help the family members pinpoint the location of the user. Also, the police hotline will be alarmed thru text message with the same message and URL.

Providing specific coordinates will help the police and investigators to respond immediately and ideally prevent crime and minimize any unwanted situation.



**TABLE OF CONTENTS**

**TITLE PAGE ..... i**

**APPROVAL SHEET ..... ii**

**ACKNOWLEDGMENT ..... iii**

**ABSTRACT ..... iv**

**TABLE OF CONTENTS ..... v**

**CHAPTER 1 ..... 1**

    1.1 Background of the Study ..... 1

    1.2 Objectives of the Study..... 2

        1.2.1 General Objectives ..... 2

        1.2.2 Specific Objectives..... 3

    1.2 Significance of the Study ..... 3

    1.3 Scope and Limitations..... 5

    1.4 Conceptual Framework ..... 6

    1.5 Definition of Terms..... 6

**CHAPTER 2 ..... 10**

    2.1 Related Literature..... 10

        2.1.1 State of Crime in the Philippines..... 10

        2.1.2 Overall Crime and Safety Situation ..... 11

        2.1.3 The numbers are alarming: Sexual harassment vs women in  
PHL..... 12

        2.1.4 Crime Statistics: Police Regional 4A ..... 13

        2.1.5 How Batangas Compares with other CALABARZON Provinces in  
Crime Incidence in 2016 ..... 14

        2.1.6 Crime in Cavite, Philippines..... 16

        2.1.7 PNP: Cavite Crime volume declines by 44.65 percent..... 17

        2.1.8 Duterte: SWS survey shows Philippines 'crime-ridden'..... 17

        2.1.9 Self Defense: What to Carry If You Don't Want to Carry a Gun..... 19

        2.1.10 Overall Crime and Safety Situation ..... 24



2.1.11	Violent Crime Is on the Rise in U.S. Cities .....	25
2.1.12	DTC buses to go extra mile for women safety .....	26
2.1.13	Kota girl develops women’s safety devices, seeks funding .....	27
2.1.14	Women’s safety XPRIZE goes to Leaf device to end sexual assault..	28
2.1.15	Children or grown-ups, Bengaluru’s SafeInCity is working to keep everyone safe with its IoT device .....	28
2.1.16	WanderSafe founder heads to the US where more VCs will back women... ..	29
2.1.17	The real-life dangers of learning self-defense .....	29
2.1.18	Blowing the Whistle on Campus Rape .....	30
2.1.19	Global Medical Assistive Technologies Market Analysis and Forecast 2017-2025 .....	31
2.2	Related Studies .....	32
2.2.1	Distress Signal Tracker Using GPS and SMS Technology: A Prototype.....	32
2.2.2	PC – Based GPS Tracking with Immobilization Capability Through SMS.....	33
2.2.3	Design of the GPS Tracking System for Monitoring Parametric Vehicular Measurements with Accident Notification via SMS for Saudi German Hospital.....	34
2.2.4	Microcontroller-based Vehicle Security System with Tracking Capability using GSM and GPS Technologies .....	35
2.2.5	Holdup Emergency Locator Prototype (H.E.L.P) with Integrated Wearable Bluetooth Controller .....	36
2.2.6	Fingerprint identification, location finder communication system....	37
2.2.7	Anti-theft protection of vehicle by GSM & GPS with fingerprint verification.....	38
2.2.8	Design of a GPS/GSM based tracker for the location of stolen items and kidnapped or missing persons in Nigeria .....	39
2.2.9	Alarm system using Microcontroller, GPS and GSM devices.....	40
2.2.10	Improved Tracking with IEEE 802.11 and Location Fingerprinting..	41
2.2.11	Position Tracking Using WiFi .....	42
2.2.12	Project Rape Whistle .....	43



2.2.13	Design and implementation of safety armband for women and children using ARM7 .....	43
2.2.14	All in one Intelligent Safety System for Women Security .....	44
2.2.15	Automatic notification of personal emergency contacts from a wireless communication device .....	45
2.2.16	System containing location-based personal emergency response device.....	46
<b>CHAPTER 3</b>	<b>.....</b>	<b>47</b>
3.1	Methodological Framework .....	47
3.2	Gathering of Data.....	48
3.2.1	Survey Questionnaires .....	49
3.2.2	Evaluation Questionnaires .....	49
3.2.3	Interview .....	50
3.2.4	Expert Testing.....	50
3.3	Proposed Research Respondents .....	50
3.4	Testing Methodology .....	51
3.4.1	Proposed Testing Location .....	51
3.5	System Process and Design.....	52
3.5.1	System Flowchart.....	52
3.5.2	System Architecture.....	53
3.6	System Components.....	54
3.6.1	Hardware Components .....	54
3.6.2	Software Application.....	57
<b>CHAPTER 4</b>	<b>.....</b>	<b>59</b>
4.1	System Prototype .....	59
4.1.1	Hardware Design.....	59
4.1.2	Actual Hardware.....	61
4.2	Database Schema.....	64
4.3	System Testing .....	65
4.4	Testing Result .....	74
4.4.1	Radio Frequency (RF) Modules: Transmission and Reception .....	75



4.4.2	GSM Message Reception Test.....	77
4.4.3	GPS Waiting Time.....	79
4.4.4	Battery Charging Time .....	80
4.4.5	Battery Usage Time .....	82
4.4.6	User Interface Upload Waiting Time .....	84
4.5	User’s Evaluation.....	85
4.6	Expert Testing.....	91
<b>CHAPTER 5</b>	.....	<b>93</b>
5.1	Conclusion .....	93
5.2	Recommendation .....	94
<b>BIBLIOGRAPHY</b>	.....	<b>95</b>
<b>APPENDICES</b>	.....	<b>98</b>
APPENDIX A.	Gantt Charts .....	98
APPENDIX B.	Evaluation Form .....	100
APPENDIX C.	Budget Plan .....	101
APPENDIX D.	Oral Defense Forms .....	103
APPENDIX E.	Photo Documentation .....	106
APPENDIX F.	SIM808 GPRS/GSM+GPS Shield v1.0 datasheet .....	111
APPENDIX G.	433Mhz RF Transmitter with Receiver Datasheet.....	114
APPENDIX H.	Source Codes.....	115
APPENDIX H.	Curriculum Vitae .....	176