
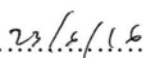


“I hereby declare that I have read through this report entitle “**Disaster Remote Messaging System**” and found that it has comply the partial fulfilment for awarding the degree of Bachelor of Mechatronic Engineering”.

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Supervisor's Name : DR. Ahmad Zaki Bin HJ Shukor

Date :  .....

**DISASTER REMOTE MESSAGING SYSTEM**


**GOPALASAMY A/L KASIAPPAN**

**A report submitted in partial fulfilment of the requirements for the degree of  
Bachelor in Mechatronic Engineering**

**Faculty of Electrical Engineering  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**2016**

I declare that this report entitled “**Disaster Remote Messaging System**” is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :  .....

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Date : 23/6/2016 .....

To my beloved mother and father

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## ABSTRACT

Since history started, natural disasters have threatened mankind existence. Natural disasters happen mainly due to the geographic position and climate change. Timely disaster warning and evacuation or safety measurement could save lives of people. Malaysia is a country which citizen are rarely prepared to safety measure of the natural disaster especially earthquake since most of us thought earthquake in Malaysia is impossible. Earthquake is type of natural disaster which cannot be predicted exact time before it happen. The country lacks of effective disaster preparedness system to comfort natural disaster. For this reason as mention, I have proposed a system that could detect the earthquake and send safety measurement message that the receiver can display the message. The embedded system used to develop this disaster remote messaging system are Raspberry Pi. This project explains how to send message and receive message using Raspberry Pi. The objective of the project is to detect medium range natural disaster using sensor, to develop a disaster messaging system using smartphone's application and to calculate the efficiency rate of the message delivered. The system using smartphone application WhatsApp from the library of Yowsup for sending. Vibration sensor is used to detect the vibration (earthquake) then send the signal to Raspberry Pi. Input signal from the sensor trigger Raspberry Pi to send precaution message which is pre-code to be display. The message will be send to recipient mobile phone which has installed with Whatsapp smart phone application. This will alert him or her on the earthquake and quickly takes precaution measurement to save his/her life.

Since time is a factor when disaster happens, the experiment on time needed for the system to detect earthquake, send, receive and display the message are conduct. The experiment results will demonstrates the effectiveness of our system. Hence, with the introduction of this product, many innocent lives could be saved as well.

## ABSTRAK

Sejak sejarah bermula, bencana alam telah mengancam kewujudan manusia. Bencana alam berlaku terutamanya disebabkan oleh kedudukan geografi dan perubahan iklim. Amaran bencana yang tepat pada masanya dan pemindahan atau langkah keselamatan boleh menyelamatkan nyawa rakyat. Malaysia adalah sebuah negara yang mana warganegara jarang bersedia untuk langkah keselamatan bencana alam khususnya gempa bumi kerana kebanyakan daripada kita fikir gempa bumi di Malaysia hanya mimpi ngeri. Gempa Bumi adalah jenis bencana alam yang tidak boleh diramalkan masa yang tepat sebelum ia berlaku. Negara ini tidak mempunyai sistem yang berkesan persiapan menghadapi bencana untuk menghibur bencana alam. Atas sebab ini seperti yang di nyatakan, saya telah mencadangkan satu sistem yang boleh mengesan gempa bumi dan menghantar mesej langkah keselamatan dan penerima boleh memaparkan mesej tersebut. Sistem terbenam yang digunakan untuk membangunkan sistem pesanan jauh bencana ini adalah Raspberry Pi. Kertas kerja ini menerangkan bagaimana untuk menghantar mesej dan menerima mesej menggunakan Raspberry Pi. Objektif projek ini adalah untuk mengesan bencana alam magnitud sederhana menggunakan sensor, untuk membangunkan satu sistem pesanan bencana menggunakan aplikasi telefon pintar dan untuk mengira kadar kecekapan daripada mesej yang disampaikan. Sistem menggunakan aplikasi telefon pintar Whatsapp dari Yowsup untuk menghantar. Sensor getaran digunakan untuk mengesan getaran (gempa bumi) kemudian menghantar isyarat untuk Raspberry Pi. Isyarat input daripada pencetus sensor Raspberry Pi untuk menghantar mesej langkah berjaga-jaga yang pra-kod untuk menjadi paparan. Mesej akan dihantar kepada penerima telefon bimbit yang mempunyai aplikasi telefon pintar Whatsapp. Hal ini akan menyedarkan seseorang mengenai gempa bumi.

Masa adalah faktor utama apabila bencana berlaku, eksperimen pada masa yang diperlukan untuk sistem untuk mengesan gempa bumi, menghantar, menerima dan memaparkan mesej dijalankan. Keputusan eksperimen menunjukkan keberkesanan sistem kami. Oleh itu, dengan pengenalan produk ini, banyak nyawa yang tidak berdosa dapat diselamatkan juga.

## TABLE OF CONTENT

CHAPTER	TITLE	PAGE
	<b>ACKNOWLEDGEMENT</b>	v
	<b>ABSTRACT</b>	vi
	<b>TABLE OF CONTENTS</b>	viii
	<b>LIST OF TABLES</b>	xiii
	<b>LIST OF FIGURES</b>	xvi
	<b>LIST OF ABBREVIATIONS</b>	xx
	<b>LIST OF APPENDICES</b>	xxi
<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Motivation	1
	1.2 Problem statement	5
	1.3 Objectives	6
	1.4 Scope	6
	1.5 Project Outline	6
<b>2</b>	<b>LITERATURE REVIEW</b>	
	2.1 Theories on Disaster	8
	2.1.1 Natural Disaster	9
	2.1.1.1 Earthquake	10



2.1.1.1.1	Fault Type of Earthquake	11
2.1.1.1.2	Measurement	11
2.1.2	Earthquake Earlier Warning System	17
2.2.1	Beidou Communication (BeiComm) Device for Rescue in Disaster	19
2.2.2	Early Disaster Warning and Evacuation System on Mobile Phone	22
2.2.3	GSM Alarm Device for Disaster Early Warning with Disaster and Emergency Warning Network (DEWN)	24
2.2.4	Development of the fire Alarm System Using Raspberry Pi and Arduino Uno	26
2.2.5	Earthquake Monitoring Using Volunteer Smartphone- Based Sensor Network	30
2.2.6	Criteria Comparison	33
2.3	Evaluation	34
2.4	Summary	37
<b>3</b>	<b>METHODOLOGY</b>	
3.1	Introduction	38
3.2	Project Activity and Planning	39
3.2.1	Milestone	41
3.2.2	Process Flow Chart	42
3.2.3	Hardware Selection	43
3.2.3.1	Raspberry Pi	43
3.2.3.2	Accelerometer	46
3.3	Calculation of Threshold value	49
3.4	Experiment Setup	50

3.4.1 Experiment 1: Sensor Test	50
3.4.1.1 Comparison between Accelerometer and Arduino Vibration Sensor	50
3.4.1.2 Experiment 1 Setup	51
3.4.2 Experiment 2: Controller to Interface with Sensors	54
3.4.2.1 Comparison between Arduino Uno and Raspberry Pi	55
3.4.2.2 Experiment 2 Setup	55
3.4.3 Smartphone Application as SMS platform in Raspberry Pi	61
3.4.3.1 Installing and Register WhatsApp using Raspberry Pi	61
3.4.4 Experiment 3: Efficiency Rate of the System at Indoor Test	62
3.4.4.1 Experiment 3 Setup	62
3.4.5 Experiment 4: Efficiency Rate of the System at Outdoor Test	65
3.4.5.1 Experiment 4 Setup	65
3.4.6 Experiment 5: Reliability of the System at Indoor Test	69
3.4.6.1 Experiment 5 Setup	69
3.4.7 Experiment 6: Reliability of the System at Outdoor Test	70
3.4.7.1 Experiment 6 Setup	71

<b>4</b>	<b>RESULT AND DISCUSSION</b>	
4.1	Overview	72
4.2	Calculation of Threshold Value	73
4.2.1	Discussion of Calculate Threshold Value	75
4.3	Results of Experiment 1: Results of Sensor Test	76
4.3.1	Discussion of Sensor Test	76
4.4	Results of Results of Experiment 2: Results of Controller Test	78
4.4.1	Discussion of Controller Test	80
4.5	Results of Installing and Register WhatsApp in Raspberry Pi	81
4.5.1	Discussion of WhatsApp Installation in Raspberry Pi	84
4.6	Results of Experiment 3: Efficiency from Indoor Text	86
4.6.1	Discussion of Efficiency at Indoor Test	92
4.7	Results of Experiment 4: Efficiency from Outdoor Text	93
4.7.1	Results from Electronic Faculty, FKEKK, UTeM	93
4.7.2	Results from Mechanical Faculty, FKM, UTeM	99
4.7.3	Discussion of Efficiency at Outdoor Test	105
4.8	Result of Experiment 5: Reliability Test at Indoor	107
4.8.1	Discussion of Reliability at Indoor Test	108
4.9	Result of Experiment 6: Reliability Test at Outdoor	109
4.9.1	FKEKK and FKM	109
4.9.2	Discussion of Reliability at Outdoor Test	110

<b>5</b>	<b>CONCLUSION AND RECOMMENDATION</b>	
	5.1 Conclusion	111
	5.2 Recommendation	113
<b>6</b>	<b>REFERENCES</b>	114

## LIST OF TABLES

TABLE	TITLE	PAGE
1.1	Earthquake in Japan with Damage to Residential [1]	3
1.2	Causes of Death in the Earthquake in Japan [1]	4
2.1	Richter Scale with correspond Acceleration	14
2.2	Modified Mercalli Scale	15
2.3	Function of the Push Button Switches	16
2.4	Comparison of the Criteria from Journal	33
2.5	Advantages and Disadvantages of the Methods	36
3.1	Milestone Planning	41
3.2	Criteria and Specification of Raspberry Pi	44
3.3	GPIO Connector	45
3.4	Specification Comparison of Accelerometer and Arduino Vibration Sensor	51
3.5	Specification Comparison of Raspberry Pi and Arduino Uno	55

4.1	Threshold Value for Different Acceleration, Magnitude Scale	75
4.2	Time Taken for two Different Sensor to light up LED	76
4.3	Analog to Digital Converter (adc) Value from Serial Monitor of Arduino Uno	78
4.4	Percentage of Error from Arduino Uno output adc Compare with Calculation adc	78
4.5	Analog to Digital Converter (adc) Value from Raspberry Pi	79
4.6	Percentage of Error from Raspberry Pi adc Value Compare with Calculated adc	79
4.7	Time Taken for Message to be received at Morning Section Experiment	86
4.8	Time Taken for Message to be received at Afternoon Section Experiment	88
4.9	Time Taken for Message to be received at Evening Section Experiment	90
4.10	Time Taken for Message to be received at Morning Section Experiment	93
4.11	Time Taken for Message to be received at Afternoon Section Experiment	95
4.12	Time Taken for Message to be received at Evening Section Experiment	97
4.13	Time Taken for Message to be received at Morning Section Experiment	99
4.14	Time Taken for Message to be received at Afternoon Section Experiment	101
4.15	Time Taken for Message to be received at Evening Section Experiment	103

4.16	Reliability for Message to be received at Indoor Test	107
4.17	Reliability for Message to be received at Outdoor Test	109

## LIST OF FIGURES

FIGURE	TITLE	PAGE
2.1	Seismograph	12
2.2	Schematic Diagram of Example Scenario	21
2.3	Overall Design of the Google Cloud Messaging System	22
2.4	Google Cloud Messaging Architecture	23
2.5	The Block Diagram of the Alarm Device	24
2.6	The DEWN Architecture and Device	25
2.7	Block Diagram of the fire alarm system	26
2.8	The Flowchart of C programming in Arduino	28
2.9	The Flowchart of Python programming in Raspberry Pi	29
2.10	Number of Smartphones with the Earthquake Network Application	31
2.11	Spatial Distribution of the Smartphone in Mexico City; Red Dot: Active Smartphone, Green Dot: Smartphone Enable to Detect Earthquake	32



3.1	Flow Chart of the Progress for the Entire System	40
3.2	Flow Chart Process Flow Chart	42
3.3	Block Diagram of the Raspberry Pi	43
3.4	Raspberry Pi and Raspberry Pi Logo	44
3.5	Accelerometer	47
3.6	Gravity Force According to Position	48
3.7	Hardware Setup	52
3.8	Component Setup Illusion	53
3.9	Component Setup for Experiment	53
3.10	Accelerometer at Initial Position	56
3.11	Holding Accelerometer Parallel to X axis	57
3.12	Holding Accelerometer Parallel to Y axis	57
3.13	Accelerometer with Raspberry Pi Connection	59
3.14	Place Accelerometer Plane	59
3.15	Holding Accelerometer Parallel to X-axis	60

3.16	Holding Accelerometer Parallel to Y-axis	60
3.17	Hardware Base/Setup for Experiment	63
3.18	Hardware Base/Setup	66
3.19	Three Stop Watch Used in Doing This Experiment	67
3.20	Distance between FKE and FKEKK	68
3.21	Distance between FKE and FKM	68
4.1	Message Received of 6 Digit Code for Registration	82
4.2	Message Sent from Raspberry Pi to One Number	82
4.3	Echo Message That Sent to Raspberry	83
4.4	Echoing Message from Raspberry Pi	83
4.5	Average Time Taken to Receive Message at Morning Indoor Test	77
4.6	Average Time Taken to Receive Message at Afternoon Indoor Test	87
4.7	Average Time Taken to Receive Message at Evening Indoor Test	89
4.8	Average Time Taken to Receive Message at Morning At FKEKK	92
4.9	Average Time Taken to Receive Message at Afternoon At FKEKK	94

4.9	Average Time Taken to Receive Message at Evening At FKEKK	96
4.10	Average Time Taken to Receive Message at Morning At FKM	100
4.11	Average Time Taken to Receive Message at Afternoon At FKM	102
4.12	Average Time Taken to Receive Message at Evening At FKM	104

**LIST OF ABBREVIATIONS**

PWM	-	Pulse width modulation
km	-	Kilometer
m	-	Meter
cm	-	Centimeter
mm	-	Millimeter
L	-	Length
W	-	Width
H	-	Height
V	-	Volts
g	-	Gravitational Force
$m/s^2$	-	Meter per Second Square
s	-	Seconds

**LIST OF APPENDICES**

<b>APPENDIX</b>	<b>TITLE</b>	<b>PAGE</b>
A	Gantt chart for Final Year Project 1	117
B	Gantt chart for Final Year Project 2	118
C	Initial Arduino Coding for Accelerometer	119
D	Sensor Test Coding	121
E	Accelerometer Test with Raspberry Pi Coding	124
F	Disaster Remote Messaging System Coding	126

## CHAPTER 1

### INTRODUCTION

In this chapter, motivation, problem statement, objective, scope and project outline will be presented and discussed. At here, description of where the project start from, the limitation the target of the project will be described throughout. Besides, some statistic of the true fact of the related to the project will be disclose.

#### 1.1 Motivation

On 5 June 2015, Malaysian has faced an unforgettable moment which is a strong magnitude of earthquake with moment measure 6.0 Richter scale hits Ranau, Sabah, East Malaysia at 7.15am [2]. It was strongest earthquake in Malaysia since 1976 which measured 5.8 Richter scale struck Lahad Datu. On the same day evening, three aftershock earthquakes happened measuring 4.3 Richter scale for first two and 2.8 Richter scale for third [3]. Even though the earthquake hits Malaysia was a medium range natural disaster, but it has 18 casualties and cause many injuries to people and causes many property damage [4] [5] [6] . Malaysia still outdated in earthquake disaster management since the last earthquake happened in 1976 and many people thought Malaysian have myth that Malaysia is a place where earthquake is impossible. Thus, Malaysian has no precaution on earthquake or don't know what to do if earthquake strike. Public get panic and over earthquake and causes the situation goes chaos. This also may causes loses of life as some people may fall down and others are step on them during chaos. People inside buildings may die or seriously injured due to heavy concrete fall on them. Not only in Malaysia, in many developing countries like recently in Nepal, there are totally more than 8000 died [7]. In the last 25 years, just in five dead list earthquake have

ombined to cause deaths of 680,000 people in Haiti, China, Pakistan, Iran and India Ocean [4]. From the Table 1.1 and Table 1.2 below, it can be conclude that buildings collapse causes more people to die. 37 people died due to fence and fallen object on them. Correct method to handle or manage earthquake are still not available in Malaysia, therefore we need to explore more about earthquake management so that in future, with proper handling, the total death toll will educe or nil if the earthquake strike.

Table 1.1: Earthquake in Japan with Damage to Residential [1]

Earthquake	Year	Month/day	Hour: min	Magnitud e (JMA)	Totally Collapse	Burnt	Heavily Damaged	Lightly Damaged
Niigata	1964	6/16	13:01	7.5	1960	290	6640	67825
Tokachi-Oki	1968	5/16	9:49	7.9	673	18	3004	15697
Izu-Hanto-Oki	1974	5/9	8:33	6.9	134	5	240	1917
Izu-Oshima-Kinkai	1978	1/14	12:24	7.0	96	0	616	4381
Miyagaken-Oki	1978	6/12	17:14	7.4	1183	7	5574	60124
Nihonkai-Chuba	1983	5/26	11:59	7.7	986	5	2115	3258
Naganoken-Seibu	1984	9/14	8:48	6.8	23	1	86	473
Kusiro-Oki	1993	1/15	20:06	7.8	53	2	254	5311
Hokkaida-Nansei-Oki	1993	7/12	22:17	7.8	487	107	400	4854
Sanriku-Haruka-Oki	1994	12/28	21:19	7.5	72	0	429	9021
Hyogoken-Nanbu (Kobe)	1995	1/17	5:46	7.2	100302	7000	108741	227373