"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".

Signature : .....

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

Date : 23/6/16

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 : .....

Name : Gopalasamy a/l Kasiappan

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 menyedarken 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.

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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

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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]. 'rom the Table 1.1 and Table 1.2 below, it can be conclude that buildings collapse causes more ieople to die. 37 people died due to fence and fallen object on them. Correct method to handle ır manage earthquake are still not available in Malaysia, therefore we need to explore more bout 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	Magnitude (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