



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**VOICE ACTIVATED HOME SYSTEM FOR PARALYZED  
PEOPLE**

This report is submitted in accordance with the requirement of Universiti Teknikal  
Malaysia Melaka (UTeM) for the Bachelor Degree of Engineering Technology  
(Industrial Power) with Honours

by

**NUR SYAFIQAH BINTI SOLAHUDDIN**

**B071210160**

**920110025586**

FACULTY OF ENGINEERING TECHNOLOGY

2016

**BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA**

**TAJUK: VOICE ACTIVATED HOME SYSTEM FOR PARALYZED PEOPLE**

**SESI PENGAJIAN: 2016/17 Semester 2**

Saya **NURSYAFIQAH BINTI SOLAHUDDIN**

mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. \*\*Sila tandakan (✓)

- SULIT** (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972)
- TERHAD** (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
- TIDAK TERHAD**

Disahkan oleh:

\_\_\_\_\_  
Alamat Tetap:

LOT 2235,KG BARU,BKT JENUN

06720,PENDANG

KEDAH DARUL AMAN.

\_\_\_\_\_  
Cop Rasmi:

Tarikh: 8/12/2016

:

Tarikh: \_\_\_\_\_

\*\* Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini perlu dikelaskan sebagai SULIT atau TERHAD.

**FAKULTI TEKNOLOGI KEJURUTERAAN**

Tel : +606 234 6623 | Faks : +606 23406526

Rujukan Kami (Our Ref) :  
Rujukan Tuan (Your Ref) :

8 DISEMBER 2016

Pustakawan  
Perpustakaan UTeM  
Universiti Teknikal Malaysia Melaka  
Hang Tuah Jaya,  
76100 Durian Tunggal,  
Melaka.

Tuan/Puan,

**PENGKELASAN LAPORAN PSM SEBAGAI SULIT/TERHAD LAPORAN  
PROJEK SARJANA MUDA TEKNOLOGI KEJURUTERAAN ELEKTRIKAL  
(KUASA INDUSTRI): NUR SYAFIQAH BINTI SOLAHUDDIN**

Sukacita dimaklumkan bahawa Laporan PSM yang tersebut di atas bertajuk  
“**VOICE ACTIVATED HOME SYSTEM FOR PARALYZED PEOPLE**” mohon  
dikelaskan sebagai \*SULIT / TERHAD untuk tempoh LIMA (5) tahun dari tarikh  
surat ini.

2. Hal ini adalah kerana IANYA MERUPAKAN PROJEK YANG DITAJA  
OLEH SYARIKAT LUAR DAN HASIL KAJIANNYA ADALAH SULIT.

Sekian dimaklumkan. Terima kasih.

Yang benar,

\_\_\_\_\_  
Tandatangan dan Cop Penyelia

## DECLARATION

I hereby, declared this report entitled “VOICE ACTIVATED HOME SYSTEM FOR PARALYZED PEOPLE” is the results of my own research except as cited in references.

Signature : .....

Author's Name : .....

Date : .....

## **APPROVAL**

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electrical Engineering Technology (Industrial Power) with Honours. The member of the supervisory is as follow:

.....

(Project Supervisor)

## ABSTRAK

*Sistem rumah pintar adalah satu sistem bantuan komputer yang akan menyediakan semua keselesaan,keselamatan,keselamatan dan penjimatan tenaga yang terpakai secara automatik kepada dan diprogramkan melalui komputer. Sistem ini kebanyakannya boleh digunakan untuk mengawal semua lekapan dan kelengkapan di rumah anda,daripada menubuhkan lampu untuk pelbagai appliances. Nowadays rumah,majoriti manusia tidak dapat dipisahkan dengan telefon bimbit walaupun satu minit sahaja.Hanya dengan mempunyai telefon, maka anda boleh melaraskan atau mengawal lampu atau mematikan di dalam atau di luar rumah,menyelia semua aktiviti yang berlaku di rumah, atau hanya, ia boleh bermakna bahawa anda menetapkan infrastruktur rumah anda baru atau pejabat yang menggunakan sumber elektrik dihasilkan.Rumah-rumah adalah rumah lebih banyak manfaat yang luas dan pintar yang mungkin berfaedah.Telefon yang boleh mengawal infrastruktur rumah menawarkan keselesaan dan kemudahan kepada kehidupan manusia yang membolehkan kawalan berpusat peranti.Secara am nya, rumah konvensional menggunakan suis menghisap mudah yang berkaitan untuk membekalkan kuasa untuk digunakan untuk mengawal peralatan elektrik seperti lampu. Tambahan pula, ini beralih biasanya terletak di dinding dalam peranti dikawal dan ketinggian manusia biasa yang sama menyebabkan isu-isu dengan orang lumpuh itu. Jadi, untuk mengatasi masalah ini, di sini adalah salah satu kaedah yang boleh dicadangkan .*

## ABSTRACT

Smart home system is a computer-aided system that will provide all comfort, safety, and energy savings, which applies automatically to and programmed through a computer. This system mostly can be used to control all fixtures and fittings in your home, ranging from setting up lighting for a variety of household appliances. Nowadays, majority mankind cannot be separated with mobile phone even a single minute. Only by having the phone, then you can adjust or control the lighting on or off the inside or outside of the home, supervising all activities that occur in the home, or simply, it could mean that you set new the infrastructure of your home or office that uses its resources to produced electricity. The houses are spacious and smart home more benefits that may be advantageous. The phones that can control the infrastructures of the house offers comfort and convenience to human life that allows centralized control of devices. In general, conventional home using simple latching switches that connected to supply power for the use to control electrical appliances such as lamps. Furthermore, this switches usually located on the wall in the controlled devices and the corresponding normal human height causing the issues with the paralysis person. So, to overcome this problem, here is one of the method that could be proposed.

## **DEDICATION**

To my beloved parents

Dedicated to my dearest and precious parents and family.

As for their love, eternal support, encouragement and all the sacrifices. Not to forget my paramount, other half that supports the vicissitudes of me to be able to complete this project here in Melaka and apart from my family. Thank you for being besides me always. Besides, I would like to take this opportunity to express my heartfelt gratitude to all those who helped me to make my final year project a success. First and foremost I would like to thank Allah who has provided me the strength to do justice to my work and contribute my best to it so that it has turned out to be a successful project. As a final word, I would like to thank each and all individual who have been a source of support and encouragement and helped me to accomplish my goal and achieve my dissertation work successfully.

Thank you.



## ACKNOWLEDGEMENT

In the name of Allah, the Almighty who give us the truth, the knowledge and with regards to Prophet Muhammad S.A.W for guiding us to straight path. I thank to Allah for giving me the strength to finish my writing for this report. I would like to take this opportunity to express my appreciation towards my supervisor Associate Mr .Ab Wafi Bin Ab Aziz for his guidance, advice and suggestions to help me throughout this project from the first day onwards. All of his contribution surely helped me so much for which I could never pay back. I wish to express appreciation to friends for their valuable helps and assistance. I would like to extend my sincere gratitude to those who have supported me throughout the entire project and for helping me get through it all. May all of your kindness be returned by Allah. Last but not least, I would like to thank my parents, Solahuddin B.Mustapa and Shakinah Bt. Dun for constantly encouraging me to strive for excellence in my education. Their support and love are everything to me which always keep me motivated to achieve success. It is a worthwhile experience and I am truly grateful to everyone who has given me their help and support. Thank you.

# TABLE OF CONTENT

Abstrak	i
Abstract	ii
Dedication	iii
Acknowledgement	iv
Table of Content	v
List of Tables	ix
List of Figures	x
List Abbreviations, Symbols and Nomenclatures	xi

## CHAPTER 1: INTRODUCTION

1.0	Background	1
1.1	Problem Statement	3
1.2	Objectives	3
1.3	Scope	3

## CHAPTER 2: LITERATURE REVIEW

2.0	Introduction	5
2.1	Home automation	5
2.2	Voice Recognition	7
	2.2.1 Voice Recognition Program	8
	2.2.2 Differentiation of voice recognition	11
	2.2.3 Disciplines are involved in voice recognition	12
	2.2.4 Process of Speech Engine	12
2.3	Arduino	13
	2.3.1 Advantages of Using Arduino	14
2.4	Bluetooth Module	15
2.5	User specialization(Type of paralysis)	16
	2.5.1 Spinal Cord Injury Overview	17
	2.5.2 Functionality After a Spinal Cord Injury	18

<b>CHAPTER 3: METHODOLOGY</b>	19
3.0 Steps of Methodology	19
3.1 Literature Review	19
3.1.1 Identifying Problem	20
3.1.2 Designing Application	20
3.2 Software Development	21
3.2.1 MIT App Inventor	21
3.2.2 Arduino Software	22
3.3 Hardware Development	23
3.3.1 Bluetooth Module HC-06	23
3.3.2 Arduino UNO	23
3.3.3 2 Channel 5 VDC Relay Module	25
3.4 Designing Application	26
3.4.1 Voice Recognition Method	26
3.4.1.1 Client's Bluetooth	27
3.4.1.2 Recognizer Speech	27
3.5 Designing Circuit	27
3.6 Electronic & Programming Evolution	38
3.7 Integrating Electronic Part Toward Circuit	29
3.8 Testing & Troubleshooting	29
<b>CHAPTER 4: PROJECT EVOLUTION</b>	30
4.0 Introduction	30
4.1 Development of Android Application	30
4.1.1 Simulation Text To Speech	31
4.1.2 Testing Bluetooth Connection	33
4.1.3 Voice Recognition Testing	33
4.2 Hardware Development	36
4.2.1 Arduino Microcontroller	36
4.2.2 Bluetooth Module HC-06	37
4.2.3 Electronic Circuit	38
4.3 Experimental Result	39

<b>CHAPTER 5 : RESULT &amp; DISCUSSION</b>	<b>42</b>
5.0 Introduction	42
5.1 Analysis Result Recorded	43
5.1.1 Analysis Real Time Result Bedroom Lamp	43
5.1.2 Analysis Experimental Result Bedroom Lamp	44
5.1.3 Analysis Real Time Result Bedroom Lamp	45
5.1.4 Analysis Experimental Result Bedroom Lamp	46
5.1.5 Analysis Real Time Result Bedroom Lamp	47
5.1.6 Analysis Experimental Result Bedroom Lamp	48
5.1.7 Analysis Real Time Result Bedroom Lamp	49
5.1.8 Analysis Experimental Result Bedroom Lamp	50
5.2 Conclusion Tabulated Data	51
5.3 Analysis of Distance's Parameter	51
5.3.1 Distance human being to reach switch	51
5.3.2 Distance Paraplegia With Android Device towards Arduino	51
5.4 Analysis Experimental Result for Android Device to Connect with Arduino	52
5.5 Limitation of Project	52
5.5.1 Distance of Android Device more than 20 meter	53
5.5.2 Verbalization Limitation	53
5.5.3 Required Wireless-fidelity(Wi-fi)	53
 <b>CHAPTER 6 : CONCLUSION &amp; RECOMMENDATION</b>	 <b>54</b>
6.0 Introduction	54
6.1 Project Summary	54
6.2 Achievement of Research's Objective	54
6.3 Project Significant	55
6.4 Problem Occurred during Project Progression	55
6.5 Recommendation for Further Innovation	56
 REFERENCES	 57

APPENDICES	59
Gantt Chart PSM	60
Command Used For Device	61
Circuit Design	62
Arduino's Coding	63

## LIST OF TABLES

4.1	Experimental Result Bedroom Lamp	39
4.2	Experimental Result Livingroom Lamp	40
4.3	Experimental Result Bedroom Fan	40
4.4	Experimental Result Livingroom Fan	41
5.1	Real Time Result Bedroom Lamp	43
5.2	Experimental Result Bedroom Lamp	44
5.3	Real Time Result Livingroom Lamp	45
5.4	Experimental Result Livingroom Lamp	46
5.5	Real Time Result Bedroom Fan	47
5.6	Experimental Result Bedroom Fan	48
5.7	Real Time Result Livingroom Fan	49
5.8	Experimental Result Livingroom Fan	50
5.9	Experimental Result Android device to Connect with Android	52

## LIST OF FIGURES

2.1	Voice Act as input forward phone	7
2.2	Requirement for speech engine	9
2.3	Process speech engine	13
2.4	Arduino microcontroller board	13
2.5	Bluetooth module	16
2.6	General classification of paralysis	17
3.1	MIT App Logo	21
3.2	Flowchart process of application	22
3.3	Arduino UNO microcontroller	24
3.4	Arduino UNO Pinout	25
3.5	2 channel 5vdc relay module	26
3.6	Circuit drafting	28
3.7	Project's connection at aduino uno	29
4.1	MIT app with speech program	31
4.2	Command after press pushbutton	32
4.3	Transferring selected command	32
4.4	Paired Bluetooth connection	33
4.5	Pushbutton "PRESS FOR SPEAK"	34
4.6	Command "Livingroom lamp on"	34
4.7	Command "Emergency"	35
4.8	Speech recognizer program	35
4.9	Success uploading program into Arduino	36
4.10	Arduino Uno functioning	37
4.11	Testing Bluetooth module HC-06	38
4.12	Project wiring connection	39

## **LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE**

Wi-Fi	-	Wireless Fidelity
OS	-	Operating System
HAS	-	Home Automation System
PC	-	Personal Computer
RAM	-	Random Access Memory
A/D	-	Analog -To-Digital
LPC	-	Linear Predictive Coding
AVR	-	Atmega and Vegard's Risc processor
PAN	-	Personal Area Network
GFSK	-	Gaussian Frequency-Shift Keying
Mb	-	Megabyte
GPS	-	Global Positioning Systems
ISM	-	Industrial, Scientific and Medical
SIG	-	Special Interest Group



# CHAPTER 1

## INTRODUCTION

### 1.0 Introduction

This chapter is intended to provide background information of the study conducted. It covers the background of study, problem statements, the objectives and also the scope of project.

### 1.1 Background

Smart home system is a computer-aided system that will provide all comfort, safety, security and energy savings, which applies automatically to and programmed through a computer, in a shopping center or where we live. This system mostly can be used to control all fixtures and fittings in your home, ranging from setting up lighting for a variety of household appliances, which orders can be done by using sound, infrared rays, or via remote control (remote). Application of this system allows to controlling the turning on and of the appliances of household such light and fan.

At the time of modernization, most people cannot be away from their smartphones. It has been confirmed, a total of 5,000 people from the US, UK, China, India, South Korea, South Africa, Indonesia and Brazil took Smartphone survey conducted by Time magazine. The results of this study show that most people use their smartphones, whereby, 84% claim that they will not survive without their mobile phone in their daily life ( Teik, 2013). The study also caught that 75% of the Android's market share of smartphones and some 136 million Android phones were sold successfully in the third quarter of 2012 (Anonymous,

2012) .Android has been listed has an excellent capabilities of mobile operating system that applied on mobile gadgets on the market today, and a phone operating system (OS) Android has become the most popular and commonly used by the public.

Only by having the phone, then you can adjust the lighting on the inside or outside of the home, supervising all activities that occur in the home, or simply, it could mean that you set all the infrastructure of your home or office that uses its resources to generate electricity. The houses are spacious and smart home more benefits that may be in the find.

In homes that had broad breadth, smart home more beneficial. In home automation is one of the major growing industries that can change the way people live. According to M.Weiser (1991), based on the study on Home automation system (HAS) project that have been done by the previous researcher and developer, are based on wireless environment. Most of the system used computer to control the home appliances. Furthermore, this utilization is not pertinent nowadays because the size of the computer is enormous and not easy to handle.

However, according to Jiang et. al (2000), for this project, it is about the product that bases on voice as the input, and will conduct a process throughout the power supply of the home; system that can respond to the voice command and control the on or off status of electrical devices such as lamp and fan in the house. The subject that will be specialize in this project is paraplegia person. Paraplegia is the person that have disabilities on their feet and cannot move freely like other human being. They can only move their upper part of body to do all thing, as viewed in Paralysis Resource Centre web at [http : //www.christopherreeve.org](http://www.christopherreeve.org)

## 1.2 Problem Statement

At present, in the home automation industry is booming to improve the quality of our lives. It offers comfort and convenience to human life that allows centralized control of devices. In general, conventional home using simple latching switches that connected to supply power for the use to control electrical appliances such as lamps. Furthermore, this switches usually located on the wall in the controlled devices and the corresponding normal human height.

Base on this proposal there are some reasons why smart home should be proposed because:

(i) Ganasekar et.al (2012) classify people that suffer from disabilities are often unable to perform routine task with great facility depending in the extent of their limitation. In this case, the paralyzed people will be having difficulties turned neither on nor off of the lights due to the switch is at higher place.


(ii)Control device arduous to be achieved.

## 1.3 Objectives

There are several objectives that are should be focused to be achieved at the end of the project which includes:

- (i) To produce the model that indicates the actual product of this home system
- (ii) To produce tools that will improve the quality of paralyzed people that cited by Rajesh *et.al* (2011) or to ease their everyday difficulties in switch on or off light and fans

## 1.4 Scope

As to ensure the completion of project achieved the stated objectives. The development of the project is estimated to involve software and hardware. So, the project shall be com Universiti Teknikal Malaysia Melaka

- (i) Use Arduino as the microcontroller and code the data that will operate the appliances which is ,it will be conducted through this system
- (ii) To develop android application for voice recognition
- (iii) To produce a model for this project, it is consist of several component such as bulb 9Watts, Arduino Uno microcontroller, Bluetooth Module HC-06, relay, and android phone or tab.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This area fundamentally directs the creator in setting up the whole report substance including the graphical outlines which can be found in supplements. While the first chapter clarified the background this project , this chapter proceeds with a fully-referenced review from the relevant literature. It covers introduction to home automation ,voice recognition and specialized people which is have paralysis, factors affecting paralyzed ,second problem due to their limitation , prediction the function of devices that will be used for this voice activated home automation.

#### **2.1 Home Automation**

Automation has likewise included a considerable measure of home furnishing items, for example, lights, fans and other home appliances as well. An automation is the thing that it seems like: automating the capability to control things around the house from the window shading to creature eaters with straightforward push catch (or heading sound).

A few things, for example, giving light to turn on and off at your order, simple and generally modest, however others, for example, reconnaissance cameras may require more genuine speculation of time and cash. What needs to be emphasized in this project is, home automated for turning the lights on.

The most recent development in wireless innovation have been made to control numerous parts of your home should be possible through your cell phone from anyplace on the planet by means of Wi-Fi. For the individuals who have not yet made the leap to the platform which is wirelessly, at present you can get the same results with a PC and internet association.

There are more and more products that can be associated with a technology platform and controlled from a distance to make your home secure and easier. Moreover, home automation will help you save on service bills or the right term is utility bills by oversee the amount of electricity you use on a regular day. Furthermore, there are also several number of price points which can be used as a stepping stone to how much technology you want for inclusion in your smart home, so you can start small and develop gradually.

*“Home automation is a very promising area. Its main benefits range from increased comfort and greater safety and security, to a more rational use of energy and other resources, allowing for significant savings. It also offers powerful means for helping and supporting the special needs of people with disabilities and, in particular, the elderly. This application domain is very important and will steadily increase in the future.”*

Pursuant to Gill et.al (2009).According to Nunes and Delgado (2000), in recently introduced a network device which enables the home improvement that has continued at an unprecedented rate .

## 2.2 Voice Recognition



Figure 2.1 Voice act as input towards phone

As illustrated in figure 2.1, there are voices that act as input towards the telephone receiver. Voice or speech recognition is the ability of a machine or program to accept and interpret the dictation, or to comprehend and execute uttered commandments which is cited by (O'Shaughnessy, 2001)

For utilization with PCs, digital signals are generated due to the conversion of analog audio. This necessitates analog-to-digital conversion. For a PC to interpret the signal, it must have a digital database, or vocabulary, of words or syllables, and a swift method of contrasting this data with signals. The patterns of speech are kept on the hard drive and stored in memory when the program is begun. A stored pattern is checked by the comparator against the yield of the A / D converter.

### 2.2.1 Voice Recognition Program

In practice, the size of a voice-recognition program's efficient vocabulary is straightforwardly interconnected to the random access memory capacity of the computer in which it will be assembled. A voice-recognition program runs ordinarily speedier if the whole vocabulary can be loaded into Random Access Memory (RAM) as compared with searching the hard drive for some of the matches. Then, processing speed is critical as well, because it affects how fast the computer can search the RAM for the matches.

Alternatively, all voice-recognition systems or programs make lapses. Furthermore, as example, the situation such as youngsters who were screaming, the dogs that are barking, and outside discussion groups which was very noisy, can convey fake input. Quite a bit of this can be dodged just by utilizing the framework as a part of a peaceful room. There is additionally an issue with words that sound seems alike, however are spelled contrastingly and have diverse implications , for instance ,“hear” and “here”. This issue may sometime be a great extent that overcome the utilizing stored contextual information. Nevertheless, this will obliges more RAM and prompt processors than are currently available in the personal computer.

Moreover, recognition of speech is the capability either machine or program to distinguish phrases, same goes to words in spoken language and metamorphose them to a machine-readable (computer recognizable) format. The software of rudimentary speech recognition has a restricted vocabulary of words and phrases and may only distinguish these if the commands that delivered by user clearly pronounced. More sophisticated software has the ability to accept natural speech. For more details, call routing, speech-to-text, voice speech and voice dialing, incorporate as speech recognition applications.

The terms "speech recognition" which as portray at figure 2.2 below, and “voice recognition “are at times utilized conversely. Notwithstanding, both of this terms signify different things. Speech recognition is used to identify words in spoken language. The