



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF AUTOMATIC HEALTHCARE SYSTEM BY USING GSM FOR PARALYSIS PATIENT

This report submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Telecommunication) with Honours.

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirements for the award of Bachelor of Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

.....
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ABSTRAK

Projek penjaga kesihatan secara automatik yang menggunakan GSM untuk pesakit lumpuh ialah projek yang menggunakan aplikasi pengesan isyarat melalui sensor Apds-9960. Sistem ini membantu pesakit lumpuh untuk melakuakn kehidupan seharian mereka tanpa bercakap atau menjerit pada penjaga atau jururawat dan hanya memberikann sedikit pergerakan isyarat yang mudah pada sensor Apds-9960. Apabila sensor mengesan isyarat yang diberikan, ia akan menghantar semula isyarat digital pada GSM SIM 900A. Jururawat akan membantu dengan mudah bila mereka dapat arahan dari pesakit. Peranan pesakit dalam perprojek ini adalah sebagai pelanggan yang membaeri arahan apa yang meredakan mahukan. Pesakit lumpuh memerlukan penjagaan hampir 24 jam sehari kerana sesetengah pesakit tidak mampu bercakap dengan betul dan juga tidak boleh menggerakkan separuh atau seluruh badan mereka. Mereka yang sebagai manusia masih memerlukan makan, minum, buang air dan kehidupan harian yang lain tetapi mereka tidak boleh melakukan seorang diri. Projek ini bukan sahaja membantu pesakit lumpuh tetapi juga membantu jururawat untuk menjaga atau merawat pesakit mereka dengan lebih mudah. Data ujikaji telah direkod

ABSTRACT

An Automatic Healthcare System using GSM for paralysis patient is a project using application of gesture detection via Apds-9960 sensor. The system helps the paralysis patient to do their daily life without their need to speak or loud at nurse and just only give easy movement gesture on Apds-9960 sensor. When sensor detected, it will send the digital signal to ARDUINO UNO which act as heart of the whole system and send back the digital signal to the GSM Module SIM-900A. Nurse will assist with easy went they get the order from patient. Role patient in this project as customer who orders what they want. Paralysis patient need to care almost 24 hours per days because some the patient their not able to speak properly and also cannot move their half or the whole body. They still human that needs food, water and also want to pee and so on but they can't do alone. This project not just only helps the paralysis patient but also assist nurse to care or treatment their patient with more easily. The experiment data are recorded and collected before they are analysed by the end of the report.

DEDICATION

Alhamdulillah, praise to the Almighty Allah S.W.T

This thesis is dedicated to:

My beloved parents Aini Binti Mohd Yusof. To my brothers and sisters Azrin Arnizan, Muhammad Ikhwan and Amirul Ezzudin. A big appreciate to my supervisor, Madam Asma Binti Che Aziz, my lecturers, my friends, Ifwat Izzati binti Muhammad Amru, Nor Farhana binti Asir, Nur Anis Farhana Binti Rashid, Muhammad Amsyar Shahidan Hadzri, Hafizul Alief Bin Abu Bakar, Muhammad Izzat Bin Ruzaini, Ahmad Adib and all my friends and thank you for your idea and support so that the report can be completed successfully.

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LIST OF ABBREVIATIONS, SYMBOLS AND NOMENCLATURE

ASEAN	-	Association of Southeast Asian Nations
IT	-	Information Technology
MITC	-	Melaka International Trade Centre
RM	-	Malaysian Ringgit
NU	-	Not Used
UTeM	-	Universiti Teknikal Malaysia Melaka
FYP	-	Final Year Project
GSM	-	Global System for Mobile Communication
Scl	-	Serial Data Line
Sda	-	Serial Clock Line
Gnd	-	Ground
Vcc		Voltage

CHAPTER 1

INTRODUCTION

1.0 Project Background

In advance telecommunication technology, people make it an easier and faster to do a something in a long distance with the short time. People always use the technology to complete the work or help a worker to care for paralyzed patient especially at hospital and also for family who aid paralyzed patient at home or specific area. This project “Development of Automatic Healthcare System Using GSM for Paralysis Patient” is the project used the technology in telecommunication, the evolution in telecommunication will apply in this project is by using GSM module SIM900A. At the same time, a few circuit and software such as ARDUINO IDE compiler used to functions this project.

Nowadays, at hospital and NGO’s serving paralysis patient need to care their patient almost 24 hours for each patient in one day. This happened because their patient has a whole or partial body disabled to move by themselves while their also not able to speak properly to convey. This project helps workers or family who care the disabled person such as medical staff/nurse or doctor to facilitate to treat them. A few main component and equipment are used in this project which is gesture sensor (APDS-9960) and controlled by ARDUINO UNO board which act as microcontroller by using GSM module SIM900A.

By using the gesture sensor (APDS-9960), it will aid the patient to convey anything they want through the GSM module by sending message. The function of

this sensor is the patient just needs to swipe their hand at gesture sensor to convey a message. Besides, the data will display the convey sign through LCD screen to easier the patient know what they want to convey. Other than that, the buzzer will sound when the emergency case occur when patient swipe their hand to emergency case. The main concept of entire project is the hand gesture movement act as transmit signal while the gesture sensor will received signal and send data to ARDUINO UNO board. This concept will help to care taking of the patient and it will easily to handle the patient and not required every time with patient to care them and it the best way to healthcare of the patient.

1.1 Problem Statement

According BERNAMA Online, Kuala Lumpur 28/10/2016, research from Head of Department of Medicine, UNIVERSITI KEBANGSAAN Malaysia Medical Centre (PPUKM, an estimated around 40,000 Malaysians suffer a paralysis attack each year including children. This problem will be faced by medical staff or nurse and doctor. The first problem is when the patient suffers a paralysis attack, the whole or their partial body disabled to move which means their movement is restricted and they also barely to communicate with anyone because they are not able to speak like a normal person. It will be hard nurse or doctor to understand what they want to convey and help them manage their daily needs such as eating, drinking, bathing and whatever they need. This project is separate into two condition either used in house or Hospital and it might be used in specific area such as Folks Elderly Institutions.

Usually, every hospitals and NGO's serving paralyzed patients cannot provide full care of treatment and cannot afford to treat them of all time although they Hospital have enough medical staff/nurse. Besides that, according the condition of patient that afford to move, has be confirm that the patient unable to press medical button to alert if has emergency case . To compare with another disease, paralysis attack required higher cost for their treatment includes their medicine. Not all type family is come from the rich family and not afford to pay higher bill. Therefore, this

system also suitable used at home with just only buy the medicine at Hospital and no need to keep stay in Hospital for a long time period.

Therefore, with the automatic healthcare system for paralysis patient will be easier for medical staff/nurse and doctor to care and treat their patient also save their time because only take care of them when get the notification even there are not beside their patient.

1.2 Objective

- i. To study and understand the operation of automatic healthcare system that involves GSM, APDS-9960 Gesture Sensor and ARDUINO UNO
- ii. To design and develop the Automatic Healthcare system using GSM for paralysis patient.
- iii. To analyse the measurement of precision of hand gesture by using APDS-9960 gesture sensor and the efficiency of GSM module.

1.3 Scope of Project

The automatic healthcare system for paralysed patient is to help and facilitate paralysed patient to communicate or do another thing they want. This system is place in certain area such as inside hospital, home or Old Folks Institutions. The purpose of this project is help patient who cannot take care by themselves. At the same time, this system also help the medical staff during treat their paralyzed patient where they do not have to always be on the patient at all times and only provide assistance if needed.

These projects use direct 240 power supply to obtain continuous supply because these systems need 24 hours for patient. These systems have several components that related with the power supply. All major components used output

5V but only APDS-9960 used 3.3V for output. These systems require the power supply circuit which who capable and able to obtain ideal output to all each components.

This system only used one sensor which is APDS-9960 Gesture sensor. This sensor operate just only used hand to swipe over the sensor to give gesture from any directions which is up, down, right, left, near and far. This sensor is detected about 10cm to 20m range above the sensor. This sensor also able to realize the ambient light, measure the colour and also can detect the proximity. This sensor will send the signal to the ARDUINO UNO board after received the gesture signal.

ARDUINO UNO in this system is act as microcontroller. It able to control the overall system by program code and also used to transmit signal received from APDS-9960 to GSM module. GSM Module SIM900A in this system used as notification. It will notify to medical staff after received signal from ARDUINO UNO board with simple message (SMS). This system will not working if one of this major devices or component is unable to use and if this occurs, the objective in this system cannot achieve. The limitation of the automatic healthcare system is:

- This system is limit to paralyzed patient who cannot move like normal person.
- The paralyzed patient who at least can move their hand but not their fingers.
- The paralyzed patient who not able to speak properly and barely to communicate with others.

1.4 Project Outline

The project outlines in this project will explain about the organization of the report that divided with the several chapters to make more clearly and structured. There will involve with five chapters that involved in Introduction to the Project, Literature Review, Methodology, Expected Result and Conclusion.

Chapter 1

In is a chapter about the introduction of overall project concepts. This chapter will make clear about the project background, problem statement, objectives and lastly the scope of the project. This chapter is very important because it can be a guideline to done and success the project a very well, follow as the planning.

Chapter 2

This chapter will explain about the literature review for a project that cover the previous studies, researchers and finding that related to the project. This chapter, theory, and application will be discussed use inside the researchers, and references the project process.

Chapter 3

The chapter 3 is about the Methodology. The methodology is one of the projects which presented all the steps, projects flow chart, and block diagram. It includes how to design the project. The projects process in how it works will be discussed in this chapter.

Chapter 4

This chapter overview about the expectation result Results from both simulation and experiment. The simulation circuit uses is Proteus 8 professional/ALTIUM Designer and the ARDUINO Software.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This literature review will be explaining the current and previous research that related with the automatic healthcare system project and telecommunication technology version such as GSM and so on. Besides, this chapter will review from gather of similarities or comparison from previous project, researchers, and devices that using the technology of communication.

2.1 Paralysis Patient

The definition of paralysis disease is caused in various conditions that may be classified as those which affect the muscles to them and which act indirectly through the nerves that control muscle actions. In causes of paralysis, there are four common causes of paralysis which are spinal cord injury, head injury, stroke and multiple sclerosis. Based on (Majumdar, 2014) was said that, in the spinal cord injury occurs when a neck or spine is injured and causing the brain cannot function like a normal and it might cause paralysis. It does happen because spinal cord functions as transmit signals from brain to body. When it damage, brain are not able to transmit signal to muscle and patient will be paralyzed. The most common example of spinal cord injury is vehicles accident, fall or accident while working. Other than that, in the head injury cause when brain act control the specific muscle damaged.

Furthermore, stroke also cause of paralysis. This disease occurs when blood cannot supply to the brain which required constant supply of blood that contain

oxygen and nutrition. If flow process of blood supply to the brain disturbed, it will make the patient to get stroke disease. All the explanations is several paralysis caused which related with the automatic paralyzed health care system that help the paralysis patient where they are not able to move properly and also not able to speak properly. So, this project will help the medical staff/ nurse to treat them easier than before this project invented.

However, in this project has a limit for patient to use this system because the requirement for this system at least capable to move their hand even only one hand can move. According to researcher Mita Majumdar about the cause's paralysis disease, almost all patients are not able to move properly but their thinking still able to use. So, this system is invented to aid them and easy their life within do daily life with only uses simple movement by their hand. Besides that, some patient has both problem which is their movement is restricted and not able to speak properly. Because of this problem, this sensor will aid them without any much movement and speak to complete their daily life. According to the problem statement and objective of this project, this system capable to solve all problems listed and able to facilitate the paralysis patient and also the person care them.

2.2 Automatic Paralysis Healthcare System

Based on the objective and the problem of this project, the „development of automatic healthcare by using GSM for paralysis system” is invented to aid the paralysis patient from various angle which is facilitate paralysis patient o not moving much either they are treated with their family at home or get special treatment at any Hospital or specific area such as home care elderly. This system will operate when patient try to convey with give simple message through GSM module which detected by sensor. When patient swipe their hand in any direction either up, down , right, left, near or far, the RGB gesture sensor will detect the movement which able to detect in 2 second swipe at 10cm height. Each direction has different description that referring to their daily life such as eats drink, urinating, bath and also the thing that

become emergency case. If sensor is detected, sensor will send the signal to the heart of entire system which is ARDUINO UNO board. When ARDUINO UNO read the signal, it will send the signal to GSM module. The function of GM module in this system is will give notification with simple message SMS to the user that which mean family if at home and medical staff or nurse at Hospital. If the patient swipe to the emergency case, the buzzer or alarm will turn on and the patient will get treatment faster than before use this system.

2.2.1 Application of Automatic Paralysis Healthcare System

Based on the title which is sensor based automated wheelchair project (Vijayakumar, 2013) state that, to give assistive in the modern technology is better than before technology world because with the technology can reduce time and facilitate to do daily life. To relate with problem statement, this project were indicate with utilized automated wheelchair will help the handicapped or paralyzed person to move by using wheelchair without use their hand. The purpose of this project is similar to the paralyzed patient healthcare where both project invented to help the disabled person to facilitate them do daily life easier but different in this project only used eye to operate by using Eye Tracking Sensor. Besides that, the automated wheelchair also able used at Hospital and specific area and it same goes with paralyzed patient health care that fully used in Hospital and still suitable to place the project at specific area such as elderly care centre. However, even these projects were used different main device and sensor, but the purpose the project invented is same and can solve the problem of paralysis patient in their daily life.

Besides that, based the journal with title assisting system or paralyzed (Prof. R.K.Moje, Abhijeet Botre , Sumit pakhare, Vikas Tupe, 2016)state that the most problem Paralysis disease is their movement is restricted and in every paralyzed patient required almost 24 hours support. This project