



POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PROJECT : FINAL REPORT

Project Title	DEVELOPMENT OF PARALYSIS PATIENT CARE SYSTEM WITH IOT
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Course's Code	DEE50102
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**DECLARATION OF ORIGINALITY AND OWNERSHIP**

TITLE : DEVELOPMENT OF PARALYSIS PATIENT CARE SYSTEM  
WITH IOT  
SESSION : 2 2021/2022

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I am a final year student of Diploma in Electronic Engineering (Medical), Department of Electrical Engineering, Politeknik Premier Sultan Salahuddin Abdul Aziz Shah, which is located at Persiaran Usahawan, Politeknik Premier Sultan Salahuddin Abdul Aziz Shah, 40150 Shah Alam, Selangor.

I acknowledge that 'The Project above' and the intellectual property there in is the result of our original creation / creation without taking or impersonating any intellectual property from the other parties.

We agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the Diploma in Electronic Engineering (Medical) to me.

Made and in truth that is recognized by;

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In front of me, PUAN NOR KHARUL AINA BINTI MAT DIN ( )

As a project supervisor, on the date: .....

**APPROVAL PAGE FOR FINAL YEAR PROJECT**

Submitted in partial full of requirements for diploma of Electronic Medical Engineering at Politeknik Premier Sultan Salahuddin Abdul Aziz Shah by :

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Concentration

Title : DEVELOPMENT OF PARALYSIS PATIENT CARE  
SYSTEM WITH IOT

APPROVED :

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Supervisor Project

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Signature

## ACKNOWLEDGEMENTS

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my final year project to complete the project successfully. I am extremely grateful and remain indebted to my lecturer Puan Nor Kharul Aina Binti Mat Din for being a source of inspiration and for her constant support in the design, implementation and evaluation of the project.

I'm also thankful for her constant constructive criticism and invaluable suggestions, which benefited me a lot while developing the project on "Development Of Paralysis Patient Care System With IOT". She is very co-operative throughout this project work. Through this column, it would be my utmost pleasure to express my warm thanks for her encouragement, co-operation and consent without which I wouldn't be able to accomplish this project.

Many people, especially my classmates and lecturer, have made valuable comment suggestions on this proposal which gave me an inspiration to improve my project. I want to thank to all the people for their help directly and indirectly. I would like to express my gratitude towards my parents for their kind co-operation and encouragement which help me in completion of this project. I would like to express my special gratitude and thank to industry persons for giving me such attention and time. My thanks and appreciations also go to our colleague in developing the project and people who have willingly helped me out with their abilities.

## ABSRTACT

Researcher : Aarthi Elhilvilhi Reddy A/P Partiban  
Presentation Title: Development of Paralysis Patient Care System With IOT  
Research focus : Biomedical Electronic Engineering  
Studies : Politeknik Premier Sultan Salahuddin Abdul Aziz Shah  
Student Level : Diploma

Abstract :

Presenting an automatic healthcare system where the system able to help and facilitates the paralysis patient to complete their daily life. When a patient suffers from a paralysis attack, the whole or partial of their body maybe disabled to move which means their movement is restricted and they also barely to communicate with anyone because they are unable to speak like a normal person. It will be hard for medical staff to understand what they want to convey and in helping them to manage their daily needs such as eating, drinking, bathing and etc. By developing this project, the health officer can assist the paralyzed patient when they are alerted by the message from patient via GSM network. There are several instruction of movement gesture sensor presented in this paper in order to assist health officer in helping the paralyzed patient to complete their needs. Whenever the patient gives the simple hand movement instruction, then it will be delivered through SMS and the alerted notice will be display on notification board to alert the health officers for assisting the patient.

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## CHAPTER 1

### 1.1 INTRODUCTION

Paralysis is the inability to move muscles on your own and with purpose. It can be temporary or permanent. The most common causes are stroke, spinal cord injury, and multiple sclerosis. Paralysis can be a complete loss of movement known as plegia, or a significant weakness called paresis. Paralysis is most often caused by damage in the nervous system, especially the spinal cord. Other major causes are stroke, trauma with nerve injury, poliomyelitis, cerebral palsy, peripheral neuropathy, Parkinson's disease, ALS, botulism, spina bifida, multiple sclerosis, and Guillain—Barre syndrome. For example, monoplegia/ mono paresis is complete loss of movement or weakness of one limb. Hemiplegia/hemiparesis is complete loss of movement or weakness of arm and leg on same side of the body. Paraplegia/paraparesis is complete loss or weakening of both legs. Tetraplegia /tetra paresis or quadriplegia/quadruparesis is complete loss or weakness of both arms and both legs.

Paralysis is caused by injury or disease affecting the central nervous system (brain and spinal cord) which means that the nerve signals sent to the muscles is interrupted. Paralysis can also cause a number of associated secondary conditions, such as urinary incontinence and bowel incontinence.

Though, there are innovative approaches for curing or treating paralysis patients, but the aim of treatment is to help a person adapt to life with paralysis by making them as independent as possible. Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines. They seem to be only available in hospitals and not able to be used at the patient's home or at their convenience. Our goal is to make a device that will be able to retrain a patient's motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt.

## 1.2 PROJECT BACKGROUND

Paralysis Patient Care System is a device that helps disabled person in displaying a message over the LCD by just simple motion of any part of his body which has motion abilities. This system also takes care of the situation where in no one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS. There are several instruction of movement gesture sensors presented in the paper in order to assist health officer in helping the paralyzed patient to complete their needs.

Though, there are innovative approaches for curing or treating paralysis patients, but the aim of treatment is to help a person adapt to life with paralysis by making them as independent as possible. Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines. They seem to be only available in the hospitals and not able to be used at the patient's home or at their convenience.

## 1.3 PROBLEM STATEMENT

We come across hospitals and NGOs serving paralytic patients who have their whole or partial body disabled by the Paralysis attack. Paralytic patients in most cases are not able to convey their needs as they are not able to speak properly or cannot convey through sign language due to loss in motor control by their brain. It is also very risk to let paralytic patient in a situation where no one is present to attend them in emergencies like stroke or other health issues.



#### 1.4 PROJECT OBJECTIVE

- i. To study management and treatment of paralyzed patients.
- ii. To study management and treatment of paralyzed patients.
- iii. To design an innovative patient care system with displays the associated message on the LCD screen and buzzer sound.

#### 1.5 SCOPE OF PROJECT

Paralytic patients who have their whole or partial body disabled by the Paralysis attack. Various conditions such as stress, blood pressure and improper functioning of central nervous systems are reasons which lead in paralytic attacks. Patient who had paralytic attack have their whole or partial bodies disabled. This paralytic patient can neither speak nor express their demands or wishes. These patients cannot have quick reflex system, hence there is no or less coordination between vocal systems, limbs and brain.

#### 1.6 PROJECT SIGNIFICANCE

Paralysis patient care system is a recognition system for the physically disabled. In real world, there are many people who are paralytic and cannot communicate easily. In this project angle sensor are used to convert physical parameter into electrical signal, which can be read by an observer or by an instrument. So with help of this system the barrier faced by the paralytic people in communicating with society can be reduced to great extent. In such situation, this proposed project can come to the rescue. The patient can communicate by displaying the message on the LCD screen by simple motion of their functioning body parts. The particular aspect of this device is that if no one is near by the patient, he can send the message in the form of a SMS to the family members or their care taker through the developed mechanism.

## CHAPTER 2

### 2.1 INTRODUCTION

In this chapter is significance it will cover a research of this project and information related the investigation. This part additionally will talk about a research that comparative with this undertaking. A few article and journals have been checked on furthermore, be references to this venture since it previously done to increase a few information. This section also is about anatomy research for developing this device.

### 2.2 LITERATURE REVIEW TOPIC 1

#### 2.2.1 SUBTOPIC LITERATURE REVIEW TOPIC 1

Paper 1: Hira Beenish, Fakeha Nasar, Ehsan Sheikh, Muhammad Fahad KIET Journal of Computing and Information Sciences (2021)

<https://www.mendeley.com/catalogue/a9aa35af-87f1-3007-9879-88ef568b1dd1/>

- ✓ **Title** : Design and implementation of monitoring system for paralysis patient using IOT
- ✓ **Objectives** : IoT improves the internet and physical device connectivity, among other things as well. The main purpose of this connectivity of huge scale is to enabling the information of any object from anywhere.
- ✓ **Problem statement** : There is a persistent need for continuous interaction with the technologies, however the paralyzed patients can't interact with these gadgets like laptops, cellphones, tablets and notepads but there is a more devices that can act as a solution to interact with these machines, but they are expensive like google glasses, it is not possible for every paralyzed patient to connect and interact with with these gadgets.

- ✓ **Methodology** : Authors proposed a retinacontrolled device called "Eye-com". This device is constructed from cost effective IoT devices such as Micro controller Arduino, accelerometer, X-bee wireless sensor and IR diodes. This device easily ascended on the glasses. By using this device paralyzed patient can easily interact with the machines by simple head movements and their eye blinks Proposed a prototype include three health sensors.
- ✓ **Sensor used** : The system consists of four embedded electronics like TCRT 5000 as the eye blink sensor which can measure the intensity of IR bounced back on the eye, Arduinoadaptable microcontroller and RF link Bluetooth,pair module.

## 2.2.2 SUBTOPIC LITERATURE REVIEW TOPIC 1

Paper 2: V Akhila, Y Vasavi, K Nissie, P Venkat Rao

International Journal of Research in Information Technology (2017)

<https://www.mendeley.com/catalogue/0c182a76-f056-3c04-8c1d-068f74f62b92/>

- ✓ **Title** : An IOT based Patient Health Monitoring System using Arduino Uno
- ✓ **Objectives** : The combination of IoT with arduino is the new way of introducing Internet of Things in Health care Monitoring system of patients. Arduino Uno board collects data from the sensors and transfer wirelessly to IoT website. the usage of arduino increases exponentially due to its reliability, easiness, open source programming, and lowcost.
- ✓ **Problem statement** : It offers a complete and self- contained Wi-Fi networking solution; it can be used to host the application or to offload Wi-Fi networking functions from another application processor. The data generated from arduino is available in the IoT website thinkspeak.com with the use of Wi-Fi module. An integrated development (IDE) environment integrated application programmers Environment or debugging environment) is a software provides facilities that software computer for development. Comprehensive to (also known

as integrated design).

- ✓ **Methodology** : The Arduino Integrated Development Environment or Arduino contains Software (IDE) text editor for a writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them
- ✓ **Sensor used** : Data generated by the sensors ESP8266 ATMEGA 328P systems are processed by arduino microcontroller provides unsurpassed ability to embed Wi - Fi capabilities within other

### 2.2.3 SUBTOPIC LITERATURE REVIEW TOPIC 1

Paper 3:M Mohana, S Priyadharshini, N Sowmiya, G Pavithra Devi European Journal of Molecular and Clinical Medicine (2020)

<https://www.mendeley.com/catalogue/1a183703-d09b-3f1f-a63c-6506e93c1dbf/>

- ✓ **Title** : An IOT based automated communication system for paralyzed patients using simple hand gestures
- ✓ **Objectives** : A smart wheelchair is designed such that in the first module it acts as guiding system and helps in movement of the patient. The system notifies and displays information regarding the patient which is stored in cloud for future use.
- ✓ **Problem statement** : Gesturing is an alternative way of communication for vocally affected people. In this wearable device. Using various sensors the hand gestures are captured and are converted to American sign language alphabets using machine learning and with the help of a Bluetooth module, these are displayed on the module application which also converts the text to speech.
- ✓ **Methodology** : The data from 3 axes is used for feature extraction and recognition. The data from Y-axis is used to spot a particular gesture.. Following this, to detect a gesture, the segmentation algorithm is used. This algorithm is used to exactly recognize the part of the hand that initiated the gesture.

- ✓ **Sensor used** : The hand recognition sensor uses IQ signals transmitted from transmitter, received by the receiver which is used by the CNN network to classify the reflected This system waveform. This uses 6 hand gestures form ASL.

#### 2.2.4 SUBTOPIC LITERATURE REVIEW TOPIC 1

Paper 4:Patients Sunil Jacob, Mukil Alagirisamy, Varun G. Menon, B. Manoj Kumar, N. Z. Jhanjhi, Vasaki Ponnusamy, P. G. Shynu, Venki Balasubramanian  
IEEE Access (2020)

<https://ieeexplore.ieee.org/ielx7/6287639/8948470/09099875.pdf>

- ✓ **Title** : An Adaptive and Flexible Brain Energized Full Body Exoskeleton with lot Edge for Assisting the Paralyzed
- ✓ **Objectives** : The paralyzed population is increasing worldwide due to stroke, spinal code injury, post-polio, and other related diseases. Different assistive technologies are used to improve the physical and mental health of the affected patients. Exoskeletons have emerged as one of the most promising technology to provide movement and rehabilitation for the paralyzed.
- ✓ **Problem statement** :Different assistive technologies are used to improve the physical and mental health of the affected patients. Exoskeletons have emerged as one of the most promising technology to provide movement and rehabilitation for the paralyzed. But exoskeletons are limited by the constraints of weight, flexibility, and adaptability.
- ✓ **Methodology** : The potential energy harvesting is used in the system to solve the power issues related to the exoskeleton. The stability in the gait cycle is ensured by using adaptive sensory feedback. The system validation is done by using six natural movements on ten different paralyzed persons. The system recognizes human intensions with an accuracy of 85%. The result shows that BFBE can be an efficient method for providing assistance and rehabilitation for paralyzed patients.

- ✓ **Sensor used** : The brain signals captured by the Electroencephalogram (EEG) sensors are used for controlling the movements of BFBE.

#### 2.2.5 SUBTOPIC LITERATURE REVIEW TOPIC 1

Paper 5: B. Pavitra, D. Narendar Singh, Sudhir Kumar Sharma, SSRN Electronic Journal (2020)

<https://www.mendeley.com/catalogue/96f11864-d5a3-39ae-ba4b-bcc95791d6e2/>

- ✓ **Title** : Smart Patient Assistance and Health Monitoring System Using IOT
- ✓ **Objectives** : Using sensors that keeps a track of their pulse and body temperature and informs the care taker for any critical situations. In addition to this, it sends the notifications to the Smartphone of the care taker based on their requirements and emergency using gestures through a accelerometer. Some of the basic requirements like need for food and water need to go for washroom are informed to the caretaker through these gestures.
- ✓ **Problem statement** :Paralyzed patients health status like body temperature and pulse along with their daily requirements need to be monitored constantly. Sometimes, taking care care of each and every patient constantly at the same time becomes a difficult task for the care taker. To take care of them at every moment in a day is also difficult.
- ✓ **Methodology** : The remaining patients in a ward cannot use the above module as it is unnecessarily triggered when the patient moves. So we propose a separate module here. That can send same messages to the caretaker by a mere touch which also monitors the patient's body temperature and heartbeat using the required sensors and sends messages to the caretaker during abnormal conditions.
- ✓ **Sensor used** : 2.4'inch TFTLCD Touchscreen interfaced to a Arduino Mega.

### 3.2.3 PROJECT DESCRIPTION

In the circuit implementation will be explain briefly the whole circuit in the project system and also explain about the lock diagram and component to be used in the circuit. Regarding to the project design, the operation of this project is automatic paralysis healthcare system is aid and facilitate the paralysis patient either patient in home or get treatment at Hospital. Besides, the system of this project also aids the family patient or medical staff to take care of them easier and not 24 hours to treat them.

The operation of gesture sensor is detecting any movement with any part of the body mostly by hand which used to convey instruction to help them for example medical staff or nurse at hospital which responsible to treat and care of the patient almost 24 hours every day. There are several hand movement direction set up and each movement direction will indicate different type of instructions for example to help for meals, assist to toilet and etc. So, this system will use to facilitate those care taken of the paralysis patient. The Arduino is one of the electronic components that use the microcontroller ATmega328 interface where the hardware this board used consist of simple open source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. The GSM Module used in this project is GSM Module SIM 900A due to 2G capabilities in Malaysia was used GSM900 and GSM1800.

In this project, GSM Module SIM900A used for sending simple message (SMS) to the consumer after receiving signal from ARDUINO UNO. The APDS-9960 RGB and gesture sensor is a one of the sensor that combine human and machine interface. This sensor is only requiring the gesture by swiping hand over the sensor. This sensor used to detect some movement or gesture of human and this sensor aware is the device that consists of five inbuilt sensor depending on internet of sensors. For the gesture sensing example, it has some requirement to make this sensor to function. There are 6 types of gesture will use in this project which is up, down, right, left, near and far. For up, down, left and right are required a distance around 4 to 8 inches (10 to 20 cm) above the sensor while for far and near is different way to detect.

## CHAPTER 3

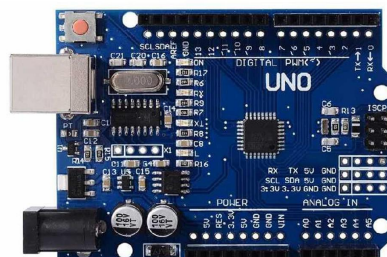
### 3. METHODOLOGY

Hardware Products that we used. It consists of arduino microcontroller, Infrared Sensor, Photodiode, WiFi and Bluetooth.

#### 1. ATMEGA BASED MICROCONTROLLER (ARDUINO UNO)

Arduino is an open source computer hardware and software company, project, and user community that designs and manufacture single-board Microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

Arduino board designs use a variety of microprocessors and controls. The boards are equipped with sets of digital analog input/output (I/O) pins that may be interfaced to various expansion boards or Breadboards (shields) and other circuits. The board features serial communications interfaces, including Universal\_Serial Bus(USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using tradition compiler tool chains, the Arduino project provides an intergrated development environment (IDE) based on Processing language project.





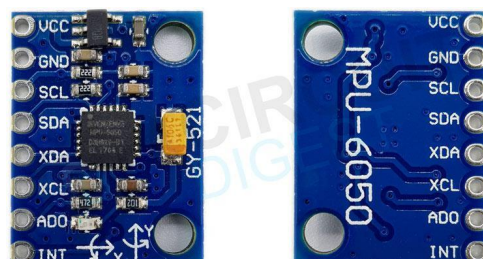
## 2. POTENTIOMETER

Potentiometers are variable resistors. Potentiometers are resistors where the resistance can be changed using a knob or a slider. Potentiometers are used to control many things, including how bright or dim the lights in your house are and the volume controls on your television. Some are used in voltage dividers. The idea of a device that could be used to control the amount of electricity going to a component was thought by many people, but the carbon potentiometer we commonly use today was invented by Thomas Edison in 1872 at the age of 25. He called this device a “coiled resistance wire rheostat”.



## 3. MPU6050

MPU6050 is a Micro Electro-mechanical system (MEMS), it consists of three-axis accelerometer and three-axis gyroscope. It helps us to measure velocity, orientation, acceleration, displacement and other motion like features. MPU6050 consists of Digital Motion Processor (DMP), which has property to solve complex calculations.



#### 4. GSM MODULE

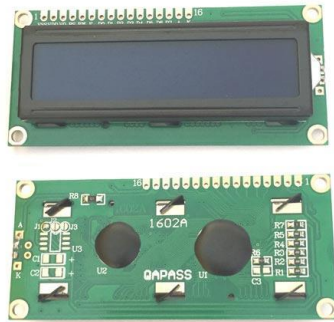
SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions.



#### 5. LCD Display

LCD(liquid crystal display) is the technology used for display in notebook and other smaller computers. Like light-emitting diode diode (LED) and gas-plasma technologies, LCD's allow displays to be much thinner than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. An LCD is made with either passive matrix or an active matrix display display grid. The active matrix LCD is also known as a thin film transistor (TFT) display. The passive matrix LCD has a grid of conductors with pixels located at each intersection in the grid. A current is sent across two conductors on the grid to control the light for any pixel. An active matrix has a transistor located at each pixel intersection, requiring less current to a control the luminance of a pixel. For this

reason, the current in an active matrix display can be switched on and off more frequently, improving the screen refresh time (your mouse will appear to move more smoothly across the screen).



## 6. BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.



### 3.2.1 BLOCK DIAGRAM OF THE PROJECT

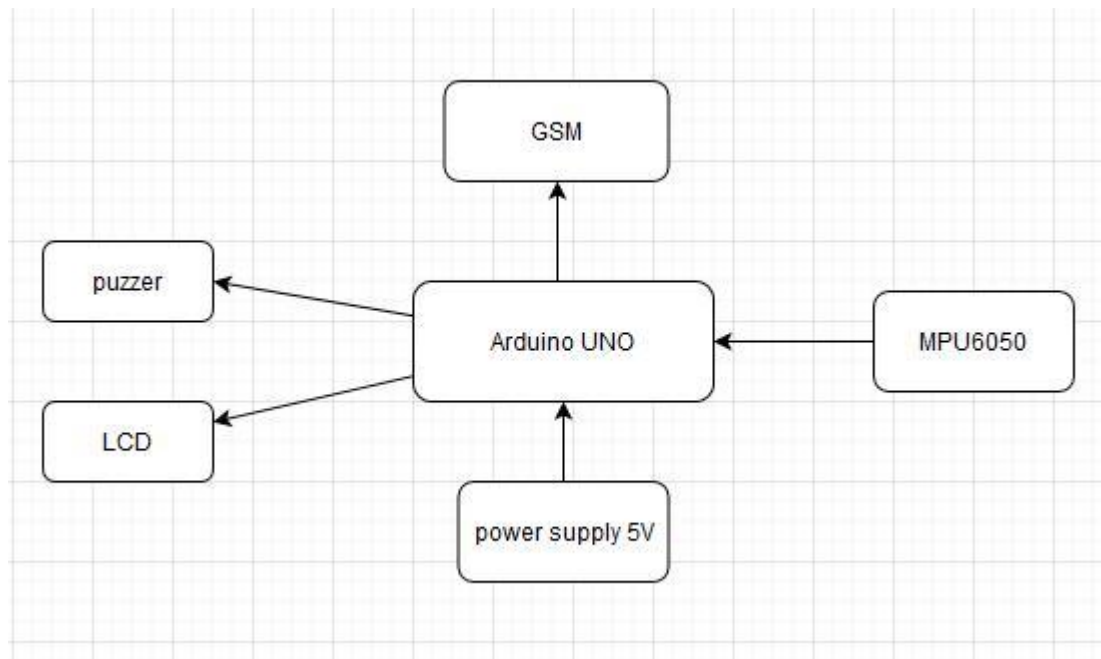


Figure 3.6 shows the blockdiagram of paralysis patient care system project

### 3.2.2 FLOWCHART OF THE PROJECT

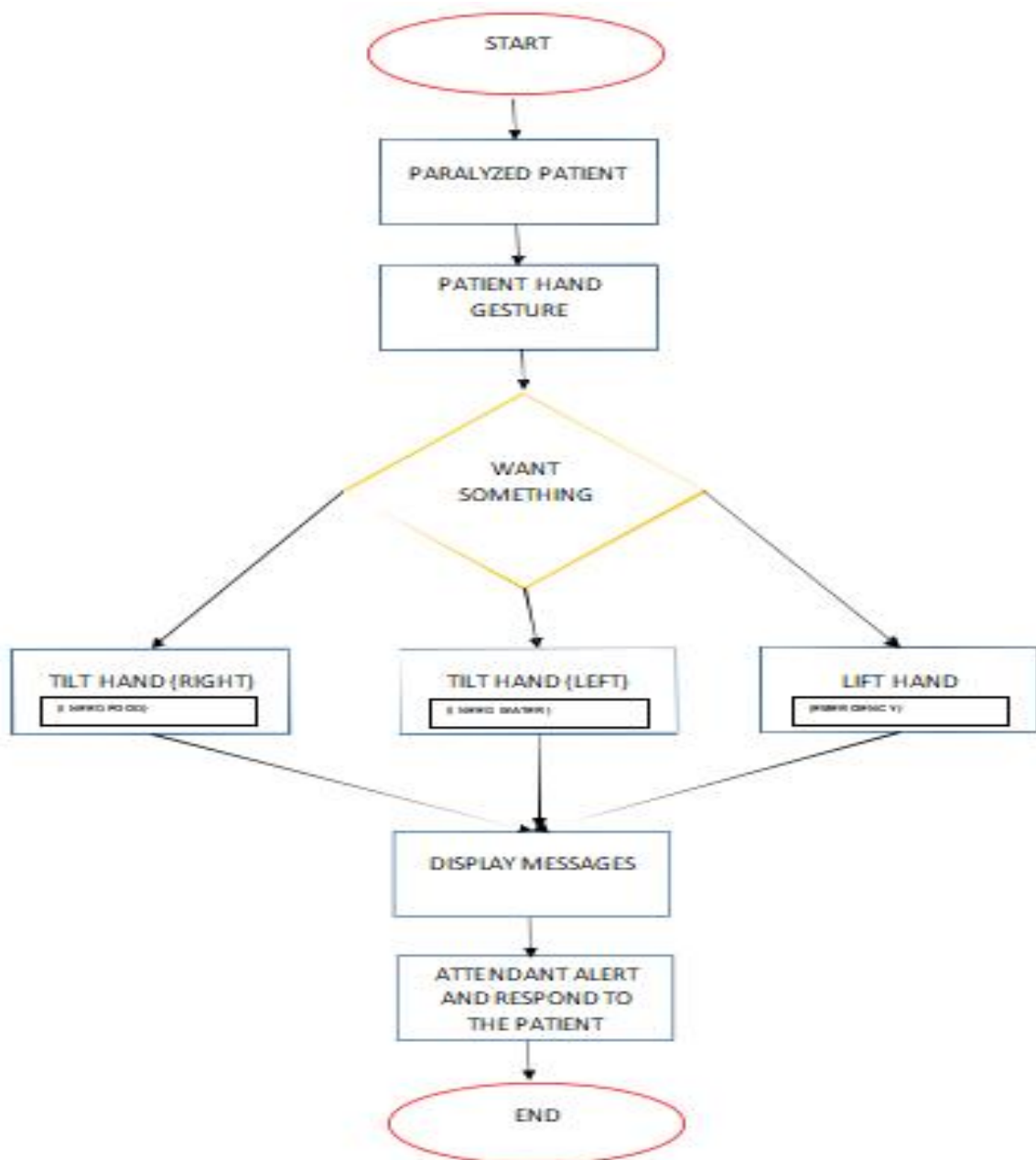


Figure 3.7 shows the flowchart of paralysis patient care system project

### 3.3 PROJECT HARDWARE

#### 3.3.1 SCHEMATIC CIRCUIT

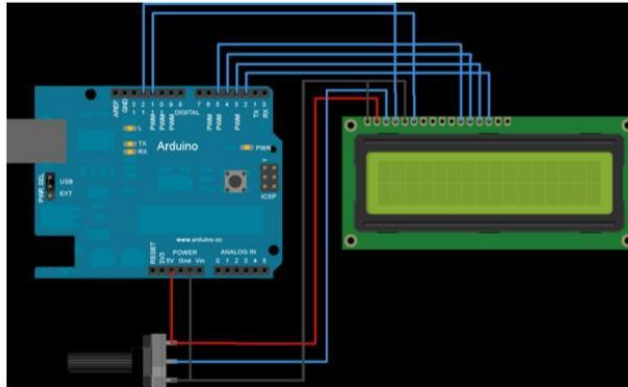


Figure 3.8 shows the connection of arduino to LCD 16x2

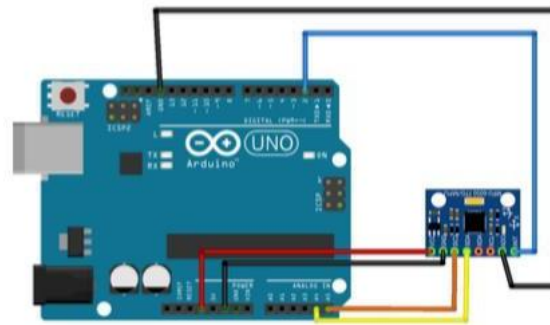


Figure 3.9 : Shows the schematic connection of arduino to MPU6050

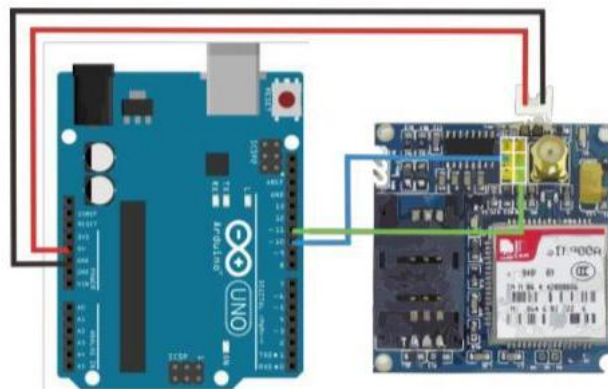


Figure 3.10 : Shows the schematic connection of arduino to gsm module

## 3.4 PROJECT SOFTWARE

### 3.4.1 PROTEUS 8 PROFESSIONAL SOFTWARE

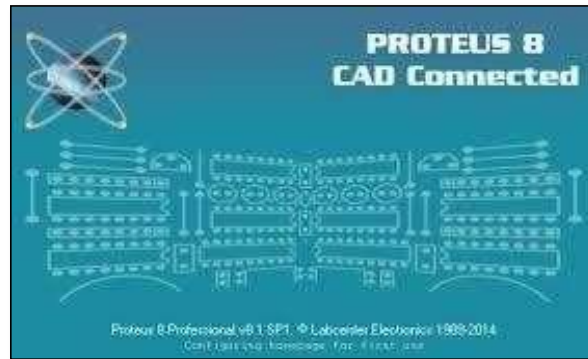


Figure 3.11: Proteus 8 Professional Software

Shows the Proteus Professional software which used to draw a schematic, PCB layout, code and evaluate the schematic. To drawing a schematic Proteus is the easier software to be used. This software also can be designing a PCB very easy

### 3.4.2 ARDUINO UNO



Figure 3.12: Arduino Software

Shows the Arduino Software, this product utilized a simplified version of C++ and making it simpler to learn with the program of the product. To utilize the Arduino pins, the users need to characterize which pin is being to be utilize

### 3.4.3 TINKERCAD



Figure 3.13:TINKERCAD

Tinkercad is a free-of-charge, online 3D modeling program that runs in a web browser. Since it became available in 2011 it has become a popular platform for creating models for 3D printing as well as an entry-level introduction to constructive solid geometry in schools.

### 3.5 Prototype Development

#### 3.5.1 Mechanical design/Product Layout

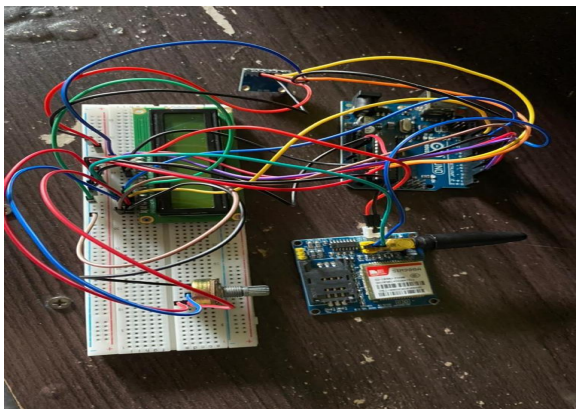


Figure 3.14 Project Prototype.

Show the connection on the breadboard. This is the example for paralysis patient care system that will be produce. It is comfortable and easy to brings anywhere.

### 3.4 SUMMARY



This proposed project used the technology in telecommunication, where the evolution in telecommunication was applied in this project by using GSM module SIM900A. At the same time, a few circuit and software such as ARDUINO IDE compiler was used to be as a controller for all of the main and sub equipment. 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 of (APDS-9960), it will aid the patient to convey anything that they want through the GSM module by sending message. The function of this sensor is the patient just have to swipe their hand at gesture sensor to convey a message. Besides that, the data will be display at the convey sign through LCD screen to easier the patient know what they want to convey. Other than that, the buzzer will sound when there are emergency case occurred if the 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 board. This concept will help paralyzed patient to convey their instruction or need.

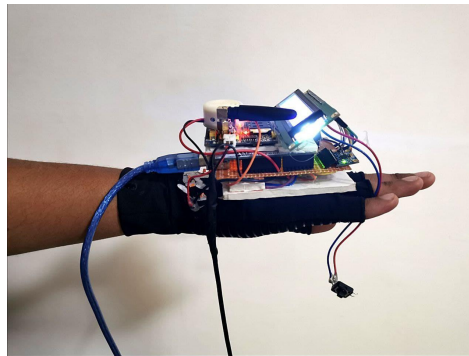
## 4.0 RESULTS AND DISCUSSION

### 4.1 INTRODUCTION

The aim of the project was to development of automatic healthcare system using GSM for paralysis patient. The Arduino when Apds-9960 was detected by giving the simple gesture movement. This part was analyzed the time delayed of GSM module and the sensitivity of Apds-9960.

### 4.2 RESULT

When a 9V power source is connected to the Arduino board via the AC jack, the Arduino is turned on, and then the instructions are shown on the LCD. The person concerned presses the push button, after that MPU6050 sensor is activated on the current position of the hand and message displayed on the LCD then waiting for the gesture movement. After the user did the gesture, a ringing sound is issued to indicate the completion of the command and MPU6050 sensor determines the gesture and then send the message or make a call. After that, the device returns to the first position, waiting to press the push button again and repeat the same previous steps. SMS is a text messages for mobile phone sometimes it can takes more time to send or receive a message. It can be happen because of network coverage was weaked at some places. So with this testing, we are able to know how long the duration messages for reach at the other end. This figure below has shown the analysis the performance of the GSM module in this project.



#### 4.2.1 ESTIMATED COST

No	Material	Function	Price
1.	Arduino Uno	Easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects.	RM 56.00
2.	LCD 2x16	It can display 16 characters per line and there are 2 such lines	RM15.00
3.	Buzzer	An audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short).	RM 12.00
4.	Breadboard	Used for building temporary circuits. It is useful to designers because it allows components to be removed and replaced easily.	RM 25.00
5.	Jumper	Acts as a switch by closing (or opening) an electrical circuit. Jumpers can be added or removed to change the function or performance of a PC component.	RM 13.00
6.	Potentiometer	To control electrical devices such as volume controls on audio equipment.	RM 8.00
7.	Casing	To place the project connection inside.	RM 15.00
8.	GSM Module	IOT application	RM 29.00
9.	MPU6050	to measure velocity, orientation, acceleration, displacement and other motion like features	RM 16.00
TOTAL			RM 174.00

## 5.0 CONCLUSION

As the conclusion, the project was developed to create a system using ARDUINO as the main controller. Aligned with current technologies, this project was created to ensure the paralyzed patient obtain the best treatment and care during in hospital without family members to help them just only giving some easy movement gesture to the sensor. Other than that, it also created to analyze the performance of APDS-9960 with GSM module to give attention so that easy to assist their patient before asking what they want.

Last but not least, a few improvement still need to be done regarding to the research of automatic healthcare system using GSM system. To ensure the system still efficient and improve the already system has, a few modification should be made to create the more sophisticated idea for this system. Thus, the automatic Healthcare System using GSM can be upgraded by using several improvement of components, align with the latest technology. A few recommendations can be applied such as upgrading the system at transmission system from GSM Module to the wireless system communication because this system not depending the coverage network from services provider and this system is more sophisticated than GSM system. Use the accelerometer system to ensure that the gesture movement capable read the distance almost 5 meter than this sensor able to read 20cm maximum and by using accelerometer able to make sign language via fingers because this system use x, y, z concept. Add the gyroscope system which able to detect if a patient fall down and make this project more useful for patient.

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## APPENDIX: CODING FOR PROJECT PARALYSIS PATIENT CARE SYSTEM

```
#include <LiquidCrystal.h>
// initialize the library by associating any needed LCD interface pin
// with the arduino pin number it is connected to
const int rs = 7, en = 6, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
#include <MPU6050_tockn.h>
#include <Wire.h>
int S=A0;
MPU6050 mpu6050(Wire);
int sys=0;
int maxvalue=45;
int minivalu=-45;
float gyroYoffset;
float gyroXoffset;
const int buz = 8;
void setup() {
  pinMode(S,INPUT);
  Serial.begin(9600);
  pinMode(buz, OUTPUT);
  Wire.begin();
  lcd.begin(16,2);
}

void loop() {
  if (sys==0)
  {
    if (digitalRead(S)==0)
    {
      sys=1;
    }
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("EMERGENCY CALL");
    lcd.setCursor(0,1);
    lcd.print("TILT YOUR HAND ");
    delay(200);
  }
  if (sys==1)
  {
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("PLEASE WAIT...");
    mpu6050.begin();
    mpu6050.calcGyroOffsets(true);
    sys=2;
  }
}
```

```

}
if (sys==2)
{

lcd.clear();
lcd.setCursor(0,0);
lcd.print("READY!");
mpu6050.update();
Serial.print("angleX : ");
Serial.print(mpu6050.getAngleX());
Serial.print("\tangleY : ");
Serial.println(mpu6050.getAngleY());
if (mpu6050.getAngleX()>=maxvalue)
{
digitalWrite(buz, HIGH);
delay(500);
digitalWrite(buz, LOW);
delay(500);
Serial.println("M1");
Serial.print("ATD +601112130469;\r"); //Phone number you want to call
lcd.clear();
lcd.setCursor(0,0);
lcd.print("CALLING");
sys=0;
delay(2000);
}
else if (mpu6050.getAngleX()<=minivaluel)
{
digitalWrite(buz, HIGH);
delay(500);
digitalWrite(buz, LOW);
delay(500);
Serial.println("M2");
sms1();
sys=0;
delay(2000);
}
if (mpu6050.getAngleY()>=maxvalue)
{
digitalWrite(buz, HIGH);
delay(500);
digitalWrite(buz, LOW);
delay(500);
Serial.println("M3");
}

sms2();
sys=0;
delay(2000);
}
else if (mpu6050.getAngleY()<=minivaluel)
{
digitalWrite(buz, HIGH);
delay(500);
digitalWrite(buz, LOW);
delay(500);
Serial.println("M4");
sms3();
sys=0;
delay(2000);
}
}}
void sms1() {
lcd.clear();
lcd.setCursor(0,0);
lcd.print("I need Food");
lcd.setCursor(0,1);
lcd.print("Sending Message..");
}

```



```

Serial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
delay(1000); // Delay of 1000 milli seconds or 1 second
Serial.println("AT+CMGS=\"+601112130469\"\\r"); // Replace x with mobile number
delay(1000);
Serial.println("I need Food");
delay(1000);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}
void sms2() {
lcd.clear();
lcd.setCursor(0,0);
lcd.print("I need water");
lcd.setCursor(0,1);
lcd.print("Sending Message..");
Serial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
delay(1000); // Delay of 1000 milli seconds or 1 second
Serial.println("AT+CMGS=\"+601112130469\"\\r"); // Replace x with mobile number
delay(1000);
Serial.println("I need Water");
delay(1000);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}
void sms3() {
lcd.clear();
lcd.setCursor(0,0);
lcd.print("I need Toilet");
lcd.setCursor(0,1);
lcd.print("Sending Message..");
Serial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
delay(1000); // Delay of 1000 milli seconds or 1 second
Serial.println("AT+CMGS=\"+601112130469\"\\r"); // Replace x with mobile number//912159932
delay(1000);
Serial.println("I need Toilet");
delay(1000);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}

```