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Motion Based Message Conveyer for Paralytic or Disabled Person

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I. INTRODUCTION

The principle point of the task is to execute a minimal effort solid framework which will build up correspondence between incapacitated or handicapped patients and a medical attendant. Accelerometer is connected to Raspberry pie controller which will acts as an input. The heart of this system is accelerometer. This can be two axis or three axis static accelerometer connected to analog input of controller. A patient can without much of a stretch send messages to the medical caretaker by simply tilting an accelerometer associated with a body part equipped for development.

This point of tilt is sent to a controller which at that point starts correspondence between the patient and nurture and furthermore chooses which message is to be transmitted dependent on the tilt angle. Message can be displayed on the display as well as the message is converted in audio using speech module. A buzzer will alert the nurse in case of an emergency, Along with the buzzer the system also includes the mobile application which convey a message to nurse or relatives using a data which is stored on cloud in case of emergency. For fully Paralytic patient, optical tracking technique can be used which is a video based eye tracking technique., It uses infrared light for illumination and infrared camera to capture the image of the eye. In this eye tracking method there is no physical contact made with the eye. It takes input from the camera as an image or as a video. This system will not only help the patient but also ease out the nurse's job. The primary intention is to supplant the ordinary methodology of patient-nurture correspondence with present day advancements that give an a lot quicker and dependable way.

A. Objective Of Project

As we all know, till the date many systems have been designed for normal patients or blind/deaf people, but among the large number of advancements done in the medical sector, not many really center around helping patients with incapabilities to convey. Despite the fact that checking frameworks make it simpler for specialists to gather and watch a patient's vitals, there aren't numerous alternatives for genuine verbal correspondence for impaired patients. Here we propose a straightforward yet successful approach to take care of this deep rooted issue.

II. LITERATURE SURVEY

1) *Title:* Hand Gesture Recognition Application for Physically Disabled People.

a) *Author:* D. Vishnu Vardhan, P. Penchala Prasad. Assistant Professor, Department of ECE, JNTUA College of Engineering Pulivendula, Andhra Pradesh, India.

b) *Review of Author:* This paper has completely explained about the hand gesture recognition. An electronic hand glove has been made for the people who are dumb or suffering from Quadriplegia and paraplegia, diseases caused due to the injuries to the spinal cord. In this glove 5 accelerometer sensors have been used on each and every finger of the glove. Because of this they give more exactness in extremely little developments of the fingers moreover. The accelerations of a hand motion in three perpendicular directions are detected by accelerometers and acceleration values were transmitted to microcontroller. Different hand gestures were given the different messages which were converted into voice messages using audio module.

2) *Title:* Motion Based Message Conveyer for Paralytic/Disabled People.

a) *Author:* Arpit Verma, Nitish Kapila, Narsingh Rathore, Aakash Prajapati. B.Tech Students Department of ECE SRM University NCR Campus Modinagar

b) *Review of Author:* The accelerometer yields consistent simple voltage levels by recording the adjustment in X and Y bearing. These voltages are sent to the comparator IC which compares it with the references voltages that have been set via variable resistors attached to the IC. The levels are set between any two voltages. Every voltage generated by the accelerometer is compared with these set voltages and an analog 1 or 0 signal is generated by the comparator IC. The simple sign so produced is bolstered as contribution to the encoder IC. Encoder changes over that parallel simple sign waveform into sequential simple

sign waveform which is good for transmission. Press button which is joined with the transmitting pin empowers transmission of the sign. The coded information will be passed onto the RF module just when the catch is squeezed. This button helps in making sure that no data is transmitted unless required. Working frequency of RF is 315 MHZ. The receiver receives the signal from transmitter, demodulates it and passes it to decoder IC. Original data bits are recovered by decoding the signal received by the decoder. Decoder converts the serial waveform to parallel waveform which is suitable for microcontroller use the info is a sequential coded tweaked waveform while the yield is parallel. The parallel paired information from the encoder is sustained to the microcontroller. After examination with old insights, the microcontroller gives yield towards the LCD.

III. BLOCK DIAGRAM

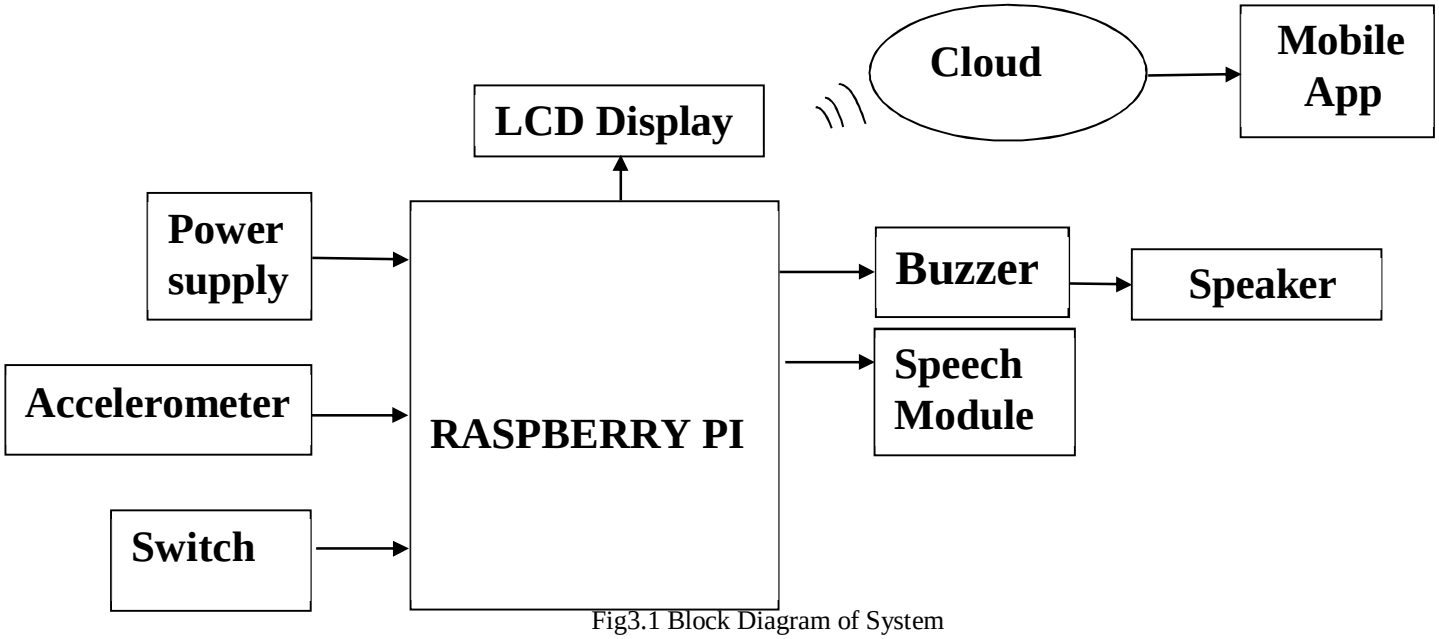

Fig3.1 Block Diagram of System

We propose a framework that enables crippled individual to show a message by simply straightforward movement of any piece of his body. Our proposed framework works by perusing the tilt course of the client part. This gadget should be mounted on client finger of hand. Tilting the device in different directions at particular angle that conveys a different message. Here we use accelerometer so as to gauge the measurements of movement. It then passes on this data to the Raspberry pi. The Raspberry pi processes the data and displays the particular message as per input obtained. It now displays the associated message on the LCD screen. It likewise sounds a ringer alongside message when it gets movement signal from the accelerometer. The speech module helps converting the text message to speech which can be heard through the speaker/Earphones connected. A GSM module (app) is built for faster and easy message conveying and storage.

IV. CIRCUIT DIAGRAM

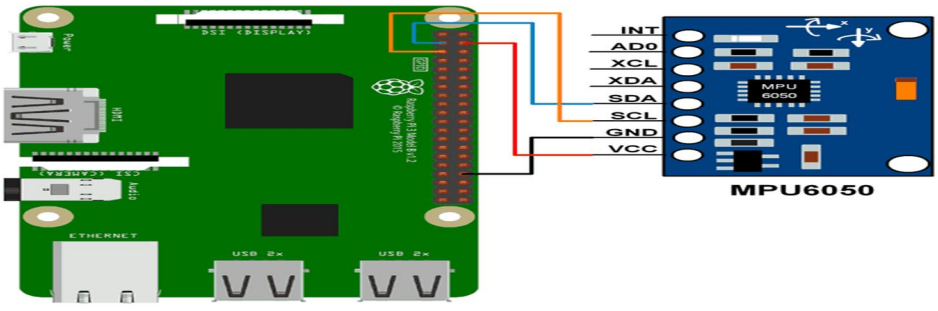

Fig 4.1 Circuit Diagram of System

Here in fig 4.1, we have interfaced MPU6050 module with Raspberry Pi to read Gyroscope and Accelerometer value and print them. We can interface MPU6050 module with Raspberry Pi using Python and C language. We will display the value of Accelerometer and Gyroscope on terminal which are read from MPU6050 module. This is a schematic diagram of the system.
In fig 4.2, we see the actual interfaced diagram of Raspberry pi to MPU6050(Accelerometer/Gyroscope).

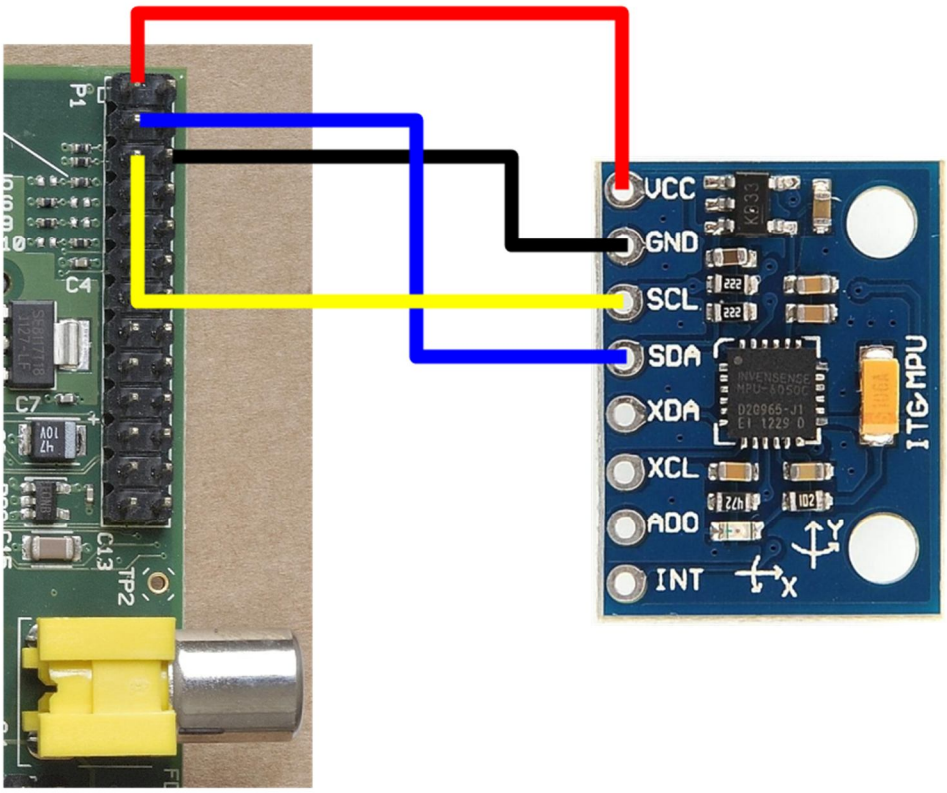

Fig 4.2. Interfacing Diagram Of MPU6050 TO Raspberry Pi

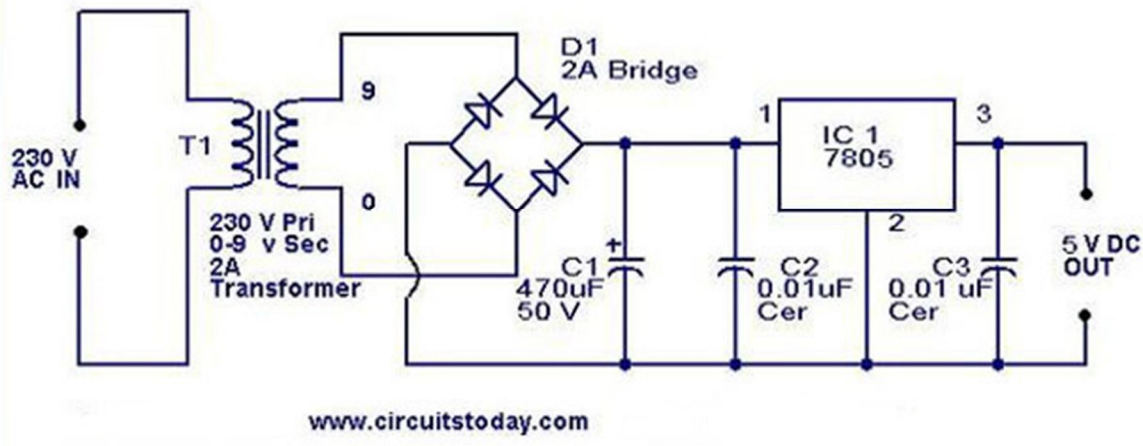

Fig 4.3. 25v Power Supply

In fig 4.3, A power supply can be used for providing the necessary amount of power at the precise voltage from the main source like a battery. A transformer alters the AC mains voltage toward a necessary value and the main function of this is to step up and step down the voltage.

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A. Design Steps

1) Step 1: Burning OS in Raspberry Pi

a) *SDFormater:* Software used to format card reader. Its free software, and is considered one of the best tools to format SD memory cards ensuring they comply fully with their SD File System Specification. SD Formatter is designed specifically for SD/SDHC/SDXC memory cards. Some utilities may actually format the protected area, however SD Formatter does not.

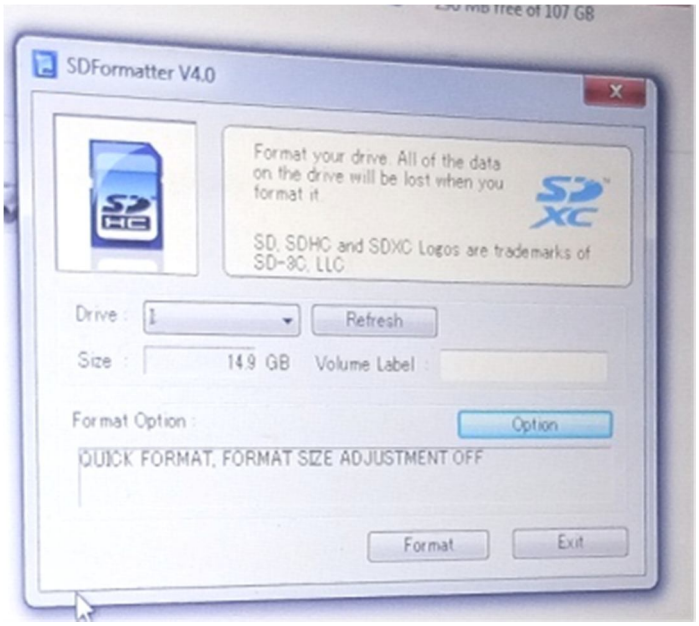

Fig 4.3. Sd-Formater Software

b) *Win32DiskImager:* It is software to burn OS on the SD card. **Win32 Disk Imager** is a simple open source application that writes files/OS SD card, creating a virtual disk drive.

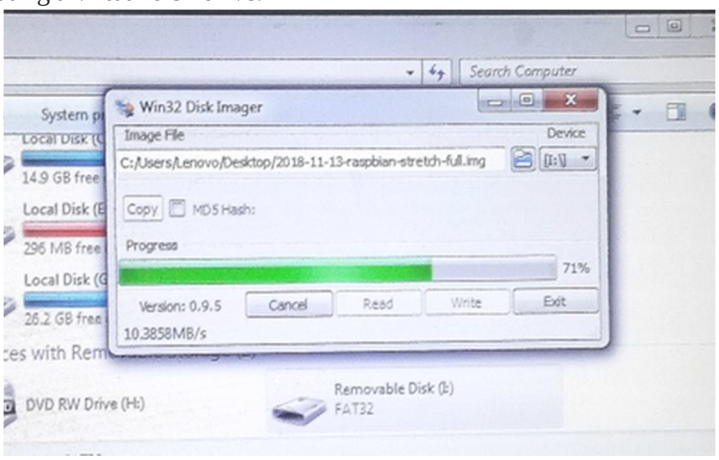

Fig 4.4. Win32-Disk-Imager Process Of Burning Os To Sd Card

2) *Step 2:* We have selected the programming language to work on Raspberry Pi.

3) *Step 3:* Developing Speech module

a) Developed a program for speech module using python as programming language.

b) Software interface to convert text to speech on the speakers is required. For this we need a Text To Speech engine (TTS). The TTS engine we are used is eSpeak. Installed Espeak utility. Espeak has a lot of options to select voice types, accents and playout speeds. Assuming that the sound device and audio configuration is setup correctly, we need to hear the speech as per the text you passed to espeak command.

c) Connected Raspberry Pi to PC through HDMI cable and provided with the power supply with rest of the necessary connections made.

d) Speaker/ Headphones were connected to the audio jack which will help us to detect whether the necessary output of our speech module is attained.

.

4) *Step 4*

a) Interfacing accelerometer (using male & female jumper wires):

i) Wire the GND pin of the Accelerometer to Physical Pin 6 **(**GND**)** on the Raspberry Pi.

ii) Wire the VCC pin of the Accelerometer to Physical Pin 1 **(**3v3**)** on the Raspberry Pi.

iii) Wire the SDA pin of the Accelerometer to Physical Pin 3 **(**SDA**)** on the Raspberry Pi.

iv) Wire the SCL pin of the Accelerometer to Physical Pin 5 **(**SCL**)** on the Raspberry Pi.

b) Developed a program to implement a process of displaying message the disabled person is trying to convey i.e. what he/she needs. Have set certain angles of movement for a particular message to be displayed on the screen.

They are:

i) From angle 30 to 50: I want water.

ii) From angle 50 to 70: I want food.

iii) From angle 70 to 100: I need to go to washroom

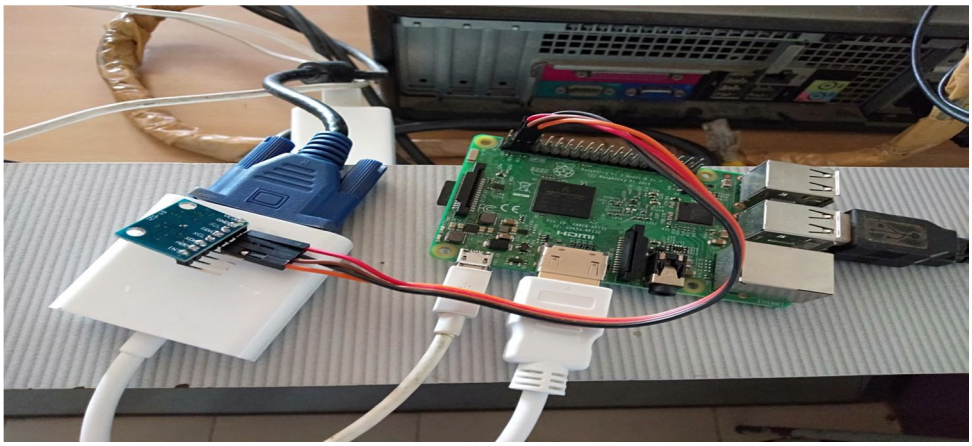

Fig 4.5. Interfacing Of Accelerometer & Raspberry Pi

5) *Step 5:* Interfacing with LCD: We have interfaced LCD to Raspberry Pi to display the message to be conveyed.

6) *Step 6:* (To Be Implemented) Connecting Buzzer. This will sound along with message as soon as it receives motion signal from the accelerometer.

7) *Step 7:* (To Be Implemented) Building GSM Module (App) providing faster and easy message conveying with offline text messages in absence of internet.

V. SYSTEM SPECIFICATIONS

A. Hardware Specifications

1) Selections of Components

Motion Based Message conveyer For Paralytic or Disabled Person consists of

a) Raspberry Pi

b) Accelerometer

c) Speech Module

d) Speaker

e) LCD Display

f) Power Supply (5V)

g) Switch

h) Mobile Application

B. Software Specifications

1) Softwares Used

a) Python IDE 3.5

b) SD Formatter

c) Win32DiskImager

SR no.	Component name	Specification	Quantity	Cost per unit
1	Raspberry pi	SoC: Broadcom BCM2837,CPU: 4× ARM Cortex-A53, 1.2GHz, RAM 512MB,etc	1	4000
2	Accelerometer	MEMS 3-aixs accelerometer and 3-axis gyroscope values combined Power Supply: 3-5V Communication : I2C protocol,etc	1	
3	Speaker			
4	LCD	Operating Voltage is 4.7V to 5.3V. Current consumption is 1mA without backlight. Alphanumeric LCD display module, meaning can display alphabets and numbers. Consists of two rows and each row can print 16 characters.	1	
5	Power supply	5V		
6	Switch			
7	HDMI cable		1	

VI. SIMULATION RESULT

In fig 6.1 we have simulated the speech module which helps converting the text message to speech. Here we have used **Text-to-speech (TTS)** which is a type of speech synthesis application that is used to create a spoken sound version of the text in a computer document. In our program the TTS engine we are using is eSpeak. TTS can enable the reading of computer display information for the visually challenged person, or may simply be used to augment the reading of a text message. Through the speaker/headphones connected we were able to hear the message we wanted to attain.

Fig 6.2A. Simulation of Accelerometer

In fig 6.2a. We have implemented accelerometer which will help to attain the angle from hand/leg movement(the part with sensation when rest of the body is paralyzed) ,which will help to display the message the patient wants to convey

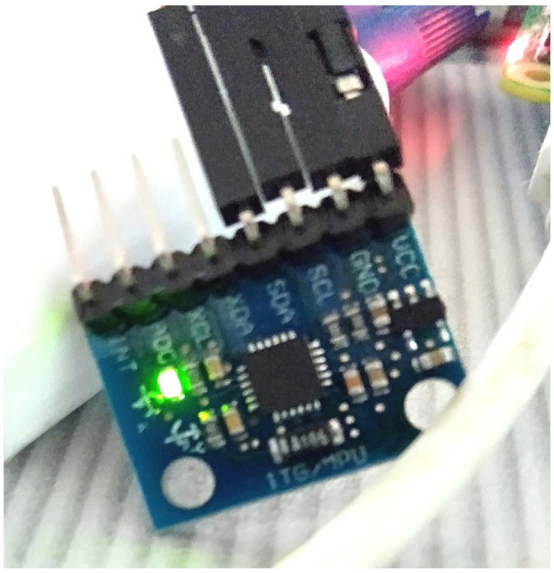

FIG 6.2b. ACCELEROMETER

In fig 6.2b. Accelerometer is shown which will be attached to person's hand/leg which when moved in certain angle for example "30 to 50" will display the msg "I want water" after the angle is attained.

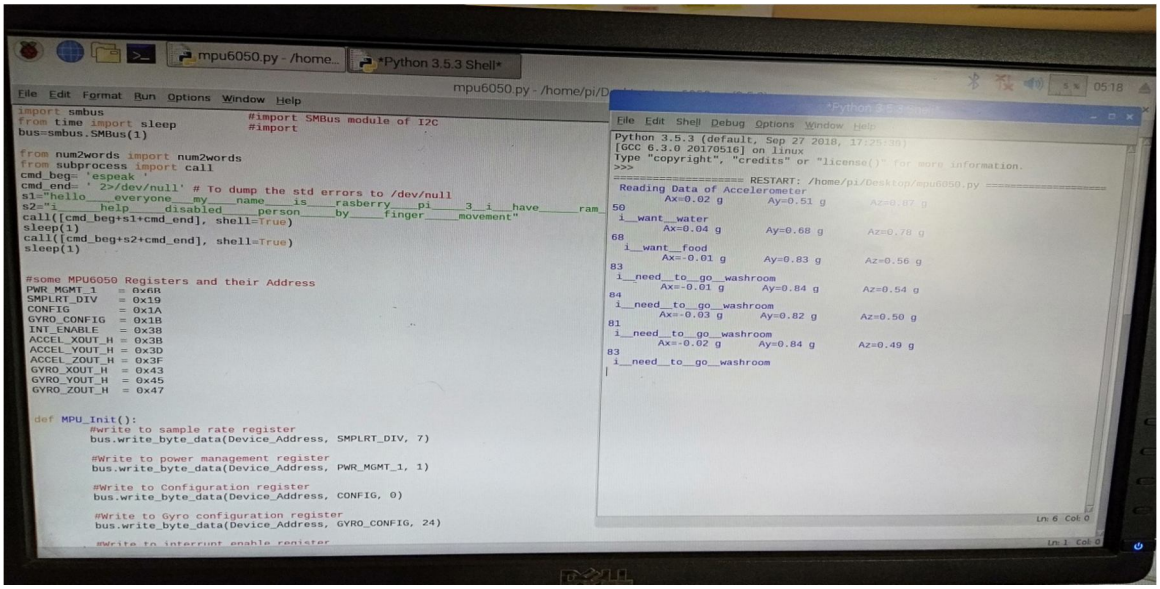

FIG 6.2 c. Output of Accelerometer

In fig 6.2c. Shows the output of the implemented program of accelerometer.

VII. RESULTS

This gadget has made movement of message conceivable just by the movement of a body part. The simplicity of message transport is the primary preferred standpoint of this framework. A basic framework for paralyzed or disabled individuals can be accomplished without the utilization of complex type of information sources. The model we have made is completely useful yet confined to a little territory of activity. For an expansive territory and transmission, the technique utilized must be more successful and faster. Our framework effectively demonstrates that this framework is a phenomenal way to deal with patient-nurse interaction at hospitals. This module can also be used in homes. Additionally, alongside just message transmission other information like body temperature, heart rate and so forth can likewise be transmitted to the nurse with the goal that an ongoing record of the considerable number of patients is kept up.

A. Summary Of Results

Sr No	Types of Results	Observations
1	SDFormater	Software used to format card reader. Its free software, and formatted SD memory cards and ensured that it comply fully with their SD File System Specification
2	Win32DiskImager	This software to burned OS on the SD card.
3	Text To Speech engine (TTS).	The TTS engine we used is eSpeak. Installed Espeak utility. Espeak has a lot of options to select voice types, accents and playout speeds. Assuming that the sound device and audio configuration is setup correctly, we need to hear the speech as per the text you passed to espeak command.
4	Accelerometer	Have set certain angles of movement for a particular message to be displayed on the screen. They are: From angle 30 to 50: I want water. From angle 50 to 70: I want food. From angle 70 to 100: I need to go to washroom
5	Lcd Display	Displayed the message to be conveyed.

VII. CONCLUSION

We run over clinics and NGO's serving incapacitated individuals. Presently these individuals are not able to do full body development when contrasted with an ordinary individual. In such a circumstance we propose a framework that enables incapacitated individual to show a message by simply basic movement of any piece of his body. Our proposed framework works by perusing the tilt bearing of the client part. This undertaking will help the individuals who are not ready to do the full development of the body. This task is planning to satisfy the correspondence hole between these individuals and the ordinary ones. The accelerometer we are utilizing is of 3 tomahawks, so it is precise for little development too. For example, if an individual with handicap is ravenous, he will do some development with the body part containing accelerometer.
Ringer will become on and a message will be shown on the LCD.
By actualizing this framework a basic gadget for incapacitated or impaired individual accomplished without utilization of complex type of sources of info. Correspondence through this framework is exceptionally quick and successful. Magnificent methodology actualized between understanding medical attendant interchanges. In this task, the observing of patient is effectively mimicked. Expending less force and consuming less space. It is likewise seen that the expense to the end clients is additionally less contrast with other microcontroller and chip..

VIII. FUTURE SCOPE

A. This Motion Based Message Conveyer For Paralytic or Disabled Person helps to establish communication between paralytic or disabled patients and a nurse.
B. The future scope of this project would be:
C. For fully Paralytic patient, optical tracking technique can be used which is a video based eye tracking technique. It uses infrared light for illumination and infrared camera to capture the image of the eye. In this eye tracking method there is no physical contact made with the eye. It takes input from the camera as an image or as a video.
D. By extending the system, we can also send a text message rather than a message through an mobile application if the internet is not available at that instant.
E. This system can also be used by people who are confined to a wheelchair.

IX. APPLICATIONS

A. It is more applicable in hospitals for 24 hours monitoring a patient.
B. It is also applicable in house for monitoring a single patient.

X. ACKNOWLEDGMENT

We express our sincere gratitude towards the faculty members who makes this projectphase I a successful.
We would like to express our thanks to our guide {Mr. Prashant Titare} for his whole hearted co-operation and valuable suggestions, technical guidance throughout the project work.
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Finally, we would like to thank all staff members and faculty members of E&TC Department who helped us directly or indirectly to complete this work successfully.

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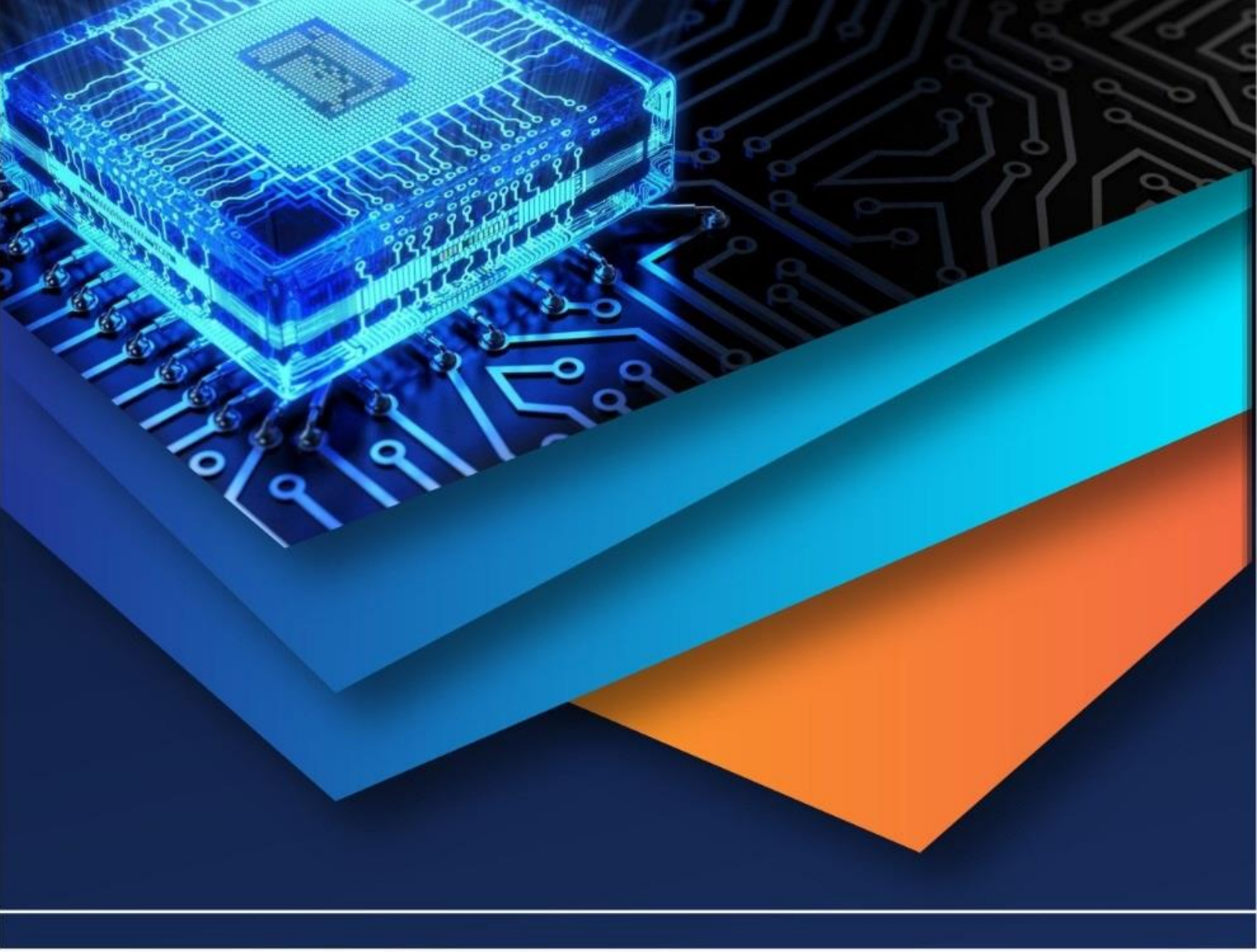

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