IOT Paralysis Patient Health Care Project

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Abstract— With an improvement in technology and miniaturization of sensors, there have been attempts to utilize the new technology in various areas to improve the quality of human life. One main area of research that has seen an adoption of technology is the healthcare sector. The people in need of healthcare services find it very expensive, this is particularly true in developing countries.

As a result, this project is an attempt to solve a healthcare problem society is currently facing. The main objective of the project was to design a remote healthcare system. It has two main parts. The first part is detection of patient's vitals using sensors, second for sending data to care taker, Guardian and Doctor.

Hence the proposed architecture collects the sensor data through Nodemcu and relays it to the caretaker, where it is processed and analyzed for remote viewing. Feedback actions based on the analyzed data can be sent back to the doctor or guardian through SMS and alerts call in case of any emergencies.

I. INTRODUCTION

A. Overview

The IOT based paralysis patient health care system is a system designed to help the patient convey various messages to doctors, nurses, or his/her loved ones sitting at home or office over the internet. The system makes use of microcontroller-based circuitry to achieve this functionality. It makes use of a hand motion recognition circuit and a receiver plus transmitter circuit. The hand motion circuit is used to detect hand movements using an accelerometer and then transmit this information wirelessly over Nodemcu to the receiver system. The receiver system is designed to receive and process these commands and display them over the LCD display as well as transmit the data online over near one's mobile application.

B. IoT Technologies and Monitoring

Internet of things is of two words Internet and Things. In this term things reflect the various IoT devices which have some unique identities. It has capabilities to perform remote sensing, live monitoring of certain sorts of data. IoT collects the data, then processes the data and sends the data to various servers. Mancuso and Franco [1], had already done similar research on tomato greenhouse in the South of Italy.

An ideal IoT device consists of different interfaces for connecting devices.

IoT devices can be of various forms such as smart watches, IoT smart home monitoring, IoT intelligent transport systems, IoT smart health devices etc.

C. *IoT Enabling Technologies*

IoT has a fanatical support of various other technologies such as Wireless Sensor Networks, Cloud Computing, Big Data, Internet and Search Engines, Communication Protocols, etc.

Wireless Sensor Network (WSN): It includes sensors or nodes which are integrated in such a way that it can watch data in sorted form.

Cloud Computing: Cloud computing supplies shared processing resources and data to computers and other devices according to the demand needed. It could be in any form such as IaaS, PaaS, DaaS, etc.

Big Data Analytics: Big Data analytics is needed to examine large amounts of data sets which hold various forms of data types. Big Data is used to uncover hidden patterns, market trends, etc.

Communication Protocols: It works as the backbone of IoT Systems to supply connectivity for applications and protocols which allow us to exchange data over the network.

D. *Objective Of Project*

The main objective of this project is that, if there is any sudden emergency or needs to be completed for the patient, he/she could easily inform the caretaker for needs and doctor for any emergency

Proposed work

E. *Components and Modules(Hardware Requirements)*

In the current section, the part and modules which are being used for IoT based Health Monitoring System is being discussed:

1) *Accelerometer*
An accelerometer is a device that **measures the vibration, or acceleration of motion of a structure**. The force caused by vibration or a change in motion (acceleration) causes the mass to "squeeze" the piezoelectric material which produces an electrical charge that is proportional to the force exerted upon it.
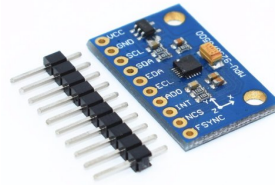

FIG-1

2) *ESP8266 WIFI Module*
The ESP8266 Wi-Fi Module is **a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network**. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

FIG-2

3) *LCD Display*
A liquid crystal display (LCD) has **liquid crystal material sandwiched between two sheets of glass**. Without any voltage applied between transparent electrodes, liquid crystal molecules are aligned in parallel with the glass surface.

FIG-3

4) Transistors Cables and Connectors
Sockets provide for repeated insertion, removal, substitution and replacement of Integrated Circuits (ICs) and **transistors** in a circuit.
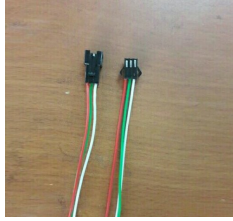

FIG-4

5) PCB
These types of **connector** systems are mounted or processed to a printed **circuit board** (**PCB**).

FIG-5

6) Transformer/Adapter
An adapter **adapts to new outlets** while a

converter or transformer converts the voltage of the

outlet per-se.

7) 12C module
The I2C Module has **an inbuilt PCF8574 I2C chip that converts I2C serial data to parallel data for the LCD display**. These modules are currently supplied with a default I2C address of either 0x27 or 0x3F. To determine which version, you have checked the black I2C adaptor board on the underside of the module.

FIG-6

8) Mpu6050
The MPU6050 module is **a Micro Electro-Mechanical Systems (MEMS) which consists of a 3-axis Accelerometer and 3-axis Gyroscope inside it**. This helps us to measure acceleration, velocity, orientation, displacement and many other motions related to parameters of a system or object.

FIG-7

9) Sim800a GSM module
The SIM800A Quad-Band GSM/GPRS Module with RS232 Interface is **a complete Quad-band GSM/GPRS solution in an LGA (Land grid array) type which can be embedded in the customer applications**. SIM800A supports Quad-band 850/900/1800/1900 MHz, it can transmit Voice, SMS, and data information with low power consumption.

FIG-8

10) Buzzer
Active Buzzer Arduino module **produces a single-tone sound when signal is high**. To produce different tones, use the Passive Buzzer module. The Active Buzzer module consists of a piezoelectric buzzer with a built-in oscillator. It generates a sound of approximately 2.5 kHz when the signal is high.

FIG-9

11) Lm2596 module

The LM2596 is a commonly used step-down **switching regulator IC**. The adjustable version can take in input voltage from 4.5V to 40V and convert it to variable voltage sourcing up to 3A of continuous current. Because of its high current capability it is commonly used in power modules to power/control heavy loads.
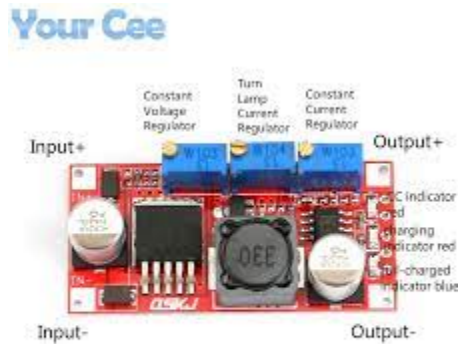

FIG-10

F. *Circuit Description and Working Principle*

Our system is all about taking care of a paralysis patient and for the safety of the patient. The patient can easily convey the message through just slight hand movement and his near ones can easily see if the patient stood up.

When a patient is on bed and shows movement in any direction the message set for that direction will be displayed on screen as well as notification will be sent to the caretaker, family member's mobile phone and also would be able to see on the cloud. If the patient tries to stand up without any help, then also the message will convey, the patient had stood up so someone would go for help.
And if the patient tries to stand up and at that time he tries to stand up and he falls on the ground then the emergency call will be made to the doctor and all of the others will get a message and application notification.

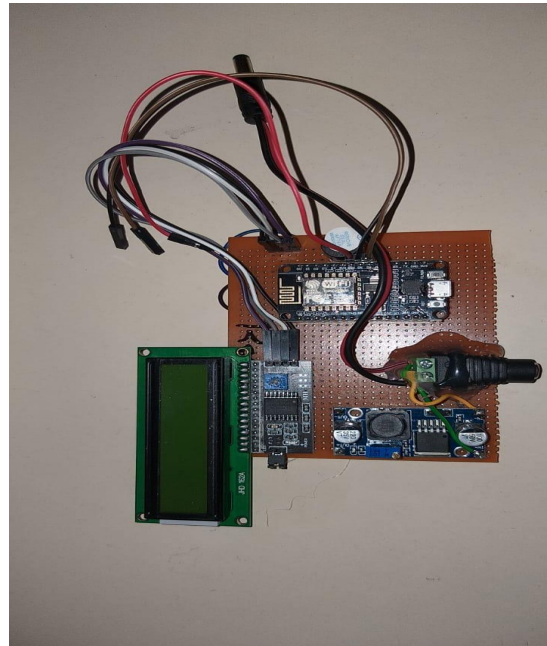**1- NodeMcu , LCD, Power converter**
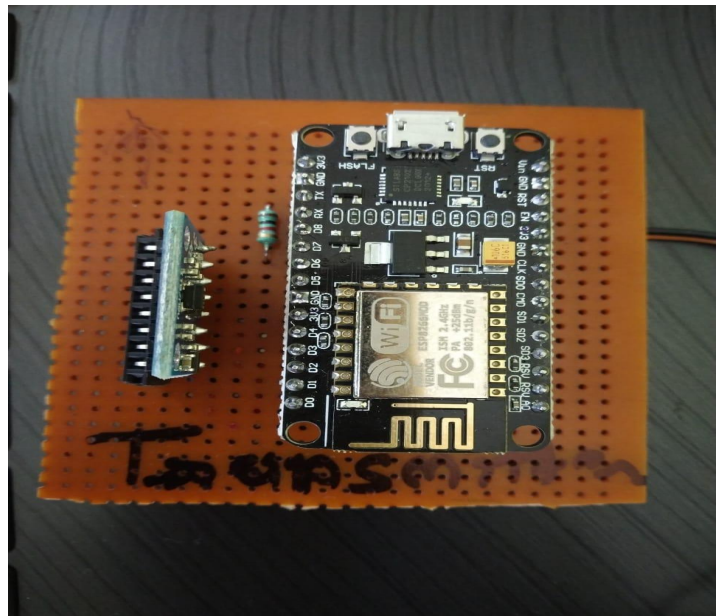

FIG-11

2- NodeMcu & MPU6050

FIG-12

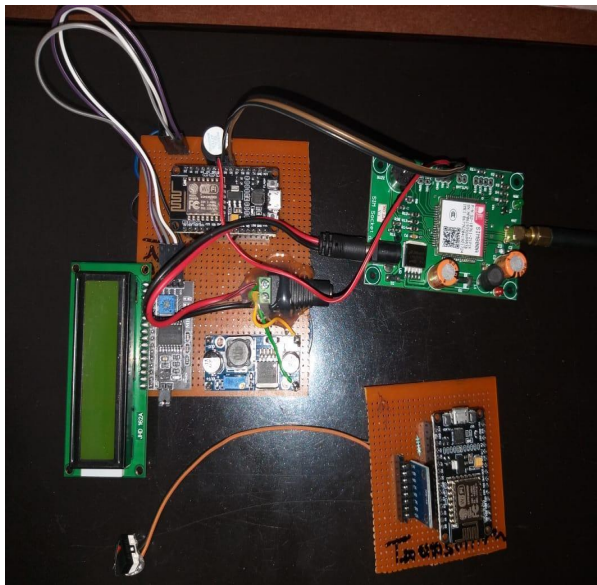### 3) Gsm Module

FIG-13

FIG-14 Working Model

II.   CIRCUIT DIAGRAM

A **circuit diagram** (also known as an **electrical diagram**, **elementary diagram**, or **electronic schematic**) is a simplified conventional graphical representation of an electrical circuit. A pictorial circuit diagram uses simple images of components, while a schematic diagram shows the components of the circuit as simplified standard symbols; both types show the connections between the devices, including power and signal connections. Arrangement of the components interconnections on the diagram does not correspond to their physical locations in the finished device.

Unlike a block diagram or layout diagram, a circuit diagram shows the actual wire connections being used. The diagram does not show the physical arrangement of components. A drawing meant to depict the physical arrangement of the wires and the components they connect is called "artwork" or "layout" or the "physical design."

Circuit diagrams are used for the design (circuit design), construction (such as PCB layout), and maintenance of electrical and electronic equipment.
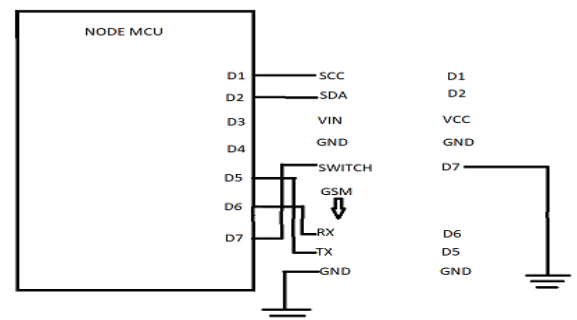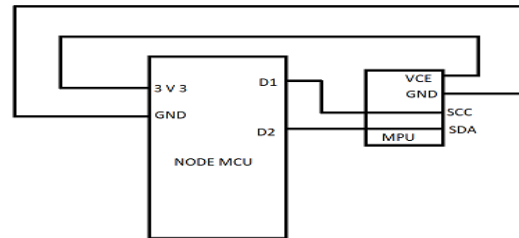
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