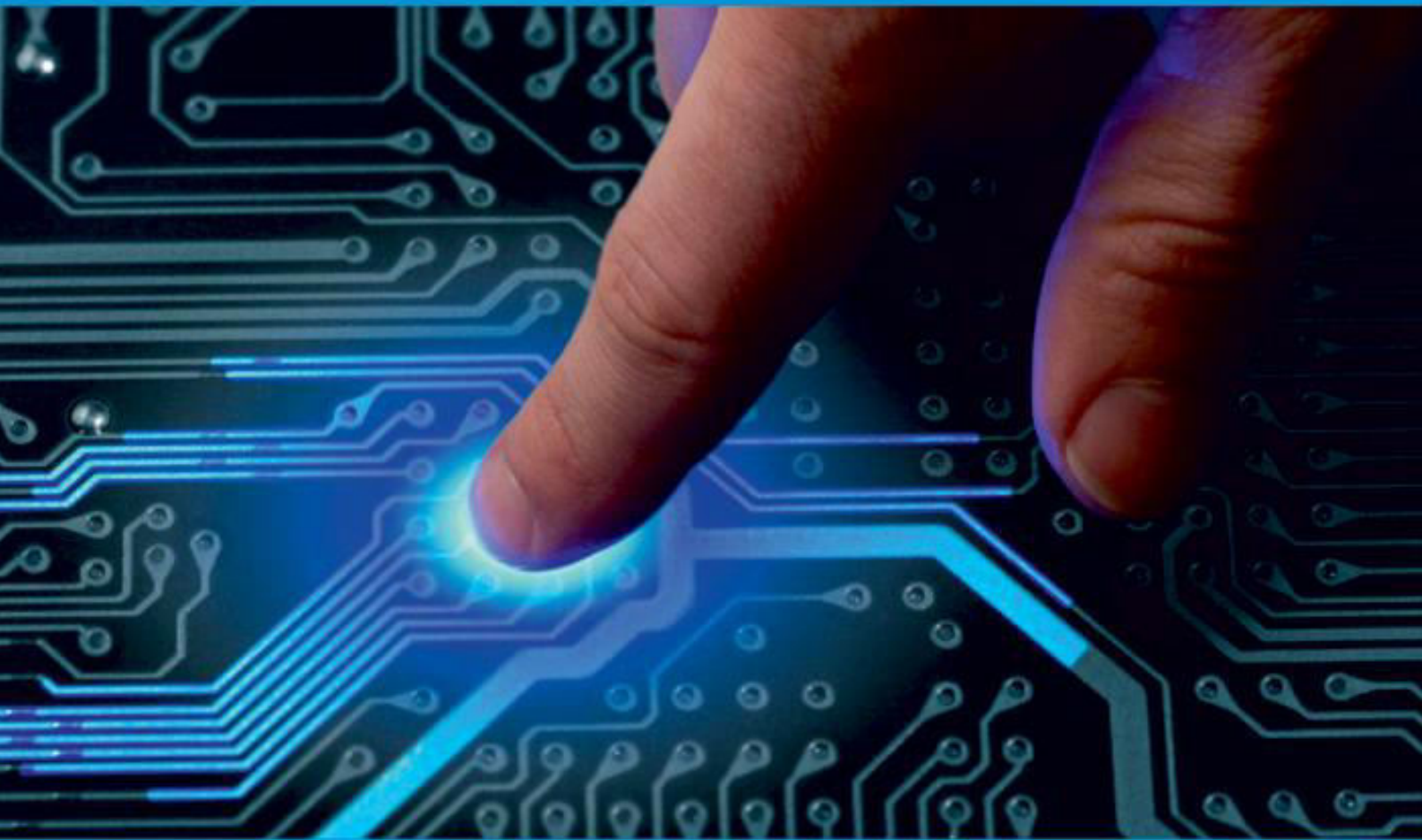




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Paralysis Person's Monitoring System

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ABSTRACT: For a paralyzed person, it becomes necessary to monitor ones for their health and safety. Due to weakness and weak joints, they have a great risk of falling. Now it is important to know if a paralysis person has fallen so that he/she can be helped on time. Also, people on wheelchair need to be checked for fall detection. For this purpose, we propose a paralysis person monitoring system. The system uses accelerometer and gyro sensor to detect person movements, it can be mounted on persons hand or wheelchair for detection. The sensor is connected to a node MCU to constantly transmit the acceleration data. Now the system keeps monitoring for fall detection and abrupt movement changes in person. A sudden abrupt change with jerk in the system is treated as a fall. Now in case the person did not fall, and alarm was false, the system allows to snooze the alert if person presses snooze button in 5 seconds. If person does not press the snooze, system detects person has fallen and automatically triggers alert through Wi-Fi connection to alert the loved ones of the person about the situation instantly.

KEYWORDS: Node MCU (Micro-Controller Unit); Wi-Fi(Wireless Fidelity).

I. INTRODUCTION

The working of the device here is shown by holding in the fingers of the mobile hand. The user now just needs to tilt the device in a particular angle to convey a message. Tilting the device in different directions conveys a different message. Here we use accelerometer to measure the statistics of motion. It then passes on this data to the node MCU. Then it processes the data and displays the message as per input obtained. The node MCU now displays the associated message on the LCD screen. It also sounds a buzzer along with message as soon as it receives motion signal from the accelerometer. If there was no one to attend to the message displayed on the LCD, the patient can choose to tilt the device for some more amount of time which will trigger an SMS to be sent through a GSM modem to the registered caretaker of the patient with the message that the patient wants to convey. The system describes a wireless patient monitoring system that could allow patients to be mobile in their environment. The developed system includes a heartbeat sensor to measure the patient's pulse, as well as a temperature sensor to keep track of the room temperature in case of emergency.

Richard C.Simpson et al. [1], described that both children and adults benefit substantially from access to a means of independent mobility. While the needs of many individuals with disabilities can be satisfied with traditional manual or powered wheelchairs, a segment of the disabled community finds it difficult or impossible to use wheelchairs independently.

Sateesh Reddy Avutu et al [2], described that the lever is used to change mode of operation 5 and the gear box system is used, to establish the contact between wheels of the wheel chair and two DC motors. The calculated result shows the robustness of the manual cum powered wheelchair design. Based on the result we ensure that the proposed wheelchair will improve the quality of the life of the elderly people and those with disabilities.

V.G.Austka et al.[3]explained using voice reorganization technology. So, we are using HM 2007module to recognize the speech signal. This module is used to convert the voice signal into corresponding binary code that is given to the microcontroller, and the microcontroller gives the output according to the voice input. Generally, microcontroller generates codes in its output according to the input. So, using this module we can control the dc motor corresponding to the voice command.

Meghs Shree A.C et al. [4] described that Wheel-Chair is controlled by RTOS as its center working framework. It comprises of touch-screen based route navigation alongside obstacle avoidance and fall identification, Live streaming, GPRS is utilized for area assurance and GSM is utilized to impart in those situations where certain irregular occasions like falling, mischance or medical problems are trigged. constant cooperation capacities are outlined with

rationale to make client working wheel-seat totally self-ward and his communication with earth can resemble of an ordinary individual.

Issa Saleh Ali Al-Sawai et al. [5] analyzed Using "FORWARD BEND DETECTION" is possible to find whether the person in the wheelchair is bending his back in front. In such a case, an alarm will be activated and SMS will be sent to the corresponding person. The proposed work is simulated using proteus and then implemented in hardware.

Kuhn-Lin Lu et al. [6] described a method which helps an Image-based Fall Detection System (IFADS) for nursing homes, where public areas are usually equipped with surveillance cameras. Unlike existing fall detection algorithms, we mainly focused on falls that occur while sitting down and standing up from a chair, because the two activities together account for a higher proportion of falls than forward walking. IFADS first applies an object detection algorithm to identify people in a video frame.

Abdul R Sati et al [7] described that the project presents a brain-controlled wheelchair (BCW) control strategy that reduces the total time required to complete a task and the concentration effort imparted by the user. The proposed BCW strategies are compared to state-of-the art BCW control methodologies available in the literature. The results show that the proposed methods not only reduce the concentration time but also provide a safer and reliable control compared to other BCW.

Mihail Popescu et al. [8] described that this paper proposes an improved framework by fusing the Doppler radar sensor result with a motion sensor network. As a result, performance is significantly improved after the data fusion by discarding the false alarms generated by visitors. The improvement of this new method is tested on one week of continuous data from an actual elderly person who frequently falls while living in her senior home.

Satyam Parkale et al. [9], described that This Uses sensor technology with micro-controller and Wi-Fi module to help the user monitor their loved ones. Those people in most cases are not able to speak .by using these system. This system takes care when in no one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS. It then passes on this data to the microcontroller. The microcontroller processes the data displays the particular message as per input obtained. The microcontroller now displays the associated message on the LCD screen. It also buzzer along with message as soon as it receives motion signal from the accelerometer. If there was no one to attend to the message displayed on the LCD, in this way the Automated Paralysis Patient Care System truly automates the care taking ability of the patient which ensures a timely.

Mohammed F. Alhamind et al [10], described that Current evolutions in the Internet of Things and cloud computing make it believable to build smart cities and homes. Smart cities provide smart technologies to residents for the improved and healthier life, where smart healthcare systems cannot be ignored due to rapidly growing elderly people around the world. Smart healthcare systems can be cost-effective and helpful in the optimal use of healthcare resources.

II. METHODOLOGY

The set-up device consists of accelerometer in order to measure the statistics of motion. It then passes on this data to the node MCU. Then it processes the data and displays the message as per input obtained. The node MCU now displays the associated message on the LCD screen. It also sounds a buzzer along with message as soon as it receives motion signal from the accelerometer. If there was no one to attend to the message displayed on the LCD, the patient can choose to tilt the device for some more amount of time which will trigger an SMS to be sent through a GSM modem to the registered caretaker of the patient with the message that the patient wants to convey. It also sounds a buzzer along with message as soon as it receives motion signal from the accelerometer. If there was no one to attend to the message displayed on the LCD, the patient can choose to tilt the device for some more amount of time which will trigger an SMS to be sent through a GSM modem to the registered caretaker of the patient with the message that the patient wants to convey.

2.1 ACCELEROMETER

Accelerometer is a device which is used for measuring the acceleration and the tilt angle of anybody over which it is mounted. The output of an Accelerometer IC is in 28 terms of variable voltage linear to the acceleration or the tilt angle. So, accelerometers can used in lot of applications as two-wheel balancing system.

2.2 GSM MODEM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A wireless modem behaves like a dial-up modem. GSM uses several cryptographic algorithms for security. The ciphers are used for ensuring over-the-air voice privacy. The system supports multiple algorithms so operators may replace that cipher with a stronger one. Both A5/1 and A5/2 algorithms are broken, and their cryptanalysis has been considered in the literature.

2.3 BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board.

2.4 JUMPER WIRE

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed. Jumper wires typically come in three versions: male-to-male, male-to-female and female-to-female. The difference between each is in the end point of the wire. Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into. Male -to-male jumper wires are the most common and what you likely will use most often. When connecting two ports on a breadboard, a male-to-male wire.

2.5 LCD DISPLAY

A liquid crystal display is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly. These are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically-modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome.

2.6 WIFI

A Wi-Fi-enabled device, such as a personal computer video game console, Smartphone or digital audio player, can connect to the Internet when within range of a wireless network connected to the Internet. The coverage of one or more (interconnected) access points called hotspots comprises an area as small as a few rooms or as large as many square miles. Coverage in the larger area may depend on a group of access points with overlapping coverage.

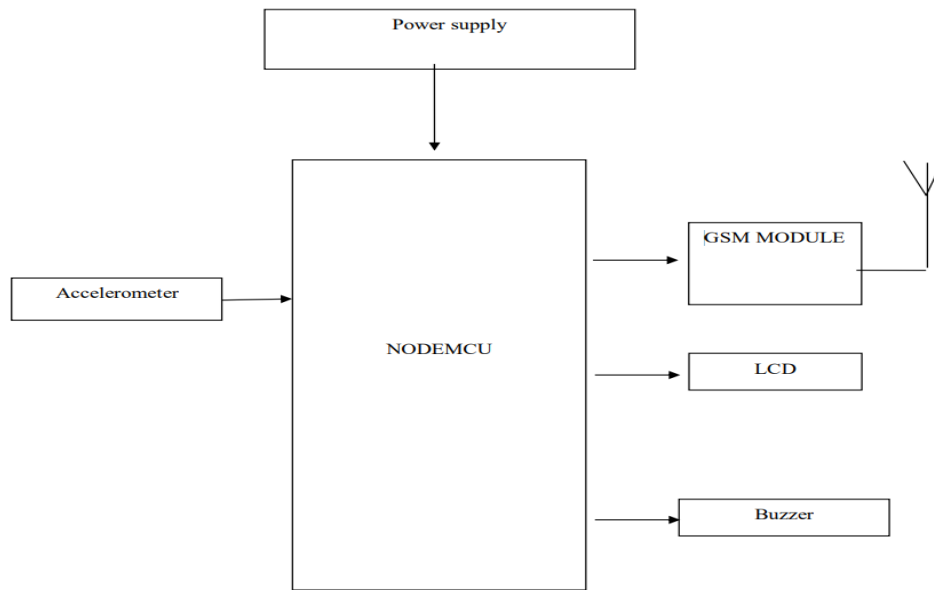


Figure.1 Block Diagram for Paralysis Persons Monitoring System

2.7 NODE MCU

Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Expressive Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the Eula project, and built on the Expressive Non-OS SDK for ESP8266.

It uses many open source projects, such as Launceston and SPIFFS. Node MCU is an open-source LUA based firmware developed for ESP8266 chip. By exploring functionality with ESP8266 chip, Node MCU firmware comes with ESP8266 Development board/kit. Node MCU Development board. Node MCU Dev Kit/board consist of ESP8266 Wi-Fi enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Expressive Systems with TCP/IP protocol. For more information about ESP8266. Node MCU Development Board v1.0 (Version2), which usually comes in black colored PCB.

MSP430 launch pad is a development board which can be used to design all Arduino based applications since both have similar capabilities and features. Similar to Arduino being developed on AVR controllers, the MSP430 launch pad is developed on TI MSP430 microcontrollers. This device can be used to develop low end applications and not high-end applications, as it does not have high processing power like Raspberry pi.

2..1 ESP8266 ARDUINO CORE

A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language. Some ESP8266 enthusiasts developed an Arduino core for the ESP8266 Wi-Fi SoC, popularly called the "ESP8266 Core for the Arduino IDE."

NodeMCU Development board is featured with Wi-Fi capability, analog pin, digital pins and serial communication protocols. Basically, NodeMCU is Lua Interpreter, so it can understand Lua script easily. When we write Lua scripts for NodeMCU and send/upload it to NodeMCU, then they will get executes sequentially. It will not build binary firmware file of code for NodeMCU to write. It will send Lua script as it is to NodeMCU to get execute.

In Arduino IDE when we write and compile code, ESP8266 toolchain in background creates binary firmware file of code we wrote. And when we upload it to NodeMCU then it will flash all NodeMCU firmware with newly generated binary firmware code. In fact, it writes the complete firmware. That's the reason why NodeMCU not accept further Lua scripts/code after it is getting flashed by Arduino IDE.

After getting flashed by Arduino sketch/code it will be no more Lua interpreter and we got error if we try to upload Lua scripts. To again start with Lua script, we need to flash it with NodeMCU firmware. Since Arduino IDE compile and upload/writes complete firmware, it takes more time than Explorer IDE.

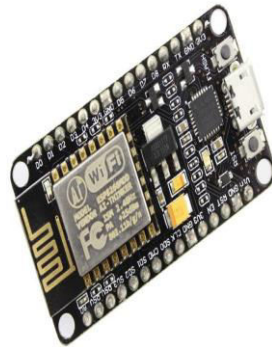


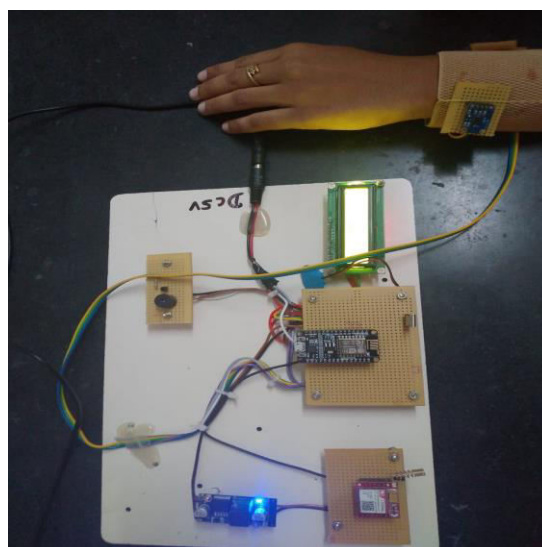
Fig.2 NODE MCU

III. RESULTS AND DISCUSSION

The project was developed to create a system using MCU 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 improvements still need to be done regarding to the research of automatic healthcare system using GSM system.

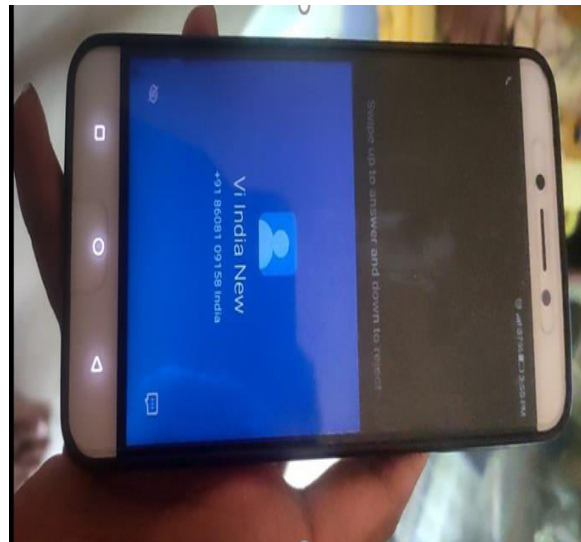
To ensure the system still efficient and improve the already system has, a few modifications should be made to create the more sophisticated idea for this system. Thus, the automatic Healthcare System using GSM can be upgraded by using several improvements of components, align with the latest technology. 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

Project Model



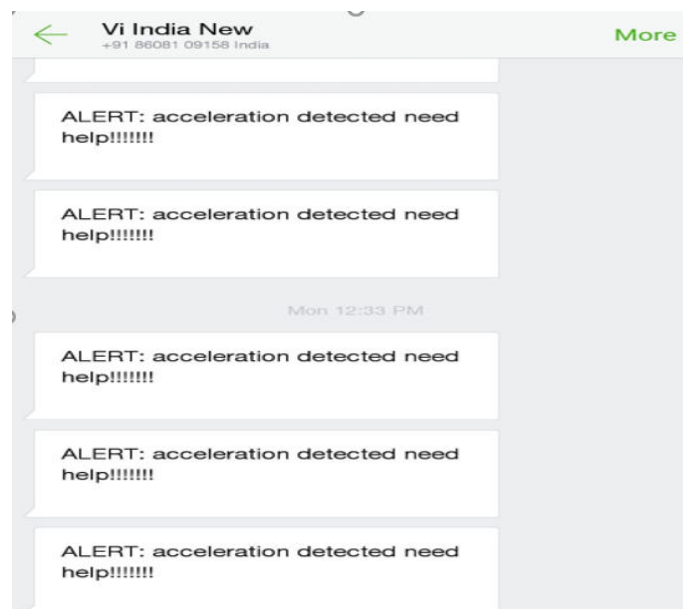
(a)

Output-Call Alert



(b)

Message Alert



(c)

IV. CONCLUSION

As a conclusion, the developed method is used to safeguard the paralysis person from the danger. With the help of this project, the device developed named paralysis persons monitoring system for patients using node MCU which detects the persons health rate and approaches the paralysis person to indicate the range and the level of dangerousness. This will definitely help the patient to save their lives by detecting the fall detection.

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