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Paralysis Patient Health Care Device

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ABSTRACT

A survey of the Global Burden of Diseases (GBD) estimated that, approximately 5.8 million people lose their lives due to stroke. Stroke is the major cause of paralysis, which affects almost 33.7% of the population with paralysis. But there is no optimal tracking system to monitor the patient's health and daily needs. In this highspeed world, it is not possible to constantly take care of their near ones who need their help. To overcome such difficulties paralyzed patient monitoring equipment is introduced. During the survey we come across many hospitals and NGOs serving paralytic patients with their whole or partial body disabled by the Paralysis attack. Those people in most cases are notable to convey their needs as they can't be able to speak properly nor can they convey through sign language due to loss in motion control in their brain. In this way the Automated Paralysis Patient Care System truly automates the care taking ability of the patient which ensures a timely attention to the patient and thus for a good health of the patient. Ensuring the health and well-being of paralysis patients requires continuous monitoring and personalized care. This project introduces an "Automated Paralysis Patient Healthcare System" using advanced sensors, specifically the MAX30100 pulse oximeter and DHT11 temperature and humidity sensor. These sensors, along with IoT technologies, facilitate realtime monitoring of vital health parameters. The system aims to enhance patient care by automating data collection, analyzing health metrics, and providing timely alerts. The integration of MAX30100 and DHT11 sensors enhances the accuracy and breadth of health data captured, contributing to improved healthcare outcomes for paralysis patients .

Keywords: node MCU, ,buzzer,MAX30100 Pulse Oximeter, ThingSpeak, Microcontroller Unit

1. INTRODUCTION

As The paralysis patients are unable to move their muscles for their purposes. There are so many symptoms and causes for this condition, especially spinal cord injury which affects the nervous system. There are some existing systems for individual comforts. In this, we also have some sensors. The aim is to create a novel device which helps disabled people. It will help them to interact with other people with minimum efforts. This device may one day improve the lives of the people with paralysis. Even though, there are so many innovative approaches for curing these people, but here this will help them to adapt with paralysis by making them as independent as possible. Fortunately, the last decade has seen promising technology advances to address these concerns. In addition, the accelerometer will also give

a buzzer sound when patients fall on the floor. In this project we using Wi-Fi module which is Wi-Fi serial transceiver module, based on ESP8266 SoC. This chip implements a full TCP/IP protocol stack and the very interesting feature is that it has also a great computational power onboard. That means that you can use this board as a simple Wi-Fi connection board, offloading the main processor of your controller from the Wi-Fi communication management. Location information plays an important role in most of the applications in Wireless Sensor Network (WSN). Recently, many localization techniques have been proposed, while most of these deals with two Dimensional applications. Whereas, in Three Dimensional applications the task is complex and there are large variations in the altitude levels. In these 3D environments, the sensors are placed in mountains for tracking and deployed in air for monitoring pollution level or health monitoring. The Internet of Things (IoT) concepts have been widely used to interconnect the available medical resources and offer smart, reliable, and effective healthcare service to the patients. Health monitoring for active and assisted living is one of the paradigms that can use the IoT advantages to improve the patient's lifestyle

2. LITERATURE REVIEW

The opportunity for patients to have constant monitoring of their health state is now possible by means of intelligent sensors. The continuous monitoring of health status is a fundamental practice for paralytic patients. In a hospital either the nurse or the doctor has to move physically from one patient to another for continuous health monitoring, due to which it is not possible to monitor one patient continuously. Thus, any critical condition cannot be identified unless the doctor or nurse checks the patient's health at that time. So, a

system is developed to convey a message from patient to person monitoring his health Another author proposed a hand gesture system based on real-time vision Detection of human- computer interactions in many applications. The system can recognize 35 different hand gestures It is provided faster and more accurately by Indian Sign Language and American Sign Language, or ISL and ASL. RGB to GREY.

A segmentation technique was used to minimize the possibility of false positives. The authors suggested a method Features were extracted using the same improvised scale-invariant feature transformation (SIFT). The system is exemplary Use MATLAB. The GUI model was developed to design an efficient user-friendly hand gesture recognition system. Implementation. Information analysis cooperation, intelligent aid diagnosis, healthcare information technology, and patient monitoring are the four most recent developments in this field. The Internet of Things (IOT) platform offers a promising technology to achieve the health care services, and can further improve the medical service systems. IOT wearable platforms can be used to collect the needed information of the user and its ambient environment and communicate such information wirelessly, where it is processed or stored for tracking the history of the user. Such a connectivity with external devices and services will allow for taking preventive measure (e.g., upon foreseeing an upcoming heart stroke) or provide immediate care (e.g., when a user falls and needs help). This paper proposes a system that converts identified signals into actions using 2 interfaces namely distance sensor interface for actions such as volume control, scrolling, keyboard shortcuts. The actions of the mouse are controlled using user's fingertip. The system uses binary crystal growth algorithm for its working and the recognition algorithm used for recognizing gestures.

This paper proposes a device which interprets sign language for English alphabets. The data is collected using data collection module, then data is mapped to its corresponding sign and sign is converted into alphabets. This system uses the dynamic time warping (DTW) and nearest mapping algorithm which translates data into English alphabet and compare the acquired data with trained data set to identify the most appropriate sign.

3.COMPONENTS

1. MAX30100 Pulse Oximeter:
   - Measures heart rate and oxygen saturation levels for continuous monitoring of vital signs.

2.Alert System:

- Generates alerts for abnormal health conditions, facilitating timely intervention and healthcare provider notifications

4.Working principle:

1.Sensorconnection:

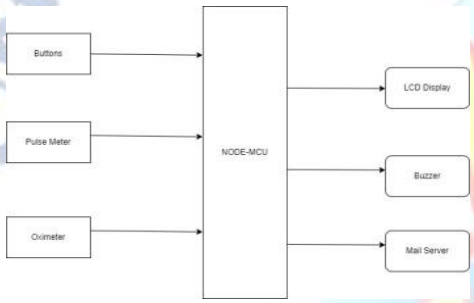
Connect the MAX30100 pulse oximeter sensor to the NodeMCU using appropriate connections (e.g., I2C communication). Power the MAX30100 and configure it to measure heart rate and SpO2.

2.Data acquisition:

Use the NodeMCU to periodically read data from the pulse oximeter. Retrieve heart rate and SpO2 values.

3.Threshold setting:

Define threshold values for heart rate and SpO2. These values will be used to determine whether the patient's condition is within normal limits.



4.condition monitoring:

Continuously monitor the patient's heart rate and SpO2 levels. If the heart rate or SpO2 falls outside the predefined normal range, trigger an alert.

5.Alert system: Activate the buzzer to generate an audible alert when abnormal conditions are detected. Optionally, incorporate additional notification methods such as SMS, email, or app notifications for remote monitoring by caregivers.

6.Data logging:

Implement a data logging mechanism on the NodeMCU to store historical heart rate and SpO2 data for future analysis.

7.Power Management:

Implement power-saving mechanisms to optimize the system's energy consumption, ensuring prolonged operation without frequent battery replacements.

8.User interface:

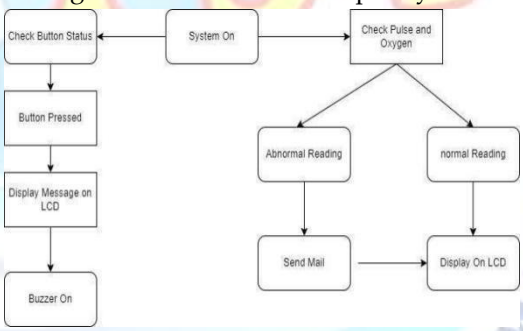
Develop a user interface, either through a web interface or a dedicated application, to allow caregivers or healthcare providers to monitor the patient's health remotely.

9.Testing and Calibration:

Test the system in different scenarios and calibrate the threshold values for heart rate and SpO2 based on individual patient needs.

5. Existing Problem

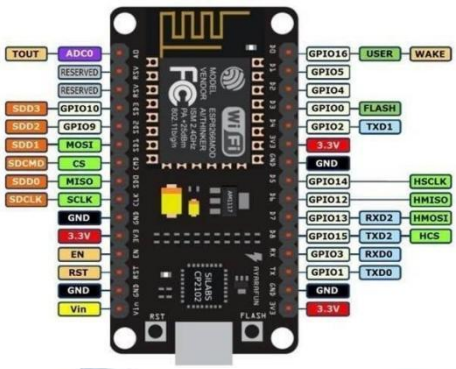
Paralytic patients who have their whole or partial body disabled by the Paralysis attack. These people i-mos cases are not able to convey their needs as they are neither able to speak properly nor do they convey through sign language due to loss in motor control by their brain. Traditional healthcare for paralysis patients may rely on periodic clinic visits leading to gaps in continuous monitoring and timely intervention. Patients may face challenges in communicating their health status, and caregivers may experience difficulties in managing care effectively. There is a need for automated systems that can provide real-time information on vital health parameters, enabling proactive healthcare management for paralysis patients.



There are several existing systems available for patients with paralysis but this system helps to constantly monitor and understand the patient's needs. the message will change according to the position of the accelerometer. We must then know their needs and assist them on the basis of their needs. The temperature sensor, humidity sensor and pulse meter were used in this system. These sensors should be for patients with issues, or gloves; they can feel the temperature of the patient, moisture and pulses. If the patient is in a critical situation, it will sound alert with a buzzer when the patient is on the floor or when the pulse speed is above normal levels. This system can help treating patients

suffering from paralysis, and it's also very cheap and easy to buy without debts.

Node-MCU – Node MCU is an open-source LUA based firmware developed for the ESP8266 wi-fi chip. By exploring functionality with the ESP8266 chip, Node MCU firmware comes with the ESP8266 Development board/kit i.e. Node MCU Development board. It supports serial communication protocols i.e. UART, SPI, I2C, etc.



Buzzer: buzzer is a simple but effective component used to provide audible alerts or notifications in response to specific events or conditions. In IoT applications, a buzzer is often integrated into devices to alert users or trigger attention when certain thresholds or conditions are met.

Pulse-oximeter (MAX30100) –

MAX30100 is an integrated pulse oximeter and heart rate monitor sensor solution. It's an optical sensor that derives its readings from emitting two wavelengths of light from two LEDS-a red and an infrared one-then measuring the absorbance of pulsing blood through a photo detector This particular LED color combination is optimized for reading the data through the tip of one's finger it is fully configurable through software registers and the digital output data is stored in a 15-deep FITO within the device. It has an 2C digital interface to communicate with a host. This project will be available for monitoring at the operational levels. The normal heart beat range of a paralyzed can be nearly 60-100 beats per minute. If the range goes below 60, it may lead to heart block, syncope and when the range goes above 100, it may lead to anxiety and tachycardia. So, when it increases or decreases the status of the patient pulse rate will be intimated. The oxygen level of aparalyzed patient shall be above 93%. If the range reaches below 93%, it leads irrational thinking and health problems. This can be measured to know the fall in oxygen. The normal respiratory rate of a paralysis can be nearly 12-20 breathes per minute. The rate is usually measured when a person is at rest and simply involves counting the number of breaths for one minute by counting how many times the chest rises. If the paralysis increases for the paralyzed patient, then the respiration increases this can be the basic parameter of the paralyzed. If the respiration rate increases or decreases 12-20breathe per minute, it will be intimated. All the basic parameters are monitored and if there is a dangerous change in paralyzed patient's status then a message will be intimated to the doctor and caretaker about the condition of the paralyzed. This contribution of paralysis monitoring system is for better process management, superior flexibility and increased efficiency within hospitals is further underlining the appeal of wireless networking options for paralysis patient monitoring systems.

Data Acquisition is carried out by the sensors that measure the various physiological data and carries these bioelectrical signals to the microcontroller. Data Transmission Typically the data collected by the microcontroller is transmitted to the internet using IOT module and an SMS can Resent to the caretaker if any critical parameter is recorded. Individual sensor's data can be accessed via computer or mobile connected to internet. Cloud based Processing Diagnoses and prognosis of a number of health conditions and diseases can be done using the sensor data. Long term storage of patient's health information can be done and the health information can be accessed using internet

The IOT just is the web of stuff. Independent technologies can collect and transmit data without human intervention via a wireless network. There are endless personal or business opportunities. In the health care industry, remote monitoring has been possible with IOT- enabled devices that

release the possibility of keeping patients safe and healthy and that enable doctors to provide superlative health care. Respond to and enable physical objects to collect information and respond to instructions. To collect, store, handle, manipulate, and manipulate data. The communications infrastructure that includes protocols and technologies that permit two physical objects to exchange at his most important. We used My-sql and PHP as a simple and easy-to-use IOT platform for data storage, data viewing and device control. By using some backend program, we sentan alert on mail, Connect the respective sensors to a node MCU which gets connected to a database.

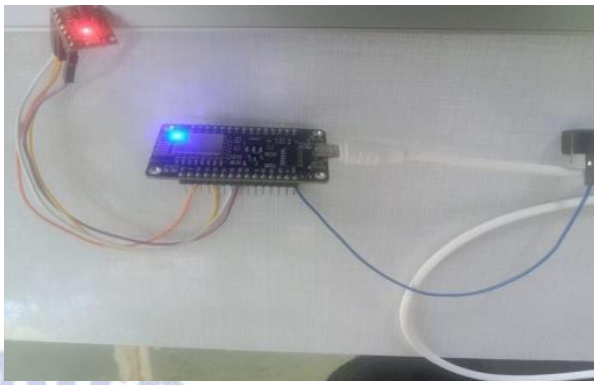
By using this value, we can monitor the data gathered by the sensors. Based on the patient needs it will give sound and the output will be displayed on the LCD display and if the patients pulse or oxygen become abnormal it will be displayed on the lcd which will be monitored continuously. Also, a mail will be triggered.

A.Proposed Solution

prop

osed solution of our system is to help a person adapt to life with paralysis by making them as independent 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

Experimental Results



This is the result of sensors in which we get result of paralysis is shown below

Output Table

S.No	Age	Heart Rate (BPM)	Respiratory Rate (Breaths/min)
1	0-5 months	30-150	25-40
2	6-12 months	80-140	20-30
3	1-3 years	80-130	20-30
4	3-5 years	80-120	20-30
5	6-10 years	70-110	15-30
6	11-14 years	60-105	12-20
7	14+ years	60-100	12-20

Table No1 : Heart Rate and Respiratory Rate for Different Ages

Sensor	Pin Connection	Output of Oximeter	Time Required
Oximeter	VCC - VCC GND - GNDSCL - D1 SDA - D2	To Detect Pulse of Patient	28 us

Table No 2: Output of Oximeter sensor along with connection pins

CONCLUSION

To achieve independence in mobility for people with physical disability, right mobility equipment has to be designed based on the severity and type of disability. This is not a trivial job just because the nature and type of disability varies from person to person. So different methods are essential to help those peoples

and as future engineers it is our duty to develop newer technologies to assist paralyzed patients. The primary objective of this paper is to develop an IoT based health monitoring system that able to provide health data monitoring of the user. The proposed system is able to send the health data to the visualization platform in real-time, and sends alarm notifications to emails. User's relatives or authorized users can view the health data of the patient. The alarm notifications can be sent to any related personnel when there are sudden changes in heart rate and abnormal body temperature. The health data are stored in a local and cloud database, which allow the user to keep track of their health condition by tracking the health data.

In future, we can use the chipset to implement this system. All parts are integrated in the chip, so that we can. This chip fits easily with the patient with paralysis Gloves and bands avoid clothes. But there is one disadvantage that will happen increase cost but the increase.

The LM35 temperature can be included as a cheap alternative for body temperature monitoring. The temperature output of the LM35 temperature sensor is not reliable since the outputs of the sensor fluctuates a lot during the experiment. As a result, false alarms may be triggered from time to time which reduces the reliability and efficiency of the health monitoring system. Besides, other medical sensors such as ECG sensors and blood pressure sensors can be added into the system to improve the functionality of the system. The users will be able to track their health conditions better if the system is capable of tracking more other health data accurately.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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