

HUMAN EPILEPTIC SEIZURES DETECTION BASEDON IoT

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ABSTRACT

Epilepsy is the most common neurological disorder and it can affect all the people particularly for the patient's affected by a brain tumor, elder people affected by stroke, autism disorders, sleeping disorders. The most common symptoms of epilepsy is variation in heartbeat rate, muscle movement called as seizures, variation in heartbeat rate etc.

The proposed smart alert system is specially designed for the epilepsy patients to detect the seizures and send the message to caretaker or doctor. If they affected by seizures.

The smart alert system will monitor the patient's heartbeat, pulse rate,

oxygen level with the help of respective sensor. With the help of smart alert system the patient can lead normal life.

The main Objective of this proposed system is to develop the real-time monitoring and alert system to help epilepsy affected persons in their day to day activities in life.

Keywords: Cloud server..., Node MCU..., Healthcare...,

INTRODUCTION

The smart alert system is wearable gadget it detects the seizures within few minutes. It receives the signals from the human body to detect the

occurrence of seizures . The device transmits a coded signal when it detects the symptoms as soon. Then wireless receiver decodes the signal to produce control signals for switching ana alarm trace out the exact location of the patient.

The abnormal activity in brain leads to seizures. It is diagnosed in brain tumor patients, elderly people who affected by stroke, young children and Autism affected children, This will be so difficult for the caretaker and the doctor to monitor the occurrence of seizures at all times especially during sleep. Another risk of epilepsy is if theseizures continue more than five minutes

Will leads to sudden and unexpected death will occur. The only visible symptom of epilepsy is seizures.

PROBLEM STATEMENT

There are 50 million people living with epilepsy worldwide, and most them are reside in developing countries. About 10 million person with epilepsy are there in india.

The occurrence of seizures is unpredictable and often dangerous, increasing the risk of injury, hospitalization and mortality, and adversely affecting a patient's mental health, often resulting in anxiety, depression.

EXISTING SYSTEM

In existing system for epileptic which comprise of an NODE MCU(ESP8266) and sensors such as muscle sensor (EMG), temperature sensor, oxygen sensor, heartbeat sensor, AC vibration sensor and GPS module, cloud server.

When the epileptic patient is in working or doing any other work like walking, swimming, cycling etc, the device will monitor and sense the patients blood pressure and temperature and the oxygen level in the patient body.

When the blood pressure rate and oxygen rate is decreased the device get activated and trace the location of the patient using GPS module the patient location is send to the caretaker or doctor which the contact number has been registered.

By using the more sensors, the controller monitors and all the sensor data. So it requires more power backup system for battery.

PROPOSED METHOD

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In this block diagram microcontroller and different sensors like heartbeat sensor, temperature sensor, and accelerometer are used as inputs of this ARDUINO UNO. These types of sensors are used for monitoring the primary health condition of elderly and disabled people. Moreover, GSM used to send SMS signal. The LCD screen has placed here to see the data of these signals. Among all three sensor's temperature sensors and heart rate sensors are connected to a microcontroller analog pin. LCD

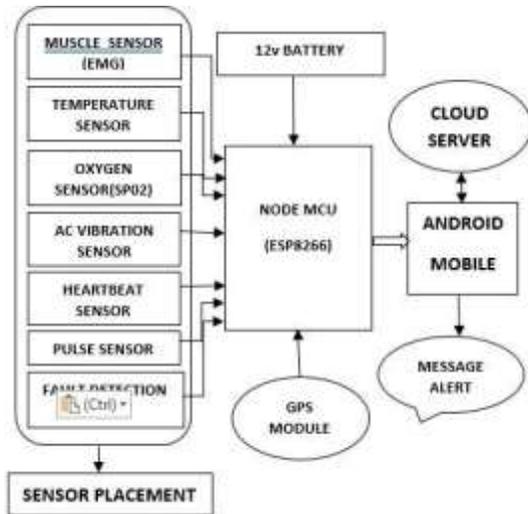
has been connected with a microcontroller to show sensors data. The accelerometer has been connected with the system for fall detection. GSM module connected with some present value, when the value exceeds that means patient become sick or in danger. If the sensor value exceeds the preset value the GSM send notification to the mobile phone. Here mobile phone worked as a receiving device. There is no wire connection with themobile phone and the system.

METHODOLOGY

The consists of different sensors proposed by health monitoring system which are divided into two categories. One is used to detect any physical changes occurs in coma patients and second is used for monitoring vitals of the Epilepsy patients.

Oxygen sensor which is used to monitor oxygen level of the patient. Pulse sensor which is used to monitor the patient heart beat. Temperature and Blood pressure are the two vital records and the monitor to understand healthystatus of a patient.

BLOCK DIAGRAM



Hardware Description

In Node MCU(ESP8266) device handle all sensors with the help of IoT server, that provide services and control over the network.

TEMPRATURE SENSOR

The hardware system include:

- A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes.
- Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. Heart Rate can be monitored in two ways: one way is to manually check

the pulse either at wrists or neck and the other way is to use a Heartbeat Sensor

- SpO₂, the saturation percentage of oxygen in the blood, has become a standard of patient care across the globe. Almost every patient monitor has a built-in or attachable capability to monitor this crucial vital sign. SPO₂ is an indirect and non-invasive method of measuring oxygen saturation in blood.
- A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include the time the message was transmitted satellite position at time of message transmission. The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite using the speed
- Node MCU(ESP8266) delivers highly integrated Wi-Fi SoC solution to meet the continuous demands for efficient power usage, compact design and reliable performance in the industry. With the complete and self-contained Wi-Fi networking capabilities, It can perform as either a standalone

application or the slave to a host MCU. When ESP8266EX hosts the application, it promptly boots up from the external flash. ESP8266EX delivers highly integrated Wi-Fi SoC solution to meet the continuous demands for efficient power usage, compact design and reliable performance in the industry. With the complete and self-contained Wi-Fi networking capabilities, It can perform as either a standalone application or the slave to a host MCU. When ESP8266EX hosts the application, it promptly boots up from the external flash.

SOFTWARE DESCRIPTION

Micro-USB: Node MCU can be powered through the USB port.

3.3 V: Regulated 3.3V can be supplied to this pin to power the board.

GND: Ground pins.

Vin: External Power Supply.

EN, RS: The pin and the button reset the microcontroller.

A0: Used to measure analog voltage in the range of 0-3.3V.

GPIO1 to GPIO16: Node MCU has 16 general purpose input-output pins on its board.

SD1, CMD, SD0, CLK: Node MCU has four pins available for SPI communication.

TXD0, RXD0, TXD2, RXD2: Node MCU has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.

I2C Pins: Node MCU has I2C functionality support pins, you have to find which pin is I2C.

APPLICATIONS

- Produce continuous alarm signal to alert caretaker or doctor
- Immediately message will send the to the caretaker.
- Incase if the patient not in home or they away from the caretaker it will send the current location of the patient.
- This device will update the patient body condition for every 10 minutes
- This device will help in detecting seizures and will provide details about the patient to the doctor

FEATURES OF PROPOSED SYSTEM:

1) 24/7 monitoring of coma patient.

2) The recording of the

patient's data will be

continuous.

3) Low in cost.

4) Less in Power

consumption.

5) No need of continuous

human attention.

- 6) The speed of communication between the doctor and patient is very high. 7) The doctor can easily monitor the patient through worldwide, anywhere at any time.
- 8) System is completely movable.
- 9) Reduce in time.
- 10) All data are stored in database, so that we will not lose any data.

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CONCLUSION

The proposed technology will help epilepsy patient to lead better and secured lifestyle in their houses. People with such difficulty create an insecure problem to roam outside and unable to communicate properly with the people. Moreover, they feel guilty to express their problem and get the solution for this. This can be value added service to provide comfortable and confident living style in their houses. This technology-based product will improve the mental health of the users and reduces the risk of failing.

