IOT Based Paralysis Patient Healthcare Monitoring System

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Abstract—An IOT- based healthcare monitoring system for paralysis patients is presented in this article. Multiple wireless devices are used in the system, which also includes an IOT gateway and a cloud server. This system helps disabled person in displaying a message over the LCD by just simple motion of a part of his finger which has motion abilities by using wearable gloves. It takes care of the situation whereon one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS. The patient's heart rate, and body temperature are all measured by the sensors. A doctor can access the data and further analyze it after it has been gathered and saved on a cloud server. In the event of an emergency or unusual readings, the system also sends the doctor or nursing staff alert texts. The suggested method enables real-time monitoring of paralysis patient's health and enables prompt medical assistance for them, GSM, Additionally, it can be used to identify any health-related issues.

Keywords: Health Monitoring accelerometer, Arduino UNO, temperature, voice module.

I. INTRODUCTION

Patients with paralysis are unable to use their muscles to serve their needs. This disorder has a wide range of signs and symptoms, not the least of which is spinal cord damage, which has an impact on the nervous system. There are several systems for individual comforts already in place. However, this technique will assist in keeping track of the patients' overall needs. On the LCD panel, their messages will be seen. We also have several sensors in this. The objective is to design an innovative aid for the disabled. They will be able to engage with others effortlessly thanks to it. The lives of those who are paralyzed may one day be better thanks to this device. Although there are other creative methods for treating these individuals, this will help them adjust.

Innovative healthcare solutions have emerged as a result of the quick development of modern technologies. The IOT based Paralysis Patient Healthcare Monitoring system is one such solution. For patients with paralysis, this system uses Internet of Things (IOT) enabled devices to offer real-time remote monitoring and alarm. The device gives medical personnel access to crucial medical data, enhancing the quality of life for patients who suffer from paralysis. The device is fitted with sensors that can track changes in the patient's state and notify medical staff of any alterations. In the event of an emergency, the system can also notify the patient's relatives and care takers.

II. LITERATURE SURVEY

Due to the development of sophisticated sensors, patients now have the possibility to continuously check their health status. For individuals who are paralyzed, it is essential to continuously assess their health status. It is physically impossible to watch one patient continually in a hospital since the nurse or doctor must physically shift from one patient to the next. Since the patient's health cannot be checked at that time, no critical condition can be found. In order to send a message from the patient to the person keeping track of his health, a system is created. In 2021, Sujin J S, Mukesh S, Sashwant M, Ramesh Kumar R proposed an IOT based patient health monitoring system using TCP/IP protocol.The 16X2 LCD Display used in the suggested methodological system continuously monitors and displays the patient's vital signs, such as heart rate, blood pressure, and temperature, in the local display unit [5]. Additionally, the SIMCOM GSM modem is used to decode, process, and use the TCP/IP protocol to transfer the sensor's measured values to the remote server. Our solution also includes a sophisticated decision-making algorithm to forecast the patient's critical position and automatically send the triggered SMS notification and Call alert to the concerned party. J (here they used for Nurse Station and corresponding Doctor). The URL of the designated static webpage is included in the SMS that was delivered to the doctor. In 2021, Diptee Gaikar. Prof. Kalindikalebere proposed automated paralysis patient healthcare system. The intention is to enables basic hand movements for paralyzed persons to communicate. Each accelerometer is connected to a certain finger because to the way the accelerometers are positioned on the gloves. With the aid of connecting wires, this accelerometer is attached to the Atmega8-powered Arduino UNO. When the accelerometer's direction changes, the initial or stable value of the accelerometer changes. This value determines which pre-coded messages, such as "call the doctor" or "emergency," are displayed. The system is propelled by the beep sound to alarm when the message is shown to inform the patients' attendants. The project's first component is an accelerometer, which can recognize motions based on changes in location. The sensor's x, y, and z pins display an analogue voltage variation in response to a change in position. Using an Op-Amp, system turn this analogue variant into a digital representation. As a comparator, it establish a threshold voltage (comparison) using presets, and the voltage is either high or low depending on the input voltage. Here, a quad op-amp IC called LM324 is employed. On changing positions, this circuit generates a variety of 4-bit binary sequences. The RF channel is used to send this sequence. The accelerometer circuit, which the transmitter part will be connected to, will provide parallel binary data as input to the HT12E encoder.

III.PROPOSED SYSTEM

The proposed system architecture for the project is shown in Figure 1.The system should have an Arduino UNO to control the GSM module and sensors' real-time data transfer. The caretaker is informed of any emergency situations. It consists of temperature sensor, acceleration sensor, APR 33A3 voice sensor, and flex sensors. The Internet of Things (IOT) should be used to combine the data received from the sensors.

A temperature sensor should be utilized to monitor the patient's body temperature and send notifications in the event of an elevated or decreased temperature. The patient's unexpected movements or falls should be detected by an accelerometer sensor, which should also notify the career in case of an emergency. To inform the career in the event of an emergency, the APR 33A3 Voice Sensor should be utilized to pick up any voice from the patient. The GSM module should be utilized to warn the career in case the Flex Sensors 1,2,3,4 fail to detect any movement of the patient's limbs.

III. SYSTEM DESIGN

The IOT-based paralyzed patient health care system is a tool created to assist the patient in communicating with doctors, nurses, or loved ones while at home or work over the internet. To deliver this functionality, the system uses circuitry based on a microprocessor. It employs a hand motion recognition circuit. Using an accelerometer sensor, the hand motion circuit can detect hand movements.

In this design, we're going to monitor the health of the case using vibrant sensors like temperature sensors, ECG sensors, and accelerometer sensors. The continuous readings from these sensors will be displayed on TV displays, and we're going to develop an Android operation that will allow us to obtain these readings so that the caretaker can monitor the case in the sanitarium even if he is some distance away, or, to put it another way, the caretaker can monitor the patient at any time. The suggested system operates by interpreting the various hand tilts. The patient wears a glove with the flex sensors attached to it. To send different messages, the user only needs to tilt the device. The statistics of motion are measured using an accelerometer. It then sends this information to the microcontroller, which interprets it and displays the specific message in accordance with the input received.

A. Arduino UNO:

An open-source microcontroller with strong performance and low power consumption. The sensors in the proposed system would be controlled by an Arduino UNO microcontroller. The Arduino Uno provides a variety of features for interacting with a computer, other Arduino boards, or other microcontrollers. It is programmed using the IDE, or integrated development environment. It is compatible with both online and offline platforms.

B. GSM/GPRS Module:

A device that employs GSM mobile telephone technology to offer a wireless data connectivity to a network is known as a GSM modem or GSM module. Mobile phones and other devices that communicate with mobile telephone networks use GSM modems. To identify their device to the network, they need SIMs. A GSM modem can be a standalone modem with a serial, USB, or Bluetooth connection, or it can be a mobile phone that has GSM modem functionality. A GSM modem can be a standalone modem with a serial, USB, or Bluetooth connection, or it can be a mobile phone that has GSM modem functionality.

C. Low-Cost Sensor Network:

The low-cost sensor network used in this system consists of different types of sensors that measure different parameters in the patient body. These sensors include Temperature Sensor, ECG Sensor, Accelerometer Sensor, and Flex Sensors. These sensors are connected to Arduino UNO, which is responsible for collecting data from the sensors. The temperature and ECG level would be shown on an LCD display, and an alarm would be given to the user if they reached a harmful level.
The data gathered would also be stored on an IOT platform, which would also be used to analyze it.

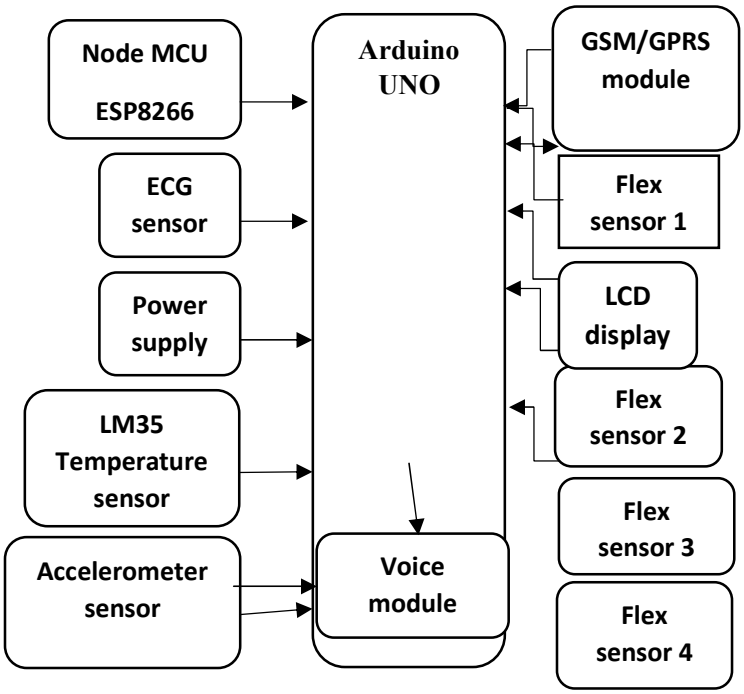

Diagram of the IOT based Paralysis Patient Healthcare Monitoring System

V. CONCLUSION

A promising approach to enhancing the quality of life for paralysis patients and their families is the suggested IoT based Paralysis Patient Healthcare Monitoring and Alert System. With the help of this technology, the patient's vital signs and physical activity may be remotely monitored, and when necessary, notifications can be sent to the patient's family and caretakers. Along with better patient outcomes and more personalized and holistic treatment, this technique may also pave the path for better healthcare services. The technology may potentially lower healthcare

expenses and provide greater efficiency in healthcare delivery. As a whole, this method has the potential to significantly advance patient care and healthcare.
There are numerous mechanisms in place to keep track of paralyzed patients' health, but few of them concentrate on their communication. By allowing the paralyzed to communicate their desires and keeping them as motivated as possible, communication will be used to close the gap between these patients and others in the way we suggest.

VI. FUTURE DEVELOPMENTS

In future we can implement this system using the chipset. With the paralyzed patient's gloves, this chip fits perfectly. Better care can be delivered by increasing the amount of parameters that can be tracked and by alerting the career or doctor when the values change. Artificial intelligence models will be incorporated into the system to increase its efficiency and accuracy in detecting changes in the patient's condition. Creating a mobile application that will let caretaker keep track of the patient's condition from any location at any time. Integrating the technology with the current medical infrastructure to simplify data analysis and flow.

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