IoT Helping System for Paralysis Patient

Bharat Tank[1], S.S.P.M. Sharma[2], Sanjay Hadiya[3]

Department of Electronics & Communication Engineering

Parul Institute of Technology, Parul University, Gujarat, India

Email: bharat.tank@paruluniversity.ac.in[1], sspm.sharma8977@paruluniversity.ac.in[2],160305111002@paruluniversity.ac.in[3]

Abstract

Technology is the most crucial thing for healthcare, not only for sensing the parameter but also for communication, recording, and display devices. It is essential to measure various medical parameters. Hence the latest trend in healthcare parameter measurement and communication method using IOT is adopted. Internet of things catalyzes healthcare and plays a prominent role in a wide range of healthcare applications. In this project, the Arduino Nano microcontroller is used as a gateway to communicate to various sensors such as EMG, MAX30100 and ADXL335. The microcontroller picks the data from the multiple sensors and shows a result on LCD or sends the data on the website with the help of the WIFI module (ESP8266). The controller is also connected with a buzzer and LED to alert a caretaker. Caretaker and doctor can access that data on a website ex. thingspeak. This system consumes low power and is easy to set up.

Keywords: - EMG, MX30100, ADXl335, Arduino Nano, IOT

INTRODUCTION

A paralysis patient cannot move their muscle. It is temporary or permanent. The most common causes for paralysis are stroke, spinal cord injury, and multiple sclerosis. In the plegia, there is a complete loss of movement. Paralysis may cause damage to the nervous system, especially in the spinal cord. There are three types of loss of movement in paralysis: monoplegia, hemiplegia, tetraplegia.

Nowadays, IoT based healthcare measurement system is handy for doctors and patient's caretakers. We can measure various health parameters using sensors that are tattered on the wrist and finger. Sensors send data to the microcontroller, and the microcontroller sends data to the WIFI module and LCD. With the help of the wifi module, we can show patients parameter measurement on the website.

PROPOSED SYSTEM ARCHITECTURE

The proposed system contains an Arduino Nano microcontroller as the main processing unit. The sensor unit consists of a microcontroller and sensors like MAX30100, EMG, ADXL335 and WIFI module (ESP8266) and LCD, LED, and buzzer.
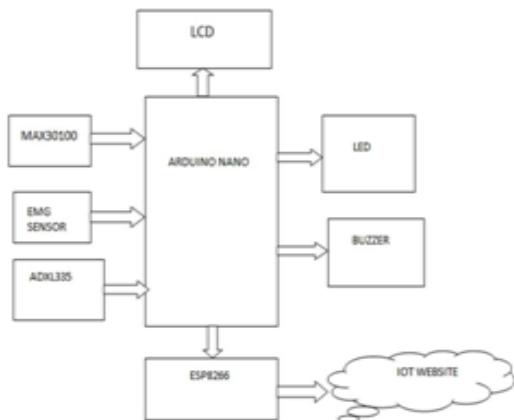
Fig. 1 Proposed system Architecture

HARDWARE IMPLEMENTATION

The general block diagram of the system is as shown in figure-1. In this system, various sensors measure body parameters like MAX30100, EMG sensor, and ADXL335. Arduino Nano microcontroller collects data from sensors and sends data on the website with the help of a wifi module.

The Max30100 is an integrated pulse oximetry and heart-rate monitor sensor and temperature measurement. It combines two LEDs, a photodetector, optimized optics, and low-noise analogue signal processing to detect pulse oximetry, Spo2 and heart-rate signals. EMG Sensor, also known as electromyography sensor, measures small electrical signals generated by your muscles by little movement, including lifting your arm, clenching your fist, or even the simplest actions like moving a finger. The ADXL335 is an accelerometer. It is small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. This sensor senses the range of ±3 g.

These digital formed signals are transferred to the microcontroller. Simultaneously all these parameters are sent to the WIFI module, and we can access this data on the website. If the microcontroller fails to work by any mean, then the whole system will not work. Sensors values will read directly by a microcontroller.

We can set a range of body parameters like heartbeat if the value is below or above this range buzzer and LED gives an alert.
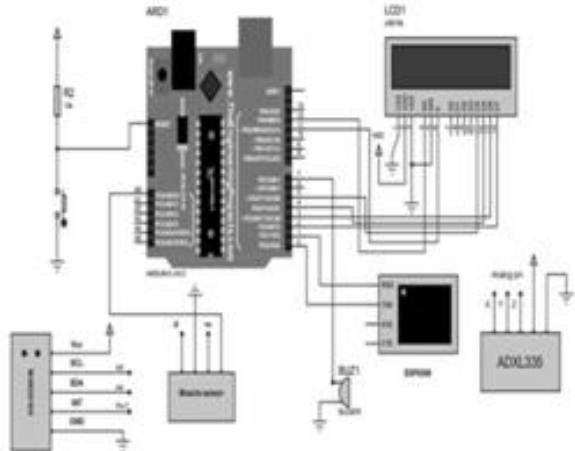

Fig. 2 Circuit Diagram of System

The Schematic diagram of the system is as shown in the above fig. 2. We've given in input to run hardware Healthcare monitoring. The sensor senses various parameters such as Temperature, SpO2, and Muscle movement.

We have implemented wifi module ESP8266 and ADXL335 accelerometer with our controller part.
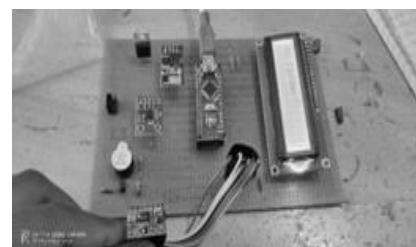
**Fig. 3 Hardware Implementation of Actual System**
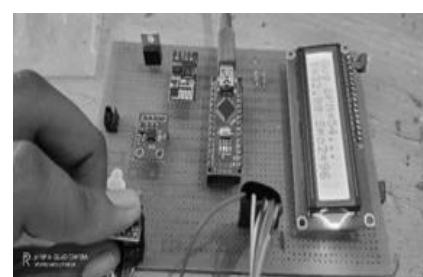
Fig. 4 Accelerometer 1st movement with a message
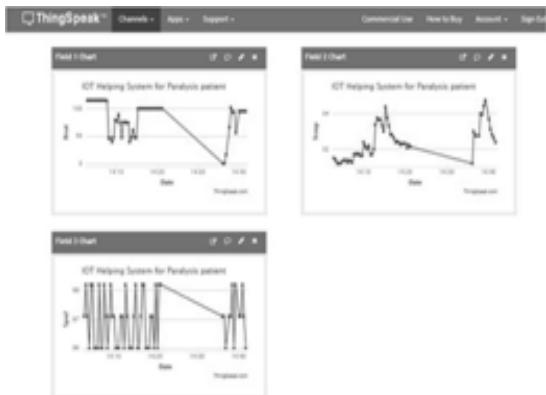
Fig. 5 Result on thing speak website.

CONCLUSION

This paper describes an IoT Based helping system for paralysis patient. This system is beneficial for paralysis patients who can barely move their hand. Convey the message to the doctor or patient's caretaker. The doctor directly shows a body parameter on the website. So they can access data anywhere with the help of the internet. If measured parameters are not at a normal rate that time, this system shows the alarm for alert and gives a warning with the help of LED. When the patient moves their hand up/down or left/right, the system shows a message on LED like "need food", "need water", etc.

This system is beneficial in hospital for taking care of paralysis patient.

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