iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 Issue: V Month of publication: May 2023

DOI: https://doi.org/10.22214/ijraset.2023.52538

Critical Patient Monitoring and Alerting System

Arundhati Giri[1], Srushti Hamand[2], Sakshi Hiremath[3], Gajanan Jadhav[4], Sahil Jadhav[5]
[1, 2, 3, 4, 5]*VIT Pune*

Abstract: In recent times as the world is facing many challenges in the sector of politics, economy, weather, social etc health still remains the top priority for everyone. In the field where the need of the professionals is always rising no one can get constant surveillance .For the very need we have come up with a system that can help us with the surveillance of the critical patients.
The system that we suggest can help us with the finding the needs of the patients.The system has an alerting feature as well that will alert the doctor on call or the person in charge if the heartbeat of the patient is disrupted.
Keywords - IOT, Arduino UNO, patient monitoring, alarm system.

I. INTRODUCTION

Paralysis is the inability to move muscles on your own and with purpose. It can be temporary or permanent. The most common causes are stroke, spinal cord injury, and multiple sclerosis. Paralysis can be a complete loss of movement known as a significant weakness called paresis. Paralysis is most often caused by damage in the nervous system, especially the spinal cord. Paralysis is caused by injuries and diseases that affect the central nervous system (brain and spinal cord). That is, the nerve signals sent to the muscles are interrupted. There are innovative approaches to cure or treat people with paralysis, but the goal of treatment is to help people with paralysis adjust to life by making them as independent as possible. The problem with these types of devices being developed is that they are very large and expensive machines. They seem to be available only in hospitals and cannot be used at home or at the patient's convenience. It's affordable and cheap enough that you can buy it without going into a lot of debt.

II. LITERATURE SURVEY

1) IOT Based Paralysis Patient Healthcare

Sanket Kad, Aishwarya Joshi, Shital Bajgude, Dhanashri Naiknawre (2022)

In this paper they present a smart health monitoring system that uses biomedical detectors to check the case's condition and uses the internet to inform the concerned.

The biomedical detectors thenconnectedArduino UNO regulator to read the data which is in turn connived to an TV display/ diurnal examiner to see the affair.Data is uploaded to the garçon to store and converted it into JSON link for imaging it on a Smartphone. An android operation has been designed in order to fluently see the case's information by their croakers and family members.

2) Automated Paralysis Patient Health Care Monitoring System

Deepasri.T(2017)

In this paper monitoring system,bio sensors are used to sense the vital framework of patients such as pulse rate, blood pressure, airflow sensor and these parameters are measured continuously and transmit the message to the caretaker by using GSM. This can be processed in a Microcontroller(MSP430).

3) Paralyzed Patient Monitoring Equipment – IoT Viancy V

This research work focuses on inventing wearable equipment that will help the patient to communicate instantly to the Care-Taker and also to keep track of their health conditions.

III. ELEMENTS OF A SYSTEM

The system is made up of various components, which are listed below:

1) ARDUINO UNO
2) LM35 Temperature
3) RF module
4) Heart rate sensor
5) Gyroscope and Accelerometer sensor

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

6) LCD Display
7) Jumper Wire
8) Buzzer

A. ARDUINO UNO

Arduino is an open-source hardware and software company, project, and user community that designs single-board microcontrollers and microcontroller kits for building digital devices and interactive objects for sensing and controlling devices. objects in the physical world. and manufacturing. Various microprocessors and controllers are used in Arduino board designs. The board is equipped with a set of digital and analog input/output (I/O) pins that can be connected to various expansion boards or breadboards (displays) and other circuits. The board has a serial communication interface, including the Universal_Sreial Bus (USB) on some models, which is also used to load programs from a PC.Microcontrollers are typically programmed using functional dialects of the C and C++ programming languages. Arduino projects provide an integrated development environment (IDE) based on programming language projects in addition to using traditional compiler toolchains.

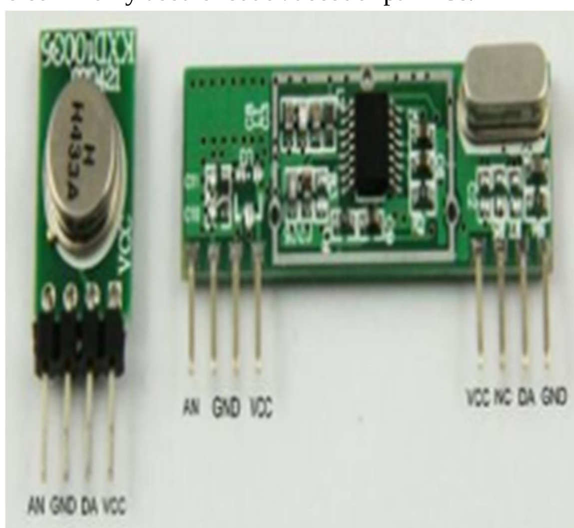
B. LM35 Temperature

Temperature is the most commonly measured process variable in mechanical computing. Generally, temperature sensors are used to convert temperature pulses into electrical aspects. Temperature sensors are an effective way to monitor and control temperature in industrial applications. There is a big difference between the types of temperature sensors. Sensors vary widely in characteristics such as contact orientation, temperature range, calibration method, and sensing element.

Temperature sensors consist of a sensitive element enclosed in a plastic or metal casing. Using a conditioning circuit, the sensor will reflect changes in ambient temperature.

C. RF Module

RF modules, as their name suggests, operate at radio frequencies. The corresponding frequency range varies between 30 kHz and 300 GHz. In this RF system, digital data is represented as changes in carrier amplitude. This type of modulation is called amplitude shift keying (ASK). RF transmission is preferred over IR (infrared) for many reasons.First, signals via RF can travel greater distances, making them suitable for long distance applications. Also, while IR operates primarily in line-of-sight mode, RF signals can propagate even if there are obstacles between the transmitter and receiver. Second, RF transmissions are stronger and more reliable than IR transmissions. Unlike infrared signals, which are affected by other sources of infrared emissions, radio frequency communications use specific frequencies. The radio frequency module is composed of a radio frequency transmitter and a radio frequency receiver.The transmitter/receiver pair (Tx/Rx) operates at 434 MHz. The RF transmitter receives serial data and transmits it wirelessly via RF through the antenna connected to pin 4. Transfers occur at rates of 1Kbps - 10Kbps. The transmitted data is received by an RF receiver operating on the same frequency as the transmitter. RF modules are often used with encoder/decoder pairs.The encoder is used to encode the parallel data fed from the transmission, while the reception is decoded by the decoder. HT12E-HT12D, HT640-HT648, etc. are commonly used encoder/decoder pair ICs.



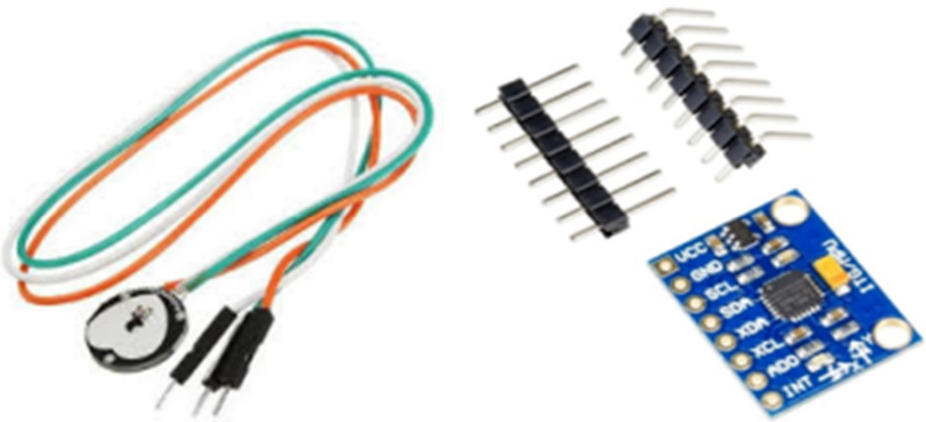
D. LCD Display

A 16x2 LCD means it can display 16 characters per line, and there are 2 such lines. In this LCD, each character is displayed in a 5x7 pixel matrix. The intelligent 16 x 2 alphanumeric dot matrix display is capable of displaying 224 different characters and symbols. The LCD display has two registers, command and data.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

E. Heart Rate Sensor

Heart rate monitoring is very important for patients because it can determine the condition of the heart (heart rate only). There are many ways to measure your heart rate, but the most accurate method is using an electrocardiogram. But an easier way to monitor your heart rate is with a heart rate sensor. It comes in all shapes and sizes and provides instant heart rate readings. Heart rate sensors are used in watches (smart watches), smartphones, chest straps, etc.Heart rate is measured in BPM, the number of times the heart contracts or expands in one minute. The heart rate sensor works on the principle of photoplethysmography. According to this principle, changes in blood volume in an organ are measured by changes in the intensity of light passing through that organ. The light source in a heart rate sensor is usually an IR LED and the detector is a photodetector such as a photodiode, LDR (light dependent resistor) or phototransistor.



F. Gyroscope and Accelerometer sensor

Gyroscope, also called angular rate sensor or angular rate sensor, is a device that detects angular rate. Simply put, angular velocity is the change in angle of rotation per unit time. Angular velocity is usually expressed in deg/s (degrees per second). An accelerometer is a device that measures the precise acceleration (or rate of change of velocity) of an object in its own instantaneous stationary coordinate system, which is different from coordinate acceleration. Acceleration in a fixed coordinate system.

The GY-521 module is a breakout board for its MPU-6050 MEMS (Micro Electro Mechanical System) with 3-axis gyroscope, 3-axis accelerometer, digital motion processor (DMP) and temperature sensor. Digital motion processors make it possible to process complex algorithms directly on the circuit board. DMPs typically deal with algorithms that generate stable position data from raw sensor values. Sensor readings are obtained via the I2C serial data bus requiring only two wires (SCL and SDA).

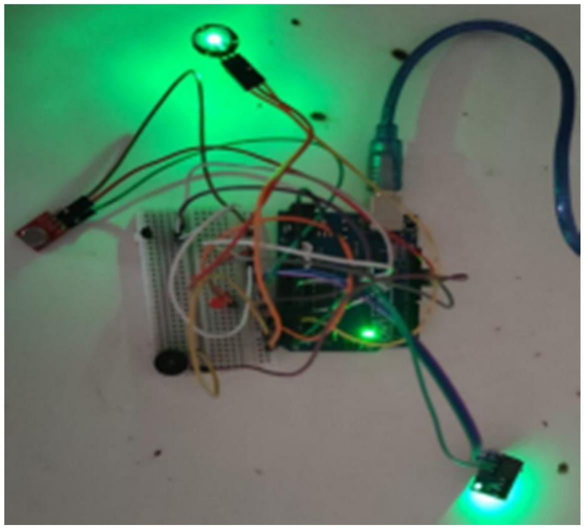
Specification

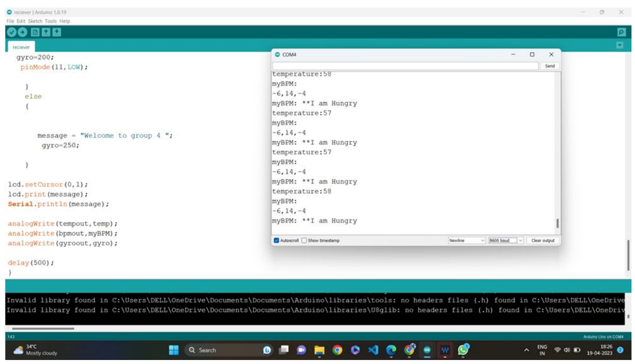
1) Accelerometer ranges: ±2, ±4, ±8, ±16g
2) Gyroscope ranges: ± 250, 500, 1000, 2000 °/s
3) Voltage range: 3.3V – 5V (the module include a low drop-out voltage regulator)

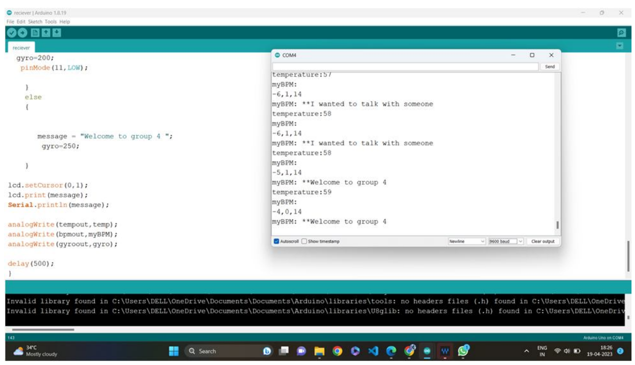
G. Buzzer

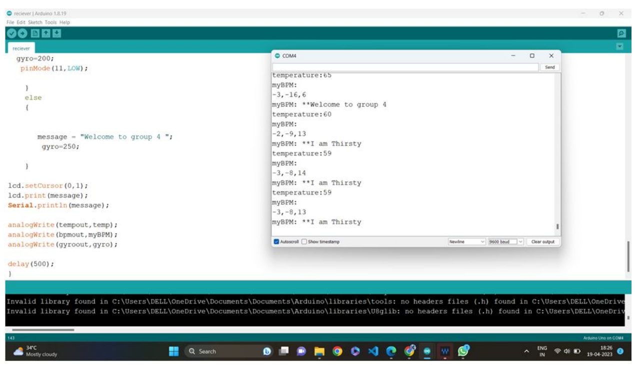
A buzzer or buzzer is a sound signaling device that can be mechanical, electromechanical or piezoelectric. Typical uses for buzzers and buzzers include alerting devices, timekeeping, and confirmation of user input, such as mouse clicks or key presses. We used a piezo buzzer as a warning for LPG and fire detection in our project. The piezoelectric elements can be driven by oscillating electronic circuits or other sources of audio signals, driven by piezoelectric audio amplifiers. The buzzer alerts us by emitting a continuous beep when a fire is detected and continues to emit a beep until the fire is extinguished and by emitting a pulsating beep to alert us to LPG leaks**.** The diagram of piezoelectric buzzer is given below:

IV. EXPERIMENTAL RESULTS









Hand movement	Message displayed	Accuracy
Gyro = 50	I am Hungry	93.53%
Gyro = 100	I am Thirsty	87.45%
Gyro = 150	I want to go to washroom	96.08%
Gyro = 200	I want to talk to someone	78.99%
Gyro = 250	Welcome Group 4	90.29%

V. CONCLUSIONS

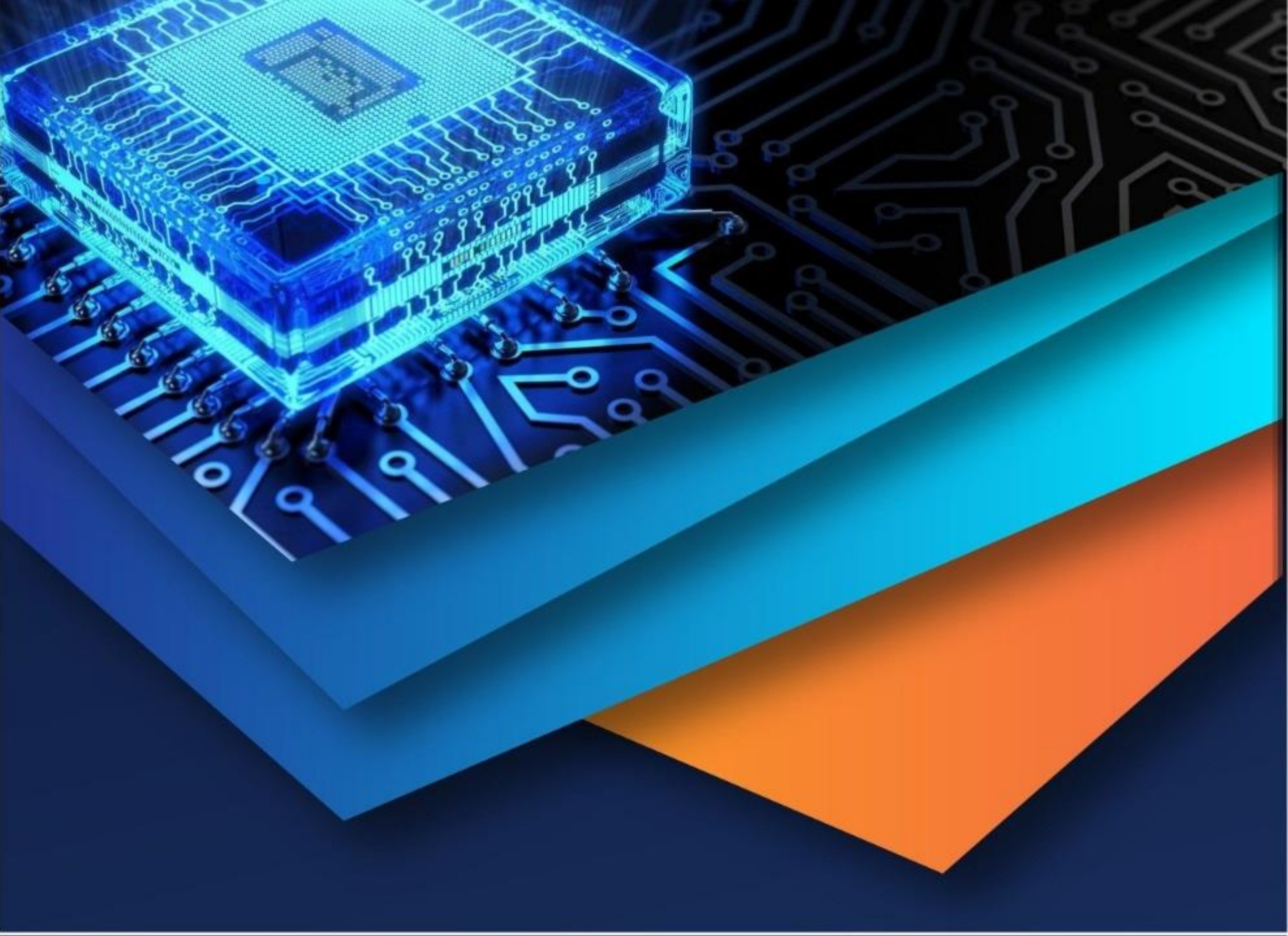
Concluding the project we can say that we have developed a compatible device which helps to monitor, determine and alert about the patients in intensive care or who are paralyzed.

VI. FUTURE SCOPE

We want to develop the application which will help with the ease of operation and also we want to develop our mechanism such that it will require less amount of space and can work on battery.

REFERENCES

[1] https://www.researchgate.net/publication/340665031_IOT_BASED_HEALTH_MONITORIN G_SYSTEM
[2] https://ieeexplore.ieee.org/document/8728501
[3] https://ieeexplore.ieee.org/document/9618721
[4] https://ijcrt.org/papers/IJCRT2108139.pdf
[5] https://www.irjmets.com/uploadedfiles/paper/issue_4_april_2022/20614/final/fin_irjmets16493 11094.pdf



10.22214/IJRASET

INDEX COPERNICUS 45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY