IOT Based Health Monitoring System for Comatose and Paralyse Patient

Mohammed Shaibaz Khan [1], Mohammed Ghouse Uddin [2], Katam Pravidik Reddy [3], Chandrashekar M [4].
[1,2,3]*Students of Electronics and Communication Engineering, ISL Engineering College, Bandlaguda, Hyderabad, 500005*
[4] *Faculty, ISL Engineering College, Bandlaguda, Hyderabad, 500005*

Abstract:- **Comatose patients require constant monitoring to ensure timely intervention in Case of any medical emergencies. In this paper, we propose an IoT-enabled Monitoring system that utilizes NodeMCU ESP8266 with DHT11, MAX30102, Flex sensor for body motion, and ultrasonic sensors for fall detection. The Collected data is transmitted to the BLYNK IoT platform and displayed on an I2C LCD for real-time monitoring. Additionally, we have incorporated an ESP32 Cam For live monitoring of the patient. The proposed system provides an effective and Efficient solution for continuous monitoring of comatose patients to improve Healthcare outcomes.**

I.INTRODUCTION

Comatose patients require constant monitoring to ensure timely intervention in Case of any medical emergencies. In the past, traditional monitoring systems Have been cumbersome and require manual intervention. However, with the Advent of the Internet of Things (IoT) technology, remote monitoring of patients Has become more feasible. IoT enables the use of sensors and wireless Networks to remotely monitor patients, and provides real-time data analysis to Detect any abnormalities in the patient's vital signs.

In this paper, we propose an IoT-enabled comatose patient monitoring system That provides real- time monitoring and data analysis to improve healthcare Outcomes.

The system is designed using NodeMCU ESP8266 with DHT11, MAX30102, Flex sensor for body motion, and ultrasonic sensors for fall Detection. The proposed system provides an effective and efficient solution for Continuous monitoring of comatose patients.

The NodeMCU ESP8266 is a microcontroller that enables the use of WiFi and Bluetooth connectivity, making it ideal for IoT applications. The DHT11 sensor is Used to measure temperature and humidity, while the MAX30102 sensor is used To measure heart rate and oxygen saturation levels.

The flex sensor is used to Detect any body movements of the patient. Additionally, ultrasonic sensors are Used for fall detection.

The collected data from these sensors is transmitted to the BLYNK IoT platform, Where real-time monitoring can be done by medical staff. The BLYNK IoT Platform provides a user-friendly interface for visualizing the collected data, Including temperature, humidity, heart rate, oxygen saturation, and body Movements.

II.LITERATURE SURVEY

Internet of Things (IoT) is a network of physical objects that contain embedded technologies to communicate and sense/interact with internal or external environments. In simple terms, IoTcan be defined as a concept where an object has the ability to connect data over a network without requiring direct human intervention. IoT has the ability to share data with various technology devices.

Literature Survey Temperature and Humidity Sensor (DHT11):"Design and Development of a Smart Greenhouse using DHT11 Sensor", authors Mr. Mohammad Rashed Al Mamun and Ms. Zinnia Sultana from the Department of Electrical and Electronic Engineering at Bangladesh University of Engineering and Technology conducted a literature survey on the DHT11 sensor. The paper covered topics such as the operating principle, characteristics, calibration, and applications of the DHT11 sensor in a smart greenhouse system.

In the research paper titled "A Comparative Study of

DHT11 and DHT22 Sensors for Monitoring Temperature and Humidity", authors Mr. Surya Narayan Panda and Mr. S. Saravanan from the Department of Instrumentation and Control Engineering at National Institute of Technology in India conducted a literature survey on the DHT11 and DHT22 sensors. The paper compared the performance of both sensors for monitoring temperature and humidity.I

II METHODOLOGY

The methodology of the comatose patient monitoring project involves four key steps. First, physiological data from comatose patients, including vital signs such as heart rate, blood pressure, oxygen saturation, and brain activity, will be continuously collected using appropriate monitoring devices. Second, the collected data will undergo thorough analysis using advanced signal processing and machine learning techniques. This analysis will involve feature extraction to identify crucial patterns and trends in the physiological signals, enabling the detection of any anomalies or changes in the patient's condition. Third, based on the analyzed data, an alarm system will be developed to provide timely notifications and alerts in the event of significant deviations from normal parameters, ensuring prompt medical intervention. Finally, the alarm system will be validated and refined through rigorous testing and evaluation, aiming to enhance its accuracy and reliability in real-world scenarios

Description: The comatose patient monitoring project aims to develop an effective system for monitoring the physiological parameters of comatose patients. By continuously collecting vital signs such as heart rate, blood pressure, oxygen saturation, and brain activity, the project seeks to detect any changes or anomalies in the patient's condition. Advanced signal processing and machine learning techniques will be utilized to analyze the collected data, identifying patterns and trends that may indicate a deteriorating or improving state. An alarm system will be developed based on the analysis results to provide timely alerts, enabling healthcare professionals to intervene promptly and improve patient outcomes. Through rigorous testing and validation, the project aims to enhance the accuracy and reliability of the monitoring system in real-world scenarios.

III BLOCK DIAGRAM

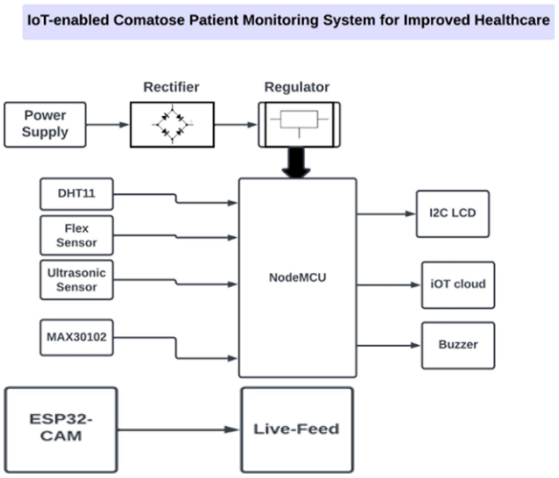

Fig BLock Diagram of Health monitoring Circuit

IV CONCLUSION

The IoT-based health monitoring system for paralyzed/comatose patients is a promising project that has the potential to transform healthcare by providing continuous and accurate monitoring of patients who are in a critical state. The project combines advanced sensor technologies, wireless communication, and cloud computing to create a wearable device that can monitor the vital signs and other physiological parameters of patients in real-time.

The system is designed to be unobtrusive and comfortable for patients to wear, and it can be easily integrated into existing healthcare systems and workflows. The data collected by the system can be accessed by healthcare professionals and caregivers using a secure web- based interface, which allows them to monitor the patient’s condition and make informed decisions about their care.

The project has several potential benefits for patients, healthcare providers, and caregivers. For patients, it provides continuous monitoring of their vital signs and other physiological parameters, which can help detect changes in their condition and allow for early intervention. For healthcare providers, it provides a more efficient and effective way to monitor patients, reducing the need for manual data collection and

allowing for more personalized care. For caregivers, it provides peace of mind knowing that their loved one's condition is being continuously monitored, even when they are not physically present.

The IoT-based health monitoring system for paralyzed/comatose patients has the potential to improve patient outcomes, reduce healthcare costs, and enhance the quality of life for patients and their families. With further development and refinement, this system could become a valuable tool in the management of critical patients and help to advance the field of healthcare technology.

Remote viewing of data Problems associated with having data online. Tackle Distributed denial of service. DDOS, and Data privacy/security especially of medical systems.

IoT based Remote Patient Monitoring System can be enhanced to detect and collect data of several anomalies for monitoring purpose such as home ultrasound, Brain signal monitoring, Tumor detection etc

More research on problems associated with having data online, data privacy as IoT is managed and run by multiple technologies and multiple vendors are involved in it. Security

VI.RESULT

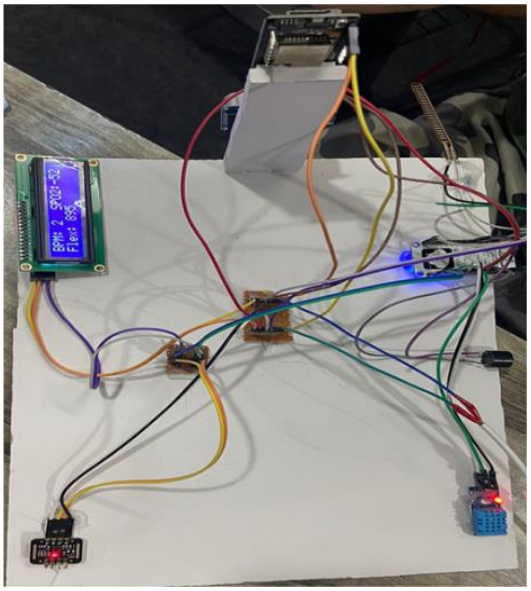

FIg 2 Circuit Board of Health Monitoring Kit

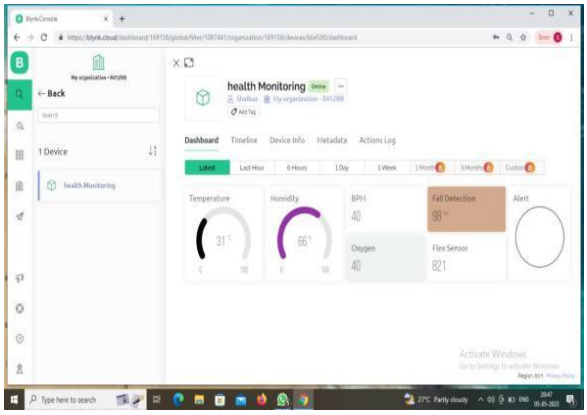

Fig 3 Web Server of Circuit

The IoT-based health monitoring system for paralyzed/comatose patients is a project aimed at developing a wearable device that can monitor the vital signs and other physiological parameters of patients who are in a paralyzed/comatose state. The system uses sensors, wireless communication technologies, and cloud computing to collect, store, and analyze the patient's data in real-time.

The device consists of various sensors, such as temperature, heart rate, blood pressure, and oxygen saturation sensors, which continuously monitor the patient's vital signs and other physiological parameters. The data collected by these sensors are transmitted wirelessly to a cloud-based server, where it is processed and analyzed in real-time using advanced algorithms and machine learning models.

VII.FUTURE SCOPE

In the future, the comatose patient monitoring project holds several potential avenues for further development and improvement. One possibility is the integration of wearable or implantable devices that can continuously monitor physiological parameters without restricting the patient's mobility. This could enhance patient comfort and allow for long-term monitoring outside of hospital settings. Additionally, advancements in machine learning algorithms and artificial intelligence could enable the system to provide more precise and personalized alerts by learning from a larger dataset and adapting to individual patient characteristics. Furthermore, the project could explore the incorporation of non-invasive imaging techniques, such as functional magnetic resonance imaging (fMRI) or electroencephalography (EEG), to provide additional insights into the patient's

brain activity and aid in their diagnosis and treatment. Lastly, collaboration with healthcare professionals and medical researchers could lead to the development of comprehensive guidelines and protocols for utilizing the monitoring system, ensuring its widespread adoption and standardization in clinical practice.

REFERENCE

[1] Anjum, A., & Zia, T. (2018). Wearable sensors for remote health monitoring. Sensors, 18(4), 1211.

[2] Nasriani, H. R., & Ehtesham, H. (2019). Real-time health monitoring system using internet of things. Journal of Healthcare Engineering, 2019.

[3] BLYNK. (2023). Blynk – IoT for everyone. Retrieved from https://blynk.io/.

[4] "Arduino Architecture"https://www.engineersgarage.com/what-is-gsm-gprs-module [Oct. 1, 2017]

[5] "Systems design" https://en.wikipedia.org/wiki/Systems_design [Oct. 15, 2017]

[6] "The Internet of Things in healthcare: an overview"https://scholar.google.com/citations?user=Y4opLB8AAAAJ&hl=en [Sept. 7, 2017]

[7] "Envisioning inclusive futures: technology-based assistive sensory and action substitution" https://www.infona.pl/resource/bwmeta1.element.elsevier-3d45bfdd-fe55- 359f-84e4-674a21cae024 [Sept 4, 2017]

[8] "A multiple communication standards compatible IoT system for medical usage"http://ieeexplore.ieee.org/document/6577775/?reload=true [Sept 5, 2017]