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IOT Based Human Health Monitoring using ESP8266 and Arduino

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ABSTRACT: The main goal of this project is to develop a health monitoring system that is as efficient as possible using Internet of Things (IoT) technology, including the Arduino Uno, Heartbeat Sensor, Temperature Sensor, GSM Module, and WI-FI Modules. In which the health of every patient in a hospital should be continuously checked without human involvement. It emphasises remote monitoring and real-time data gathering so that healthcare providers can get notifications when they're needed. This novel technique combines sensor technology, wireless connectivity, and data analysis to provide real-time monitoring of vital signs such as heart rate, temperature, and blood pressure. By exploiting these features, this system provides patients and healthcare professionals with the resources they need to enhance patient care, deliver prompt interventions, and encourage proactive health management.

KEYWORDS*:* Arduino uno ATMEGA328P, Heartbeat sensor, Digital humidity, Temperature sensor, GSM module, WI-FI module, Internet of Things**.**

I. INTRODUCTION

The biggest issue in the modern world is health monitoring. Patient experiences major health problems as a result of inadequate health monitoring. Today, there are several IoT devices available for online patient health monitoring. These smart devices are being used by health professionals to monitor their patients. In this project, we'll create an IoT based health monitoring system that monitors the patient's body temperature and heart rate while also sending email and SMS alerts whenever those readings exceed threshold levels. With the development of IoT-based patient health monitoring systems, the Internet of Things (IoT) and ESP8266 and Arduino technology have ushered in a revolutionary era in healthcare. This novel method combines sensor technology, wireless connectivity, and data analysis to allow real-time monitoring of vital signs like heart rate, temperature, and blood pressure.

II. RELATED WORKS

Our project intends to create a cutting-edge health monitoring system that will enable seamless monitoring of people's health, especially for those who have mobility issues. Our initiative's main driving force is to enable people with various health needs to easily obtain real-time health data. No matter how physically capable they are, we want to help people understand their important health metrics and be able to actively participate in maintaining their wellbeing. Our project aims to develop a user-friendly health monitoring system that encourages inclusion and independence, enabling everyone to take control of their health with ease, by utilizing cutting-edge technology and data processing techniques.

III.EXISTING METHOD

As part of the patient health monitoring system, vital signs and other health data are now manually recorded by medical professionals during routine in-person visits. This approach lacks continuous, real-time monitoring, which may delay receiving early treatment for major health issues. Inaccurate patient records can be produced through manual data entry and antiquated systems, which can lower the standard of medical care.

IV.PROPOSED SYSTEM

By combining ESP8266 with Arduino for real-time data collecting, the suggested system seeks to revolutionise patient health monitoring. Continuous, remote monitoring capabilities are provided, allowing for prompt alerts and data-driven

decision-making, enhancing patient care and engagement. The Arduino Sketch running on the device executes the project's numerous capabilities, including reading sensor data, converting them into strings, sending it to the IoT platform, and displaying measured temperature and pulse rate on a character LCD.

V.BLOCK DIAGRAM

This straightforward block diagram demonstrates the ESP8266 and Arduino-based IoT-based patient health monitoring system. BPM and environmental temperature are measured, respectively, by the pulse sensor and the LM35 temperature sensor. The code is processed by the Arduino, which then outputs it to a 16*2 LCD display. The ESP8266 Wi-Fi module establishes a wireless connection and transfers data to an IoT device server. ThinkSpeak is the IoT server is being used here. The data can also be viewed by logging into the ThinkSpeak channel from anywhere in the world.

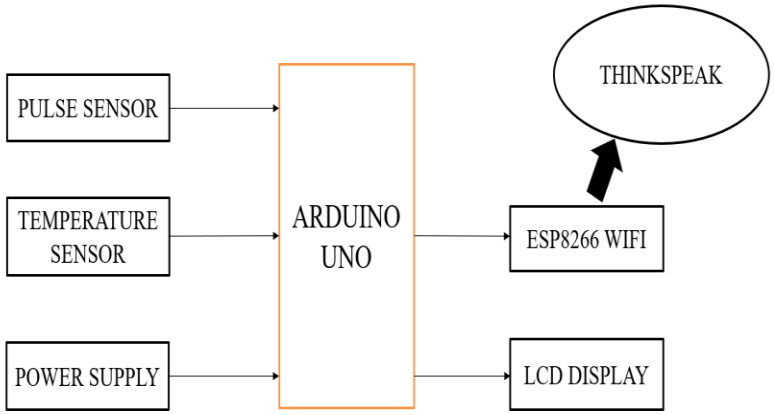

Fig 1. Block diagram for proposed method

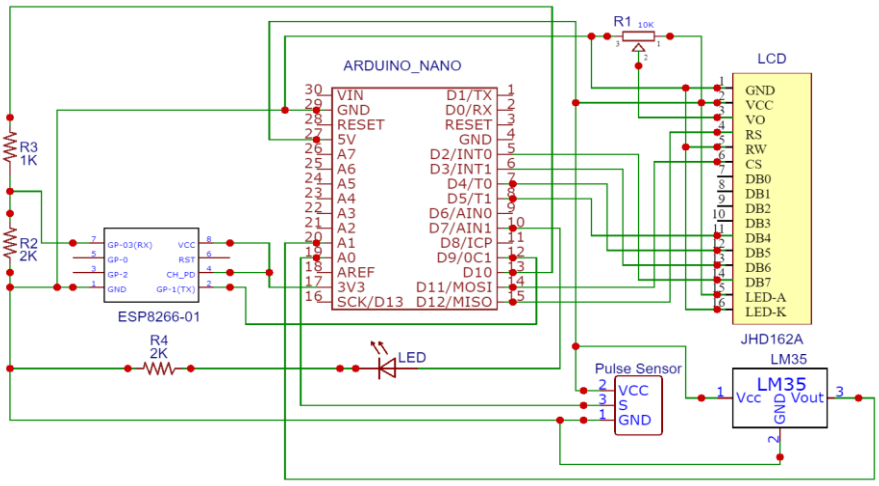

Fig 2. Circuit diagram for proposed method

Circuit Diagram for an IoT-Based Patient Health Monitoring System. Connect the Arduino's A0 pin to the pulse sensor's output pin, and the other two pins to VCC and GND. Connect the output pin of the LM35 temperature sensor to Arduino pin A1, and the other two pins to VCC and GND. A 2-ohm resistor should be used to connect the LED to Arduino's Digital Pin 7. Connect the LCD's Pins 1, 3, and 16 to GND. Connect LCD Pin 2 and Pin 15 to VCC. Connect LCD Pins 4, 6, 11, 12, 13, and 14 to Arduino Digital Pins 12, 11, 5, 4, and 3. When connected directly to the Arduino, the ESP8266's RX pin, which operates on 3.3V, will not interact with the Arduino. Therefore, we must create a voltage divider for it that will change 5V into 3.3V. The 2.2K and 1K resistors can be connected to achieve this. As a result, the

resistors are used to link the ESP8266's RX pin to pin 10 of the Arduino. Connect the Arduino's pin 9 to the ESP8266's TX pin.

VI. EXPERIMENTAL RESULTS

We can monitor our data and manage our system remotely by accessing the Think Speak website and using the Channels and web pages that it offers. Think Speak, a cloud-based IoT platform, is predicted to produce major improvements in healthcare administration when used to implement a human health monitoring system. The system promises to provide real-time monitoring and analysis of critical health metrics using Think Speak's capabilities, ensuring prompt interventions and individualised care. Patients should anticipate improved illness management because the device makes it possible to continuously monitor variables including heart rate, blood pressure, and glucose levels. The seamless integration of remote patient monitoring enables healthcare professionals to keep tabs on their patients' health wherever they are, encouraging a pro-active approach to healthcare. Additionally, it is predicted that the system's data analytics tools would produce useful insights that will aid in the early diagnosis of health anomalies and the predictive analysis of future health hazards. This anticipatory strategy encourages preventative healthcare practises while also preventing problems. Additionally, the platform's user-friendly design guarantees simple access to health data, encouraging people to take an active role in managing their health. In the end, it is anticipated that the use of Thinkspeak in a human health monitoring system will revolutionise healthcare delivery, improving patient outcomes, encouraging preventive healthcare practises, and raising standard of living in general.

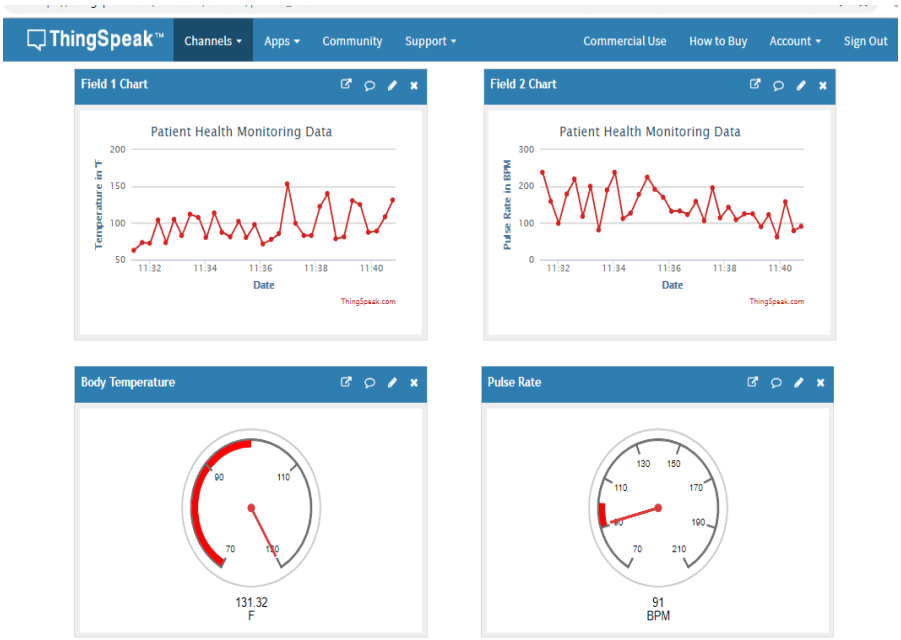

Fig 3. Expected result

VII. FUTURE SCOPE

The future scope of human health monitoring systems is tremendously bright, thanks to technological improvements and a rising focus on preventive healthcare. With the incorporation of wearable technology, Internet of Things (IoT) sensors, and artificial intelligence algorithms, these systems are ready to advance in sophistication. Future iterations will concentrate on continuous monitoring of chronic diseases, early detection of potential health threats, and real-time health tracking. More seamless data interchange between devices and healthcare professionals will be made possible by improved connectivity and interoperability, encouraging more tailored and timely interventions. Additionally, the fusion of virtual health platforms and telemedicine services will transform remote patient monitoring and medical consultations, enabling access to healthcare services from any location in the world. The development of a holistic, patient-centered ecosystem that encourages proactive health management, lowers healthcare costs, and ultimately enhances the overall quality of healthcare delivery is key to the future of human health monitoring systems.

VIII. CONCLUSION

The combination of IoT-based technologies, ESP8266, Arduino Uno, and the ThinkSpeak application, in conclusion, constitutes a revolutionary development in the monitoring of human health. The real-time data collecting, analysis, and transmission capabilities of this cutting-edge system allow for continuous monitoring of critical health indices. Healthcare has improved in personalization, accessibility, and proactivity by utilising the potential of IoT devices and cloud-based systems like ThinkSpeak. ThinkSpeak's user-friendly interface makes it easy for patients and healthcare professionals to interact with it, while the smooth integration of ESP8266 and Arduino Uno guarantees effective data processing. This all-encompassing strategy revolutionises patient care while also enabling people to take control of their own health. Because of this, the combination of cutting-edge technologies promises to improve healthcare outcomes and encourage early action.

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