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HEARTBEAT AND BODY TEMPERATURE MONITORING OVER IOT

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ABSTRACT

A Major subject of concern in the medical field is to save lives of patient as soon as possible. Improper care, late detection, slow diagnosis and expensive machineries are reasons of most deaths of patients. Saving lives had become challenging work without the help of technology. As a remedy to this we came up with a solution of patient health monitoring system which will keep track of various health components of patient. The system is very portable and can be manufactured at low cost. This system is capable to monitor heart beat and temperature of the body. The device will work on Internet of things technology. This device is implemented using ARDUINO UNO board with external Wi-Fi device such as ESP8266. And the device will be connected to Wi-Fi, with help of which the data will be sent over to internet over to Thingspeak cloud platform. With which the data can be monitored from anywhere at any time.

INTRODUCTION

The advancement of IoT technology has paved the way for innovative solutions in various domains, including healthcare. Remote health monitoring systems play a crucial role in monitoring vital signs of patients, enabling timely intervention and improving healthcare outcomes. This project focuses on designing a system that can monitor heartbeat and body temperature remotely using IoT components.

The area of work of this project is based on Electronics and Communication. This project is basically done by Arduino. Because Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators so Arduino is a main part of this project. Arduino coding is needed for sensing heart rate and body temperature by using Arduino software. Through this project I'm introducing Software and hardware implementation.

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A heart rate monitor is a device that measures a subject's heart rate in real-time or records it for later analysis. Resting heart rates are typically around 72 bpm for adults, 120 bpm for babies, and 90 bpm for older children. During exercise, heart rate increases and gradually returns to resting levels afterward, indicating a healthy cardiovascular system. Abnormal heart rates can indicate conditions like bradycardia (low) or tachycardia (high). Heart rate can be measured by placing a thumb over the subject's artery and multiplying the count by 2. Combining a heart rate monitor with a temperature sensor provides valuable insights into both pulse and body temperature, aiding in patient monitoring and healthcare management.

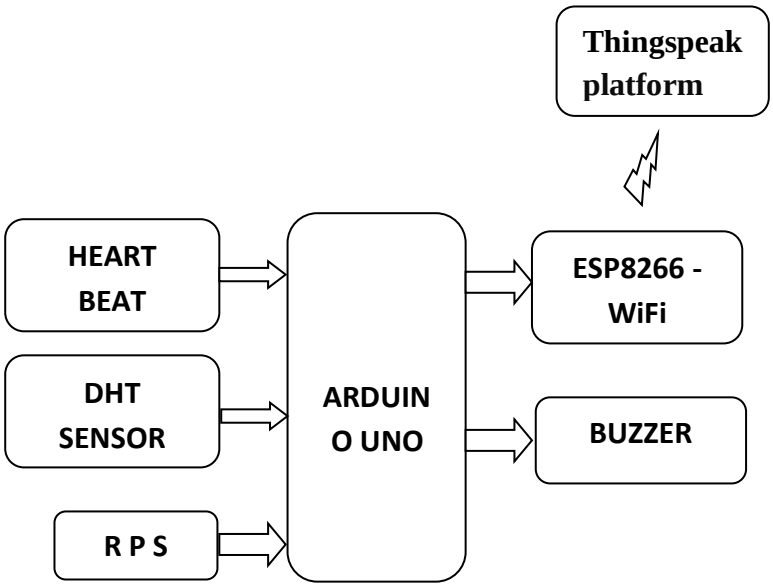

Figure.1 Block Diagram

OBJECTIVE OF THE PROJECT

This project aims to develop a system for real-time monitoring of heartbeat and body temperature over the internet using Arduino, ESP Wi-Fi module, heartbeat sensor, DHT sensor, buzzer, and the Thingspeak platform. The system provides continuous monitoring and alerts the user in case of abnormal readings.

- Design a system for real-time heartbeat and body temperature monitoring.
- Transmit data wirelessly using ESP Wi-Fi module.
- Integrate the system with the Thingspeak platform for remote monitoring.
- Incorporate an alert mechanism for abnormal readings.

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LITERATURE SURVEY

1. Wearable IoT Devices

Current literature emphasizes the use of wearable IoT devices for health monitoring. Devices such as smartwatches and fitness trackers, incorporating heart rate and temperature sensors, have gained popularity (Lopez et al., 2017). However, these systems often lack the customization and accessibility required for specific healthcare applications.

2. Remote Health Monitoring Systems

Remote health monitoring systems utilize IoT to collect and transmit health data to centralized platforms for analysis. These systems often involve the use of dedicated medical-grade sensors and professional monitoring services (Jiang et al., 2019). While effective, they may be cost-prohibitive for individual or home use.

3. DIY Health Monitoring Projects

Some literature highlights the emergence of do-it-yourself (DIY) health monitoring projects. These often involve the use of microcontrollers, sensors, and open-source platforms for data visualization (Banerjee et al., 2020). However, the majority lack comprehensive integration and may not offer real-time monitoring capabilities.

PROPOSED SYSTEM

The proposed system utilizes Arduino UNO as the central microcontroller, DHT Sensor for temperature measurement, ESP-8266 for IoT connectivity, and a Heartbeat Sensor for pulse monitoring. A Buzzer is incorporated for immediate feedback, enhancing user awareness.

The system is designed to communicate with the Thingspeak platform, providing a user-friendly interface for real-time data visualization. The app allows users to monitor their heartbeat and body temperature seamlessly, making health data accessible and understandable.

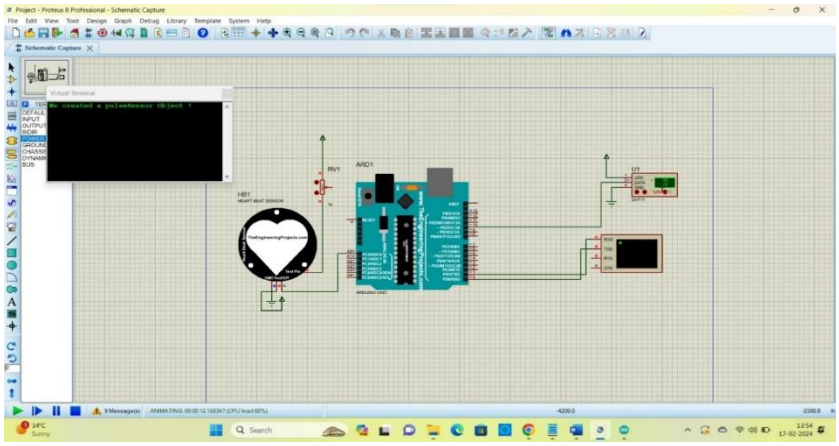

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Figure.2 Pulse sensor output on Proteus

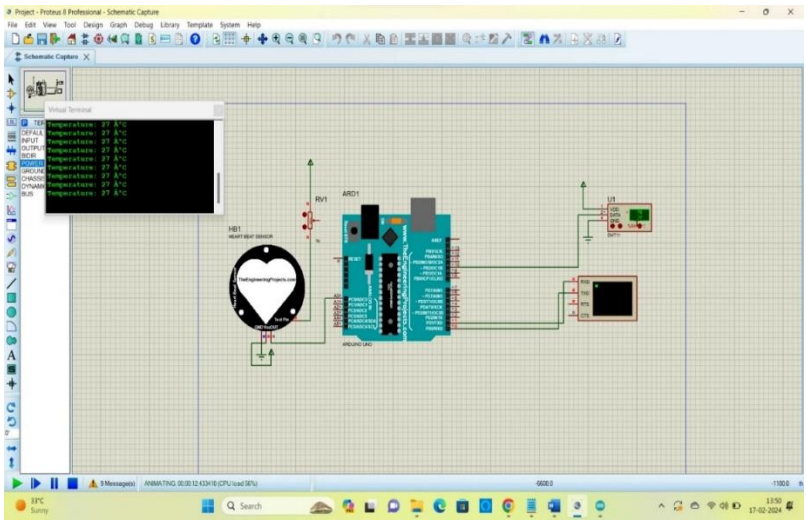

Figure.3 DHT11 sensor output on proteus

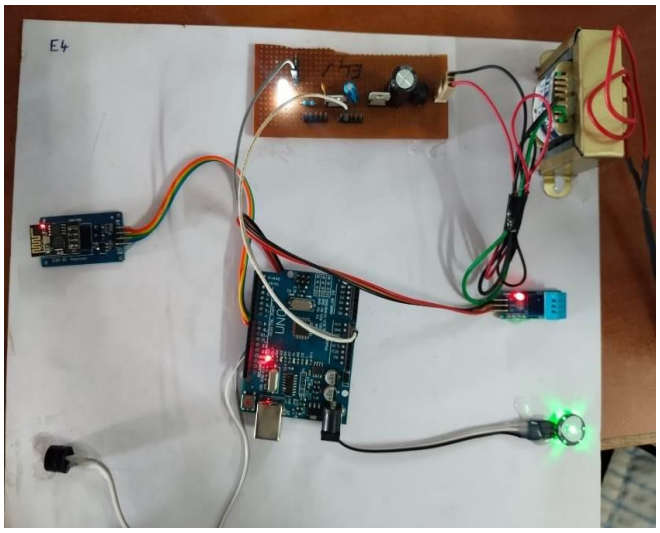

Figure.4 Project Setup

RESULTS

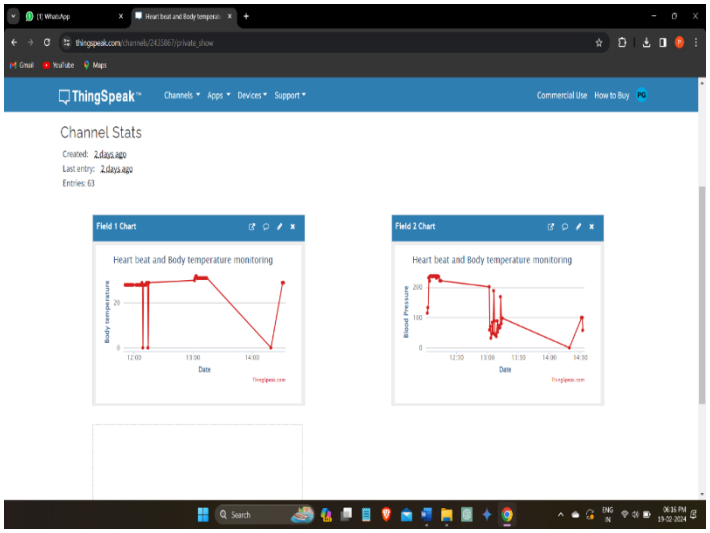

Figure.5 Thingspeak output

APPLICATIONS

1. Personal Health Management: The proposed system finds application in personal health management, allowing individuals to monitor their vital signs conveniently.

2. Remote Patient Monitoring: The system holds potential for remote patient monitoring, providing healthcare professionals with real-time data for timely interventions.

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3. Research Initiatives: Data collected from such systems can contribute to research initiatives, enabling the study of health trends and patterns on a broader scale

CONCLUSION

The project successfully demonstrates the implementation of a remote health monitoring system using IoT technology. It provides users with real-time access to their heartbeat and body temperature data, facilitating proactive healthcare management. Further enhancements could include integrating additional sensors for comprehensive health monitoring.

The completion of the Heartbeat and Body Temperature Monitoring Over IoT project marks a significant milestone in the realm of remote health monitoring systems. By leveraging Arduino, ESP Wi-Fi, heartbeat sensor, DHT sensor, buzzer, and the ThingSpeak platform, we have successfully developed a robust system capable of real-time monitoring and alerting of vital signs.

In conclusion, the Heartbeat and Body Temperature Monitoring Over IoT project represents a significant advancement in healthcare technology, offering an accessible and effective solution for remote health monitoring. By empowering individuals to monitor their vital signs in real-time and receive timely alerts, the system contributes to proactive healthcare management and improved health outcomes. Moving forward, further research and development in this area hold the potential to revolutionize the way we monitor and manage health, ultimately leading to a healthier and more informed society.

FUTURE SCOPE

Incorporate additional sensors for monitoring other vital signs such as blood pressure and oxygen saturation levels.

Implement machine learning algorithms for predictive analysis and early detection of health issues.

Enhance the user interface of the ThingSpeak platform for a more intuitive user experience.

The Heartbeat and Body Temperature Monitoring Over IoT project holds great potential for future expansion and enhancement. Some avenues for future scope include:

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Integration of Additional Sensors: Expand the capabilities of the system by integrating additional sensors to monitor other vital signs such as blood pressure, oxygen saturation levels, or glucose levels. This would provide a more comprehensive picture of an individual's health status.

Enhanced Data Analysis: Implement advanced algorithms for data analysis, including machine learning techniques, to identify patterns and trends in the health data collected. This could enable early detection of health issues and personalized health recommendations.

Mobile Application Development: Develop a dedicated mobile application to complement the ThingSpeak platform, offering additional features such as personalized health insights, medication reminders, and integration with electronic health records (EHR) systems.

Remote Patient Monitoring: Extend the project's application to remote patient monitoring in clinical settings. This could involve integrating the system with healthcare providers' systems for real-time monitoring of patients' vital signs and remote consultation with healthcare professionals.

Wearable Device Integration: Explore the integration of the monitoring system into wearable devices such as smartwatches or fitness trackers. This would enable users to monitor their health continuously throughout the day and receive personalized insights and recommendations.

Community Health Monitoring: Implement a networked system for community health monitoring, allowing multiple users to contribute their health data to a centralized platform for population health analysis and intervention planning.

Data Privacy and Security: Focus on enhancing data privacy and security measures to ensure the protection of users' health information. This could involve implementing encryption techniques, access controls, and compliance with relevant healthcare data regulations.

Low-Power Design: Optimize the system for low power consumption to prolong battery life, particularly for applications involving wearable devices or remote monitoring in resource-constrained environments.

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Localization and Cultural Sensitivity: Consider adapting the system to different cultural contexts and languages to ensure its relevance and usability in diverse communities worldwide.

Collaborative Research and Development: Foster collaboration with healthcare professionals, researchers, and technology developers to further innovate and refine the system, leveraging interdisciplinary expertise for maximum impact.

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