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IOT BASED HEALTH MONITORING SYSTEM

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***Abstract*—**With the rapid advancements in healthcare technology, continuous monitoring of patient health has become essential. This paper presents an IoT-based Health Monitoring System using sensors and microcontrollers to track vital signs such as heart rate, body temperature, and blood oxygen level. The system transmits data wirelessly to a cloud platform for remote monitoring, enabling timely medical intervention. The proposed system improves accessibility, reduces hospital visits, and provides reliable health tracking at an affordable cost.

Index Terms— IoT, Health Monitoring, Patient Care, Biomedical Sensors, Wireless Communication.

INTRODUCTION

Healthcare is one of the most critical sectors influenced by IoT technologies. The rising number of patients with chronic diseases demands continuous health monitoring. Traditional medical systems rely heavily on in-person checkups, which are not always feasible. IoT-based systems offer a smart solution by providing real-time health data to doctors and patients through wireless networks.

The IoT-based Health Monitoring System focuses on remote measurement and analysis of vital health parameters. By integrating sensors with a microcontroller and wireless connectivity, patient data can be continuously recorded and shared with healthcare providers for immediate response.

LITERATURE SURVEY

Existing research highlights multiple IoT-enabled healthcare frameworks. Systems such as wearable devices, Bluetooth-enabled health monitors, and cloud-integrated platforms have been widely studied. Each approach contributes to improving healthcare efficiency, but limitations such as high cost, complexity, and restricted connectivity remain.

Table I compares different health monitoring approaches.

Table I. Comparison of Health Monitoring Approaches

Approach	Technology Used	Advantages	Limitations
Wearable Devices	Smart Watches	Continuous Monitoring	Limited Battery Life
Bluetooth Monitors	Microcontroller + Bluetooth	Low Cost	Short Range
Cloud-based IoT	Sensors + Wi-Fi	Remote Monitoring	Internet Dependent
Proposed System	Sensors + IoT + Cloud	Real-Time, Affordable	Basic Parameters Only

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The literature shows that IoT-based systems provide the best trade-off between affordability and accessibility, making them suitable for large-scale adoption.

PROPOSED SYSTEM

The proposed IoT-based health monitoring system is built using:

- **Microcontroller (ESP32/Arduino):** Core processing unit for handling sensor data.
- **Sensors:** Heart rate sensor, temperature sensor (LM35/DS18B20), SpO2 sensor for oxygen level.
- **Wi-Fi Module:** Enables transmission of health data to the cloud.
- **Cloud Platform:** Stores and displays patient data on a web/mobile dashboard.
- **Alert Mechanism:** Triggers notifications in case of abnormal readings.

System Operation: Sensors continuously record health data, which is processed by the microcontroller. Data is transmitted via Wi-Fi to a cloud application. Medical professionals and

Systemcaregivers can access this data remotely, ensuring timely decision-making.

Fig. 1 illustrates the system architecture.

Fig. 1. Block Diagram of IoT Based Health Monitoring

RESULTS AND DISCUSSION

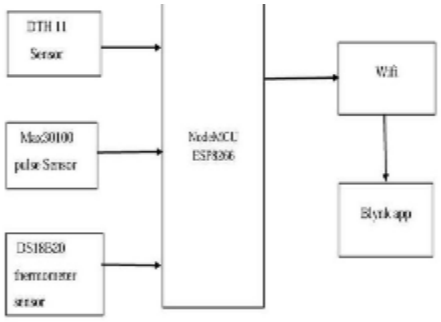
The prototype system was tested with multiple users to validate its functionality. Results confirmed that the sensors accurately measured health parameters with minimal error compared to clinical devices. The system provided real-time updates on a cloud dashboard, and alerts were successfully triggered when abnormal values were detected.

The system demonstrated reliability, scalability, and cost-effectiveness. While more advanced IoT medical devices exist, this system provides a simple and affordable model that can be deployed in rural areas where access to healthcare is limited.

CONCLUSION AND FUTURE SCOPE

The IoT-based Health Monitoring System proved to be effective for real-time tracking of vital parameters. It reduces the dependency on frequent hospital visits and enables continuous patient monitoring from remote locations.

Future enhancements may include the integration of AI for predictive analysis, additional sensors for blood pressure and ECG monitoring, and mobile app integration for easier accessibility. With further development, this system can significantly improve healthcare delivery and save lives.



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REFERENCES

[1] S. M. Riazul Islam, D. Kwak, M. Humaun Kabir, M. Hossain, and K. Kwak, "The Internet of Things for Health Care: A Comprehensive Survey," *IEEE Access*, vol. 3, pp. 678–708, 2015.

[2] A. Pantelopoulos and N. G. Bourbakis, "A Survey on Wearable Sensor-Based Systems for Health Monitoring and Prognosis," *IEEE Transactions on Systems, Man, and*

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Cybernetics, Part C (Applications and Reviews), vol. 40, no. 1, pp. 1–12, Jan. 2010.
[3] M. Chen, Y. Hao, Y. Li, C. Lai, and D. Wu, "On the Design of Health Monitoring Systems With Biomedical Sensors and Wireless Networks," *IEEE Wireless Communications*, vol. 20, no. 4, pp. 126–132, Aug. 2013.
[4] N. Patel, "IoT Based Health Monitoring System Using ESP32," *International Journal of Innovative Research in Computer and Communication Engineering*, vol. 7, no. 6, pp. 3456–3461, 2019.
[5] A. J. Jara, M. A. Zamora, and A. F. Skarmeta, "An Internet of Things—Based Personal Device for Diabetes Therapy Management in Ambient Assisted Living (AAL)," *Personal and Ubiquitous Computing*, vol. 15, no. 4, pp. 431–440, Apr. 2011.
[6] H. Alemdar and C. Ersoy, "Wireless sensor networks for healthcare: A survey," *Computer Networks*, vol. 54, no. 15, pp. 2688–2710, Oct. 2010.
[7] V. Ramesh and S. Saranya, "IoT Enabled Remote Health Monitoring System for Rural Communities," *International Conference on Communication and Signal Processing*, 2020, pp. 652–656.