

Smart IoT-Based Real-Time Patient Monitoring System - MEDIHUB

Using Arduino Uno R4 WiFi and Simulated Vitals Dashboard

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OI. Introduction

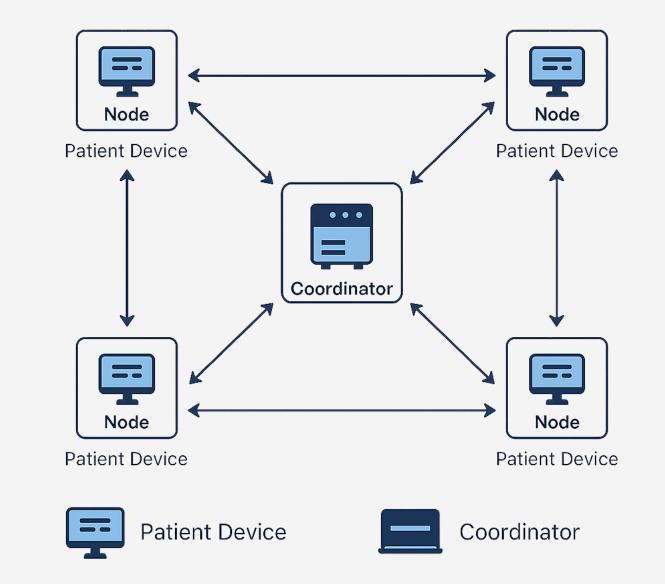
Traditional hospital monitoring requires constant manual checks, which is time-consuming and resource- intensive. This project proposes an IoT-based system to continuously track vit

IoT-based system to continuously track vital signs like temperature, heart rate, SpO₂, ECG, and glucose levels, making healthcare smarter and more efficient.

O2. Why This System is Needed

- ✓ Reduces nurse fatigue by automating vitals monitoring
- Supports remote care for elderly or chronic patients
- Tenables real-time alerts for abnormal conditions
- Logs patient history for future diagnosis and analysis
- Scalable for hospitals, clinics, and home-care

03. System Architecture





04. WHY ZIGBEE Mesh network

Zigbee Mesh Network Explained

Zigbee is a low-power wireless communication protocol ideal for IoT devices.

- Mesh topology means each node (patient device) can relay data to the next, improving range and reliability.
- In contrast to WiFi, Zigbee can connect more devices, with lower power usage.

How Zigbee Mesh Works:

- 1. Each Arduino (or Zigbee module like XBee) acts as a node.
- 2. Nodes communicate with nearby ones until data reaches the gateway (router or coordinator).
- 3. If one node fails, data finds another route making it fault-tolerant

5. Implementation

🎎 🛊 Simulated Data:

Temperature (36.5–38°C)
Heart Rate (60–100 BPM) SpO₂
(94–100%)

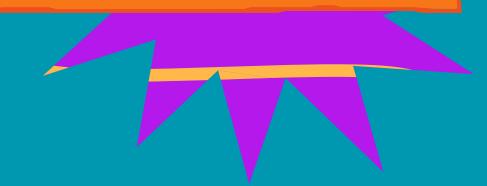
ECG (0.5–1.5 mV)
Glucose (80–140 mg/dL)

Dashboard Features:

25 Patient Slots
Login System
Monitoring Panel
Notes & History Logs Device
Sync + Calibration Options

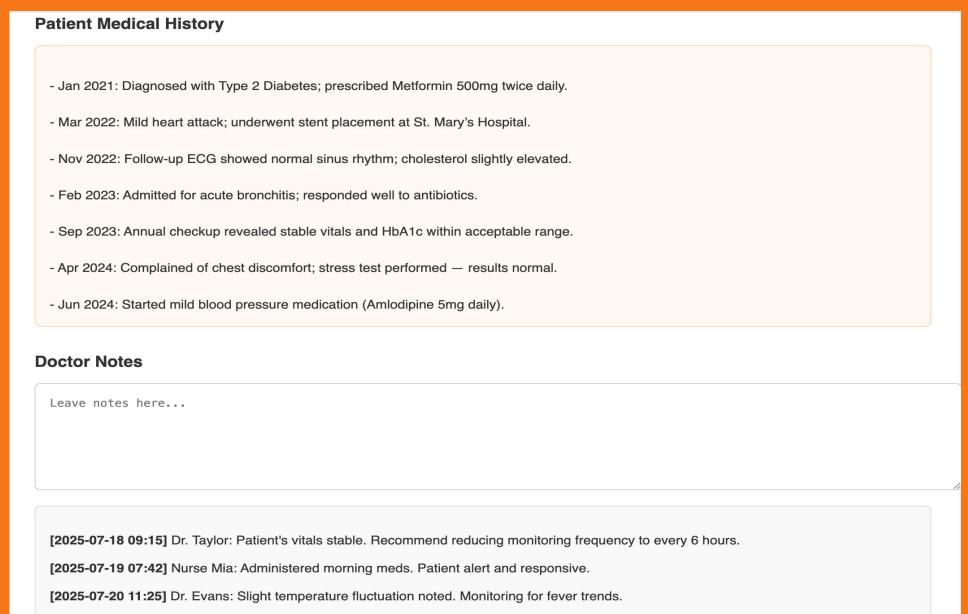
06. Results

- Successfully simulated realtime vitals
- Web dashboard updated every 2 seconds
- History log with timestamps
- Fully modular UI (scalable to 100+ patients)



Patient List Search by name or bed number Search by name or bed number Bed 108 Carla Ruiz ID: P3 Status: GRITICAL Status: GRITICAL Status: GRITICAL Bed 112 ID: P15 Status: GRITICAL Status: GRITICAL Status: GRITICAL Bed 110 Kylie Patel ID: P11 Status: WARNING Status: WARNING Status: WARNING Frank Owens ID: P15 Status: GRITICAL Status: GRITICAL Status: GRITICAL Bed 113 ID: P20 Status: WARNING Status: WARNING WARNING WARNING Status: WARNING





07. Conclusion

This project demonstrates how affordable microcontrollers and simple web technologies can build a powerful, scalable, and realistic hospita monitoring system. It has the potential to improve patient safety, reduce staff burden, and modernize healthcare infrastructure — especially in underserved areas.

70-80%

of hospital delays in patient care are linked to inefficient monitoring and communication systems.