ABSTRAK

PERANCANGAN *WEARABLE DEVICE* UNTUK PEMANTAUAN DENYUT JANTUNG DAN SUHU TUBUH BERBASIS *INTERNET OF THINGS* (IOT) PADA *SMARTPHONE ANDROID*

(2025:xv + 93 halaman + 40 gambar + 11 tabel + 13 lampiran)

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Pemantauan tanda vital seperti denyut jantung dan suhu tubuh penting untuk deteksi dini gangguan kesehatan. Penyakit jantung masih menjadi penyebab utama kematian, diperparah oleh pola hidup tidak sehat dan stres. Penelitian ini merancang *wearable device* berbasis *Internet of Things* (IoT) untuk memantau denyut jantung dan suhu tubuh secara *real-time*. Sistem menggunakan sensor *MAX30102* dan *DS18B20*, serta modul *ESP32* yang terhubung ke *platform Adafruit IO* dan aplikasi *Android*. Pengujian dilakukan pada 30 subjek, dengan hasil menunjukkan persentase *error* seluruh pengukuran di bawah 5% jika dibandingkan alat medis standar. Sistem menunjukkan waktu koneksi *Wi-Fi* di bawah 10 detik dan waktu respons data kurang dari 2 detik. Aplikasi *Android* menampilkan data secara *real-time* dan memberikan notifikasi jika terjadi anomali. Dengan akurasi tinggi, konektivitas stabil, dan kemudahan penggunaan, perangkat ini dinilai layak sebagai alat pemantauan kesehatan mandiri, terutama bagi individu dengan risiko tinggi terhadap gangguan jantung.

Kata Kunci: Pemantauan Kesehatan, Denyut Jantung, Suhu Tubuh, *Internet of Things* (IoT), *Wearable Device*

ABSTRACT

DESIGN OF A WEARABLE DEVICE FOR HEART RATE AND BODY TEMPERATURE MONITORING BASED ON THE INTERNET OF THINGS (IOT) ON ANDROID SMARTPHONES

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Monitoring vital signs such as heart rate and body temperature is essential for the early detection of health issues. Cardiovascular disease remains a leading cause of death, exacerbated by unhealthy lifestyles and chronic stress. This study developed an Internet of Things (IoT)-based wearable device to monitor heart rate and body temperature in real-time. The system utilizes the MAX30102 heart rate sensor and the DS18B20 temperature sensor, integrated with an ESP32 module connected to the Adafruit IO platform and an Android application. Testing was conducted on 30 subjects, and results showed that the percentage error for all measurements was below 5% when compared to standard medical devices. The system achieved Wi-Fi connection times of under 10 seconds and data response times of less than 2 seconds. The Android application displays real-time data and provides notifications in the event of anomalies. With its high accuracy, stable connectivity, and user-friendly interface, the device is well-suited for personal health monitoring, particularly for individuals at a high risk of cardiovascular conditions.

Keywords: Health Monitoring, Heart Rate, Body Temperature, Internet of Things (IoT), Wearable Device