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Acquisition of Biomedical Data Using IoT

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Abstract: *In this paper, we present a comprehensive Internet of Things (IoT)-based health monitoring system that measures key vital signs, including heart rate (BPM), oxygen saturation (SpO2), temperature, and electrocardiogram (ECG) signals, using an ESP32 microcontroller. The system leverages a variety of sensors, such as the MAX30105 for optical measurement of heart rate and SpO2, a dedicated Pulse Sensor for additional BPM detection, a DHT11 for temperature readings, and an ECG module connected to an analog input. Data is transmitted over a Wi-Fi network to the Thing Speak platform, allowing for real-time remote monitoring, data visualization, and analysis. To efficiently handle multiple sensor readings and data uploads without blocking, we utilize Free RTOS task scheduling on the ESP32. Our experimental results demonstrate the system's reliability, ease of use, and accuracy in capturing vital health parameters, illustrating its potential in telemedicine, remote patient.*

Keywords: IoT, ESP32, MAX30105, SpO2, Heart Rate, ECG, Free RTOS, DHT11, Thing Speak, Healthcare