

Rancang bangun sistem pemantau tanda vital: detak jantung, suhu tubuh, dan laju pernapasan bersifat Non-Invasif pada kursi roda listrik berbasis internet of things = Design and implementation of Non-Invasive vital sign monitoring system: Heart rate, body temperature, and respiratory rate on electric wheelchair based on internet of things

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Abstrak

Penelitian ini bertujuan untuk merancang dan membangun sistem pemantau tanda vital detak jantung, suhu tubuh, dan laju pernapasan pada kursi roda listrik menggunakan sensor MAX30102, DS18B20, dan strain gauge BF350 3AA terhubung dengan platform online Blynk dan mengetahui performa masing-masing sensor dengan referensi alat pengukur detak jantung dengan manset merk 1byOne, termometer digital merk ThermoOne Alpha-2, dan pengukur laju pernapasan secara manual. Pada penelitian ini sistem berhasil dibuat dan dapat menampilkan hasil pemantauan tanda vital detak jantung, suhu tubuh, dan laju pernapasan pada platform online Blynk. Pada uji performa pengukuran didapat error pengukuran detak jantung sebesar 2,586%, suhu tubuh sebesar 0,082%, dan laju pernapasan sebesar 6,285%. Selain itu, juga didapat persamaan kalibrasi dari regresi linear hasil pengukuran tanda vital masing - masing sensor, yaitu: Detak jantung_Kalibrasi = (detak jantung_MAX30102) - 4,72) / 0,94, suhu tubuh_Kalibrasi = (suhu tubuh_DS18B20 - 3,62) / 0,90, dan laju pernapasan_kalibrasi = (laju pernapasan_strain gauge - 2,78) / 0,82.

This research aims to design and build a heart rate, body temperature, and respiratory rate monitoring system on an electric wheelchair using MAX30102, DS18B20, and BF350 3AA strain gauge sensors connected to the Blynk online platform and determine performance of each sensors with compared to a 1 by One cuff-based heart rate monitor, ThermoOne Alpha-2 digital thermometer, and manual measurements. In this research the system was successfully developed and evaluates the measurement error of the heart rate as 2.586%, body temperature with an error of 0.082%, and the respiratory rate with an error of 6.285%. Furthermore, equations are obtained for sensor calibration from the linear regression of vital sign measurement from each sensor: Heart rate_calibrated = (heart rate_MAX30102) - 4,72) / 0,94, body temperature_calibrated = (body temperature_DS18B20 - 3,62) / 0,90, and respiratory rate_calibrated = (respiratory rate_strain gauge - 2,78) / 0,82.