

Rancang Bangun Thermal Camera Berbasis Sensor Suhu Infrared Menggunakan MLX90614 dan AMG8833 = Thermal Camera Design Based on Infrared Temperature Sensor Using MLX90614 and AMG8833

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Abstrak

Demam merupakan gejala dari penyakit COVID-19 yang memiliki sensitivitas 54% dan spesifisitas 67% terhadap SARS-CoV-2 sehingga dapat dijadikan acuan untuk mencegah penyebaran penyakit COVID-19. Dua sensor yang paling sering dijadikan termometer infrared adalah MLX90614 dan AMG8833 karena rentang suhu pengukurannya yang tinggi dan akurasinya yang baik. Hasil pengukuran termometer infrared dapat dipengaruhi oleh jarak ukur, suhu ruangan, dan aktivitas fisik pada tubuh manusia. Oleh karena itu, pada skripsi ini penulis merancang rangkaian thermal camera dengan dua buah sensor infrared dan mengevaluasi kinerja sensor berdasarkan jarak ukur (15, 30, 40, dan 60 cm), suhu ruangan non-AC dan AC (30 dan 26,4 oC), serta aktivitas fisik. Hasil penelitian menunjukkan jarak pengukuran terbaik adalah 15 cm dan besar persentase error rata-rata variabel (EV) yang berbeda dari setiap sensor, yaitu sensor MLX90614 0,560% (15 cm) dan 0,843% (60 cm) sedangkan sensor AMG8833 0,577% (15 cm) dan 1,439% (60 cm). Kemudian MLX90614 mempunyai EV 0,567% (non-AC) dan 0,553% (AC) sedangkan sensor AMG8833 0,868% (non-AC) dan 0,948% (AC). Setelah itu MLX90614 mempunyai EV 0,469% (sebelum aktivitas fisik) dan 0,651% (setelah aktivitas fisik) sedangkan AMG8833 1,259% (sebelum aktivitas fisik) dan 0,558% (setelah aktivitas fisik). Selain tiga variabel uji, casing alat dapat membuat EV sensor AMG8833 kurang dari 1,00% (sebelum dan setelah aktivitas fisik). Akibat adanya nilai EV di atas 1,00 %, penelitian ini dapat dilanjutkan dengan memberikan komponen tambahan yang dapat membuat sensor lebih fokus.Fever is a symptom of COVID-19 disease which has a sensitivity of 54% and specificity of 67% to SARS-CoV-2 so that it can be used as a reference to prevent the spread of COVID-19 disease. The two sensors that are mostly used as an infrared thermometer are the MLX90614 and AMG8833 sensor because of their high measurement range and good accuracy. The measurement results of an infrared thermometer can be influenced by the measuring distance, room temperature, and physical activity on the human body. Therefore, in this thesis the author designs a thermal camera circuit with two infrared sensors and evaluates the performance of the sensor based on the measuring distance (15, 30, 40, and 60 cm), non-AC and AC room temperature (30 and 26.4 oC), and physical activity. The results showed that the best measurement distance is 15 cm and the average of variable error percentages (EV) are different for each sensor. The MLX90614 sensor has 0.560% (15 cm) and 0.843% (60 cm) EV while the AMG8833 sensor has 0.577% (15 cm) and 1.439% (60 cm) EV. Then the MLX90614 has an EV of 0.567% (non-AC) and 0.553% (AC) while the AMG8833 sensor has 0.868% (non-AC) and 0.948% (AC). After that, MLX90614 has an EV of 0.469% (before physical activity) and 0.651% (after physical activity) while AMG8833 has 1.259% (before physical activity) and 0.558% (after physical activity). In addition to the three test variables, the device enclosure could make the AMG8833 sensor EV less than 1.00% (before and after physical activity). Due to the there are EV values above 1.00%, this research can be continued by adding other components that can make the sensor more focused.