

**RANCANG BANGUN ALGORITMA PREDIKSI KENYAMANAN
TERMAL PERSONAL PADA RUANG HUNI BERDASARKAN TINGKAT
KEPUASAN MENGGUNAKAN CITRA TERMAL DENGAN METODE
*DEEP LEARNING***

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INTISARI

IEQ (*Indoor Environment Quality*) dalam aspek kenyamanan termal ruang huni sangat dibutuhkan oleh manusia dalam kehidupan sehari-hari. Selain itu, penyediaan kenyamanan termal ruang huni diketahui mengonsumsi energi terbesar dalam suatu bangunan. Berdasarkan definisinya, kenyamanan termal personal ruang huni tidak hanya menyatakan sensasi termal, namun juga kondisi psikologis seseorang.

Pada penelitian ini, dilakukan rancang bangun algoritma prediksi kenyamanan termal personal pada ruang huni berdasarkan tingkat kepuasan menggunakan citra termal. Digunakan *deep learning* dengan arsitektur mendalam bernama VGG-19 untuk melakukan klasifikasi tingkat kepuasan melalui ekstraksi citra termal berisi pola suhu wajah akibat perubahan laju aliran darah yang berkaitan dengan kondisi kenyamanan termal. Hasil penelitian menunjukkan bahwa algoritma berhasil memprediksi kenyamanan termal personal berdasarkan tingkat kepuasan dengan akurasi sebesar 95,83%. Implementasi dari algoritma prediksi kenyamanan termal dapat menampilkan hasil prediksi kenyamanan termal berdasarkan hasil klasifikasi tingkat kepuasan seseorang di dalam ruang huni.

Kata-kata kunci : Kenyamanan Termal, Kepuasan, *Deep Learning*,
VGG-19, Pencitraan Termal

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**DESIGN OF PREDICTION ALGORITHM FOR INDOOR PERSONAL
THERMAL COMFORT BASED ON SATISFACTION LEVEL OF
THERMAL IMAGING USING DEEP LEARNING METHOD**

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ABSTRACT

IEQ (Indoor Environment Quality) in terms of thermal comfort is well-known to have great impact on human's daily life. Despite being essential, the energy use of providing thermal comfort is particularly significant of total building energy consumption. Therefore, it is important to predict the state of personal thermal comfort both to provide thermal comfort and as an energy conservation effort of eliminating excessive energy use in thermal comfort.

According to the definition, personal thermal comfort does not only express thermal sensation but also psychological condition as a result of a person's environment adaptation ability. In this study, a prediction algorithm for indoor personal thermal comfort is proposed based on the level of satisfaction. Deep learning is used with an in-depth architecture called VGG-19 in order to classify the level of satisfaction through extraction of thermal image containing facial heat patterns related to thermal comfort condition due to changes in blood flowrate. The result shows that the algorithm succeeded in predicting indoor personal thermal comfort with an accuracy of 95,83%. The implementation of the prediction algorithm displays the result of predicted thermal comfort states, such as comfortable and uncomfortable.

Keywords : Thermal Comfort, Satisfaction, Deep Learning, VGG-19,
Thermal Imaging

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