ABSTRACT

Accurate and efficient classification of external wounds is essential for determining appropriate medical treatment. To support this need, this study implements all EfficientNet variants, specifically EfficientNetB0 through EfficientNetB7, using a Transfer Learning approach to classify six wound types. The initial dataset of 462 images was imbalanced and addressed through oversampling, resulting in 834 images that were further enhanced using data augmentation. All models were trained using the Adam optimizer and optimized with EarlyStopping and ReduceLROnPlateau. The results show that EfficientNetB2 provides the most stable performance, achieving an accuracy of 95.24% and a Macro F1-Score of 0.95 on the test set. In contrast, larger variants such as EfficientNetB7 experienced severe overfitting despite high training accuracy. Based on these findings, EfficientNetB2 is recommended as the most effective architecture for external wound classification on limited sized datasets.

Keywords: *Deep Learning, EfficientNet, External Wounds, Image Classification Transfer Learning*

ABSTRAK

Klasifikasi luka luar secara cepat dan akurat penting dalam menentukan penanganan medis. Untuk mendukung proses tersebut, penelitian ini menerapkan seluruh varian *EfficientNet* dari *EfficientNetB0* hingga *EfficientNetB7* dengan pendekatan *Transfer Learning* untuk mengklasifikasikan enam jenis luka luar. Ketidakseimbangan pada 462 citra awal diatasi dengan *oversampling* hingga menghasilkan 834 citra yang kemudian diperkaya melalui augmentasi data. Seluruh model dilatih menggunakan *optimizer* Adam serta dioptimalkan dengan *EarlyStopping* dan *ReduceLROnPlateau*. Hasil pengujian menunjukkan bahwa *EfficientNetB2* memberikan performa paling stabil dengan akurasi 95.24% dan *F1-Score Macro* 0.95. Sementara itu, model berukuran lebih besar seperti *EfficientNetB7* mengalami *overfitting* meskipun akurasi pelatihannya tinggi. Berdasarkan temuan tersebut, *EfficientNetB2* direkomendasikan sebagai arsitektur yang paling efektif untuk klasifikasi luka luar pada dataset berukuran terbatas.

Kata Kunci: *Deep Learning*, *EfficientNet*, Klasifikasi Citra, Luka Luar, *Transfer Learning*