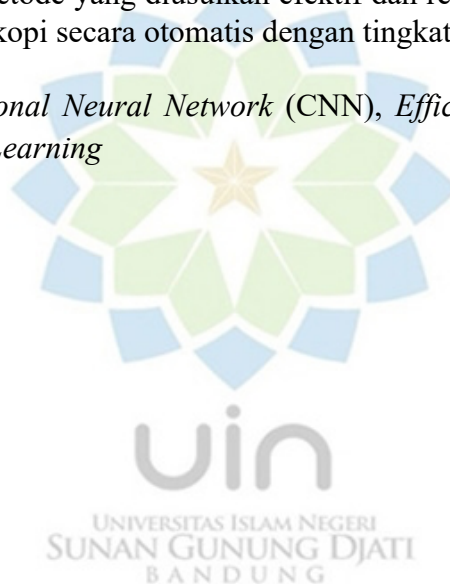


ABSTRAK

Penelitian ini membahas implementasi algoritma Convolutional Neural Network (CNN) dengan arsitektur EfficientNet-B1 untuk klasifikasi kualitas biji kopi Arabika berdasarkan citra digital. Permasalahan utama yang diangkat adalah keterbatasan metode manual yang cenderung subjektif dan kurang konsisten. Dataset yang digunakan terdiri dari dua kelas, yaitu *Layak Produksi (Good)* dan *Tidak Layak Produksi (Defect)*, yang diperoleh dari platform Roboflow. Tahapan penelitian meliputi pra-pemrosesan citra, augmentasi, penyeimbangan data, pembangunan arsitektur model, serta pelatihan dengan pendekatan *fine-tuning*. Evaluasi dilakukan menggunakan confusion matrix serta metrik akurasi, presisi, recall, dan F1-score. Hasil pengujian menunjukkan bahwa model EfficientNet-B1 mampu mencapai akurasi hingga 99,92% dengan nilai presisi, recall, dan F1-score yang seimbang pada kedua kelas. Hasil penelitian ini membuktikan bahwa metode yang diusulkan efektif dan reliabel untuk melakukan klasifikasi kualitas biji kopi secara otomatis dengan tingkat akurasi tinggi.

Kata Kunci: *Convolutional Neural Network (CNN)*, *EfficientNet-B1*, Klasifikasi Citra, Biji Kopi, *Deep Learning*



ABSTRACT

This research discusses the implementation of a Convolutional Neural Network (CNN) algorithm with the EfficientNet-B1 architecture for classifying the quality of Arabica coffee beans based on digital images. The main problem addressed is the limitation of manual evaluation methods, which tend to be subjective and inconsistent. The dataset used consists of two classes, namely Production Worthy (Good) and Defect, obtained from the Roboflow platform. The research stages include image preprocessing, augmentation, data balancing, model architecture development, and training using a fine-tuning approach. The evaluation was conducted using a confusion matrix and performance metrics such as accuracy, precision, recall, and F1-score. The experimental results show that the EfficientNet-B1 model achieved an accuracy of up to 99.92% with balanced precision, recall, and F1-score across both classes. These findings demonstrate that the proposed method is effective and reliable for performing automatic coffee bean quality classification with a high level of accuracy.

Keywords: Convolutional Neural Network (CNN), EfficientNet-B1, Image Classification, Coffee Beans, Deep Learning

