

ABSTRAK

Penyakit tanaman padi menjadi faktor utama penurunan produktivitas hasil panen di Indonesia. Keterbatasan pengetahuan petani dalam mengidentifikasi gejala klinis penyakit sering kali berujung pada keterlambatan penanganan. Penelitian ini bertujuan membangun aplikasi Android menggunakan algoritma *Deep Learning* CNN-MobileNetV2 untuk mendeteksi jenis penyakit berdasarkan citra daun. Tahapan penelitian diawali pengumpulan dataset daun padi yang diklasifikasikan ke dalam delapan kelas, yaitu *Blast*, *Bacterial Leaf Blight* (Hawar Daun), *Brown Spot* (Bercak Cokelat), *Leaf Smut* (Gosong Daun), Defisiensi Nutrisi Nitrogen (N), Defisiensi Nutrisi Potassium (K), Defisiensi Nutrisi Phosphorus (P), dan Padi Sehat. Data tersebut melewati praproses berupa penajaman citra, pengubahan ukuran, serta augmentasi untuk meningkatkan variasi dataset. Selanjutnya, dilakukan pelatihan model CNN-MobileNetV2 dan dievaluasi menggunakan *Confusion Matrix* hingga menghasilkan akurasi terbaik sebesar 96%. Tahapan berikutnya mencakup analisis kebutuhan sistem dan perancangan antarmuka menggunakan UML serta Figma. Model yang telah dilatih kemudian dikonversi ke format TensorFlow Lite dan diintegrasikan ke dalam aplikasi Android agar proses inferensi dapat berjalan secara lokal (*offline*) di perangkat pengguna. Hasil implementasi menunjukkan aplikasi AgriScan Padi mampu menyajikan fitur deteksi instan, informasi penyakit, dan penyimpanan riwayat prediksi. Pengujian fungsional *Black-Box Testing* dilakukan langsung oleh pakar pertanian di Sawah Abadi yang berlokasi di kawasan Cakung, Kota Jakarta Timur, dengan hasil 11 skenario pengujian sukses dilakukan (tingkat keberhasilan 100%). Aplikasi berhasil dibangun dengan performa komputasi efisien melalui kecepatan prediksi dibawah 0,1 detik yaitu yaitu 42,2 ms (milidetik).

Kata Kunci : Android, CNN-MobileNetV2, *Deep Learning*, Deteksi Penyakit Padi, TensorFlow Lite.

ABSTRACT

Rice plant diseases are the main factor in reducing crop productivity in Indonesia. Farmers' limited knowledge in identifying clinical symptoms of disease often leads to delays in treatment. This research aims to build an Android application using the CNN-MobileNetV2 Deep Learning algorithm to detect types of disease based on leaf images. The research stage began with collecting rice leaf datasets which were classified into eight classes, namely Blast, Bacterial Leaf Blight, Brown Spot, Leaf Smut, Nitrogen (N) Nutrient Deficiency, Potassium (K) Nutrient Deficiency, Phosphorus (P) Nutrient Deficiency, and Healthy Rice. The data goes through preprocessing in the form of image sharpening, resizing, and augmentation to increase the variety of the dataset. Next, the CNN-MobileNetV2 model was trained and evaluated using the Confusion Matrix to produce the best accuracy of 96%. The next stage includes system requirements analysis and interface design using UML and Figma. The trained model is then converted to TensorFlow Lite format and integrated into an Android application so that the inference process can run locally (offline) on the user's device. The implementation results show that the AgriScan Padi application is able to provide instant detection features, disease information, and storage of prediction history. Black-Box Testing functional testing was carried out directly by agricultural experts at Sawah Abadi located in the Cakung area, East Jakarta City, with the results of 11 successful test scenarios (100% success rate). The application was successfully built with efficient computing performance through a prediction speed of under 0.1 second, namely 42.2 ms (milliseconds).

Keywords: Android, CNN-MobileNetV2, Deep Learning, Rice Disease Detection, TensorFlow Lite.