ABSTRAK
APLIKASI DETEKSI PENYAKIT PADA DAUN TANAMAN KUNYIT BERBASIS ANDROID MENGGUNAKAN CNN DAN HDLC

(Ade Dwi Prayoga, 2025 : 147 Halaman)

Penyakit pada daun kunyit (Curcuma longa) seperti Aphids Disease, Blotch, dan Leaf Spot merupakan masalah yang dapat menurunkan kualitas tanaman dan hasil panen apabila tidak dideteksi sejak dini. Proses deteksi secara manual sering kali membutuhkan keahlian khusus dan rentan terhadap kesalahan. Penelitian ini bertujuan mengembangkan aplikasi Android bernama DeLeaf yang mampu mendeteksi penyakit daun kunyit secara otomatis menggunakan algoritma Convolutional Neural Network (CNN) dan metode pengembangan Hybrid Design Life Cycle (HDLC). Model yang digunakan adalah Custom CNN yang dirancang dan dilatih dari awal menggunakan dataset empat kelas daun kunyit, melalui tahapan preprocessing seperti resizing ke 224×224 piksel, normalisasi, dan augmentasi. Pelatihan dilakukan hingga 50 epoch di lingkungan Google Colab, kemudian model dikonversi ke TensorFlow Lite dan diintegrasikan ke aplikasi menggunakan bahasa Kotlin, serta dilengkapi penyimpanan riwayat berbasis SQLite. Hasil pengujian menunjukkan bahwa model Custom CNN mencapai akurasi 92,5% pada pengujian di Google Colab dan 90% saat digunakan di aplikasi Android, dengan waktu inferensi rata-rata sekitar tiga detik per gambar. Evaluasi fungsional berbasis blackbox menunjukkan bahwa seluruh fitur aplikasi berjalan sesuai dengan perancangan, sementara pengujian kelayakan menggunakan System Usability Scale (SUS) menghasilkan skor rata-rata 77,25 yang termasuk kategori *Good – Acceptable*. Dengan demikian, aplikasi DeLeaf dinilai mampu memberikan deteksi penyakit daun kunyit secara cepat, akurat, dan mudah digunakan pada perangkat mobile.

Kata Kunci : CNN, TensorFlow Lite, Android, Penyakit Daun Kunyit, HDLC, SUS.

ABSTRACT
ANDROID-BASED DISEASE DETECTION APPLICATION ON TURMERIC PLANT LEAVES USING CNN AND HDLC

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Diseases affecting turmeric leaves (Curcuma longa), such as Aphids Disease, Blotch, and Leaf Spot, can significantly reduce crop quality and productivity if not detected early. Manual identification often requires expert knowledge and is prone to inaccuracy, especially for non-specialist users. This research aims to develop an Android-based application called DeLeaf, designed to automatically detect turmeric leaf diseases using a Convolutional Neural Network (CNN) and the Hybrid Design Life Cycle (HDLC) development method. The study employs a Custom CNN model trained from scratch on four classes of turmeric leaf images, with preprocessing steps that include resizing to 224×224 pixels, normalization, and data augmentation. The model was trained for 50 epochs in Google Colab, then converted into TensorFlow Lite format and integrated into an Android application built with Kotlin, supported by a local SQLite database for storing detection history. Experimental results show that the Custom CNN model achieved an accuracy of 92.5% during testing in Google Colab and 90% when implemented in the Android application, with an average inference time of approximately three seconds per image. Functional testing using the blackbox method confirmed that all application features functioned as intended, while usability evaluation using the System Usability Scale (SUS) produced an average score of 77.25, categorized as Good – Acceptable. *Overall, DeLeaf demonstrates strong potential as a fast, accurate, and user-friendly mobile tool for detecting diseases in turmeric leaves.*

***Keywords** : CNN, TensorFlow Lite, Android, Turmeric Leaf Disease, HDLC, SUS*