

RANCANG BANGUN APLIKASI MOBILE PENDETEKSI PENYAKIT *BROWN SPOTS* PADA DAUN SAWIT DENGAN CNN BERARSITEKTUR VGG16

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ABSTRAK

Tanaman kelapa sawit memiliki peran strategis dalam perekonomian Indonesia, namun produktivitasnya dapat terganggu oleh serangan penyakit seperti *Brown Spots* yang menyerang daun. Penyakit ini disebabkan oleh jamur *Curvularia spp.* dan umumnya sulit dideteksi secara dini oleh petani karena keterbatasan pengetahuan serta metode identifikasi konvensional yang kurang efektif. Penelitian ini bertujuan untuk merancang aplikasi mobile berbasis Android yang terintegrasi dengan model *Convolutional Neural Network* (CNN) berarsitektur VGG16 guna mendeteksi penyakit *Brown Spots* pada daun kelapa sawit. Pengembangan aplikasi dilakukan dengan metode *Rapid Application Development* (RAD) yang menekankan kecepatan dan iterasi prototipe secara berkelanjutan. Model CNN dilatih menggunakan dataset gambar daun sawit yang didapatkan melalui metode *Web Scraping* dan kemudian diintegrasikan ke dalam aplikasi. Pengujian dilakukan melalui *Black Box* dan *User Acceptance Test* (UAT) dengan skala Likert, hasil menunjukkan bahwa aplikasi berfungsi dengan baik sesuai skenario pengujian dan memperoleh tingkat penerimaan pengguna sebesar 90% dalam kategori "Sangat Setuju". Model CNN berarsitektur VGG16 menunjukkan performa klasifikasi yang sangat baik dengan akurasi 97% serta nilai *precision*, *recall*, dan *F1-score* sebesar 0,97. Hasil ini membuktikan bahwa aplikasi yang dibangun efektif untuk mendeteksi penyakit *Brown Spots* secara akurat dan praktis, serta diharapkan dapat mendukung peningkatan produktivitas tanaman sawit.

Kata kunci: Kelapa Sawit, *Brown Spots*, *Convolutional Neural Network*, Aplikasi Mobile, *Rapid Application Development*

MOBILE APP FOR BROWN SPOTS DETECTION ON OIL PALM LEAVES USING CNN WITH VGG16 ARCHITECTURE

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ABSTRACT

*Oil palm plays a strategic role in Indonesia's economy; however, its productivity can be disrupted by plant diseases such as Brown Spots, which affect the leaves. This disease is caused by the *Curvularia* spp. fungus and is often difficult for farmers to detect early due to limited knowledge and the ineffectiveness of conventional identification methods. This study aims to design an Android-based mobile application integrated with a Convolutional Neural Network (CNN) model using the VGG16 architecture to detect Brown Spots on oil palm leaves. The application was developed using the Rapid Application Development (RAD) method, which emphasizes speed and continuous prototype iteration. The CNN model was trained using a dataset of oil palm leaf images obtained through web scraping and was then integrated into the application. The application was tested using Black Box testing and a User Acceptance Test (UAT) with a Likert scale. The results showed that the application performed well according to the testing scenarios and achieved a 90% user acceptance rate, categorized as "Strongly Agree." The CNN model with VGG16 architecture demonstrated excellent classification performance, achieving 97% accuracy along with precision, recall, and F1-score values of 0.97. These results indicate that the developed application is effective in accurately and practically detecting Brown Spots and is expected to contribute to improving oil palm productivity.*

Keywords: *Oil Palm, Brown Spots, Convolutional Neural Network, Mobile Application, Rapid Application Development*