

ABSTRAK

PERANCANGAN APLIKASI KLASIFIKASI JENIS KAYU MENGUNAKAN *DEEP LEARNING* DENGAN ANALISIS TRANSMISI CITRA PADA MEBEL KARYA BERSAMA (2026:xvii + 80 Halaman + 23 Gambar + 12 Tabel + Daftar Pustaka + Lampiran)

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Identifikasi kayu pada industri mebel masih banyak dilakukan secara manual sehingga berpotensi menimbulkan ketidakakuratan dan ketidakefisienan. Penelitian ini bertujuan mengembangkan aplikasi *mobile-cloud* untuk mengklasifikasikan lima jenis kayu dan mengestimasi kategori umur kayu menggunakan *Convolutional Neural Network* (CNN) dan *Random Forest*, serta menganalisis performansi transmisi citra. Sistem dibangun menggunakan Flutter sebagai aplikasi Android dan Flask sebagai *server cloud*. Dataset terdiri atas lima jenis kayu, yaitu Jati, Tembesu, Meranti, Unglen, dan Seru. CNN digunakan untuk klasifikasi jenis kayu dan ekstraksi fitur citra, sedangkan *Random Forest* digunakan untuk mengestimasi kategori umur berdasarkan fitur hasil ekstraksi CNN. Pengujian model CNN menghasilkan *accuracy* 91%, *precision* 93%, *recall* 91%, dan *F1-score* 91%, sedangkan *Random Forest* memperoleh *accuracy* 98,4%. Analisis *Quality of Service* (QoS) dilakukan berdasarkan parameter *delay*, *throughput*, dan *packet loss* pada jaringan WiFi dan 4G LTE. Hasil pengujian menunjukkan WiFi memiliki rata-rata *delay* 1280,90 ms dan *throughput* 1722,65 KB/s, sedangkan 4G LTE menghasilkan *delay* 2987,50 ms dan *throughput* 738,55 KB/s. Kedua jaringan memperoleh *packet loss* 0%. Sistem WoodVision AI mampu mendukung identifikasi jenis kayu, estimasi kategori umur, dan transmisi citra berbasis *cloud* secara otomatis. Hasil tersebut menunjukkan bahwa sistem dapat diterapkan sebagai solusi pendukung yang efisien untuk proses identifikasi kayu pada industri mebel secara praktis.

Kata Kunci : Identifikasi Kayu, *Mobile-Cloud*, *Convolutional Neural Network* (CNN), *Random Forest*, Prediksi Umur Kayu, *Quality of Service* (QoS)

ABSTRACT

DESIGN OF A WOOD TYPE CLASSIFICATION APPLICATION USING DEEP LEARNING WITH IMAGE TRANSMISSION ANALYSIS AT MEBEL KARYA BERSAMA

(2026: xvii + 80 Pages + 23 Figures + 12 Tables + References + Appendices)

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Wood identification in the furniture industry is still largely performed manually, which may lead to inaccuracies and inefficiencies. This study aims to develop a mobile-cloud application for classifying five wood species and estimating wood age categories using Convolutional Neural Network (CNN) and Random Forest, as well as analyzing image transmission performance. The system was developed using Flutter as the Android application framework and Flask as the cloud server. The dataset consists of five wood species: Teak, Tembesu, Meranti, Unglen, and Seru. CNN is used for wood species classification and image feature extraction, while Random Forest is employed to estimate wood age categories based on the features extracted by the CNN. CNN model testing achieved 91% accuracy, 93% precision, 91% recall, and a 91% F1-score, while Random Forest achieved 98.4% accuracy. Quality of Service (QoS) analysis was conducted based on delay, throughput, and packet loss parameters over WiFi and 4G LTE networks. The results show that WiFi achieved an average delay of 1280.90 ms and throughput of 1722.65 KB/s, while 4G LTE achieved a delay of 2987.50 ms and throughput of 738.55 KB/s. Both networks recorded 0% packet loss. The WoodVision AI system is capable of supporting wood species identification, wood age category estimation, and cloud-based image transmission automatically. These results indicate that the system can be implemented as an efficient and practical supporting solution for wood identification processes in the furniture industry.

Keywords: *Wood Identification, Mobile-Cloud, Convolutional Neural Network (CNN), Random Forest, Wood Age Category Estimation, Quality of Service (QoS)*