ABSTRAK

NURUL KUSUMAWARDANI, Implemantasi Vision Transformer Untuk Klasifikasi Tanaman Obat Tradisional Berbasis Citra Buah Dan Daun.
Dibimbing oleh Darniati S.Kom.,M.T dan Chyquitha Danuputri S.Kom.,M.T

Indonesia merupakan negara megabiodiversitas dengan kekayaan tanaman obat tradisional yang telah dimanfaatkan secara turun-temurun oleh masyarakat, namun proses identifikasi di lapangan masih banyak dilakukan secara manual sehingga rentan terhadap kesalahan dan belum didukung dokumentasi ilmiah berbasis teknologi yang memadai. Penelitian ini mengimplementasikan arsitektur *Vision Transformer* (ViT) untuk mengklasifikasikan citra buah dan daun tanaman obat tradisional Indonesia secara otomatis menggunakan dataset sebanyak 1.000 citra yang terdiri dari 20 kelas (10 tanaman obat dan 10 tanaman bukan obat) yang dikumpulkan dari lingkungan alami Desa Galung, Kabupaten Mamuju, Sulawesi Barat. Model ViT-Base/16 dilatih menggunakan metode fine-tuning dengan optimizer AdamW, learning rate 2×10^{-5}, dan cosine annealing scheduler selama 30 epoch. Hasil evaluasi menunjukkan kinerja yang sangat baik dengan akurasi 99,33%, precision 99,41%, recall 99,33%, dan F1-score 99,33% pada data uji, serta akurasi 100% pada skenario klasifikasi biner antara tanaman obat dan bukan tanaman obat, kemudian diimplementasikan dalam aplikasi web berbasis Flask dengan waktu respons rata-rata 6,71 detik dan seluruh fungsi sistem dinyatakan valid melalui pengujian black-box, sehingga dapat disimpulkan bahwa *Vision Transformer* efektif dan andal dalam klasifikasi tanaman obat tradisional serta berkontribusi pada pengembangan sistem identifikasi berbasis teknologi digital.

Kata kunci: *deep learning*, etnobotani, klasifikasi citra, tanaman obat tradisional, Vision Transformer.

ABSTRACT

NURUL KUSUMAWARDANI, Implementation of Vision Transformer for Classification of Traditional Medicinal Plants Based on Fruit and Leaf Images. (Supervised by Darniati S.Kom., M.T and Chyquitha Danuputri S.Kom., M.T)

Indonesia is a megabiodiversity country with a wealth of traditional medicinal plants that have been used for generations by the community, but the identification process in the field is still largely done manually so it is prone to errors and is not supported by adequate technology-based scientific documentation. This study implements the Vision Transformer (ViT) architecture to automatically classify images of fruits and leaves of Indonesian traditional medicinal plants using a dataset of 1,000 images consisting of 20 classes (10 medicinal plants and 10 non-medicinal plants) collected from the natural environment of Galung Village, Mamuju Regency, West Sulawesi. The ViT-Base/16 model was trained using a fine-tuning method with the AdamW optimizer, a learning rate of 2×10^{-5}, and a cosine annealing scheduler for 30 epochs. The evaluation results showed excellent performance with 99.33% accuracy, 99.41% precision, 99.33% recall, and 99.33% F1-score on the test data, as well as 100% accuracy in the binary classification scenario between medicinal plants and non-medicinal plants, then implemented in a Flask-based web application with an average response time of 6.71 seconds and all system functions were declared valid through black-box testing, so it can be concluded that Vision Transformer is effective and reliable in the classification of traditional medicinal plants and contributes to the development of digital technology-based identification systems.

***Keywords**: deep learning, ethnobotany, image classification, traditional medicinal plants, Vision Transformer.*