

ABSTRAK

Identifikasi tanaman obat secara manual dapat mengalami kendala karena kemiripan bentuk daun. Pengolahan citra digital dapat membantu proses identifikasi secara otomatis melalui karakteristik daun. Penelitian ini bertujuan membandingkan penggunaan Region of Interest (ROI) dan tanpa ROI pada ekstraksi fitur Gray Level Co-Occurrence Matrix (GLCM) untuk identifikasi citra daun tanaman obat menggunakan algoritma K-Nearest Neighbor (KNN). Dataset terdiri dari 2450 citra yang terbagi dalam lima kelas, yaitu jeruk nipis, kelor, mangga, pepaya, dan sirih. Tahapan penelitian meliputi augmentasi data, preprocessing, segmentasi ROI, ekstraksi fitur GLCM, normalisasi, klasifikasi KNN, serta evaluasi menggunakan accuracy, precision, recall, dan F1-score. Pengujian dilakukan dengan dua skenario, yaitu tanpa ROI dan menggunakan ROI. Hasil pengujian menunjukkan bahwa metode tanpa ROI memperoleh akurasi terbaik sebesar 86,02% pada $K=3$, sedangkan metode dengan ROI memperoleh akurasi sebesar 90,46% pada $K=5$ dan $K=7$. Penggunaan ROI meningkatkan akurasi sebesar 4,44% dan menghasilkan precision, recall, serta F1-score sebesar 90%, dibandingkan 86% pada metode tanpa ROI. Hasil tersebut menunjukkan bahwa ROI dapat meningkatkan kualitas fitur tekstur dan performa klasifikasi.

Kata Kunci: Pengolahan Citra Digital, Region of Interest (ROI), Gray Level Co-Occurrence Matrix (GLCM), K-Nearest Neighbor (KNN), Identifikasi Tanaman Obat.

ABSTRACT

Manual identification of medicinal plants can be challenging due to similarities in leaf shapes. Digital image processing can facilitate automated identification based on leaf characteristics. This study aims to compare the use of a Region of Interest (ROI) versus no ROI during Gray Level Co-Occurrence Matrix (GLCM) feature extraction to identify medicinal plant leaf images using the K-Nearest Neighbor (KNN) algorithm. The dataset consists of 2,450 images categorized into five classes: lime, moringa, mango, papaya, and betel. The research stages include data augmentation, preprocessing, ROI segmentation, GLCM feature extraction, normalization, KNN classification, and evaluation using accuracy, precision, recall, and F1-score. Testing was conducted under two scenarios: without ROI and with ROI. The results indicate that the method without ROI achieved a peak accuracy of 86.02% at K=3, whereas the method with ROI achieved an accuracy of 90.46% at K=5 and K=7. The use of ROI improved accuracy by 4.44% and yielded precision, recall, and F1-score values of 90%, compared to 86% for the method without ROI. These results demonstrate that ROI can enhance texture feature quality and classification performance.

Keywords: *Digital Image Processing, Region of Interest (ROI), Gray Level Co-Occurrence Matrix (GLCM), K-Nearest Neighbor (KNN), Medicinal Plant Identification.*