

ABSTRAK

Ramadhan R, 2025. *Sistem Diagnosa Penentuan Masa Panen Tebu Berdasarkan Daunnya Menggunakan K-Nearest Neighbor pada Metode Pengolahan Citra*. Program Studi Teknik Informatika, Fakultas Teknik, Universitas PGRI Madiun. Pembimbing: Saifulloh, S.Kom., M.Kom. dan Pratiwi Susanti, S.Kom., M.MT.

Ketepatan dalam menentukan masa panen tebu sangat berpengaruh terhadap peningkatan *rendemen*. Metode manual yang digunakan petani selama ini masih subjektif dan tidak konsisten. Penelitian ini bertujuan mengembangkan *sistem diagnosa* otomatis berbasis *pengolahan citra digital* menggunakan algoritma *K-Nearest Neighbor (KNN)* untuk membantu klasifikasi tingkat kematangan daun tebu. Sistem dirancang sebagai *website interaktif* berbasis *Python* dan *Streamlit*, menggunakan 1.462 citra daun yang diolah menjadi 34 fitur numerik, lalu diklasifikasikan ke dalam tiga kelas: mentah, panen, dan terlambat. Hasil pengujian menunjukkan akurasi 95,22%, *RMSE* 0,9353, *MSE* 0,0547, dan *F1-score* tertinggi 0,99 pada kelas “Terlambat”. Uji *System Usability Scale (SUS)* mendapatkan skor 80 yang termasuk kategori “Good”. Sistem ini diharapkan dapat menjadi solusi bagi petani dalam mengambil keputusan panen yang lebih tepat, objektif, dan berbasis teknologi.

Kata kunci: Diagnosa Daun, Tebu, KNN, Citra Digital, Streamlit, Panen.

ABSTRACT

Ramadhan R, 2025. *Sugarcane Harvest Time Diagnosis System Based on Leaf Characteristics Using K-Nearest Neighbor in Image Processing Method*. Informatics Engineering Study Program, Faculty of Engineering, Universitas PGRI Madiun. Supervisors: Saifulloh, S.Kom., M.Kom. and Pratiwi Susanti, S.Kom., M.MT.

Accurate determination of sugarcane harvest time significantly affects the increase in sugar yield (*rendemen*). However, the manual methods commonly used by farmers are still subjective and inconsistent. This study aims to develop an automatic diagnosis system based on digital image processing using the *K-Nearest Neighbor (KNN)* algorithm to assist in classifying the maturity level of sugarcane leaves. The system was designed as an interactive website using *Python* and *Streamlit*, utilizing 1,462 leaf images processed into 34 numerical features, then classified into three categories: unripe, harvest-ready, and overripe. The test results showed an accuracy of 95.22%, RMSE of 0.9353, MSE of 0.0547, and the highest F1-score of 0.99 in the “Overripe” class. The *System Usability Scale (SUS)* test obtained a score of 80, which is categorized as “Good.” This system is expected to be a solution for farmers in making more accurate, objective, and technology-based harvest decisions.

Keywords: Leaf Diagnosis, Sugarcane, KNN, Digital Image, Streamlit, Harverst.