ABSTRAK

Hazikin, Dimas, 2025, **ANALISIS PERBANDINGAN ALGORITMA *DECISION TREE* DAN *RANDOM FOREST* TERHADAP KLASIFIKASI KUALITAS BUAH APEL.** Tugas Akhir, Program Sarjana, Program Studi Teknik Informatika. Universitas Muhammadiyah Jember.

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Apel merupakan salah satu komoditas unggulan di Indonesia yang kualitasnya perlu diklasifikasikan secara tepat untuk menjaga nilai jual. Proses klasifikasi manual masih sering digunakan, namun memiliki kelemahan dari sisi waktu, biaya, dan akurasi. Penelitian ini bertujuan membandingkan kinerja algoritma *Decision Tree* dan *Random Forest* dalam klasifikasi kualitas buah apel. Data penelitian diperoleh dari dataset Kaggle dengan atribut ukuran, berat, tingkat kemanisan, kerenyahan, kelembapan, kematangan, dan keasaman. Metode penelitian meliputi *preprocessing*, pembagian data, pelatihan model, serta evaluasi menggunakan metrik akurasi, presisi, recall, dan F1-score. Hasil penelitian perbandingan kedua algoritma tersebut menunjukan *Random Forest* memiliki performa lebih stabil dibandingkan *Decision Tree*. *Random Forest* mendapatkan tinggkat akurasi 90% dan tingkat akurasi *Decision Tree* 81% maka dapat ditarik kesimpulan bahwa algoritma *Random Forest* merupakan metode yang lebih unggul dibandingkan dengan *Decision Tree*Selain itu, dalam penelitian ini juga dilakukan pengujian dengan beberapa rasio pembagian data latih (training) dan data uji (testing), yaitu (90/10, 80/20, 70/30, 60/40, 50/50). Dari hasil pengujian tersebut, diperoleh bahwa rasio 80/20 menghasilkan tingkat akurasi yang paling tinggi dibandingkan rasio lainnya.

Kata Kunci: Klasifikasi, Apel, *Decision Tree, Random Forest*

ABSTRACT

Hazikin, Dimas, 2025. **Comparative Analysis of *Decision Tree* and *Random Forest* Algorithms for Apple Quality Classification.** Undergraduate Thesis, Department of Informatics Engineering, Muhammadiyah University of Jember.

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Apples are one of Indonesia's leading agricultural commodities whose quality needs to be accurately classified to maintain their market value. Manual classification processes are still commonly used but have several drawbacks in terms of time, cost, and accuracy. This study aims to compare the performance of the *Decision Tree* and *Random Forest* algorithms in classifying apple quality. The research data were obtained from a Kaggle dataset with attributes including size, weight, sweetness level, crispness, moisture, ripeness, and acidity. The research method includes preprocessing, data splitting, model training, and evaluation using accuracy, precision, recall, and F1-score metrics. The results of the study show that the *Random Forest* algorithm achieved an accuracy of 90%, while the *Decision Tree* algorithm achieved 81%. Therefore, it can be concluded that the *Random Forest* algorithm performs better than the *Decision Tree* algorithm in classifying apple quality. In addition, this study also tested several ratios of training and testing data splits (90/10, 80/20, 70/30, 60/40, and 50/50). Based on the test results, the 80/20 ratio produced the highest accuracy compared to the other ratios.

Keywords: Classification, Apple, *Decision Tree*, *Random Forest*