ABSTRAK

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Program Studi	:	Teknik Informatika
Judul Laporan Skripsi	:	Perbandingan Algoritma Decision Tree dan Random Multimodel Ensemble Untuk Deteksi Tingkat Kelembaban Tanah Pada Tanaman Kopi Berdasarkan Ekstraksi Fitur Normalized Difference Moisture Index
Pembimbing	:	Dr. Hadi Santoso, S.Kom., M.Kom

Penelitian ini mengevaluasi dan membandingkan kinerja dua algoritma, Decision Tree dan Random Multimodel Ensemble, untuk deteksi tingkat kelembaban tanah pada tanaman kopi dengan menggunakan ekstraksi fitur Normalized Difference Moisture Index (NDMI). Masalah yang dihadapi adalah pentingnya pengelolaan kelembaban tanah dalam pertanian kopi untuk meningkatkan hasil dan kualitas produksi. Tujuan penelitian ini adalah untuk menilai keefektifan Decision Tree dan Random Multimodel Ensemble dalam mendeteksi kelembaban tanah dan membandingkan performa keduanya. Metode eksperimen dilakukan dengan menggunakan dataset yang mencakup variasi kondisi tanah pada tanaman kopi. Random Multimodel Ensemble melibatkan sejumlah model acak untuk meningkatkan presisi dan akurasi. Hasil penelitian menunjukkan bahwa Random Multimodel Ensemble secara signifikan melampaui Decision Tree dalam hal presisi (0.97), recall (0.97), akurasi (0.97), serta nilai MAE (0.02), MSE (0.02), RMSE (0.14), MAPE (1.47), dan R2 (0.94). Posisi Random Multimodel Ensemble sebagai metode superior dalam deteksi kelembaban tanah pada tanaman kopi didukung oleh hasil eksperimen yang menunjukkan performa yang lebih tinggi secara konsisten dibandingkan dengan Decision Tree. Penelitian ini memberikan pandangan mendalam tentang potensi implementasi Random Multimodel Ensemble sebagai solusi yang lebih handal untuk pengelolaan kelembaban tanah dalam konteks pertanian kopi.

Kata Kunci: *Decision Tree, Soil Moisture, NDMI, Random Multimodel Ensemble, Coffee Plants.*

ABSTRACT

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Title Thesis	:	Comparison of Decision Tree and Random Multimodel Ensemble Algorithms for Detecting Soil Moisture Levels in Coffee Plants Based on Normalized Difference Moisture Index Feature Extraction
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This research evaluates and compares the performance of two algorithms, Decision Tree and Random Multimodel Ensemble, for detecting soil moisture levels in coffee plants using Normalized Difference Moisture Index (NDMI) feature extraction. The problem faced is the importance of managing soil moisture in coffee farming to increase yields and production quality. The aim of this research is to assess the effectiveness of Decision Tree and Random Multimodel Ensemble in detecting soil moisture and compare the performance of both. The experimental method was carried out using a dataset that included variations in soil conditions on coffee plants. Random Multimodel Ensemble involves a number of random models to increase precision and accuracy. The research results show that Random Multimodel Ensemble significantly outperforms Decision Tree in terms of precision (0.97), recall (0.97), accuracy (0.97), as well as MAE (0.02), MSE (0.02), RMSE (0.14), MAPE (1.47) values. , and R2 (0.94). The position of Random Multimodel Ensemble as a superior method for detecting soil moisture in coffee plants is supported by experimental results which show consistently higher performance compared to Decision Tree. This research provides an in-depth look at the potential of implementing the Random Multimodel Ensemble as a more reliable solution for soil moisture management in the context of coffee farming.

Keywords: *Decision Tree, Soil Moisture, NDMI, Random Multimodel Ensemble, Coffee Plants.*