INTISARI

Peramalan Hasil Panen dengan Algoritma *Extra Trees Regressor* dan Seleksi Fitur Menggunakan Regresi Lasso (Studi Kasus: Hasil Panen PT Astra Agro Lestari Tbk)

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Industri kelapa sawit merupakan salah satu sektor strategis dalam perekonomian Indonesia, mengingat Indonesia merupakan produsen kelapa sawit terbesar di dunia. PT Astra Agro Lestari Tbk sebagai salah satu perusahaan kelapa sawit terbesar di Indonesia terus berupaya meningkatkan efisiensi operasional, meminimalkan pemborosan, dan mempertahankan daya saing di industri. Untuk mencapai hal tersebut, perusahaan memerlukan sistem manajemen yang optimal, khususnya dalam hal prediksi hasil panen, karena informasi ini dapat digunakan sebagai dasar dalam pengambilan keputusan strategis, seperti penentuan jumlah tenaga kerja yang optimal. Salah satu pendekatan yang banyak digunakan untuk memprediksi hasil panen adalah algoritma *tree-based machine learning* seperti *Extremely Randomized Trees Regressor* (ETR) dan *Random Forest Regressor* (RFR). Namun, kompleksitas dan volume data yang besar sering kali menyebabkan adanya fitur yang tidak relevan, yang justru dapat menurunkan performa model prediktif. Oleh karena itu, dilakukan seleksi fitur menggunakan metode Regresi Lasso (*Least Absolute Shrinkage and Selection Operator*) untuk meningkatkan akurasi model. Penelitian ini menerapkan empat skenario pengujian model, yaitu ETR tanpa seleksi fitur, ETR dengan seleksi fitur, RFR tanpa seleksi fitur, dan RFR dengan seleksi fitur. Model terbaik dari keempat skenario tersebut digunakan untuk melakukan peramalan hasil panen selama enam bulan ke depan, yang selanjutnya dijadikan dasar dalam perhitungan jumlah tenaga kerja optimal setiap bulan.

Kata kunci: Kelapa Sawit, Peramalan Hasil Panen, *Extremely Randomized Tree*, *Random Forest*, Seleksi Fitur, Regresi Lasso, Tenaga Kerja Optimal.

ABSTRACT

(Crop Yield Forecasting Using Extra Trees Regressor Algorithm and Feature Selection via Lasso Regression (Case Study: Crop Yield of PT Astra Agro Lestari Tbk))

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The palm oil industry is one of the strategic sectors in Indonesia's economy, as the country is the largest producer of palm oil in the world. PT Astra Agro Lestari Tbk, as one of the largest palm oil companies in Indonesia, continues to strive for improved operational efficiency, waste minimization, and sustained competitiveness in the industry. To achieve these goals, the company requires an optimal management system, particularly in yield forecasting, as this information can serve as a foundation for strategic decision-making, such as determining the optimal number of workers. One widely used approach for yield prediction is the use of tree-based machine learning algorithms, such as the Extremely Randomized Trees Regressor (ETR) and Random Forest Regressor (RFR). However, the high volume and complexity of the data often lead to the inclusion of irrelevant features, which can reduce the predictive performance of the model. Therefore, feature selection using the Lasso Regression method (Least Absolute Shrinkage and Selection Operator) is applied to improve model accuracy. This study implements four model testing scenarios: ETR without feature selection, ETR with feature selection, RFR without feature selection, and RFR with feature selection. The best-performing model from these scenarios is then used to forecast harvest yields over the next six months, which subsequently serves as the basis for calculating the optimal number of workers required each month.

Keywords: Palm Oil, Yield Forecasting, Extremely Randomized Trees, Random Forest, Feature Selection, Lasso Regression, Optimal Labor.