

## INTISARI

### Perbandingan Performa Algoritma Random Forest, Extreme Gradient Boosting, dan Long Short-Term Memory dalam Prediksi Berat Badan Ayam Broiler Terhadap Variasi Kuantitas Data

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Industri peternakan ayam broiler merupakan sektor strategis dalam penyediaan protein hewani di Indonesia. Salah satu aspek krusial dalam manajemen peternakan adalah prediksi berat badan ayam broiler secara akurat, yang penting untuk penjadwalan panen dan optimalisasi pemberian pakan. Implementasi kecerdasan buatan (AI) menawarkan solusi potensial untuk prediksi pertumbuhan ayam broiler, meskipun keterbatasan data di sektor peternakan menjadi kendala utama.

Penelitian ini bertujuan untuk mengevaluasi kinerja tiga model yaitu *Random Forest (RF)*, *Long Short-Term Memory (LSTM)*, dan *Extreme Gradient Boosting (XGBoost)* dalam memprediksi berat badan ayam broiler berdasarkan data harian lingkungan. Evaluasi dilakukan menggunakan variasi ukuran *dataset* untuk mengidentifikasi ketahanan model terhadap keterbatasan data, dengan metrik evaluasi mencakup *MAE*, *MSE*, *RMSE*, dan *R-squared*, serta menguji model dengan memprediksi berat badan ayam pada data baru.

Hasil penelitian menunjukkan bahwa *Random Forest (RF)* memiliki performa yang paling unggul dan stabil di seluruh metrik evaluasi. Model ini mampu melakukan generalisasi dengan baik terhadap pola pertumbuhan ayam broiler, bahkan saat jumlah data masih terbatas. *XGBoost* memberikan hasil kompetitif, namun performanya lebih fluktuatif dan sensitif terhadap variasi data. Sementara itu, *LSTM* menunjukkan performa terendah di sebagian besar *dataset*, terutama pada data awal yang berjumlah kecil.

**Kata Kunci:** Prediksi, Berat ayam broiler, Random Forest (RF), Long Short-Term Memory (LSTM), dan Extreme Gradient Boosting (XGBoost).

## ABSTRACT

### Comparison of the Performance of Random Forest, Extreme Gradient Boosting, and Long Short Term Memory Algorithms in Predicting Broiler Chicken Body Weight Against Data Quantity Variations

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*The broiler chicken farming industry is a strategic sector in providing animal protein in Indonesia. One crucial aspect of farm management is the accurate prediction of broiler chicken weight, which is important for harvest scheduling and optimizing feed distribution. The implementation of artificial intelligence (AI) offers potential solutions for predicting broiler chicken growth, although data limitations in the farming sector pose a significant challenge.*

*This research aims to evaluate the performance of three models: Random Forest (RF), Long Short-Term Memory (LSTM), and Extreme Gradient Boosting (XGBoost) in predicting broiler chicken weight based on daily environmental data. The evaluation is conducted using variations in dataset size to identify the resilience of the models to data limitations, with evaluation metrics including MAE, MSE, RMSE, and R-squared, as well as testing the models by predicting chicken weight using new data.*

*The research results show that Random Forest (RF) has the best and most stable performance across all evaluation metrics. This model is able to generalize well to the growth patterns of broiler chickens, even when the amount of data is still limited. XGBoost delivers competitive results, but its performance is more volatile and sensitive to data variation. Meanwhile, LSTM shows the lowest performance on most datasets, especially on the small initial data.*

**Keywords:** Prediction, Broiler chicken weight, Random Forest (RF), Long Short-Term Memory (LSTM), and Extreme Gradient Boosting (XGBoost).