

ABSTRAK

Stunting merupakan salah satu masalah kesehatan yang menjadi fokus utama pembangunan manusia di Indonesia. Kondisi ini ditandai dengan gangguan pertumbuhan akibat kekurangan gizi kronis dan paparan infeksi berulang yang dialami anak dalam 1.000 Hari Pertama Kehidupan. Pemerintah melalui Kementerian Desa PDTT telah melakukan berbagai intervensi untuk menurunkan angka stunting melalui pendekatan konvergensi layanan desa. Namun, evaluasi efektivitas intervensi ini masih bersifat manual dan kualitatif sehingga sulit dijadikan dasar kebijakan berbasis data. Oleh karena itu, penelitian ini bertujuan untuk mengembangkan model klasifikasi efektivitas respon intervensi stunting berbasis data layanan desa menggunakan pendekatan *machine learning*.

Penelitian ini menggunakan data sekunder dari Kementerian Desa PDTT tahun 2023 yang mencakup indikator layanan intervensi di tingkat desa. Setelah melalui tahap pra-pemrosesan seperti pembersihan data, normalisasi kategorikal, dan pelabelan efektivitas, data dianalisis menggunakan dua algoritma klasifikasi yaitu *Decision Tree* dan *Random Forest*. Model dikembangkan dengan *Python* dan divisualisasikan dalam bentuk aplikasi interaktif menggunakan *framework Streamlit*. Model kemudian dievaluasi menggunakan metrik akurasi, *precision*, *recall*, *f1-score*, serta *confusion matrix*, dan dilengkapi dengan interpretasi SHAP (*SHapley Additive exPlanations*) untuk menjelaskan kontribusi fitur terhadap hasil klasifikasi.

Hasil penelitian menunjukkan bahwa algoritma *Random Forest* memberikan performa yang lebih tinggi dibandingkan *Decision Tree* dalam mengklasifikasikan efektivitas intervensi desa terhadap pencegahan stunting. Aplikasi Streamlit yang dibangun mampu memfasilitasi input manual, visualisasi SHAP, dan evaluasi model secara interaktif. Penelitian ini memberikan kontribusi nyata dalam penerapan *machine learning* untuk mengevaluasi kebijakan berbasis data di sektor kesehatan masyarakat, khususnya di level desa. Ke depannya, model ini dapat dikembangkan lebih lanjut dengan data tambahan dan algoritma yang lebih kompleks untuk meningkatkan ketepatan klasifikasi.

Kata Kunci: stunting, *decision tree*, *random forest*, klasifikasi, desa, konvergensi, *machine learning*, SHAP

ABSTRACT

Stunting is one of the health problems that is the main focus of human development in Indonesia. This condition is characterized by impaired growth due to chronic malnutrition and exposure to repeated infections experienced by children in the First 1,000 Days of Life. The government through the Ministry of Villages, Disadvantaged Regions and Transmigration has carried out various interventions to reduce stunting rates through a village service convergence approach. However, the evaluation of the effectiveness of this intervention is still manual and qualitative, making it difficult to use as a basis for data-based policies. Therefore, this study aims to develop a classification model for the effectiveness of stunting intervention responses based on village service data using a machine learning approach.

This study uses secondary data from the Ministry of Villages, Disadvantaged Regions and Transmigration in 2023 which includes indicators of intervention services at the village level. After going through pre-processing stages such as data cleaning, categorical normalization, and effectiveness labeling, the data was analyzed using two classification algorithms, namely Decision Tree and Random Forest. The model was developed in Python and visualized in the form of an interactive application using the Streamlit framework. The model was then evaluated using accuracy, precision, recall, f1-score, and confusion matrix metrics, and was equipped with SHAP (SHapley Additive exPlanations) interpretation to explain the contribution of features to the classification results.

The results of the study show that the Random Forest algorithm provides higher performance than Decision Tree in classifying the effectiveness of village interventions for stunting prevention. The Streamlit application that was built is able to facilitate manual input, SHAP visualization, and interactive model evaluation. This study provides a real contribution in the application of machine learning to evaluate data-based policies in the public health sector, especially at the village level. In the future, this model can be further developed with additional data and more complex algorithms to improve classification accuracy.

Keywords: *stunting, decision tree, random forest, classification, village, convergence, machine learning, SHAP*