

ABSTRAK

Perbandingan Algoritma *Support Vector Machine*, *Random Forest* dan *Gradient Boosting* untuk Klasifikasi Balita Stunting

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Stunting merupakan salah satu permasalahan gizi kronis pada balita yang dapat menghambat pertumbuhan fisik, perkembangan kognitif, serta menurunkan kualitas sumber daya manusia di masa mendatang. Pemanfaatan teknologi *machine learning* dapat menjadi alternatif dalam membantu proses klasifikasi status balita *stunting* secara cepat dan akurat. Penelitian ini bertujuan mengimplementasikan algoritma *Support Vector Machine* (SVM), *Random Forest*, dan *Gradient Boosting*, serta membandingkan kinerja ketiga algoritma tersebut pada klasifikasi balita *stunting* menggunakan metode *10×10 Repeated Stratified K-Fold Cross Validation*. Penelitian dilaksanakan mengikuti tahapan *CRISP-DM* yang meliputi *Business Understanding*, *Data Understanding*, *Data Preparation*, *Modeling*, dan *Evaluation*. *Dataset* yang digunakan berjumlah 100.000 data antropometri balita dengan tiga fitur masukan, yaitu jenis kelamin, umur, dan tinggi badan, serta empat kelas target, yaitu *Normal*, *Severely Stunted*, *Stunted*, dan *Tall*. Evaluasi model dilakukan menggunakan metrik *accuracy*, *precision*, *recall*, dan *F1-score*. Hasil penelitian menunjukkan bahwa *Random Forest* memperoleh performa terbaik dengan rata-rata *accuracy* sebesar 100%, *precision* sebesar 1000%, *recall* sebesar 100%, dan *F1-score* sebesar 100%, diikuti oleh *Gradient Boosting* dan *Support Vector Machine* (SVM). Oleh karena itu, *Random Forest* direkomendasikan sebagai algoritma yang paling optimal untuk klasifikasi balita *stunting* pada *dataset* yang digunakan maupun *dataset* dengan karakteristik serupa.

Kata kunci: *machine learning*, *stunting*.

ABSTRACT

Comparison of Support Vector Machine, Random Forest, and Gradient Boosting Algorithms for Stunting Classification in Children Under Five

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Stunting is a chronic nutritional problem among children under five that can hinder physical growth, cognitive development, and the quality of future human resources. The application of machine learning offers an alternative approach to support faster and more accurate stunting classification. This study aims to implement Support Vector Machine (SVM), Random Forest, and Gradient Boosting algorithms and compare their performance in classifying stunting using 10×10 Repeated Stratified K-Fold Cross Validation. The research followed the CRISP-DM methodology, consisting of the phases of Business Understanding, Data Understanding, Data Preparation, Modeling, and Evaluation. The dataset consisted of 100,000 anthropometric records with three input features (gender, age, and height) and four target classes (Normal, Severely Stunted, Stunted, and Tall). Model performance was evaluated using accuracy, precision, recall, and F1-score. The results showed that Random Forest achieved the best performance with an average accuracy of 100%, precision of 100%, recall of 100%, and F1-score of 100%, outperforming Gradient Boosting and Support Vector Machine (SVM). Therefore, Random Forest is recommended as the most suitable algorithm for stunting classification using the dataset employed in this study as well as datasets with similar characteristics.

Keywords: Machine Learning, Stunting.