Machine Learning Classification Analysis for Proactive Prevention of Child Stunting in Bojongsoang: A Comparative Study

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Abstract:
Stunting is a health condition that needs attention from the Indonesian government. According to the World Health Organization (WHO), the prevalence of stunting in a coun... **View more**

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Abstract:
Stunting is a health condition that needs attention from the Indonesian government. According to the World Health Organization (WHO), the prevalence of stunting in a country should be below 20%, but in Indonesia, the prevalence of stunting is 21.6% as of 2023. An unbalanced dietary intake is one of the factors influencing the prevalence of stunting. Children with stunting may experience disruptions in growth intelligence and have a higher vulnerability to diseases. Healthcare professionals and researchers need to take appropriate preventive measures to reduce stunting occurrences. In efforts to reduce the incidence of stunting, concrete steps are needed to identify and predict stunting conditions in children using machine learning. Predictions facilitated by machine learning can be executed more efficiently, reducing the need for manual computation. This study employs three different methods to assess the performance of each method in predicting stunting cases. The machine learning methods used in this analysis include Logistic Regression, Random Forest, and Naïve Bayes. These three methods have already been proven in classifying stunting in other research studies. Imbalanced data will affect accuracy and F1-score macro. Oversampling is used as a method to avoid bias in the model. Imbalanced data yields accuracy results of 99.25% for Logistic Regression with an F1-score of 46.80%, 99.25% for Random Forest with an F1-score of 41.76%, and 94.5% for Naive Bayes with an F1-score of 37.42%. Balanced data results in increased F1-scores, namely 52.73% for Logistic Regression, 65.44% for Random Forest, and 60.12% for Naive Bayes.

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Contents

Health is one of the most crucial sectors in Indonesia that requires improvement, particularly addressing issues such as low birth weight or what is commonly referred to as stunting. Stunting is a disturbance in a child's growth and development due to chronic nutritional deficiencies and recurrent infections, characterized by their height falling below the standard (WHO, 2015). The Ministry of Health data reveals the Indonesian Nutrition Status Survey (SSGI) results, indicating a stunting prevalence of 24.4% in 2021, which decreased to 21.6% in 2023. According to the World Health Organization (WHO), the prevalence of stunting should ideally be below 20%, highlighting that Indonesia's figures remain high.

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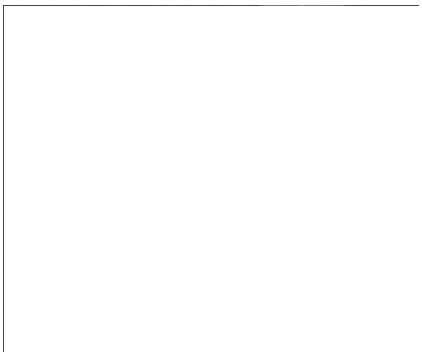

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