ANALYSIS OF TODDLER NUTRITIONAL STATUS BASED ON HEALTH INDICATORS USING THE LONG SHORT-TERM MEMORY MODEL

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ABSTRACT

This study aims to predict toddlers' nutritional status based on health indicator data using the Long Short-Term Memory (LSTM) method. The problem addressed in this study is the limitation of nutritional monitoring, which is still static and has not been able to analyze changes in nutritional conditions continuously over time. The data used consist of toddlers' anthropometric data, namely age, weight, height, and gender, in the form of time series data. The data were processed through cleaning, interpolation, labeling into three categories, namely normal, undernutrition, and overnutrition, and transformation into sequential data with a sequence length of six months as input for the model. The best model was obtained through hyperparameter testing with a configuration of 32 LSTM units, a dropout rate of 0.2, a learning rate of 0.005, a batch size of 32, and two dense layers with 64 and 32 units. The evaluation results showed a validation loss of 0.1197, a test accuracy of 93.66%, and a macro F1-score of 0.8722. These results indicate that the model is able to classify the data well across all classes, including minority classes. This model has the potential to serve as a basis for developing predictions of toddlers' nutritional conditions based on historical anthropometric data.

Keywords: *toddler nutritional status, anthropometry, LSTM, time series, prediction*

ANALISIS STATUS GIZI BALITA BERDASARKAN INDIKATOR KESEHATAN MENGGUNAKAN MODEL *LONG SHORT-TERM MEMORY*

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ABSTRAK

Penelitian ini bertujuan untuk memprediksi status gizi balita berdasarkan data indikator kesehatan menggunakan metode *Long Short-Term Memory* (LSTM). Permasalahan yang diangkat adalah keterbatasan pemantauan status gizi yang masih bersifat statis dan belum mampu menganalisis perubahan kondisi gizi secara berkelanjutan. Data yang digunakan berupa data antropometri balita, yaitu usia, berat badan, tinggi badan, dan jenis kelamin, yang bersifat runtun waktu (*time series*). Data diproses melalui tahap pembersihan, interpolasi, pelabelan ke dalam tiga kategori, yaitu normal, kurang, dan lebih, serta transformasi menjadi data sekuensial dengan panjang 6 bulan sebagai input model. Model terbaik diperoleh melalui pengujian hyperparameter dengan konfigurasi 32 unit LSTM, *dropout* 0,2, *learning rate* 0,005, *batch size* 32, serta dua *dense layer* berukuran 64 dan 32 unit. Hasil evaluasi menunjukkan *validation loss* sebesar 0,1197, *test accuracy* sebesar 93,66%, dan *macro F1-score* sebesar 0,8722. Hasil tersebut menunjukkan bahwa model mampu mengklasifikasikan data dengan baik pada seluruh kelas, termasuk kelas minoritas. Model ini berpotensi menjadi dasar pengembangan prediksi kondisi gizi balita berdasarkan data historis antropometri.

Kata kunci: status gizi balita, antropometri, LSTM, *time series*, prediksi