

# OPTIMIZING ANEMIA PREDICTION IN PREGNANT WOMEN USING A DECISION TREE ALGORITHM AND WEB-BASED PARAMETER TUNING (CASE STUDY: PUSKESMAS MLATI II)

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## ABSTRACT

The prevalence of anemia among pregnant women at Puskesmas Mlati II remains relatively high, with cases frequently occurring during the third trimester. Anemia diagnosis at Puskesmas Mlati II is conducted through laboratory tests followed by examination by the attending midwife. In response to this issue, this study focuses on developing and optimizing a prediction model using the Decision Tree algorithm and parameter tuning, utilizing data from Puskesmas Mlati II, and creating a simple system to implement the developed prediction model. The clinical data used in this study consists of 336 samples. The data was split in a 70:30 ratio, with 235 samples used for training and 101 samples for testing. The results of the prediction model using the Decision Tree algorithm and parameter tuning across four trials showed the following testing accuracies: 97% for the Decision Tree model, 96% for the Decision Tree model without feature selection, 97% for the Decision Tree model with Grid Search, and 98% for the Decision Tree model with Random Search. The best model, which was the Decision Tree with Random Search, was used to develop a system for predicting anemia among pregnant women. Testing the model's ability to predict new data showed that the Decision Tree model achieved 90% accuracy, while the Decision Tree models with Grid Search and Random Search achieved 95% accuracy in predicting outcomes consistent with expert assessments. Black Box Testing on the system resulted in 36 test cases, all of which passed, yielding a success rate of 100%. Thus, it can be concluded that the results and testing conducted are aligned with the objectives of the study, Optimization of Anemia Prediction in Pregnant Women Using Decision Tree Algorithm and Parameter Tuning for Web-Based Implementation (Case Study: Puskesmas Mlati II).

**Keywords:** Anemia, Decision Tree, Machine Learning, Parameter Tuning, Website