

ABSTRAK

NUR MUTMAINNAH HASRUL. Klasifikasi Risiko Serangan Jantung Menggunakan Support Vector Machine. Dibimbing oleh DR. DRA. DWINA KUSWARDANI, M.KOM.

Penelitian tugas akhir ini berjudul “Klasifikasi Risiko Serangan Jantung Menggunakan Support Vector Machine.” Penyakit jantung merupakan salah satu penyebab utama kematian di Indonesia, sehingga diperlukan pendekatan berbasis data untuk mendukung deteksi dini risiko serangan jantung. Penelitian ini bertujuan membangun model klasifikasi risiko serangan jantung menggunakan Support Vector Machine (SVM) dengan kernel Radial Basis Function (RBF) pada dataset *Heart Attack Prediction in Indonesia*. Metode penelitian mengikuti kerangka CRISP-DM yang meliputi tahap pemahaman masalah, persiapan data, pemodelan, dan evaluasi. Tahap *data preparation* mencakup penanganan *missing value*, *label encoding*, normalisasi fitur, serta penyeimbangan kelas menggunakan SMOTE. Model dievaluasi menggunakan *confusion matrix* dengan metrik *accuracy*, *precision*, *recall*, dan *F1-score*. Hasil menunjukkan bahwa model SVM RBF memperoleh akurasi sebesar 73,26%, dengan *precision* 72%, *recall* 75%, dan *F1-score* 74% pada kelas berisiko. Nilai *recall* yang relatif tinggi menunjukkan kemampuan model dalam mendeteksi pasien berisiko secara cukup baik. Temuan ini menunjukkan bahwa SVM RBF efektif dalam menangani pola hubungan non-linear antar faktor klinis dan gaya hidup.

Kata kunci: Klasifikasi, Support Vector Machine, Kernel RBF, Serangan Jantung, SMOTE.

ABSTRACT

NUR MUTMAINNAH HASRUL. *Heart Attack Risk Classification Using Support Vector Machine. Supervised by DR. DRA. DWINA KUSWARDANI, M.KOM.*

This undergraduate thesis is entitled “*Heart Attack Risk Classification Using the Support Vector Machine.*” Heart disease remains one of the leading causes of death in Indonesia, highlighting the need for data-driven approaches to support early detection of heart attack risk. This study aims to develop a heart attack risk classification model using the Support Vector Machine (SVM) algorithm with a Radial Basis Function (RBF) kernel on the *Heart Attack Prediction in Indonesia* dataset. The research methodology follows the CRISP-DM framework, which includes the stages of business understanding, data preparation, modeling, and evaluation. The data preparation stage involves handling missing values, applying label encoding to categorical variables, normalizing numerical features, and addressing class imbalance using the Synthetic Minority Over-sampling Technique (SMOTE). The model is evaluated using a confusion matrix with performance metrics including accuracy, precision, recall, and F1-score. The results show that the SVM RBF model achieves an accuracy of 73.26%, with a precision of 72%, recall of 75%, and F1-score of 74% for the at-risk class. The relatively high recall value indicates that the model is capable of effectively identifying patients at risk of heart attack. These findings suggest that SVM with an RBF kernel is effective in handling non-linear relationships among clinical and lifestyle factors in heart attack risk classification.

Keywords: Classification, Support Vector Machine, RBF Kernel, Heart Attack, SMOTE.