ABSTRACT

COMPARISON OF SUPPORT VECTOR MACHINE ALGORITHM AND RANDOM FOREST ALGORITHM IN HYPERTENSION PREDICTION

Oleh

Syaloom Zefanya Yuni Br Manurung (21102036)

Hypertension is a non-communicable disease that poses a risk of serious complications and continues to show increasing prevalence both globally and nationally. Early detection of hypertension is essential to prevent severe health consequences. This study aims to compare the performance of two machine learning algorithms, namely Support Vector Machine (SVM) and Random Forest (RF), in predicting hypertension using medical record data from Puskesmas Purwokerto Timur I. Given the imbalanced nature of hypertension data, this research applies a class balancing technique, namely Oversampling. The methodology involves data preprocessing, model development using SVM and RF, and evaluation using accuracy, precision, recall, and F1-score metrics. The experimental results indicate that RF delivers the highest performance, achieving an accuracy of 98.92%, while SVM reaches its best accuracy at 83.91%. These findings suggest that RF is more effective in predicting hypertension from imbalanced datasets, and the use of Oversampling significantly enhances model performance. This study is expected to contribute to the development of more accurate hypertension prediction systems to support public health prevention and management efforts.

Keywords: *Hypertension, Oversampling, Prediction, Random Forest, Support Vector Machine*