

ABSTRACT

Hypertension is a global health issue of great importance and has a significant impact as a major risk factor for cardiovascular diseases, which can lead to serious complications if not properly managed. Early detection is crucial to preventing long-term health impacts. This study aimed to develop a classification model to accurately predict hypertension risk, support early prevention efforts, and provide a web-based prediction application alongside an interactive dashboard for hypertension risk analysis. The Naïve Bayes Classifier and k -Nearest Neighbor (k -NN) algorithms were selected for their ease of implementation and ability to handle complex medical data. The research processed 1,132 raw data records from Puskesmas Gesi, Sragen, which were refined through preprocessing to yield 901 clean data records, later divided into 810 training data (90%) and 91 *testing* data (10%). The results revealed that the Naïve Bayes Classifier achieved an accuracy of 90.1%, precision of 91.5%, recall of 97.4%, and F-1 score of 94.4%, while k -NN with $k = 3$ outperformed with an accuracy of 97.8%, precision of 98.7%, recall of 98.7%, and F-1 score of 98.7%. The k -NN algorithm proved more effective in identifying complex patterns in hypertension data, making it a superior choice for enhancing clinical decision-making accuracy. Additionally, the study developed a hypertension risk prediction application and an interactive dashboard using Streamlit and Looker Studio, allowing users to predict hypertension risks interactively and facilitating practical risk analysis and early intervention.

Keywords: Hypertension, Classification, Naïve Bayes Classifier, k -Nearest Neighbor, K-Fold Cross Validation, Streamlit, Dashboard, Looker Studio.