ABSTRAK

Penelitian ini mengusulkan metode klasifikasi tingkat hipertensi menggunakan algoritma *K-Nearest Neighbor* (K-NN) berdasarkan sinyal *Photoplethysmograph* (PPG) dan estimasi tekanan darah. Data sinyal *Photoplethysmograph* digunakan untuk mengekstraksi fitur fisiologis yang mencerminkan kondisi kardiovaskular, sementara nilai sistolik dan diastolik hasil estimasi dijadikan acuan klasifikasi tingkat hipertensi. Data dikumpulkan dari 277 responden menggunakan perangkat non-invasif, dan model dikembangkan dengan bantuan platform Python dan MATLAB. Algoritma *K-Nearest Neighbor*, khususnya dengan nilai k=1, menunjukkan akurasi klasifikasi tinggi sebesar 93,9% dalam membedakan enam kategori tekanan darah. Hasil ini menunjukkan bahwa pendekatan ini berpotensi untuk dikembangkan menjadi sistem pemantauan tekanan darah secara portabel dan real-time.

Kata kunci: klasifikasi hipertensi, *K-Nearest Neighbor*, *photoplethysmograph*, estimasi tekanan darah, pemantauan non-invasif.

ABSTRACT

This study presents a method for classifying hypertension levels using the K-Nearest Neighbor (K-NN) algorithm based on Photoplethysmograph (PPG) signals and estimated blood pressure. The Photoplethysmograph signal data were utilized to extract physiological features indicative of cardiovascular conditions, while the estimated systolic and diastolic values served as reference labels for hypertension classification. Data were collected from 277 subjects using a non-invasive monitoring device, and the model was implemented using Python and MATLAB platforms. The K-Nearset Neighbor algorithm, particularly with k=1, demonstrated high classification accuracy of 93.9%, effectively distinguishing between six blood pressure categories. The findings indicate that this approach has strong potential for developing portable, real-time hypertension monitoring systems.

Keywords: hypertension classification, K-Nearest Neighbor, photoplethysmograph, blood pressure estimation, non-invasive monitoring.