

ABSTRACT

Hypertension is one of the crucial health problems in Indonesia because it is the highest cause of death and is predicted to increase 80% by 2025. Currently, there are still many hospitals that carry out conventional treatments and still considered less effective because it can cause problems in the aspects of health, technology and security. Problems from these three aspects are seen from the retrieval of patient data which is still seen at one time, conventional medical record storage which is still limited in time and there are still many thefts of patient medical record data.

Based on these problems, a website-based medical record system was designed for the early detection and monitoring of hypertension using machine learning and the Named Data Networking (NDN) network. The dataset used in making the system. This secondary data contains 657 Photoplethysmography signals and 219 patient information data, which will be predicted for SBP and DBP values and classified into four classes: Normal, pre-hypertension, grade 1 hypertension, and grade 2 hypertension. Pre-processing uses Moving Average for denoising, Butterworth Filter for filtering, and Random Over Sampler for upsampling with machine learning convolutional neural network (CNN) methods. Website development using HTML and JavaScript with servers and security using the NDN network. For connection on the website to the router. Nearby uses Web Socket Secure (WSS) to ensure connection security. On the router, it uses a forwarding application, and on the server, it uses a forwarder with Python as the web server programming language. Each system is integrated into one to become a complete E-Health system.

After testing and research for each system, the best architectural model uses the hyperparameter optimizer Adam, learning rate 0.005, batch 32, and epochs 500 to get an accuracy value of 95% with the test results, the prediction of SBP and DBP has the slightest difference of 0.019 and the largest difference of 7,913, and from 32 trials of hypertension class diagnosis, there is a difference of 3 data with the original data. Website security has an A score of 90-99, an average time wait of 61ms, and a speed index website of 547 ms. The best machine learning models have been integrated with websites and servers, and the system has been implemented well.

Keywords: *E-Health, Machine Learning, Photoplethysmography, NDN, Website*