

ABSTRACT

Oxygen saturation and heart rate are vital signs for the human body. These two vital signs determine the health condition of the human body, especially breathing. From time to time, the whole world has experienced several outbreaks and pandemics that attack the human respiratory system. For this reason, it is necessary to measure oxygen saturation and heart rate that can be used easily and comfortably at any time.

In this study, a wearable pulse oximeter was created that can measure a person's oxygen saturation and heart rate at any time and is easily monitored on the android application. For data transmission, the device is supported by Bluetooth Low Energy (BLE) so that the battery used can last a long time. So that the detection data does not experience spikes when used, data analysis is carried out using the Artificial Neural Network (ANN) method to reduce detection spikes during activities on the Jupyter Notebook 6.0.3 software.

With the MAX30100 sensor as a pulse oximeter sensor and nRF52832 as a microprocessor as well as a communication module, the tool has been successfully made with dimensions of 5.3 cm x 4 cm x 3 cm that can be used in the user's hand. All SpO₂ and bpm detection data were successfully sent to Android via Bluetooth Low Energy (BLE). The device made successfully detects the index finger with an average accuracy of SpO₂ and bpm of 99.59% and 97.14%, and successfully detects under normal conditions, after waking up and exercising with the largest average accuracy of SpO₂ of 99.72 % and bpm 98.34%. By analyzing using ANN on the Jupyter Notebook 6.0.3 application, it succeeded in reducing detection spikes with an average accuracy of 86.45%. And the device can work at low power (low energy), namely 78.53 mW - 107.95 mW with a battery life of 8 hours 33 minutes.

Keywords: *wearable, pulse oximeter, SpO₂, bpm, Artificial Neural Network, ANN*