

## ABSTRACT

The field of health is inextricably linked to humans, as a healthy body is a prerequisite for all human activities. It is well documented that the proportion of the Indonesian population comprising individuals of advanced age has increased. It is, therefore, a factor that must be taken into account, given the increased susceptibility of the elderly to a range of illnesses. In the field of medicine, there are now medical check-ups that include monitoring heart rate and oxygen levels in the blood (SpO<sub>2</sub>). These two parameters can serve as indicators of the health of the elderly. However, they cannot be universally applied, as certain conditions of the elderly may limit their ability to undergo such examinations. These conditions include financial constraints, physical limitations preventing hospital visits, and the situation of elderly individuals living alone, who may lack the supervision of family members who are unable to accompany them.

This study proposes a solution for the design of a device that can assist in the monitoring of heart rate and blood oxygen levels (SpO<sub>2</sub>) in elderly individuals. Wearable technology is an optimal means of monitoring conditions. The proposed wearable device will take the form of a bracelet. This bracelet will be capable of monitoring the condition of the elderly body and will be connected to a mobile application, allowing for remote monitoring. The design of this tool will consist of a MAX30100 sensor with an ESP32 microcontroller connected to a display, which will show the output on the bracelet.

The test results demonstrate that the device exhibits an accuracy value exceeding 90% for heart rate detection and blood oxygen levels (SpO<sub>2</sub>). Moreover, Quality of Service (QoS) testing from the device to the Blynk application on two parameters, namely throughput and delay, yielded an average of 10654,826 bps and 57,341 ms, respectively. These results indicate an efficient data transmission process. Additionally, the reliability of the system was tested, and it was found that it can be run and perform remote monitoring through the Blynk application.

Keywords: health, elderly, wearable device, wristband, SpO<sub>2</sub>, heart rate