ABSTRACT

Hemoglobin level is a vital parameter that can determine the health condition of the human body. Indications of disease caused by lack of hemoglobin is anemia and due to excess hemoglobin is polycythemia. Nationally, the measurement of hemoglobin levels is carried out invasively using the Sahli method of 27.9%. Measurement of invasive hemoglobin levels takes a long time due to the process of reagent analysis and chemical lysis of blood samples in the blood laboratory. In general, blood sampling is done using a needle, which can cause pain and increase the spread of other diseases through needle-stick wounds.

Measurement of hemoglobin levels can be done non-invasively using multiwavelength pulse oximetry which has a working principle of measuring the difference in red and reflective wavelengths. Therefore, in this final project, has made a non-invasive real-time measurement system for hemoglobin levels based on the internet of things was created using an oximetry sensor with a linear regression algorithm integrated with the Firebase Realtime Database.

The test results obtained R-Square of 0.894426 and RMSE of 0.324898 which shows the category of a strong relationship between SpO2 and hemoglobin variables that have met the accuracy requirements. Accuracy testing is done by observing the results of testing using the data in the dataset on the linear regression algorithm of 97.9059%. In addition, based on testing the accuracy of hemoglobin level measurement which is carried out directly by comparing the results of invasive and non-invasive hemoglobin, an accuracy of 94.21% is obtained. The voltage source on the hardware can last up to 78 hours with an availability value of 98.36% and reliability of 98.33%. The hardware system can measure non-invasive hemoglobin levels in real-time with a delay of 133,456 ms and a throughput of 9485,466 bps.

Keyword: *Hemoglobin, Linear Regression, Internet of Things*