ABSTRACT

Anemia is a condition in which red blood cells (erythrocytes) and hemoglobin (Hb) in a person's body are below normal values. To carry out the detection of anemia is usually done invasively by taking a sample of a person's blood through a vein. In addition to invasive means, the detection of anemia can also be done in a non-invasive way or without taking a portion of blood using a venous blood vessel. Physical anemia examination, one of which is by paying attention to the paleness of the eye conjunctiva because normally the conjunctiva of the eyes is red but in circumstances such as anemia the conjunctiva of the eye will be pale caused by blood flow that does not flow in the conjunctiva area of the eye.

In this Final Project research, non-invasive anemia detection has been carried out through images of the conjunctiva of the eye using the Principal Component Analysis (PCA) method and the K-Nearest Neighbor (K-NN) method. This study detected anemia through four stages, namely image acquisition, preprocessing, trait extraction and classification. At the preprocessing stage, cropping, resizing and converting RGB color images to grayscale is carried out, then the characteristic extraction process uses the Principal Component Analysis (PCA) method and the classification process uses the K-Nearest Neighbor (K-NN) method. Datasets of eye conjunctival images were carried out directly through smartphone cameras in JPEG (*.jpg) format from 100 individuals.

Based on the test results using the Principal Component Analysis (PCA) method and the K-Nearest Neighbor (K-NN) classification with an image size of 256×128 pixels, a PCA percentage parameter of 40%, cityblock distance, with a value of K = 9 the system is able to produce an accuracy of 87.5% with a computation time of 1,317 seconds using 40 test data and 60 training data.

Keywords: Anemia, Conjunctiva of the Eye, Hemoglobin, K-Nearest Neighbor Principal Component Analysis.