ABSTRACT

This Final Project proposes a technique for measuring cholesterol levels non-invasively from eye images using the Principal Component Analysis (PCA) extraction method, the classification method for Artificial Neural Network (ANN), and linear regression. This cholesterol measurement is based on iridology, where the white iris is obtained on the iris. The thicker the white membrane, the higher the levels of cholesterol in the body. Parameters used are type of layer, principal component, dataset, and number of hidden layer neurons.

In the initial stage, eye image taking is done by researchers. 60 eye images were used with details: 20 normal eye images, 20 cholesterol risk eye images, and 20 high cholesterol eye images. Furthermore, the eye image through the stage of pre-processing with manual cropping, resized to 660 x 600 pixels, and converted from RGB to grayscale. The PCA method is used on pre-processing eye images to extract PCA features. Then the ANN classification method was used to classify cholesterol levels into three groups, namely normal, risk of cholesterol, and high cholesterol. The linear regression method is used to calculate cholesterol levels from the ANN classification results.

The results of this Final Project indicate that the PCA method is able to extract eye images. The ANN method classifies cholesterol levels in the body with an accuracy of 96.67% in the number of hidden layer 40 neurons and computation time of 0.0019 seconds. Linear regression methods measure cholesterol levels and classify them into three groups using threshold changes with an accuracy value of 96.67%. This indicates that ANN classification is not needed. The results in this Final Project are expected to be a reference as early detection of cholesterol levels in the body.

Keywords: Artificial Neural Network (ANN), Cholesterol, Linear Regression, Principal Component Analysis (PCA)