ABSTRACT

Heart rate is the sound of heart palpitations that is produced due to the flow of blood through the heart. The heart is such a vital organ that there are many methods to detect it, starting from conventional to modern methods. Technological developments make heart rate detection systems more advanced. The design of a heart rate detection method can also be applied to facial digital image processing.

In this final project research, the development will be carried out regarding the extraction of human heart rate using facial digital image processing. The method used are the Blind Separation Signal (BSS) and the detection of face detection used is You Only Look Once (YOLO) third generation or YOLOv3 by observing the ROI of a person's facial skin color variations caused by blood circulation. The result is a human heart rate based on the python language application that makes it easy for us to measure heart rate.

The parameters to be analyzed in this study include accuracy, precision, recall, F1 score, specificity, average confidence, mAP, tolerance, and MSE. The accuracy obtained for the YOLOv3 object detection model is 95%. The best test was carried out in a straight face position with a distance of 40 cm between the face and the laptop computer and was carried out at night using 14.5watt LED lighting and the highest accuracy was 97.7%. It is hoped that in the future people will be able to measure heart rate by simply recording a face for a few seconds on a laptop camera and in real-time.

Keywords: *Heart, Heart Rate, Face Digital Image Processing, Blind Separation Signal (BSS), You Only Look Once (YOLO), Region of Interest (ROI).*