# Abstract

Red blood cells or erythrocytes is one of the important parts of the human body whose role carries oxygen to all body tissues and removes carbon dioxide from the body. The number of red blood cells in humans varies from one person to another. However, a red blood cell count exceeding the normal limit may also indicate that the person is suffering from the disorder. One of the abnormalities with excess red blood cell count is called Hematuria. In hematuria, the urine will change color to redness or slightly brownish, although not all brownish urine is categorized as having hematuria symptoms. Hematuria that can only be detected using a microscope is called Mikroskopic Hematuria. Hematuria detection is generally still manual. In this way of course the detection takes a long time and the risk of human error is possible. In the previous study, the detection of red blood cells was performed using several algorithms namely Canny, Sobel, and Hough Transform. However, some of these algorithms have not yet analyzed the best time complexity of edge detection algorithms. To solve the above problem, this final project performs the best time complexity analysis of red blood cell edge detection algorithm for urine detection of hematuria based digital image processing. The method used is 1. Conduct literature study, 2. Outline the existing algorithm code, 3. Calculate the complexity of the edge detection algorithm of the source code of the algorithm found, 4. Analyze the complexity of the edge detection algorithm to determine the best algorithm. Based on the results of analyzes performed on computer devices, the Canny algorithm has a time of execution of 15 seconds and has a complexity value of $O(4(N^2 - N + 1) + 20)$. Sobel x and Sobel y algorithms have an execution time of 43 seconds and have a complexity value of $O((N - 2)^2N + 20)$. The Hough Transform algorithm has a 371 second execution time and has a complexity value of $O((N^2 + N) + 20)$.

**Keywords:** Hematuria, red blood cells, complexity algorithm, digital image processing.