

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Literature Study

This is the first steps to carry out this project. In this stage, several journals were collected to gather further information regarding the fingerprint classification using several different methods. All of this journals were then used as the reference of my project.

3.2 Collecting Sample Images

This project will use the left thumb fingerprint image. In this project, 72 fingerprint images were used. There were 36 images using the scanner and 36 images of stamps fingerprint image

3.3 Applying Method

Code programming of the edge detection to make fingerprint patterns using the canny edge detection method.

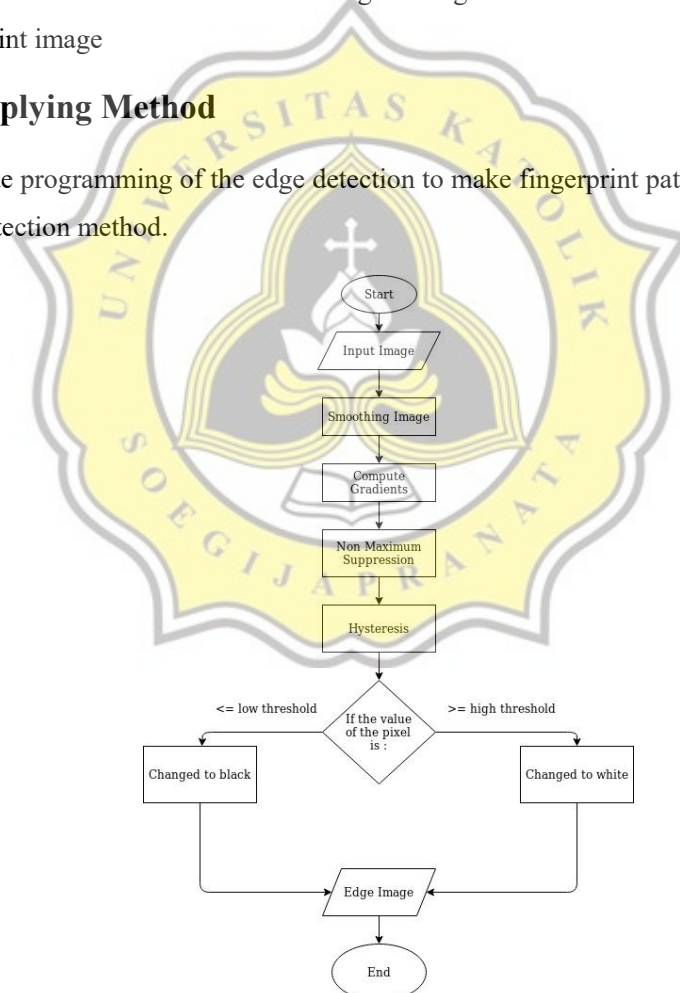


Illustration 8: Canny Flowchart

First thing that should be done is the smoothing process for the image. This process is done so that the fingerprint images were produced without any noise. Going

to the next process which was the compute gradients, this process was aiming to calculate the potential gradient from the edge of the image. After that, there was a non-maximum suppression which was intended to determine the edge point of the image. Then, the hysteresis process was done to create an outline based on the threshold, if the edge point was \geq threshold, then a white outlines will be generated, however if the edge point was \leq threshold, then an outlines will not be formed at all / have a black color. After that, a program should be created to calculate the distance proximity value between the sample image and the test image using the Euclidean distance.

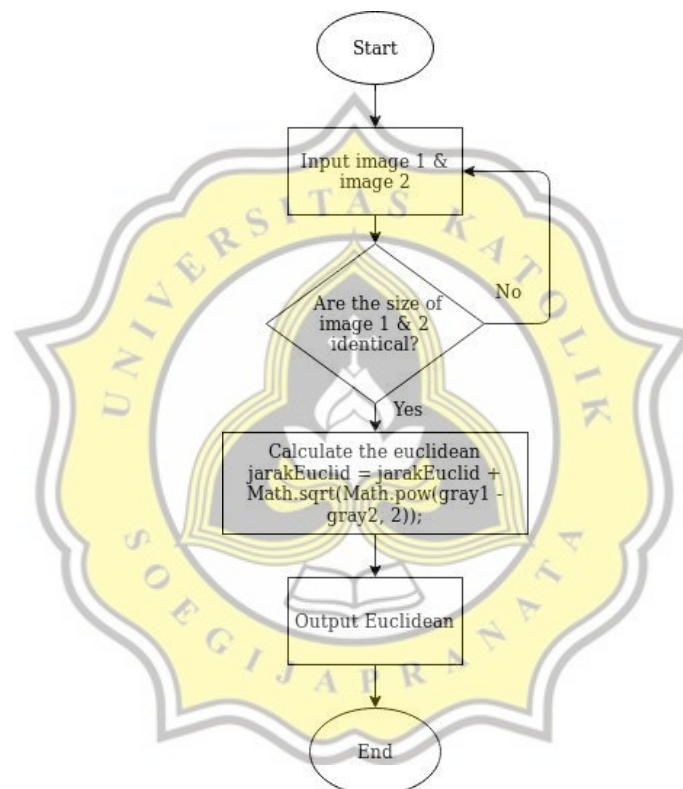


Illustration 9: Flowchart Euclidean

Firstly, we should input the first picture and second picture as comparison. Then the picture will be checked whether the size was identical or not. If the size was different, then it will go back to the image inputting process, while if it was identical, it will enter the Euclidean calculation process. The Euclidean calculation method was using the Pythagoras concept. If the Euclidean distance was 2 dimensional, there will be 2 variables that were used as comparison which were x, and y, then if it's applied to the image processing, the one that will be measured was the pixel value. The result will then be obtained from Euclidean.

After that, GUI program should be created to apply the edge detection program and the Euclidean distance as well. This program used the java programming language in Netbeans IDE.

3.4 Testing

This project use 15 fingerprint samples. After all of the data were complete, the fingerprints will then be piloted into the program. The image will enter the extraction steps by using the canny edge detection methods. After passing the edge detection, all of the picture will then be gathered together thus forming a single input image. Then at the end, the input image will be compared with all of the image using the Euclidean distance calculation.

3.5 Analyze

Compare the data using scanner with the data that use stamps fingerprint, then classified them by calculating the score that have closest gap with the sample image. Finally make the conclusion.

