

CHAPTER 4 ANALYSIS AND DESIGN

4.1 Analysis

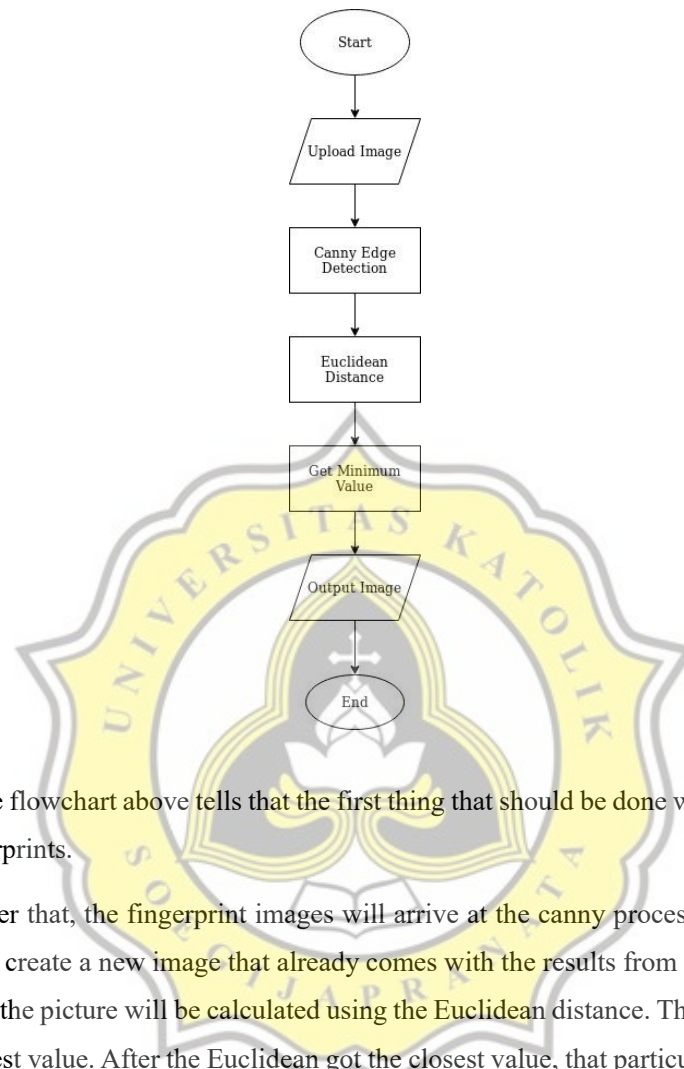
This project was created to recognize and groups the fingerprint image based on their patterns. The fingerprint patterns were grouped into 3 basic pattern, they are whorl, loop, and arch. The image processing steps should be done in order. The segmentation process, like the edge detection used in image processing, was usually used as the preprocessing steps. The first process that should be done was the image smoothing process. This process was aimed to create an output image without any noise. Then going to the compute gradients process, this process was intended to calculate the potential gradient of an edge in the image. After that, the non-maximum suppression process was aimed to localize the edge precisely. And lastly, is the hysteresis process in which this process was intended to determine the edge of the image. So if the pixel value is \leq treshold, then it will be changed to black, vice versa, if the pixel value is \geq treshold, then it will be changed to white.

Afterwards, after the edge detection process was done we will go to the classification process by measuring the proximity value from the sample image. Here I used the euclidean distance method. What should be done in the euclidean process was that we have to input image 1 and image 2 as comparisons, then the size of those image will be checked whether they are identical in size or not, if not they will be returned to the input image process, but if they were identical in size, they will enter the euclidean calculation process. The euclidean calculation method is 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.

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Illustration 10: Euclidean Formula

4.2 Desain



The flowchart above tells that the first thing that should be done was to input the image of the fingerprints.

After that, the fingerprint images will arrive at the canny process in which the canny process will create a new image that already comes with the results from edge detection. Next, the value of the picture will be calculated using the Euclidean distance. Then the Euclidean will get the closest value. After the Euclidean got the closest value, that particular fingerprint image will then be known is most similar to whose fingerprint based on the Euclidean results.

The illustration below is the GUI view based on the flowchart above.

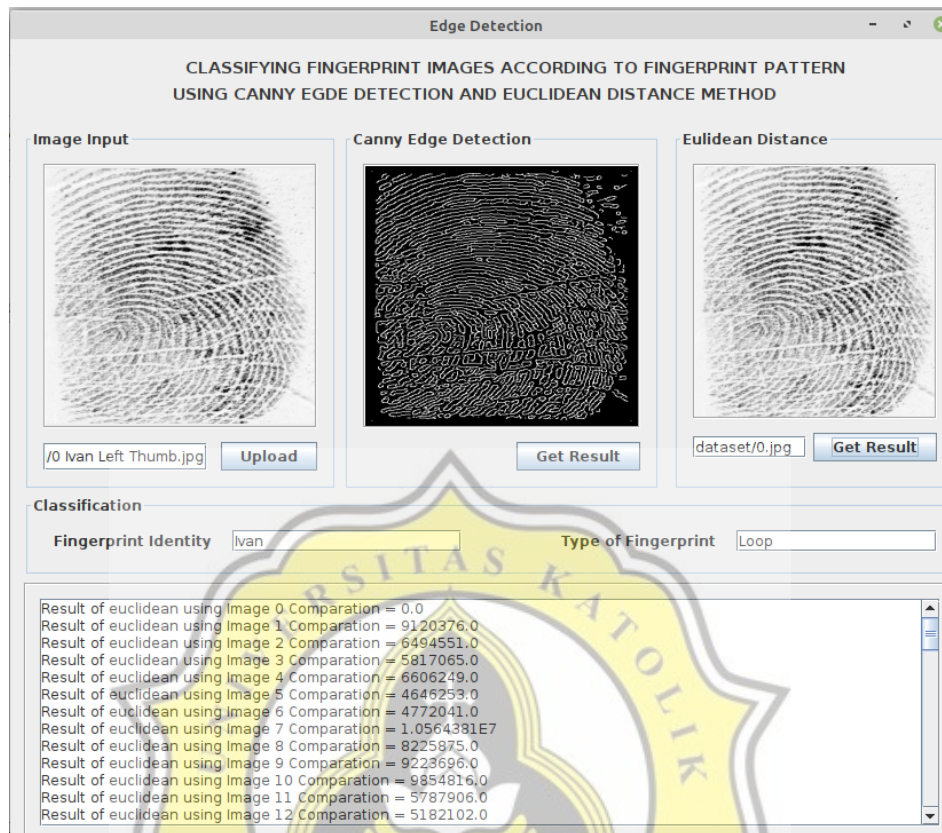


Illustration 11: GUI view

Just like it is shown in the illustration 4 above, I inputted Ivan's fingerprint image. On the image, the name of the fingerprint's image was 0_Ivan to ease the reading of the results. Then, it was known from the Euclidean result, the closest fingerprint was the image 0 with Euclidean results of 0.0 and in GUI view, Ivan's name will pop out. In other words, the Euclidean can recognize the fingerprints as Ivan's fingerprints.