ABSTRACT

Pattern recognition algorithm is very important for robotic sensing and computer vision. On this thesis, Hough Transform Algorithm is tested to detect simple closed curve like circle and ellipse. On the previous research, Hough Transform Algorithm was used to detect the number of N-side from a geometry object. However, there is still no research to analyze Hough Transform performance in detecting and differentiating simple closed curve.

To detect an object such as ellipse and circle in a digital image, first the image is acquired by capturing from a webcam or generating images from computer. Then the preprocessing stage will be done to get its edges. Next the edges will be transformed using Standard Hough Transform and the curve from Hough Transform will be analyzed. The circle will have a more constant sinusoidal curve than the ellipse. Therefore, in this research standard deviation method is used to differentiate those objects. After gaining the expected ones, a Modified Hough Transform is used to reconstruct the objects.

To analyze the performance of algorithm, all the 108 images of cicrle and ellipse with different color and size is tested. Based on the results, the system can detect and distiguish circle and ellipse objects with 95,46% accuracy as well as reconstruct those object with 100% accuracy. The average computation time in circle reconstruction is 4,86 seconds and ellipse reconstruction is about 0,594 seconds

Keywords : Standard Hough Transform (SHT), Modified Hough Transform (MHT), Circle and Ellipse