

ABSTRACT

The location of fruits on three is one of the important things required in harvesting system. In Indonesia, fruit harvesting system is still done manually (manpower). Therefore, research for the development of existing technologies and the creation of new technologies are currently being done, so that the system can be efficient in time and effort along with the rapid development of technology.

In this final project, the research of segmentation technique for fruit tracking on the tree based on shape analysis has been done. Segmentation methods used in this study is the Cr layer thresholding using fuzzy entropy. To obtain optimal results, particle swarm optimization is used as the optimization method. Next, shape analysis with Circular Hough Transform method has been done. This method was used to count the fruits.

The result from this final project is the best value of particles' number and maximum iteration. Based on the system accuracy analysis, the best particles' number is 50, while the best maximum iteration is 300, which the system accuracy is 75%. Based on the computational time analysis, the best number of particles is 10, while the best maximum iteration is 25, which the computational time is 5.96 s. If the system accuracy and computational time are considered, the best particles' number is 10, while the best maximum iteration is 100, which the accuracy of system is 78.125% and the computational time is 19.56 s.

Keywords: Image Segmentation, Thresholding, Fuzzy Entropy, Particle Swarm Optimization, Shape Analysis, Circular Hough Transform