ABSTRACT

Edge detection is the process of extracting the edge information from the image so it is decisive to understand the image content. GPU (Graphic Processing Unit) is a specialized processor for graphics processing on computer. NVIDIA has also developed a technology called CUDA (Compute Unified Device Architecture). CUDA is an architecture of hardware and software to manage parallel computing process on GPU. Ant Colony Optimization algorithms (ACO), are optimization algorithms that inspired from nature ants exploring shortest route for food. in this algorithm, applies ant as agent with update pheromone matriks in order to find the solution space.

In this research, the existing data will be processed in two stages, namely preprocessing input image and edge detection process. In the preprocessing stage of processing will be done so that the image can be processed at a later stage. For image preprocessing stages, RGB image will be added salt&peper noise and gaussian noise and change into grayscale image. After RGB image turn into grayscale image, then edge detection process executed using Ant Colony Optimization (ACO) algorithms. Edge detection process will be running in CPU and GPU.

From the analysis, showed that there was no significant difference in the quality image edge detection result running on CPU dan GPU. While the computing time on GPU faster than CPU with speedup of 1.24 for 128x128 pixel image, 1.42 for 256x256 pixel image, and 1.54 for 512x512 pixel image.

Keywords: *Edge detection, Ant Colony Optimization (ACO), GPU, CUDA*