

ABSTRACT

Ant Colony Optimization (ACO) Algorithm is a probabilistic technique for solving computational problems to find the shortest path. ACO was observed based on the habits and behavior of real ants in find food. Many experts examining or change the probabilistic to metaheuristic in order to fasten and more accurate in the selection rather than just using probabilistic. One of the ACO metaheuristic is Tabu Search Algorithms.

Parallel computing is really needed in computational problems which have high complexity so that it can be done fastly. Parallel computing requires high-performance hardware and software to execute the algorithm in parallel. One of them is Graphic Processing Unit (GPU) computing. This research will be implemented by ACO with tabu search on GPU, and then analyzed the input variables that affect the Ant Colony algorithm with a tabu search metaheuristic.

After doing research and statistical tests showed that all the variables (α , β , $\maxNode(N)$, $\maxAnt(n)$) affects the computation time with correlation value 0,913. Where the variable $\maxAnt(n)$ is most influential with correlation value 0,731. If the value of α is greater than 1 and value of β is smaller than value of α then the optimum solution is reached faster for the shortest path problem.

Keywords: *Ant Colony, Tabu Search, GPU Computing, CUDA.*