

Abstract

Graf has been widely applied in everyday life, especially in the field of computer programming. One example application graph discussed in this paper is to seek the path or the shortest path from the starting point towards the destination point. Research on this paper using the ant algorithm is Ant Colony System (ACS) with the Multi Agent System (MAS). The system built use ants as an agent assigned to look for solutions of optimization problems the shortest distance. ACS with MAS is an extension of Ant System (AS) where there is a difference in the status transition rule and pheromone updating.

This research was done by making systems that apply MAS in the ACS. Then, examined using parameters that can affect the result of the shortest distance in terms of parameters used in the calculation (regulator of pheromone intensity (α) and visibility of the regulator (β)) and parameters to determine the transition state in which ACS involves the process of exploration and exploitation to generatesolutions.

The final result obtained from this study were ACS with MAS should use the value weighted intensity regulator of pheromone (α) value is smaller than the value of weight control visibility (β) approximately 50% performance level, and to qualify $q \leq q_0$ on the probability of choosing node transition rules using $q_0 = 0.75$ which shows more opportunity exploitation process for the shortest distance close to the minimum. In the testing division / setting the number of exploration and exploitation based on arc / track has been skipped show would be better if there is a balance between both processes. In addition, memory and time appear to change linearly or more influenced by the number of nodes.

Keywords: Graf, ACS, MAS, AS, Exploration, Exploitation.