



Ant Colony Optimization Based Traffic analysis for finding shortest path in Mobile Adhoc Networks

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Abstract

This paper presents the suitability of using a genetic technique in routing data over wireless sensor networks. ACO is used to find the optimistic path. The proposed approach results in finding the shortest path using backtracking technique by pheromones. The optimized path helps in minimizing the round trip time of data can also analyze the free traffic available in the network.

Key Words: Genetic technique, backtracking, pheromones

1 INTRODUCTION

The idea of using ant colony algorithm is to finding an optimal path in a graph, based on the performance of ants looking for a path between their colony and a source of food, also by having something simple as ants to find a solution for complex computation problems seemed interesting, These new techniques can be used to

reduce time consumption to solve telecommunication optimization problems. ACO (Ant colony optimization) determines the smallest path by multiple iterations using pheromone and analyse the traffic for free network. The memory is saved in without regarding the configuration of the ground, the number of ants, etc. It is totally independent, and still remains extremely simple. Pheromones just proceed to one task: In course of time, the pheromones that left for a long time indicates that the route to the destination is far long and hence the pheromones slowly gets evaporated and the route will be removed from the network. The convergence is very influenced by the factor of evaporation, and we will see how important it is in the simulation.

2 Related Work

ACO is a type of genetic technique which works on the principle of population generation. Pheromone deposition is a type of signal that identifies the trafficless path so that the data can send within a specified time where the reliability of data can be achieved. Pheromone helps in identifying the shortest path by backtracking techniques.

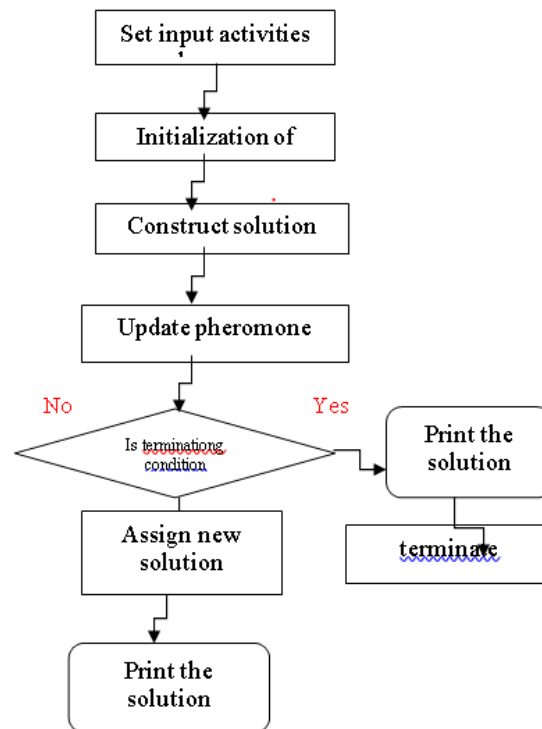
3 Proposed System

The process of constructing solutions can be regarded as a walk on the construction graph $GC = (V, E)$. The rules for the stochastic choice of solution components vary across different ACO algorithms but, in all of them it is inspired by the model of the behaviour of real ants.

The aim of the pheromone update is to find the traffic less path and shortest path by: (i) Decreasing all the pheromone values through pheromone evaporation. (ii) Increasing the pheromone levels associated with a chosen set of good solutions.

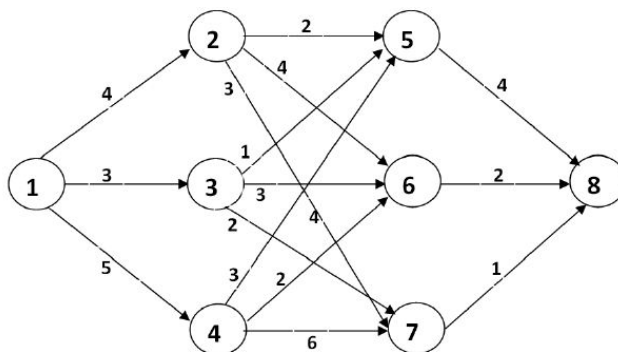
4 Algorithm Description

The first iteration is to find all the available paths by using pheromone.



5 Implementation and Experimental Result.

The method consist of three classes that will identify the Multiple paths by various iterations and finally finds the shortest path using the ACO algorithm in the main method (Main).The proposed paper helps in finding the all possible paths and analyzing the shortest path to achieve the reliability in data transfer. Before proceeding to the main algorithm, the graph picture is represented on the following picture as an example of graphs used in the implementation.



The next thing which we need before starting the ACO algorithm is ants. As they represent the data packets in network routing, they are the main actors in this play. The following code snippet gives an insight in ants characteristics.

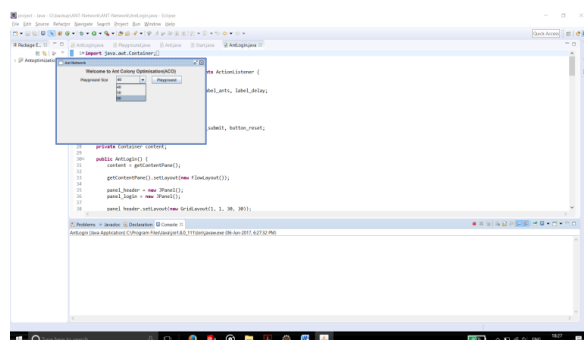


Fig: Setting the playground size

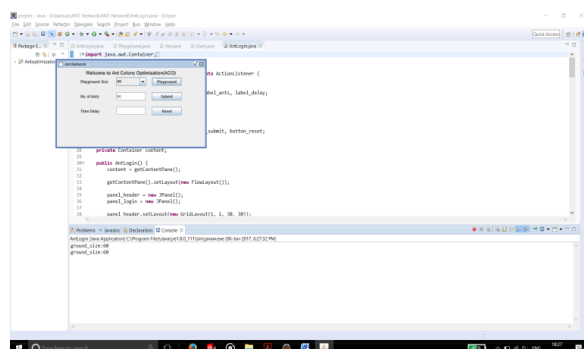


Fig: Setting the number of ants required

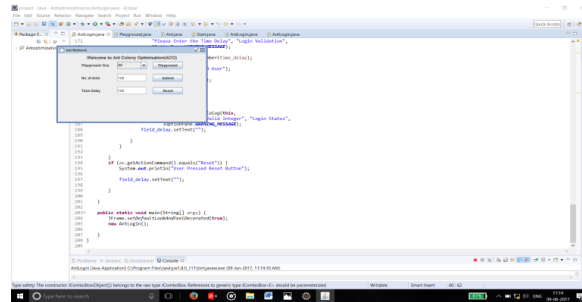


Fig: Setting the time delay required

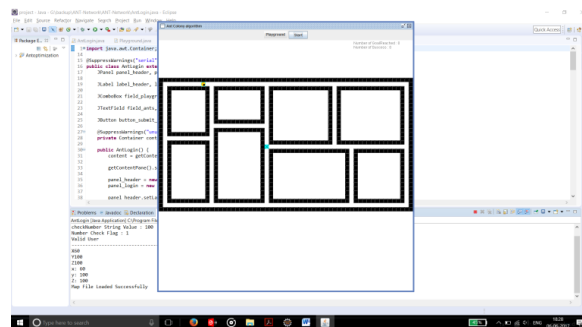


Fig:Loaded layout for the ants to move

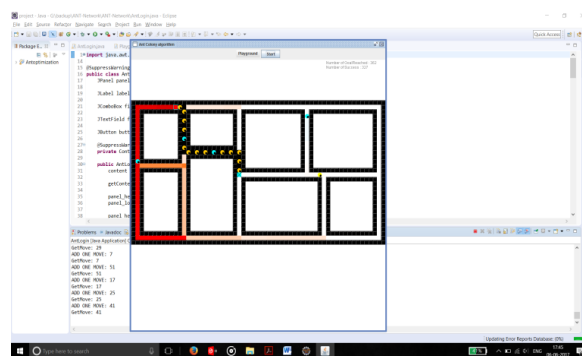


Fig: Movement of ants and the pheromone deposition in later stages.

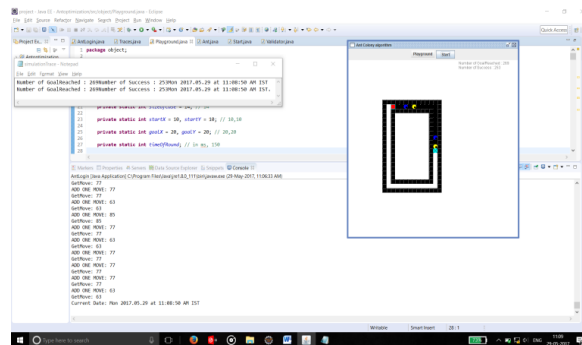


Fig: A view of the final output

6 Future Enhancement

The ACO can also implement for finding the alternate shortest path in case the existence path is of heavy traffic by using some distance vector routing protocols. ACO with support of distance vector routing protocols avoids more time consistency in identifying the shortest path, also helps in finding the multiple shortest paths their by getting the alternate path based on the cost. Future developments of this work are related further improve our mathematical model by adding more Quality of Service parameters.

7 Conclusion

In this paper, we propose an ant colony-based routing algorithm for finding the possible shortest path among multiple routes mainly in mobile adhoc networks, link quality and link reliability. Moreover, the optimal path has a high link quality and reliability. A study of this algorithm is performed on different network sizes and this algorithm is further analyzed for the effect of changing the number of ants, pheromone value importance, the heuristic value importance, and the evaporation rate on the probability of finding the optimal path and the time taken to find it. Moreover, a simulation of multimedia WSN that uses the proposed ant colony optimization is performed.

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