GENETIC ALGORITHM BASED PACKET SWITHCED NETWORK ROUTING OPTIMIZATION

Prepared by: Awwal Suleiman Bamanga

ABSTRACT

In multi-hop networks, such as the Internet and the Mobile Ad-hoc Networks, routing is one of the most important issues that have a significant impact on the network's performance.

A routing algorithm should strive to find an optimum Path for packet transmission within a specified time so as to satisfy the Quality of Service (QoS). There are several search algorithms for the shortest path (SP) problem: The breadth-first search algorithm the Dijkstra's algorithm and Bellman-Ford algorithm, to name a few. Since these algorithm can solve SP problems in polynomial time, they will be ineffective in fixed infrastructure wireless they exhibit unacceptably high computational complexity for real-time communications involving rapidly changing network topologies, an example of this would be ad-hoc network, genetic algorithm seeks to look at the whole picture of the network and come up with a set of solutions (pareto optimal front)

This project presents a genetic algorithm approach to the shortest path routing problem, in a packet Variable length chromosome (strings) and their genes (parameters), have been used to encode the problem. The genetic algorithm must slove route optimization using techniques inspired by natural evolution such as inheritance, mutation, selection and crossover, a fitness function must be defined to set performance parameters so as to enable selection (survival of the fittest), performance parameters to include load/hop count, delay time, bandwidth usage, Quality of service & Cost.

Expected output is the solution to the shortest routing problem should be a set of values (pareto optimal fronts) with diversity, the population fitness value's should converge. The developed genetic algorithm is compared with Dijkstra's algorithm to solve shortest path routing problem.