

Optimization of Wireless Network Sensors Points using Genetic Algorithm

U. Priyatharsan, P.H. Sarawana

*Department of Physical Science, Vavuniya Campus of the University of Jaffna,
Vavuniya, Sri Lanka.*

The supply of Internet services to a particular place is a difficult task whose difficulty increases as the number of equipment that will use it. Solving the problem involves the analysis of factors such as the location of the sensors network, in addition to the characteristics and constraints that have these and its location. Thus, an optimization problem that can be tackled by this type of problems called Facility Location Problem. This paper intends to apply techniques of genetic algorithms for solving the problem, obtaining a distribution of these sensors for an arbitrary city so that minimize installation costs without diminishing the quality of the signal. The problem area is divided into 6 sections and a block bounded by four blocks, resulting in 36 possible points of demand or service. Then, this sector comprises a possible total of 2880 points to be considered as potential places, of which 640 are light poles. Using a graph representation, each of these points is denoted by a node, the edges of the graph being the distance between nodes. A triangular matrix is generated with the distances between each pair of points in the model, using the algorithm of Dijkstra's shortest path, which is accessed during the subsequent process of calculation. The criteria for determining the fitness of an individual is given by a function between coverage and cost of the sensors. After a certain number of sensors, increasing costs has a velocity greater than the increase in the number of users served growth. In the case of 110 sensors, option is getting coverage of 71.64%, optimizing the fitness of individuals, in the case of using sensors 200; we have coverage increased by 18.36%, an increase in the cost of a 44.05%. Further, results show that evolution in the quality of solutions in the case of 110 sensors.

Keywords: Genetic Algorithm, Optimization, Wireless Networks