

Exploration of genetic algorithm in network coding for wireless sensor networks

ABSTRACT

Wireless network comprises of multiples nodes that work together to form a network. Each node in a wireless network communicates with one another by disseminating information packet among them. Source node and destination node are often far apart from each other, thus the information packet has to be transmitted to intermediate node(s) before it is able to be relayed to its destination. Network coding is introduced to combine several packets from different sources and broadcast the combined packet to several destinations in single transmission time slot. Each destination is capable to extract the intended information by decoding from a common packet. In short, network coding improves the throughput for wireless and wired networks but also causes side effects such as complexity of packets management and increases delay for coding opportunity. Hence, genetic algorithm is used to optimize the resources for network coding. Genetic algorithm will search for optimum routes to the destination according to the desired throughput with a desired multicast rate. In this paper, genetic algorithm is further enhanced in searching of optimum route for a packet. The simulation results show the enhanced genetic algorithm can adapt to various situations with different topologies with a better throughput and energy consumption compared to the store-and-forward method used in conventional wireless sensor network.