Energy-Efficient Scalable Routing Protocol Based on ACO for WSNs

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Abstract

Efficient routing is an essential requirement for the design of wireless sensor network (WSN) protocols to overcome inherent challenges and to meet hardware and resource constraints. An energy-efficient scalable routing algorithm based on ant colony optimization (ACO) for WSNs is presented here to find the optimal path of data transmission while consuming less energy leading to increase of network's lifetime. Most of the existing ACO based routing algorithms are designed on the assumption that the sensor nodes and the sinks are stationary and do not consider the overhead of mobility and the current node energy is not considered, which will prompt sudden passing of certain nodes. To overcome the existing problem of accommodating node mobility, reducing initialization time for ant based routing algorithm and to maintain scalability in WSN for time critical applications, an ACO based WSN routing algorithm has been proposed and analyzed in this paper. The proposed algorithm has been simulated and verified utilizing MATLAB. The evaluation results demonstrate that it has reduced energy consumption, almost 50% less consumed energy even with the increasing number of nodes, compared with the traditional ACO and an existing ant-based routing algorithm. Moreover, it increases the nodes' lifetime and lifetime of the network.

Keywords

Author Keywords: Routing algorithms; WSN; ACO; IoT; Network lifetime; Energy consumption
KeyWords Plus: WIRELESS; ALGORITHM; COLONY

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