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Efficient and scalable ant colony optimization based WSN routing protocol for IoT

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Abstract

IoT integrates and connects intelligent devices or objects with varied architectures and resources. The number of IoT devices is growing exponentially. Due to the massive wave of IoT objects, their diversity and heterogeneity among their architectures, the existing communication protocols for wireless networks become ineffective in the context of IoT. Wireless Sensor Network (WSN) has the potential to be integrated to the internet of things (IoT). The issues of the routing of WSNs impose nearly similar prerequisites for IoT routing technique. Most of the traditional routing protocols are not appropriate for WSNs and IoT because of resource constraints, computational overhead and environmental interference and do not take into account the different factors affecting energy parameter and do not accommodate node mobility. Routing algorithms must ensure the data transmission in an efficient way, having proper knowledge of the IoT system. For this reason, many intelligent systems have been utilized to design routing algorithms to handle the network's dynamic state. In this paper, an ant colony optimization (ACO) based WSN routing algorithm for IoT has been proposed and analyzed to enhance scalability, to accommodate node mobility and to minimize initialization delay for time critical applications in the context of IoT to find the optimal path of data transmission, improvising efficient IoT communications. The proposed routing algorithm is simulated using MATLAB for performance evaluations. The evaluation results have recorded an improvement in conservation of energy, of almost 50% less consumed energy even with an increase in the number of nodes, by comparing with an existing routing technique based on ant system, a current routing protocol for IoT and the conventional ACO algorithm. © 2020 ASTES Publishers. All rights reserved.

Author keywords

ACO; Energy consumption; IoT; Routing algorithms; Wireless sensor networks



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