A Review on Swarm Intelligence Based Routing Approaches

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Abstract

The principles of bio-inspired or swarm intelligence algorithms can be effectively used to achieve optimal solutions in routing for complex and dynamic wireless sensor networks or body area networks. As the name indicates, it is a field that is inspired by natural living beings like ants, bees, fishes, etc. Studies have proved that the routing protocols based on such bio-inspired methods perform better in terms of energy efficiency, reliability, adaptivity, scalability, and robustness. The general classification of routing protocols is classical-based and swarm-based routing protocols, where both the protocols were specifically categorized as data-centric, location-aware, hierarchical and network flow, and QoS aware protocols. In this paper, an evocative taxonomy and comparison of various swarm-based routing algorithms are presented. A brief discussion about the sensor network design and the major factors that influence the routing is also discussed. The comparative analysis of the selected swarm-based protocols is also done with respect to routing characteristics like query based, route selection, energy efficiency, and path selection. From the review, it is observed that the selection of a routing protocol is application dependent. This paper will be helpful to the researchers as a reference on bio-inspired algorithms for new protocol designs and also for the proper selection of routing protocols according to the type of applications.

Keywords: wireless sensor networks, routing algorithms, ant colony optimization, swarm intelligence, energy efficiency

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