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Md. Ahsan Habib, Sajeeb Saha, Md. Abdur Razzaque, Md. Mamun-or-Rashid, Giancalro Fortino, Mohammad Mehedi Hassan

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Starfish Routing for Sensor Networks with Mobile Sink

Md. Ahsan Habib, Sajeeb Saha, Md. Abdur Razzaque, Md. Mamun-or-Rashid, Giancalro Fortino[b], Mohammad Mehedi Hassan[c,d,*]

[a]*Green Networking Research Group, Department of Computer Science and Engineering, University of Dhaka, Bangladesh*
[b]*Department of Informatics, Modeling, Electronics, and Systems, University of Calabria, Italy*
[c]*Chair of Pervasive and Mobile Computing, College of Computer and Information Sciences, King Saud University, Riyadh, Saudi Arabia*
[d]*Information Systems Department, King Saud University, Riyadh, Saudi Arabia*

Abstract

Wireless Sensor Networks (WSNs) with mobile sinks were proven to provide extended network lifetime and better data delivery services. This was achieved by minimizing routing costs and avoiding development of any hot-spot zones in the network. However, existing routing strategies in the literature have limitations to offer end-to-end data delivery delay and throughput required by the real-time sensing and monitoring applications. In this paper, following the principle of water vascular system of a Starfish, we have designed a routing backbone consisting of a central *ring-canal* and a number of *radial-canals* across the network. The radius of the *ring-canal* and the number of *radial-canals* are dynamically determined based on the transmission range of sensor nodes and size of the network. The proposed *Starfish routing backbone* guarantees that each source sensor node gets single-hop access to a backbone node, which in turn facilitates to reduce data delivery delay and increases fairness of energy consumption load distribution on network nodes. The results of the simulation experiments, carried out in NS-2, prove the efficiency of the proposed *Starfish routing backbone* in terms of end-to-end data delivery delay, throughput and energy consumption compared to state-of-the-art works.

Keywords: Wireless Sensor Network (WSN), Mobile sink, Starfish routing backbone, End-to-End delay, Markov chain model, Network lifetime.

*Corresponding author, Email: mmhassan@ksu.edu.sa