Journal of Sensors

About this Journal   Submit a Manuscript   Table of Contents

Journal Menu

- Abstracting and Indexing
- Aims and Scope
- Article Processing Charges
- Articles in Press
- Author Guidelines
- Bibliographic Information
- Contact Information
- Editorial Board
- Editorial Workflow
- Reviewers Acknowledgment
- Subscription Information

- Open Special Issues
- Published Special Issues
- Special Issue Guidelines

Call for Proposals for
Special Issues

Research Article

Cross-Layer Support for Energy Efficient Routing in Wireless Sensor Networks

N. Chilamkurti,[1] S. Zeadally,[2] A. Vasilakos,[3] and V. Sharma[1]

[1]Department of Computer Science and Computer Engineering, La Trobe University, Melbourne 3086, Australia
[2]Department of Computer Science and Information Technology, University of the District of Columbia, 4200 Connecticut Avenue NW, Washington DC 20008, USA
[3]Department of Computer and Electrical Engineering, National Technical University of Athens (NTUA), Heroon Polytechniou 9, Athens 15780, Greece

Abstract   Full-Text PDF   Full-Text HTML   Linked References   How to Cite this Article

Abstract

The Dynamic Source Routing (DSR) algorithm computes a new route when packet loss occurs. DSR does not have an in-built mechanism to determine whether the packet loss was the result of congestion or node failure causing DSR to compute a new route. This leads to inefficient energy utilization when DSR is used in wireless sensor networks. In this work, we exploit cross-layer optimization techniques that extend DSR to improve its routing energy efficiency by minimizing the frequency of recomputed routes. Our proposed approach enables DSR to initiate a route discovery only when link failure occurs. We conducted extensive simulations to evaluate the performance of our proposed cross-layer DSR routing protocol. The simulation results obtained with our extended DSR routing protocol show that the frequency with which new routes are recomputed is 50% lower compared with the traditional DSR protocol. This improvement is attributed to the fact that, with our proposed cross-layer DSR, we distinguish between congestion and link failure conditions, and new routes are recalculated only for the latter.