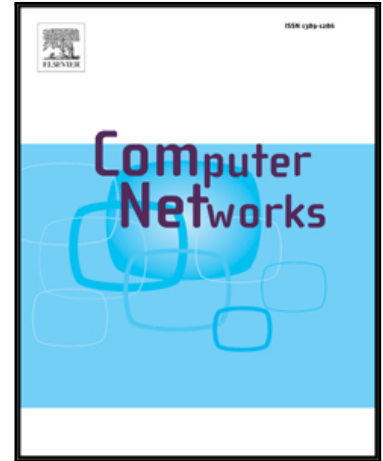


Accepted Manuscript

A High-Available and Location Predictive Data Gathering Scheme with Mobile Sinks for Wireless Sensor Networks

Chuan Zhu, Kangning Quan, Guangjie Han, Joel J.P.C. Rodrigues

PII: S1389-1286(18)30844-2
DOI: <https://doi.org/10.1016/j.comnet.2018.08.022>
Reference: COMPNW 6581



To appear in: *Computer Networks*

Received date: 16 December 2017
Revised date: 2 May 2018
Accepted date: 31 August 2018

Please cite this article as: Chuan Zhu, Kangning Quan, Guangjie Han, Joel J.P.C. Rodrigues, A High-Available and Location Predictive Data Gathering Scheme with Mobile Sinks for Wireless Sensor Networks, *Computer Networks* (2018), doi: <https://doi.org/10.1016/j.comnet.2018.08.022>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A High-Available and Location Predictive Data Gathering Scheme with Mobile Sinks for Wireless Sensor Networks

Chuan Zhu^a, Kangning Quan^a, Guangjie Han^b, Joel J.P.C. Rodrigues^c

^aOpen Lab of Industrial Cloud for Intelligent Manufacturing, Changzhou College of Information Technology, Changzhou, China E-mail: dr.river.zhu@gmail.com, pandaqkn@outlook.com

^bKey Laboratory for Ubiquitous Network and Service Software of Liaoning province, School of Software, Dalian University of Technology, Dalian, 116024, China E-mail: hanguangjie@gmail.com

^cInstitute of Telecommunications, University of Beira Interior, Covilha, Portugal and Department of Informatics of University ITMO, St. Petersburg, Russia the E-mail: joeljr@ieee.org

Abstract

The use of mobile sinks in a wireless sensor network can effectively improve network performance. However, if a mobile sink fails, the entire network performance will be seriously affected. In this paper, we propose a high-available and location predictive data gathering scheme with mobile sinks to address the mentioned issue. Namely, sensor nodes can calculate the current location of mobile sinks based on time synchronization, and the network could still work normally if some of the mobile sinks fail. Considering the energy consumption of nodes in different areas, a moving trajectory adjusting strategy is also proposed to balance energy consumption among the nodes in the network. Simulation results show that the proposed data gathering scheme has better performance than the existing schemes.

Keywords: Wireless sensor networks, Mobile sinks, High availability, Location prediction

1. Introduction

With the rapid development of the micromechanical systems, chip systems, wireless communication systems, and low-power embedded technology, the Wireless Sensor Networks (WSNs) have been widely used in many applications [1], such as data gathering, path planning, and nodes location protection [2]. Data gathering is one of the fundamental applications of WSNs, where a large number of sensor nodes are deployed in the monitoring area, through which various useful information, such as temperature, humidity, pictures, voice, and video, etc. [3], can be obtained.

These deployed nodes usually do not have mobility, and in the traditional data gathering algorithms, sink position is usually fixed. The sensor nodes near the static sink exhaust their energy faster than those who are far apart due to the heavy overhead of the relaying messages, this problem is called the “hot-spot” [4]. Furthermore, this problem causes the sensor nodes around the static sink die much faster than other nodes, which influences the network lifetime [5].

Recently, to overcome the “hot-spot” problem, various schemes with one or more mobile sinks gathering data in the network have been proposed. Namely, when sinks in the network are moving, the region of the “hot-spot” changes. This is due to the fact that the movement of sinks results in the balanced energy consumption among nodes. By combining with the Intelligent and Connected Transportation Systems (ICTS), the vehicles can be used as mobile sinks for data gathering. In [6,7],

Download English Version:

<https://daneshyari.com/en/article/10139333>

Download Persian Version:

<https://daneshyari.com/article/10139333>

[Daneshyari.com](https://daneshyari.com)