



**Spring 2008 CIS Colloquium Series
Distinguished Lecture**

Energy Efficient Self Healing Sensor Network Protocol Based on Computing with Time

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April 16, 2008

Abstract

One of the most important concerns in design of sensor network algorithms and protocols is energy efficiency, as sensors have limited power sources (batteries). Another important concern in design of both sensor network and nervous system is fault tolerance, as both nodes and links in them are plagued by transient and permanent failures.

To address these concerns, we have developed a Self-Healing Routing (SHR) Protocol for sensor networks, a protocol that uses principle of computing with time proposed initially by Hopcroft in a model of neural networks. We present a new version of SHR that allow sensor nodes to repair faulty routes and they are able to sleep (that is to have their radio off) most of the time. In fact, the nodes can nap up to 70% of the time without jeopardizing the connectivity of the network.

In the presentation, we describe the protocol itself, including the initial path discovery, normal path transition and mechanisms for route repairs. We compare the performance of our protocol with a standard AODV routing and with the basic version of SHR, when all nodes must keep their radios permanently on. We also discuss its implementation on Crossbow motes Performance measurements include the number of MAC packets transmitted and received and overall energy expenditure of the network under different communication scenarios.

Bio

Dr. Boleslaw K. Szymanski is the Claire and Roland Schmitt Distinguished Professor at the Department of Computer Science and the Founding Director of the Center for Pervasive Computing and Networking, Rensselaer Polytechnic Institute. He received his Ph.D. in Computer Science from National Academy of Sciences in Warsaw, Poland, in 1976. He was a post-doctoral fellow at the Aberdeen University in Scotland and on the faculty at the University of Pennsylvania. He is an Editor-in-Chief of Scientific Programming and on the editorial boards of other journals. Dr. Szymanski is an IEEE Fellow. His interests cover the broad area of distributed and parallel computer systems and algorithms.

Location: 4th Floor Conference Room (Wachman 447)

Time: 3-4pm, Wednesday, April 16, 2008

Refreshments will be served!