



Energy-efficient Protocol Design in Wireless Sensor Networks

Scheduled:

Monday 15 September 2008, morning

Presenter:

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Abstract:

The tutorial will discuss design principles for communication protocols in wireless sensor networks. Communication is the main source of energy waste in wireless sensor networks and because of that sophisticated communication protocols are required for wireless sensor networks. The tutorial will discuss wireless sensor network protocols on medium access control layer, network layer (including routing and topology control) and on transport layer. The basic concepts on each layer are presented and examples for these concepts will be discussed.

Outline:

The planned content is as follows:

1. Introduction (10 min)
 - a. Sensor node hardware
 - b. Sensor node software
2. Medium Access (40 min)
 - a. Scheduled protocols
 - b. Contention-based protocols
3. Topology Control (30 min)
 - a. Flat protocols
 - b. Hierarchical protocols
4. Routing (60 min)

- a. Data-centric routing
 - b. Location-based (Geographic) Routing
 - c. Hierarchical Routing
 - d. Multi-Path Routing
 - e. QoS-based Routing
5. Transport (30 min)
 - a. Congestion control
 - b. Reliable data transfer
 6. Conclusions (10 min)

Biographical Sketch:

Torsten Braun got his diploma and Ph.D. degrees from the University of Karlsruhe, Germany, in 1990 and 1993, respectively. From 1994 to 1995 he was a guest scientist with INRIA Sophia Antipolis, France. From 1995 to 1997 he worked as a project leader and senior consultant at the IBM European Networking Center, Heidelberg, Germany. Since 1998 he has been a full professor of computer science at the Institute of Computer Science and Applied Mathematics of University of Bern, Switzerland, heading the Computer Networks and Distributed Systems research group. He has been a board member of SWITCH (Swiss Education and Research network) since 2000. During his sabbatical in 2004, he has been visiting scientist at INRIA Sophia-Antipolis and the Swedish Institute of Computer Science at Kista. He is member of the National Competence Centre on Research in Mobile Information and Communication Systems (NCCR MICS) leading a number of research projects on wireless sensor networks. He has been periodically teaching a Master course on wireless sensor networks at University of Bern. He has given tutorials on various topics in wireless sensor networks at the following conferences: IEEE CCNC 2006 Las Vegas, IEEE WCSN 2006 Allahabad / India, IEEE ISCC 2007 Aveiro, AIMS 2007 Oslo.