

Illinois Center for Wireless Systems

ICWS Seminar Series



Melete: Supporting Concurrent Application in Wireless Sensor Networks

Yang Yu
Motorola Labs

Thursday, November 9, 2006, 3:00 p.m.
141 Coordinated Science Laboratory

It is vital to support concurrent applications sharing a wireless sensor network in order to reduce the deployment and administrative costs, thus increasing the usability and efficiency of the network. I will present Melete {Melete is the Muse of Meditation in Greek mythology}, a system that supports concurrent applications with efficiency, reliability, flexibility, programmability, and scalability. Our work is based on the Mate virtual machine with significant modifications and enhancements.

Melete enables reliable storage and execution of concurrent applications on a single sensor node. Dynamic grouping is used for flexible, on-the-fly deployment of applications based on contemporary status of the sensor nodes. The grouping procedure itself is programmed with the TinyScript language. A group-differentiated code dissemination mechanism is also developed for reliable and efficient code distribution among sensor nodes. Both analytical and simulation results are presented to study the impact of several key parameters and optimization techniques on the code dissemination mechanism. Simulation results indicate satisfactory scalability of our techniques to both application code size and node density. The usefulness and effectiveness of Melete is also validated by empirical study.

I will also briefly talk about other research activities pertinent to wireless sensor networks in Motorola Labs. These activities include query privacy in sensor networks, Zigbee-enabled Motorola phones, and eventing-based liquid music. The query privacy is useful in an outsourced sensor network to prevent the server from leaking the query interest of clients, e.g., regions of interest. The Zigbee-enabled phone is a prototype from Intel that connects a tMote node to a Motorola phone via a wired connection. The liquid music enhances user experience with media consumption on portable devices by personalized and contextual sensing and eventing.

Yang Yu is a Senior Research Engineer in the Application Research Center of Motorola Labs. He received his B.S. and M.S. degrees in Computer Science from Shanghai JiaoTong University, China in 1996 and 1999 respectively. He received his Ph.D. in Electrical Engineering from University of Southern California (USC) in 2005. Dr. Yu's research interest includes system modeling, algorithm design, and performance analysis for various topics in wireless sensor networks. His Ph.D. thesis is titled "Energy-efficient information processing and routing in wireless sensor networks". After joining Motorola, Dr. Yu has been working on middleware design and implementation for resource management in wireless sensor networks. He is a member of IEEE and ACM.