Meeting End-to-End Deadlines in Distributed Real-Time Embedded Systems

SPEAKER  Prof X. Sharon HU

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DATE  12 April 2012 (Thursday)
TIME  11:00 am - 12:00 noon
(Refreshments will be served at 10:45 am)

VENUE  CS Seminar Room, Y6405, 6th Floor
        Yellow Zone, Academic 1
        City University of Hong Kong
        83 Tat Chee Avenue
        Kowloon Tong

ABSTRACT

Real-time embedded systems are computing and control systems dedicated to specific real-time applications. Examples include multimedia systems, automotive powertrain control modules and fly-by-wire systems. Many of these systems are implemented on a collection of computing platforms in a distributed fashion. Besides functional correctness, such systems are often required to complete certain jobs by user specified deadlines. In a distributed real-time system, jobs are often executed on a number of processors and must be completed by their end-to-end deadlines. Without considering resource competition among different jobs on each processor, deadline requirements may be violated.

This talk introduces a distributed approach to decompose end-to-end job deadlines to local deadlines for the jobs on each processor. The approach formulates the local deadline assignment problem as a distributed optimization problem. A powerful and efficient heuristic is devised to solve the optimization. The algorithm guarantees to find an optimal solution if one exists, avoids the overhead of global time synchronization, and can readily adapt to dynamic changes in the system.

BIOGRAPHY

Sharon Hu is a professor in the department of Computer Science and Engineering at the University of Notre Dame, Notre Dame, Indiana, USA. She also holds a joint appointment in the department of Electrical Engineering at the same university. Her research interests include real-time embedded systems, low-power system design, VLSI and nano-scale computing. She has published more than 190 papers in these areas, and received the Best Paper Award from the ACM/IEEE Design Automation Conference in 2001 and from the IEEE Symposium on Nanoscale Architectures in 2009. Another paper of hers was named one of "The Most Influential Papers of 10 Years Design, Automation, and Test in Europe Conference (DATE)" in 2007.

She is currently Associate Editor for ACM Transactions on Embedded Computing Systems. She also served as Associate Editor for IEEE Transactions on VLSI and ACM Transactions on Design Automation of Electronic Systems, and as guest editors for several different journals/magazines including the IEEE Computer Magazine.

All are welcome!

In case of questions, please contact Dr Jason Xue at Tel: 3442 9815, E-mail: jasonxue@cityu.edu.hk, or visit the CS Departmental Seminar Web at http://www.csc.cityu.edu.hk/.