

Computer Science Seminar Series, 2011

National Capital Region

Optimal Speed Scaling Algorithms under Speed Change Constraints

Speaker: Prof. Fei Li
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Noon-1:00PM, NVC 325

Abstract

In this talk, we investigate energy-aware real-time scheduling algorithms with speed change constraints. A processor is equipped with variable clock frequency (speed) feature and is used to schedule a set of given jobs with deadlines. Each speed change involves time/energy overhead and recent studies show that it also impacts negatively the processor's lifetime reliability. Motivated by this, we study energy-aware scheduling problems with consideration of number and cost of speed changes. We associate a cost with each speed change to reflect its negative impact on the processor's lifetime reliability. We design event-driven speed schedules to satisfy all jobs' deadlines and optimize the energy consumption and the total cost incurred due to speed changes. Four related problems based on this framework are studied. We develop algorithms that perform arbitrarily close to the optimal and we analyze their running-time complexity.

Biography

Dr. Fei Li is an assistant professor in the Department of Computer Science at George Mason University. He received M.S., M.Phil., and Ph.D. degrees in Computer Science from Columbia University, New York, NY, in 2002, 2007, and 2008, respectively. He joined the Computer Science Department at George Mason University in 2007. Dr. Li's research interests include energy-aware scheduling algorithms, online and approximation algorithm design and analysis, combinatorial optimization, and applied algorithms for computing systems and networking. He has been on the editorial board of International Journal of Operations Research and Information Systems since 2008. He has published work in reputable journals such as ACM Transactions on Algorithms, Theoretical Computer Science, Journal of Combinatorial Optimization, Real-Time Systems, etc. He can be reached at lifei@cs.gmu.edu or 703-993-1540.