BCWS Seminar Series

Clocks and Networks of Clocks in Wireless Communication Systems

by

Professor Thomas Kunz
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Time: Wednesday, September 30, 1:30 - 2:30 pm

Place: Room 4356, Mackenzie Building, Carleton University

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Abstract: This talk reviews the role of clocks in different wireless communication systems. Building physically accurate clocks is costly, and since clocks are used on many different devices within a network, cheaper solutions based on inexpensive quartz crystal oscillators are desirable. For example, the clocks in cellular base stations (using crystal oscillators) can be kept synchronized through GPS signals. In this talk I will discuss two research problems related to clocks and networks of clocks we worked on over the past few years. In the first part, the talk will focus on the base station synchronization problem, in particular the question of maintaining synchronization when the GPS signal fails. This requires accurate models of clocks and adjusting clock frequency by learning about the sensitivity of clocks to factors such as temperature or aging. In the second part of the talk, I will extend this to a network of clocks and to clock synchronization problems typically found in Wireless Sensor Networks. The goal here is to keep a network of clocks synchronized with each other, with little overhead.

Biography: Dr. Kunz received a double honors degree in Computer Science and Business Administration in 1990 and the Dr. Ing. degree in Computer Science in 1994, both from the Technical University of Darmstadt, Federal Republic of Germany. He is currently a Professor in Systems and Computer Engineering at Carleton University. His research interests are primarily in the area of wireless and mobile computing. The main thrust is to facilitate the development of innovative next-generation mobile applications on resource-constraint, hand-held devices, exploring the required network architectures (MANETs, wireless mesh networks, wireless sensor networks), network protocols (routing, Mobile IP, QoS support), and middleware layers. He authored or co-authored close to 150 technical papers, received a number of awards, and is involved in national and international conferences and workshops.