ECE Distinguished Seminar Series

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On Securing Networked Real-Time Embedded Systems

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Dreese Lab 260

There has been an exponential growth of applications that rely on diverse types of embedded real-time end systems and devices, such as smart phones, play stations, home appliances, consumer and industrial electronics, smart sensors and actuators. These applications require diverse types of Quality-of-Service (QoS) including timeliness, dependability, security and privacy, from the end systems/devices which are usually networked together via heterogeneous networking technologies and procotols.

We now know how to guarantee timeliness and, to a lesser extent, how to provide fault-tolerance, on both end systems and their interconnection networks. However, how to secure them is far less known, despite the growing importance of protecting information stored in the end systems/devices and exchanged over their interconnection networks. Morever, timeliness, fault-tolerance, security and privacy—which I will call simply QoS—must be supported simultaneously, often with a tight resource budget such as memory, computation and communication bandwidth, and battery power. Also, different applications require different combinations of QoS components, and hence, one-fits-all solutions are not acceptable.

This talk will start with generic aspects of embedded system QoS, and then outline protection of privacy and digital rights, mobile worm propagation and containment.

Kang G. Shin is the Kevin and Nancy O'Connor Professor of Computer Science and Founding Director of the Real-Time Computing Laboratory in the Department of Electrical Engineering and Computer Science, The University of Michigan, Ann Arbor, Michigan. His current research focuses on QoS-sensitive networking and computing as well as on embedded real-time OS, middleware and applications, all with emphasis on timeliness and dependability. He received the B.S. degree in Electronics Engineering from Seoul National University, Seoul, Korea in 1970, and both the M.S. and Ph.D degrees in Electrical Engineering from Cornell University, Ithaca, New York in 1976 and 1978, respectively. He has supervised the completion of 54 PhD theses, and authored/coauthored more than 620 technical papers (225 of which are in archival journals) and numerous book chapters in the areas of distributed real-time computing and control, computer networking, fault-tolerant computing, and intelligent manufacturing. He has received a number of best paper awards, including the IEEE Communications Society William R. Bennett Prize Paper Award in 2003, the Best Paper Award from the IWQoS'03 in 2003, and an Outstanding IEEE Transactions of Automatic Control Paper Award in 1987.

He is Fellow of IEEE and ACM, and member of the Korean Academy of Engineering.