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Cyberphysical Systems

Abstract

Cyber-physical systems represent a third generation platform enabling large scale control systems, after the earlier two generations of analog control and digital control. This new platform poses multiple challenges at many levels to building reliable systems, both at the level of enabling mechanisms as well as in application design and analysis. We will address several problems related to providing guarantees on timeliness of communications, proofs of safety, and design of distributed systems.

Biographical Sketch

Kumar has worked on problems in game theory, adaptive control, stochastic systems, simulated annealing, neural networks, machine learning, queueing networks, manufacturing systems, scheduling, wafer fabrication plants and information theory. His research is currently focused on energy systems, wireless networks, secure networking, automated transportation, and cyberphysical systems. Kumar received the Donald P. Eckman Award of the American Automatic Control Council, the Fred W. Ellersick Prize of the Institute of Electrical and Electronics Engineers (IEEE) Communications Society, the IEEE Field Award for Control Systems, and the Association for Computing Machinery (ACM) SIGMOBILE Outstanding Contribution Award. Kumar is a Fellow of IEEE and ACM, a member of the National Academy of Engineering, USA, and a Fellow of the World Academy of Sciences. He was awarded an honorary doctorate by ETH, Zurich. He received the Distinguished Alumnus Award from IIT Madras, the Alumni Achievement Award from Washington University in St. Louis, and the Daniel C. Drucker Eminent Faculty Award from the College of Engineering, University of Illinois. He was a guest chair professor and leader of the Guest Chair Professor Group on Wireless Communication and Networking at Tsinghua University, Beijing, is an honorary professor at IIT Hyderabad, and a D.J. Gandhi Distinguished Visiting Professor of IIT Bombay.