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THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar

QoS Provisioning in Intelligent Vehicular Networks

by

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Date : 03 August 2012 (Friday)
Time : 11:00 am - 12:00 pm
Venue: Room 833, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Intelligent vehicular networks, which aim at enabling the driving-environment awareness, improving the transportation safety systems, and supporting Quality of Service (QoS) networking services among moving vehicles, are the cornerstone of the next-generation Intelligent Transportation Systems (ITS). High mobility of vehicles and unreliable time-varying wireless channels make the implementation of intelligence and QoS provisioning in vehicular networks significantly challenging. In this talk, we will address the key issues and challenges, as well as the state-of-the-art theories and techniques for the intelligent vehicular networks. In particular, we start with introducing the ITS techniques and their engineering applications, including DSRC, IEEE 802.11p, and Wireless Access in Vehicular Environments (WAVE). We will then focus on the designs and analyses of our newly proposed clustering-based multi-channel communications architecture that can support not only public-safety message delivery, but also a wide range of future multimedia (e.g., video/audio) and data (e.g., e-maps, road/vehicle traffic/weather information) applications. Our proposed scheme integrates clustering with contention-free and/or contention-based medium access control (MAC) protocols. Specifically, the elected cluster head vehicle functions as the coordinator to collect/deliver real-time safety messages within its own cluster and forward the consolidated safety messages to the neighboring cluster heads. We also develop the analytical model to characterize the transmission delay for the consolidated safety messages sent by the cluster-head vehicles. Using this model, we derive the desirable contention-window size, which can best balance the tradeoff between the delay of safety messages and the successful rate of delivering safety messages, satisfying the diverse QoS requirements for intelligent vehicular networks.

Biography

Xi Zhang received his Ph.D. in electrical engineering and computer science (Electrical Engineering-Systems) from The University of Michigan, Ann Arbor. He is currently an Associate Professor and Founding Director of Networking and Information Systems Laboratory, Dept. of Electrical and Computer Engineering, Texas A&M University. He was with Networks and Distributed Systems Research Department, AT&T Bell Laboratories, Murray Hills, NJ, and with AT&T Laboratories Research, Florham Park, NJ. Prof. Zhang has published more than 200 research papers. He received U.S. National Science Foundation CAREER Award in 2004. He is an IEEE Communications Society Distinguished Lecturer. He received Best Paper Awards in IEEE GLOBECOM 2007, IEEE GLOBECOM 2009, and IEEE WCNC 2010, respectively. He also received TEES Select Young Faculty Award for Excellence in Research Performance from Look College of Engineering at Texas A&M University in 2006. He has been serving as Editors, TPC Chairs, Vice-Chairs for a number of *IEEE Transactions, Journals, Conferences, Workshops, etc.* His research interests include wireless networks and communications systems, wireless networks coding, network protocol design and modeling, statistical communications, random signal processing, information theory, and control theory and systems.

****ALL ARE WELCOME ****

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