

Seminar Talk

Dr. Min Song
Professor and Chair
Department of Electrical & Computer Engineering
Stevens Institute of Technology

Friday, April 19, 2019
3:00 p.m. KH 224

Title: Message Coverage Maximization in Infrastructure-Based Urban Vehicular Networks

Abstract:

The success of vehicular networks is highly dependent on the coverage of messages, which refers to the trajectory of messages over time. Many of the existing works primarily performed in 1-D environments and merely focused on vehicle-to-vehicle communications to enhance the coverage in a given road network. Consequently, there still lacks a clear comprehension of using road infrastructures to improve message coverage in 2-D environments. In this talk, I will present a message coverage maximization algorithm (MCMA) that carefully deploys the roadside units to achieve the maximum message coverage in a 2-D environment. We first derive the analytical lower bounds of message dissemination distance for areas with different vehicle densities. The MCMA then utilizes the derived lower bounds to estimate the minimum spacing allowed between neighbor roadside units based on the prevailing traffic stream and delay constraint of applications. Also, we propose a disseminator selection algorithm for infrastructure-based urban vehicular networks to further improve message coverage. By selecting the desired types of applications, i.e., safety and non-safety, we obtain two different roadside unit deployment sets. Extensive simulation studies show that MCMA outperforms the alternative algorithms in terms of the message coverage and message dissemination speed.

Bio:

Min Song joined Stevens Institute of Technology in July 2018 as Professor and Chair of the Department of Electrical and Computer Engineering. Before joining Stevens, he was the David House Professor, Chair of the Computer Science Department and Professor of Electrical and Computer Engineering at Michigan Tech from 2014 to 2018. He was also the founding director of the Michigan Tech Institute of Computing and Cybersystems. Prior to joining Michigan Tech, Min served as a program director with the National Science Foundation (NSF) from 2010 to 2014. Min's professional career comprises 28 years in academia, government, and industry. Throughout his career, Min has published more than 165 technical papers and held various leadership positions. He served as TPC Co-Chair for many IEEE conferences including ICC and GLOBECOM. He has been serving as a member of the IEEE INFOCOM Steering Committee. He is the recipient of NSF CAREER Award in 2007 and NSF Director's Award in 2012. Min is an IEEE Fellow.