BIOGRAPHICAL SKETCH

Born in Kansas City, MO, USA
B.S. 2004, Rose-Hulman Institute of Technology, Terre Haute, IN
M.S. 2007, Florida Atlantic University, Boca Raton, Florida

QUALIFYING EXAMINATION & PUBLICATIONS

Time in Preparation: 2007—2011

Qualifying Examination Passed: Fall 2007

Selected Publications (6 of 15 total):

M. Slavik and I. Mahgoub, "On the Scalability of Wireless Multi-Hop Broadcast Protocols with Respect to Density in VANET"; IEEE International Conference on Communications and Information Technology (ICCIT 2011), March 2011.

M. Slavik, I. Mahgoub, and M. Rathod, "Statistical Broadcast Protocol Design with WiBDAT: Wireless Broadcast Design and Analysis Tool"; IEEE Wireless Communications and Networking Conference (WCNC2011), March 2011.

M. Slavik and I. Mahgoub, "Statistical Broadcast Protocol Design for Unreliable Channels in Wireless Ad-hoc Networks"; IEEE Globecom 2010 – Wireless Networking Symposium, December 2010.

M. Slavik and I. Mahgoub, "Adapting Statistical Broadcast to Linearly Oriented Networks for VANETs"; In IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'2010), October 2010.

M. Slavik and I. Mahgoub, "Stochastic Broadcast for VANET"; Proceedings of the 2010 IEEE Consumer Communications and Networking Conference, January 2010.

M. Slavik, I. Mahgoub, A. Badi, and F. Sibai, "A Functional Component Based Framework for Cross-Layer Design"; International Journal of Business Communications and Networking, 2008.

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COLLEGE OF ENGINEERING & COMPUTER SCIENCE

announces the

Ph.D. Dissertation Defense

of

Michael J Slavik

for the degree of

DOCTOR OF PHILOSOPHY (PH.D.)

MARCH 2, 2011 AT 2:00 PM

In

EE405

777 Glades Road

Boca Raton, FL

DEPARTMENT:
Computer & Electrical Engineering & Computer Science

DISSERTATION TITLE:
"Statistical Broadcast Protocol Design for VANET"

CHAIR OF THE CANDIDATE'S PH.D. COMMITTEE:
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ABSTRACT OF DISSERTATION

Statistical Broadcast Protocol Design for VANET

This work presents the development of the Statistical Location-Assisted Broadcast (SLAB) protocol, a multi-hop wireless broadcast protocol designed for vehicular ad-hoc networking (VANET). Vehicular networking is an important emerging application of wireless communications. Data dissemination applications using VANET promote the ability for vehicles to share information with each other and the wide-area network with the goal of improving navigation, fuel consumption, public safety, and entertainment. Multi-hop broadcast protocols for these schemes must reliably deliver broadcast packets to vehicles in a geographically bounded region while consuming as little wireless bandwidth as possible.

First, a high-level wireless broadcast simulation tool called WiBDAT is developed. Next, a manual optimization procedure is proposed to create efficient threshold functions for statistical broadcast protocols. This procedure is then employed to design the Distribution-Adaptive Distance with Channel Quality (DADCQ) broadcast protocol, a preliminary cousin of SLAB. An automated design procedure is then created that uses a black-box global optimization algorithm to search for efficient threshold functions that are evaluated using WiBDAT. SLAB is finally designed using this procedure.

Simulation results compare the performance of SLAB to two well-published VANET broadcast protocols: p-persistence and Advanced Adaptive Gossip (AAG). The protocols are evaluated under varying node density and speed on five different road topologies with varying wireless channel fading conditions. The results demonstrate that unlike p-persistence and AAG, SLAB performs well across a very broad range of environmental conditions.