BIOGRAPHICAL SKETCH

Born in the United States
B.S. 1995, Florida Atlantic University, Boca Raton, Florida
M.S. 2012, Florida Atlantic University, Boca Raton, Florida
Ph.D. 2017, Florida Atlantic University, Boca Raton, Florida

CONCERNING PERIOD OF PREPARATION & QUALIFYING EXAMINATION

Time in Preparation: 2013—2017

Qualifying Examination Passed: Fall 2014

Published Papers:

S. Glass, I. Mahgoub, and M. Rathod, "Rapid Prototyping of Cooperative Caching in a VANET: A Case Study", *Wireless Days 2017 (IEEE WD)*, Porto, Portugal, March 2017.

S. Glass, I. Mahgoub, and M. Rathod, "Leveraging MANET based Cooperative Cache Discovery Techniques in VANET: A Survey and Analysis", *IEEE Communications Surveys and Tutorials (IEEE COMST)*, May 2017.

S. Glass, I. Mahgoub, and M. Rathod, "Neighbor Risk Reporting in Vehicular Networks", *IEEE Symposium Series on Computational Intelligence (IEEE SSCI)*, Honolulu, Hawaii, November 2017.

S. Glass, I. Mahgoub, and M. Rathod, "Improving Privacy with Intelligent Cooperative Caching in Vehicular Ad Hoc Networks", *IEEE Transactions on Vehicular Technology (IEEE TVT)*, (Under Review).

S. Glass, D. Klein, I. Mahgoub, and M. Rathod, "Improving Privacy in Vehicular Networks", FAU and Motorola Solutions jointly offering application to United States Patent Office (USPTO).

FAU

COLLEGE OF ENGINEERING & COMPUTER SCIENCE
Florida Atlantic University

FLORIDA ATLANTIC UNIVERSITY

COLLEGE OF ENGINEERING & COMPUTER SCIENCE

announces the

Ph.D. Dissertation Defense

of

STEPHEN C. GLASS

for the degree of

DOCTOR OF PHILOSOPHY (PH.D.)

Oct. 31, 2017 at 10 a.m.

in

Engineering East, Room 405

777 Glades Road

Boca Raton, FL

DEPARTMENT: Computer and Electrical Engineering and Computer Science

DISSERTATION TITLE: “Improving Privacy with Intelligent Cooperative Caching in Vehicular Ad Hoc Networks”

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ABSTRACT OF DISSERTATION

Improving Privacy with Intelligent Cooperative Caching in Vehicular Ad Hoc Networks

With the issuance of the Notice of Proposed Rule Making (NPRM) for Vehicle to Vehicle (V2V) communications by the United States National Highway Traffic Safety Administration (NHTSA), the goal of the widespread deployment of vehicular networking has taken a significant step towards becoming a reality. In order for consumers to accept the technology, it is expected that reasonable mechanisms will be in place to protect their privacy. Cooperative Caching has been proposed as an approach that can be used to improve privacy by distributing data items throughout the mobile network as they are requested. With this approach, vehicles first attempt to retrieve data items from the mobile network, alleviating the need to send all requests to a centralized location that may be vulnerable to an attack. However, with this approach, a requesting vehicle may expose itself to many unknown vehicles as part of the cache discovery process. In this work we present a Public Key Infrastructure (PKI) based Cooperative Caching system that utilizes a genetic algorithm to selectively choose members of the mobile network to query for data items with a focus on improving overall privacy. The privacy improvement is achieved by avoiding those members that present a greater risk of exposing information related to the request and choosing members that have a greater potential of having the needed data item. An Agent Based Model is utilized to baseline the privacy concerns when using a broadcast based approach to cache discovery. In addition, an epidemiology inspired mathematical model is presented to illustrate the impact of reducing the number of vehicles queried during cache discovery. Periodic reports from neighboring vehicles are used by the genetic algorithm to identify which neighbors should be queried during cache discovery. In order for the system to be realistic, vehicles must trust the information in these reports. A PKI based approach is used to evaluate the trustworthiness of each vehicle in the system is also detailed. We have conducted an in-depth performance study of our system that demonstrates a significant reduction in the overall risk of exposure when compared to broadcasting the request to all neighbors.