

Computer Science Seminar Series, 2013

National Capital Region

Impact of Trust on Performance and Security

Speaker: Dr. Jin-Hee Cho

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1:00PM- 2:00PM, NVC 325

Abstract

In an increasingly networked world, increased connectivity could lead to improved information sharing, facilitate collaboration, and enable distributed decision making, which are underlying concepts in Network Centric Operations. Battlefield communication networks must cope with hostile environments, node heterogeneity, often stringent performance constraints, node subversion, high tempo operations leading to rapid changes in network topology and service requirements, and dynamically formed communities of interest wherein participants may not have predefined trust relationships. In net-centric military environments, decision making based on perceived trust towards entities in a network is critical to achieving successful mission completion. To date, trust has often been interpreted as a single dimension of an entity (e.g., node) or system mainly in terms of reliability in engineering fields. Originally the trust concept derived from social sciences and has been defined with more than 100 definitions across different domains. In our work, we adopt the consensus of many disciplines and define trust as the willingness to take a risk. That is, inherently trusting behavior reveals vulnerability (e.g., risk or security breach) to a trustor with a potential betrayal of a trustee when the trustee does not behave as the trustor expected. In this talk, I would like to introduce the two-fold thrust of ARL's current trust research: (1) developing composite trust metrics (or management protocols) that consider multidimensional aspects of trust in an entity and reflects interactions between multiple layers of a complex, tactical network intertwined by communication, information, and social/cognitive networks (i.e., a multi-genre network); and (2) applying the proposed trust management protocols to various types of security/tactical applications including secure routing, intrusion detection, public key management, resource assignment, and information fusion/sharing. I will discuss critical tradeoffs identified in those applications to ensure the impact of trust on performance and security. Lastly, I would like to discuss the potential of future research areas by using techniques of networking, network security, and data mining perspectives.

Biography



Dr. Jin-Hee Cho received her BA from Ewha Womans University in Seoul, Korea in 1997 and a Master's degree in Social Work from Washington University in St. Louis, MO in 1999. And she obtained the M.S. and Ph.D in Computer Science from Virginia Tech in Blacksburg, VA in 2004 and 2008 respectively. She was supported by an Integrated Research and Education in Advanced Networking (IREAN) fellowship through the NSF Integrative Graduate Education and Research Traineeship Program (IGERT) program during her PhD study. She was a postdoctoral research fellow at the Army Research Laboratory (ARL) in Adelphi, MD since Jan. 2009 and joined ARL as a computer scientist as of July 2010. She received a Best Paper Award in the 2009 IEEE/IFIP International Symposium on Trusted Computing and Communications (TrustCom09), Vancouver, Canada. She currently serves on technical committees of numerous conferences/workshops, is on the editorial board of three journals, and reviews numerous journals, white papers, and proposals. Her research focus at ARL is on developing network protocols for trustworthy tactical cyber space using multi-disciplinary approaches and on analyzing their performance and security. She is actively collaborating with ARL's research collaboration partners through two main research programs, Network Science Collaborative Technology Alliance (NS CTA) and International Technology Alliance (ITA), in addition to ARL's internal scientists on trust research. She has received an ARL award for the outstanding technical services in FY2010 and has been nominated for The Army Modeling and Simulation Award hosted by the Department of the Army in FY2012. She has published over 40 technical papers in the areas of networking and telecommunications. Her research interests include wireless mobile networks, sensor networks, delay tolerant networks, secure group communications, key management, intrusion detection, trust management, social/cognitive networks, market-based economic modeling, game theory, and resource allocation. She is a member of the IEEE and ACM.