

The critical infrastructures of the power grid and the communication network are highly interdependent. Join the lecture to learn more about complex interdependency relations in a multi-layered network and proposed effective solution techniques.

Faculty of Electronics and Faculty of Computer Science and Management under the initiative of European research centre of Network intelligence for INnovation Enhancement ENGINE, in cooperation with Faculty of Electrical Engineering and Institute of Highway Technology and Innovation (IATI) Consortium - Centre Competence Smart Power Grids, invite on a lecture of Professor Arun Sen, Department of Computer Science and Engineering at Arizona State University, considering complex interdependency relations in power and communication networks.

Strategic Analysis and Design of Robust and Resilient Interdependent Power and Communication Networks with a New Model of Interdependency

Arunabha (Arun) Sen

08.05.2015 (Friday) – room 314, D-20, 09:15-11:15

Abstract:

The critical infrastructures of the nation such as the power grid and the communication network are highly interdependent. Recognizing the need for a deeper understanding of the interdependency in a multi-layered network, significant efforts have been made in the research community in the last few years to achieve this goal. Accordingly a number of models have been proposed and analyzed. Unfortunately, most of the models are over simplified and as such they fail to capture the complex interdependency that exists between entities of power grid and communication networks involving a combination of conjunctive and disjunctive relations. To overcome the limitations of existing models, we propose a new model that is able to capture such complex interdependency relations. Utilizing this model, we provide techniques to solve several problems, including (i) Identification of the k most vulnerable nodes of an interdependent network, (ii) Root cause analysis, (iii) Progressive recovery, (iv) Entity hardening, (v) Smallest pseudo target set identification, and (vi) Robustness analysis. We study the computational complexity of these problems and provide effective solution techniques. Finally, we evaluate the efficacy of our techniques using real data collected from power grid and communication network that spans the Maricopa county of Arizona.



Arunabha (Arun) Sen (<http://netsci.asu.edu>) received a Bachelor degree in Electronics and Telecommunication Engineering from Jadavpur University, Kolkata, India, and a Ph.D. degree in Computer Science from the University of South Carolina, Columbia, South Carolina, USA. He is currently a Professor of Computer Science and Engineering at Arizona State University. He served as the Associate Chairman of the department responsible for Graduate Programs and Research from 2001-7. He spent his sabbaticals at the University of California, San Diego in 1996, University of California, Berkeley in 2007, and currently spending his sabbatical at Wroclaw University of Technology, in Wroclaw, Poland. His research interest are in the areas of resource optimization problems networks, including wireless, optical, power grid, transportation, social networks and the newly emerging discipline of Network Science. He primarily studies the algorithmic issues related to the problems in these domains utilizing graph theoretic, game theoretic and combinatorial optimization techniques to find solutions. He has published over one hundred research papers in peer-reviewed journals and conferences on these topics. He has served as a Program Committee member or as the Chair of the Program Committee of several IEEE and ACM workshops and conferences. He has served as an Associate Editor of IEEE Transactions on Mobile Computing till 2011. His research is sponsored by the U.S. Army Research Office, Air Force Office of Scientific Research, Defense Threat Reduction Agency, Office of Naval Research and the National Science Foundation. He was also a member of the ASU team that won the first DoD Minerva project award in 2009. He started the International Workshop on Network Science for Communication Networks (NetSciCom) in 2009 and has served as one of the organizers of all the NetSciCom workshops, Rio de Janeiro (2009), San Diego (2010), Shanghai (2011), Orlando (2012), Torino (2013), Toronto (2014) and Hong Kong (2015).



For organizational reasons participants of the meeting are kindly asked to fill a short registration form available at : <http://goo.gl/forms/WP1dRXChXY>



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