
Game Theory for Cooperative Networks

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About the Speaker

Walid Saad received his B.E. degree in Computer and Communications Engineering from the Lebanese University, Faculty of Engineering II, in 2004, his M.E. in Computer and Communications Engineering from the American University of Beirut (AUB) in 2007, and his Ph.D degree from the University of Oslo in 2010. From August 2008 till July 2009 he was a visiting scholar in the Coordinated Science Laboratory at the University of Illinois at Urbana Champaign. Currently, he is a Postdoctoral Research Associate in the Electrical Engineering Department at Princeton University. His research interests include applications of game theory in wireless networks, coalitional game theory, cognitive radio, femtocell networks, wireless communication systems (UMTS, WiMAX, LTE), and the smart grid. He was the first author of the papers that received the Best Paper Award at the 7th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt), in June 2009 and at the 5th International Conference on Internet Monitoring and Protection (ICIMP) in May 2010.

About the Talk

Game theoretical techniques have recently become prevalent in a wide range of engineering applications, notably, in wireless and communication networks. With the emergence of novel networking paradigms such as cognitive radio or cooperative communications and the need for self-organizing and decentralized networks, it has become imperative to seek game theoretical tools that allow studying and analyzing the interactions of the nodes in future communication networks. In this talk, following a brief overview on the fundamentals and potential of game theory, we put a particular emphasis on coalitional game theory, which is a branch of game theory that deals with cooperative behavior.

We classify coalitional game theory in three distinct classes: canonical games, coalition formation games, and coalitional graph games. For each class, we present the basic components and solution concepts, and then, we study its application within several emerging areas of wireless and communication networks. We conclude the talk by an overview on possible future interdisciplinary research directions that span the areas of game theory and communication networks.

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