Title: Game-Theoretic Framework for Cooperative Relaying in Cognitive Radio Networks

Doctoral Research Seminar Presentation

by Zheng Wang

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WebEx Link
https://gmu.webex.com/gmu/onstage/g.php?MTID=eb2010d3142815b7d12f08417919340ac

Abstract: Cognitive radio is a promising technology that aims to improve spectrum utilization by allowing unlicensed secondary users (SUs) to access and share licensed spectrum that is not being used by the primary users (PUs). Cognitive radio networks (CRNs) require suitable power control and resource allocation schemes to avoid harmful interference to the PUs and promote system capacity. With proper interference coordination, the SUs can efficiently access the available spectrum and achieve higher system capacity without compromising the PUs. In our work, we propose a novel Stackelberg game-theoretic framework to jointly manage spectrum resources and coordinate secondary users in a cognitive radio network with decode-and-forward cooperative relaying capability to extend coverage. The PUs and SUs are mapped into leader-follower pairs in which the SUs purchase spectrum resources from their corresponding PU leaders. An optimal SU transmit strategy incorporating cooperative relaying is derived, and a hybrid scheduling algorithm incorporating both direct transmission and relay transmission is proposed. Experimental results show that the proposed Stackelberg game framework can achieve significantly better system performance with cooperative relaying compared to an SU direct transmission scheme.