Electrical & Computer Engineering

S E M I N A R

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The Local View in Networks

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Abstract—A key element of mobile wireless networks is their distributed nature, which implies that often nodes only have a local view of the network. This leads to a situation where the ground truth for each node is different from other nodes. As a result, nodes have to make distributed decisions about their transmission parameters like rate and power to maximize global spectral efficiency. Our driving question is "How well do distributed decisions perform compared to centralized decisions?"

In this talk, we will first formulate a message-passing protocol which allows the information about the network to trickle via local message forwarding. The protocol naturally gives rise to networks where nodes have different amount of local information. We will then study distributed rate-allocation policies and analyze their performance in some worst case topologies. The analysis systematically captures the extent of loss in network capacity which is incurred when nodes make decisions based on a local view of the network. Further, we will classify the topologies which are distributed decision friendly. The analysis sheds light on achievable capacity of different network protocols for classic hidden-node topologies.

Towards the end of the talk, we will shift gears and discuss emerging concepts in design, implementation and experimentation of clean-slate wireless protocols. With focus on deployed programmable networks, we will describe the main elements of open-source WARP project. Three main design flows will be discussed: WARP frameworks for at-speed tests, WARPLab for MATLAB-based over-the-air experiments and WARPnet for deployed operational networks.

When: Wednesday, **7 October 2009,** 10:00 - 11:00
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