Tutorial T-19: Wi-Fi Data Offloading

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Tutorial Overview

With the proliferation of smartphones and tablets, the demand for mobile data has been growing very rapidly, which is pushing the mobile cellular network to its capacity limit. On the other hand, the Wi-Fi technology is uniquely positioned to complement the cellular technology, due to its unlicensed nature and the worldwide adoption at home and work. In particular, Wi-Fi networks can help to offload the traffic from over-stressed cellular networks, reduce network costs and increase user satisfactions. To achieve a seamless integration of cellular and Wi-Fi technologies, however, demands forward-looking policy reforms, effective economic mechanism designs, and innovative technology solutions.

This tutorial will provide an overview, both in terms of industry practice and academic research, for understanding of opportunities and challenges of designing future mobile broadband networks with integrated offloading capabilities between cellular and Wi-Fi. The target audience of this tutorial will be researchers, engineers, and regulators in the wireless industry, who are interested in understanding the policy-economics-technology interactions of Wi-Fi data offloading.

The tutorial outline is as follows:

Part I: Industry Background and Standardization

- Global mobile data traffic growth
- Mobile data offloading: femtocell vs. Wi-Fi
- Industry Standards: Hotspot 2.0
- Case studies: AT&T and China Mobile
- Challenges of Wi-Fi data offloading

Part II: Economic and Technological Considerations and Solutions

- Delay optimal Wi-Fi offloading
- Congestion-aware network selection
- Predictive network selection in offloading
- Bargaining-based Wi-Fi data offloading
- Double auction mechanism for offloading market
- Crowd-sourced Internet connectivity through integrated cellular and Wi-Fi networks
Presenter Biography


Dr. Huang has served as the Editor of IEEE Journal on Selected Areas in Communications - Cognitive Radio Series, Editor of IEEE Transactions on Wireless Communications, Guest Editor of IEEE Journal on Selected Areas in Communications special issue on “Economics of Communication Networks and Systems”, Lead Guest Editor of IEEE Journal of Selected Areas in Communications special issue on “Game Theory in Communication Systems”, Guest Editor of IEEE Transactions on Smart Grid special issue on “Big Data Analytics for Grid Modernization”, Lead Guest Editor of IEEE Communications Magazine Feature Topic on “Communications Network Economics”, and Lead Guest Editor of IEEE Network Special Issue on “Smart Data Pricing”.