THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

Pricing, Competition, and Routing in Relay Networks

by

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Time : **2:30pm – 3:30pm**
Venue : **Room 833, Ho Sin Hang Engineering Building**
The Chinese University of Hong Kong

Abstract

The formation of multi-hop networks from selfish individual communication nodes often require a structure of incentives. We present an economic incentive framework in multi-hop relay networks where nodes price their services and route their traffic selfishly and strategically. Each node (1) makes a bid to each of its customers, specifying a charging function and a proposed traffic share, and (2) allocates its received traffic to its service providers. A node aims to maximize its profit from forwarding traffic. Both games with inelastic demand and those with elastic demand are considered. We show that the socially optimal routing can always be induced by an equilibrium where no node can increase its profit by unilaterally changing its bids. Inefficient equilibria arise in oligopolies due to the monopolistic pricing power of a superior relay. It results in a finite price of anarchy if marginal cost functions are concave, and an unbounded price of anarchy when they are convex. Pricing games with an elastic source exhibit better immunity to inefficient equilibria. In particular, any equilibrium at which congestion control is exercised by the source is efficient. In networks of general topology, the intrinsic multi-hop network structure gives rise to an infinite price of anarchy. This phenomenon persists even when the source has elastic demand.

Joint work with Yufang Xi.

Biography

Edmund Yeh received his B.S. in Electrical Engineering with Distinction from Stanford University in 1994, his M.Phil in Engineering from the University of Cambridge in 1995, and his Ph.D. in Electrical Engineering and Computer Science from MIT in 2001. Since 2001, he has been on the faculty at Yale University, where he is currently an Associate Professor of Electrical Engineering (with joint appointments in Computer Science and Statistics).

** ALL ARE WELCOME **

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