THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

Causal Video Coding Theory: Information Theoretic Basis for Future High Performance Real Time Video Codecs

by
Professor En-hui Yang
Professor & Canada Research Chair
Department of Electrical and Computer Engineering
University of Waterloo
Canada

Date : **14 December, 2009 (Mon.)**
Time : ~~2:30-3:30pm~~ **4:00pm-5:00pm**
Venue : **Room 833, Ho Sin Hang Engineering Building**
The Chinese University of Hong Kong

Abstract
Video coding standards have evolved from H.120 to H.261, H.262, H.263, and H.264 in the H.26x series and from MPEG-1 to MPEG-2, MPEG-4, and MPEG-4 Part 10 in the MPEG series. The newest video coding standard, H.264 (also called MPEG-4 Part 10), offers more than 40% rate reduction over H.263 while achieving the same visual quality. With the huge success of H.264, the video coding community is now working towards issuing a call for proposal to develop a new video coding standard which will probably be called H.265 with compression performance at least 40% better than H.264.

In this talk, we will look further beyond H.265 and introduce a new video coding paradigm called causal video coding. (All existing video coding standards are based on a paradigm called predictive video coding, and H.265 will likely be the same.) We will examine the compression performance of causal video coding from an information theoretic point of view and present a surprising result---for video sequences other than sequences satisfying a Markov property, the more video frames need to be encoded for transmission in causal video coding, the less amount of data after encoding has to be actually sent! We will also demonstrate that causal video coding can indeed provide better compression performance than predictive video coding.

Biography
En-hui Yang has been with the Dept. of Electrical and Computer Engineering, University of Waterloo, Ontario, Canada since June 1997. He spent his sabbatical leave at the Chinese University of Hong Kong from 2003 to 2004. He is a co-founder of SlipStream Data Inc. (now a subsidiary of Research In Motion). He currently also serves as an Associate Editor for IEEE Transactions on Information Theory (IT) and is sitting on the Awards Committee for IT.

Dr. Yang is a recipient of several research awards and a Fellow of IEEE, the Canadian Academy of Engineering, and the Royal Society of Canada (The Academies of Arts, Humanities and Sciences of Canada). By luck, his research has had a (positive or negative) impact on the daily life of tens of millions people worldwide.

** ALL ARE WELCOME **

Host: Professor Raymond W.H. Yeung (Tel: 2609-8375, Email: whyeung@ie.cuhk.edu.hk)
Enquiries: Information Engineering Dept., CUHK (Tel.: 2609-8385)