

Title: Bringing Reliability to the Cloud: Regenerating Codes for Distributed Storage

Speaker:

Professor P. Vijay Kumar
Indian Institute of Science and
University of Southern California

Date: Tuesday, 21 September 2010

Time: 5:00 pm

Venue: Lecture Theatre C, Chow Yei Ching Building

Abstract:

In a distributed storage network, information pertaining to a data file is dispersed across nodes in such a manner that an end-user can retrieve the data stored by tapping into neighboring nodes. A popular option (employed for example in RAID-6) that reduces network congestion and that leads to increased resiliency in the face of node failures, is to employ erasure codes such as Reed-Solomon (RS) codes. Upon failure of an individual node, a self-sustaining data storage network must necessarily possess the ability to repair the failed node. Downloading the entire data stored in the network just to bring up a single failed node as would be required with RS codes, is clearly inefficient.

Regenerating codes are a class of distributed storage codes that optimally trade the bandwidth needed for repair of a failed node with the amount of data stored per node of the network. In this talk, following an overview of this new research area, we provide the first general, yet explicit set of code constructions of regenerating codes.

Biography of the speaker:

P. Vijay Kumar obtained his B.Tech and M. Tech from the Indian Institutes of Technology and his Ph.D. from the University of Southern California (USC). He is currently a Professor in the Electrical Communication Engineering Department of the Indian Institute of Science, Bangalore and an Adjunct Research Professor at

USC. His current research interests include: cooperative communication in wireless networks, coding for distributed storage, sensor networks and low-correlation sequences for CDMA. The CDMA low-correlation sequence family $S(2)$ introduced in a 1996 paper co-authored by him is now part of the 3rd Generation W-CDMA Standard. He received the USC School-of-Engineering Senior Research Award as well as the 1995 IEEE Information Theory Society's Prize Paper Award for co-authoring a 1994 paper that provided a solution to a long-standing mystery in coding theory. He is also co-author of a paper receiving a Best Paper Award from the 4th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2008). He is a Fellow of the IEEE.

Organizer: Prof. V.O.K. Li