SEMINAR NOTICE:

Fault-Tolerant Communication Complexity

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CSL 301

Abstract:
Multi-party communication complexity studies the minimum communication (number of bits) needed to compute a function over inputs held by multiple distributed players. A key focus of distributed computing research, since the very beginning, has been to tolerate crash failures. It is thus natural to ask "If we want to compute a certain function in a fault-tolerant way, what will the communication complexity be?" This natural question, interestingly, had not yet been formally posed and thoroughly studied prior to our work.
Whether fault-tolerant communication complexity is interesting to study largely depends on how big is the difference failures make. Our results presented the very first series of lower bounds on the fault-tolerant communication complexity for the SUM aggregation function in general networks. These fault-tolerant lower bounds are (at least) exponentially larger than the corresponding upper bounds on the non-fault-tolerant communication complexity, which demonstrates the significant impact of failures. Our results also imply the optimality (within polylog factors) of some recent fault-tolerant protocols for computing SUM via duplicate-insensitive techniques, thereby answering an open question as well.

Biosketch:
Binbin Chen is a Research Scientist at Advanced Digital Sciences Center (ADSC) in Singapore. His research interests are in wireless networking, network security, sensor networks, and applied algorithms in networking. At ADSC, Binbin is working on research projects that investigate on the sensing, control, and security aspects of smart grids. Binbin earned his B.Sc. from Peking University, and his Ph.D. from National University of Singapore, both in Computer Science. He received the Best Paper award in ACM SIGCOMM 2010 for his work in efficient error estimating coding.