



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

Inference under Local Information Constraints
By
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Date : 30th November, 2018 (Fri)
Time : 3:00pm – 4:00pm
Venue : Room 833, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Independent samples from an unknown probability distribution are distributed across multiple players. A central referee seeks to do statistical inference on the underlying distribution using a limited amount of information about each players sample. What should the players send to the referee to enable sample efficient inference? We present sample-optimal algorithms for learning and testing discrete distributions under local information constraints of communication and privacy. Our algorithms are inspired by a unified view for deriving lower bounds for such problems based on a quantification of contraction in chi-square distances in a local neighborhood. Drawing from these insights, in our algorithms, we send the information to the center in a manner that results in a minimal local contraction of chi-square distances. In particular, it leads to the notion of Minimally Contracting Hash which yields sample optimal testing algorithms under both privacy and communication constraints. Perhaps surprisingly, we will see that while shared randomness does not help in learning, it greatly reduces sample complexity of testing.

This talk is based on an ongoing collaborative effort with Jayadev Acharya (Cornell) and Clément Cannone (Stanford), and will include results from our joint work on testing under privacy constraints with Cody Freitag (Cornell).

Biography

Himanshu Tyagi is an Assistant Professor in the Electrical Communication Engineering Department at the Indian Institute of Science, Bangalore. He obtained his Ph.D. from University of Maryland College Park in 2013 and was subsequently a postdoctoral researcher at the Information Theory and Applications (ITA) center. His research interests lie in information theory in its various applications, including those to compression, cryptography, machine learning, and theoretical computer science. Lately, his research has been driven by emerging problems in implementation of large scale distributed engineering systems such as IoT, blockchains, and network controlled autonomous systems.

**** ALL ARE WELCOME ****