LECTURE SERIES
TRENDS IN STATISTICS

NUS National University of Singapore | Department of Statistics and Data Science, Faculty of Science

RECENT PROGRESS ON RANDOM GRAPH MATCHING PROBLEMS

Abstract:

A basic goal for random graph matching is to recover the vertex correspondence between two correlated graphs from an observation of these two unlabeled graphs. Random graph matching is an important and active topic in combinatorial statistics: on the one hand, it arises from various applied fields such as social network analysis, computer vision, computational biology and natural language processing; on the other hand, there is also a deep and rich theory that is of interest to researchers in statistics, probability, combinatorics, optimization, algorithms and complexity theory. Recently, extensive efforts have been devoted to the study for matching two correlated Erdős–Rényi graphs, which is arguably the most classic model for graph matching. In this talk, we will review some recent progress on this front, with emphasis on the intriguing phenomenon on (the presumed) information-computation gap. In particular, we will discuss progress on efficient algorithms thanks to the collective efforts from the community. We will also point out some important future directions, including developing robust algorithms that rely on minimal assumptions on graph models and developing efficient algorithms for more realistic random graph models. This is based on joint works with Guanyi Chen, Yumou Fei, Hang Du, Shuyang Gong, Zhangsong Li and Yuanzheng Wang.

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JIAN DING

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Biography:

Professor Jian Ding received his B.S. from Peking University in 2006 and his Ph.D. from The University of California, Berkeley, in 2011. He has been a postdoc at Stanford and a faculty member at the University of Chicago and the University of Pennsylvania. Jian Ding is currently a chair professor at Peking University. Ding works on probability theory, emphasizing its interactions with statistical physics, theoretical computer science, and statistical learning theory. He is also interested in probability questions arising from "application-oriented" problems. Ding has received a few recognitions, including a Sloan Fellowship (2015), Rollo Davidson Prize (2017), ICM invited lecture (2022), ICCM gold medal (2022), Xplorer Prize (2023), the Loève Prize (2023), IMS Medallion Lecture (2024) and ICMP plenary lecture (2024).