

Fall 2024 Seminar Series



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Nearest Neighbor Methods with Applications in Functional Estimation and Machine Learning

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ABSTRACT

k Nearest Neighbor (kNN) method is an important statistical method that has a wide range of applications in functional estimation and machine learning etc. There are several advantages of kNN methods. Firstly, they are usually computationally fast and do not require too much parameter tuning. Secondly, kNN methods are purely nonparametric, which means that it can automatically adapt to any continuous underlying distributions, without relying on any specific models. Thirdly, for many statistical problems, including density estimation, functional estimation, classification and regression, kNN methods are all proven to be consistent, as long as a proper k is selected. However, despite many existing works on analyzing the performance of kNN methods, several theoretical problems still need further study. For example, the theoretical convergence rate of functional estimation, classification and regression are still not completely established. In this talk, we will present our recent progress in analyzing the convergence rates of kNN type methods for several functional estimation and machine learning problems.

BIO

Lifeng Lai received the B.E. and M. E. degrees in Information Science and Electrical Engineering from Zhejiang University, Hangzhou, China in 2001 and 2004 respectively, and the PhD degree in Electrical and Computer Engineering from the Ohio State University at Columbus, OH, in 2007. He was a postdoctoral research associate at the Department of Electrical Engineering, Princeton University from 2007 to 2009. He is now a Professor in the Electrical and Computer Engineering Department at University of California, Davis. He served as Chair of ECE Graduate Program and Vice Chair for Graduate Studies in the ECE department from 2022 to 2024. Dr. Lai was a Distinguished University Fellow at the Ohio State University from 2004 to 2007. He received the Best Paper Award from IEEE Global Communications Conference (Globecom) in 2008, the Best Paper Award from IEEE International Conference on Communications (ICC) in 2011, the Faculty Early Career Development (CAREER) Award from the National Science Foundation in 2011, and the Best Paper Award from IEEE International Conference on Smart Grid Communications (SmartGridComm) in 2012. He is currently serving as Senior Area Editor for IEEE Transactions on Information Forensics and Security, and an Associate Editor for IEEE Transaction on Information Theory and IEEE Transactions on Mobile Computing.