THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
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The Hong Kong Polytechnic University
Department of Applied Mathematics

AMA Distinguished Seminar Series in Data Science and Machine Learning

Detecting multiple change points: the PULSE criterion

By

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Abstract

To avoid either intensive computation exhaustive search-based optimization algorithms may have or false positive problem hypothesis testing-based procedures encounter, we in this paper revisit change points detection of means and of variances in a sequence of observations and propose a novel criterion by a signal statistic to define consistent estimation even when the number of change points can go to infinity at a certain rate as the sample size goes to infinity. The signal statistic exhibits a useful ”PULSE” pattern near change points such that we can simultaneously identify all change points. The estimation consistency can hold for the number of change points and for locations in a certain sense. Further, because of its visualization nature, in practice, the locations can also be relatively more easily identified by plots than existing methods in the literature. The method can also detect weak signals in the sense that those changes go to zero. As a generic methodology, it may be extendable to handle with other models. The numerical studies we conduct validate its good performance.

Biography

Dr. Zhu obtained his doctorate from Chinese Academy of Sciences in 1990. He was a research professor at Chinese Academy of Sciences, and had taught at the University of Hong Kong before joining HKBU in 2005 and was the head of the Department of Mathematics at Hong Kong Baptist University. He has also held several visiting positions including the Cheung Kong Chair Professorship under the joint program of Chinese Ministry of Education and Li Ka Shing Foundation, Hong Kong. Dr. Zhu has received a wide range of support from the NSSF of China (in 1997, he received the outstanding young scientists grant), Chinese Academy of Sciences (in 1999, he was supported by the 100 plan program for talents) and the RGC of Hong Kong. Other than several prizes and awards, Dr. Zhu won the National Natural Science award (Class II, 2013, the single investigator) and The Humboldt Research Award of Germany (1998, the single investigator). Both are the prestigious national and international award. For the latter, he is the first winner, from the Mainland, Hong Kong and Taiwan, in Science, also is still the only winner from Asia in Statistics. He is a Fellow of American Association of the Advancement of Sciences, The American Statistical Association, Institute of Mathematical Statistics, and an elected member of International Statistical Institute.

Date: 6 October 2022 (Thursday)
Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)
Venue: Online Talk via Zoom (Meeting ID: 951 8497 1451)
Speaker: Prof. Lixing Zhu, Beijing Normal University and Hong Kong Baptist University
Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University
Click to join:
https://polyu.zoom.us/j/95184971451?pwd=WXpGSkJkYUN5ZGc5UDZWWTlIbWRjZz09

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