



The Hong Kong Polytechnic University Department of Applied Mathematics

Seminar

BIAS Problems in High Dimensional Data Analytics: "Cut the Bias"

By

Prof. Syed Ejaz AHMED Brock University

Abstract

The rapid growth in the size and scope of data sets in a variety of disciplines has naturally led to the usage of the term, Big Data. The analysis of such data is important in multiple research fields such as digital marketing, gene expression arrays, social network modeling, clinical, genetics and phenotypic data, bioinformatics, personalized medicine, environmental, neuroscience, astronomy, nanoscience, among others. In high-dimensional models where the number of predicting variables is greater than observations, many penalized regularization strategies were studied for simultaneous submodel selection and post-estimation. Generally speaking, submodel are subject to inherited bias, and the prediction based on a selected submodel may not be preferable. For this reason, we propose a high-dimensional shrinkage strategy to improve the prediction performance of a submodel. Such a high-dimensional shrinkage estimator (HDSE) is constructed by shrinking a overfitted model estimator in the direction of a candidate submodel. We demonstrate that the proposed HDSE performs uniformly better than the overfitted model estimator. Interestingly, it improves the prediction performance of a given candidate submodel. The relative performance of the proposed HDSE strategy is appraised by both simulation studies and the real data analysis.

Reference: S. Ejaz Ahmed, Feryaal Ahmed and B. Yuzbasi (2022). Post-Shrinkage Strategies in Statistical and Machine Learning for High Dimensional Data. CRC Press, USA.

Biography

Dr. S. Ejaz Ahmed is a professor of statistics/data science, and he also served as the Dean of the Faculty Mathematics and Science at Brock University. He is an internationally known scholar, educator, and an accomplished researcher. His research interests concentrate on big data, predictive modeling, data science, and statistical machine learning with applications in many walks of life. His research has been supported by a variety of grants from the Natural Sciences and Engineering Research Council of Canada since 1987, the Canadian Institute of Health Research, Ontario Centre for Excellence and other sources throughout his academic career. His research achievements have been recognized with honours and awards, including the prestigious Bualuang ASEAN Chair Professorship. He is a Fellow of the American Statistical Association, an elected member of the International Statistical Institute, and a Fellow of the Royal Statistical Society.

Date: 27 September 2023 (Wednesday) Time: 16:00-17:00 (Hong Kong Standard Time GMT +8) Venue: Y306 Speaker: Prof. Syed Ejaz Ahmed, Brock University Host: Dr. Kin Yau Wong, The Hong Kong Polytechnic University