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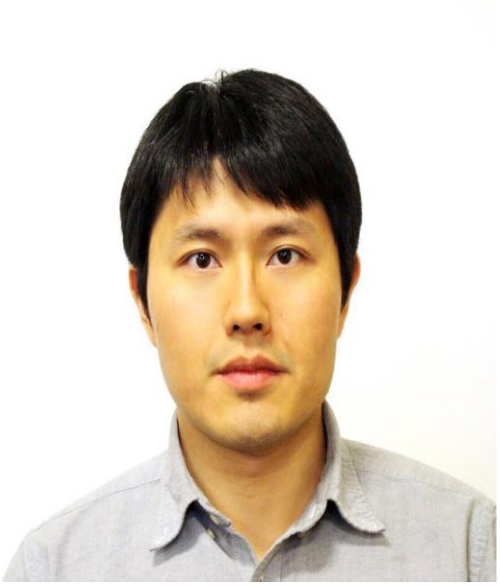

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Conquer: Convolution Smoothed Quantile Regression

September 23rd, 2020
11:30 AM EST

Zoom Meeting: Meeting ID: 988 1892 9707
Password: 448497

Virtual Coffee session before the seminar at 11:30AM EST

Abstract: Quantile regression is a powerful tool for learning the relationship between a scalar response and a multivariate predictor in the presence of heavier tails and/or data heterogeneity. In this work, we consider statistical inference for quantile regression with large-scale data in the "increasing dimension" regime. We study a convolution smoothing approach, which turns the non-dierentiable check function into a twice-differentiable, globally convex, and locally strongly convex surrogate. With a properly tuned bandwidth that depends on both sample size and dimensionality, we achieve an adequate approximation to computation and inference for quantile regression. The ensuing estimator, which we refer to as conquer, admits a fast and scalable Barzilai-Borwein gradient descent algorithm to perform optimization, and a multiplier bootstrap method for statistical inference. In the theoretical investigations of conquer, we establish nonasymptotic error bounds on the Bahadur-Kiefer linearization, from which we show that the asymptotic normality of the conquer estimator holds under a weaker requirement on the dimension of the predictors than needed for the exact quantile regression estimator. Our numerical studies confirm the conquer estimator as a practical and reliable approach to large-scale inference for quantile regression. This talk is based on a joint work with Xuming He, Kean Ming Tan and Xiaoou Pan.

Bio: I am an Assistant Professor in the Department of Mathematics at the University of California, San Diego. My research interests include high-dimensional and large-scale statistical inference, robust statistics and recently quantile regression. The general goal is about better understanding of statistical models, methods and computations as well as better use of statistical principles and tools to help decision making under uncertainty.