Multi-task Quantile Regression under the Transnormal Model

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The Chinese University of Hong Kong
(Tea reception after the talk at Lady Shaw Building)

Abstract

We consider estimating multi-task quantile regression under the transnormal model, with focus on high-dimensional setting. We derive a surprisingly simple closed-form solution through rank-based covariance regularization. In particular, we propose the rank-based $\ell_1$ penalization with positive definite constraints for estimating sparse covariance matrices, and the rank-based banded Cholesky decomposition regularization for estimating banded precision matrices. By taking advantage of alternating direction method of multipliers, nearest correlation matrix projection is introduced that inherits sampling properties of the unprojected indefinite matrix. Our work combines strengths of quantile regression and rank-based covariance regularization to simultaneously deal with nonlinearity, nonnormality and high dimensionality for high-dimensional regression. Furthermore, the proposed method strikes a nice balance between robustness and efficiency, and achieves the “oracle”-like convergence rate under the high-dimensional setting where dimension is at a nearly exponential rate to sample size. The finite-sample performance of the proposed method is also examined. The superior performance of our proposed rank-based method is demonstrated in a real application to analyze the call center arrival data.

★★★★★ All are welcome ★★★★★

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