भारतीय प्रबंध संस्थान बेंगलूर
INDIAN INSTITUTE OF MANAGEMENT
BANGALORE

The Decision Sciences Area at IIM Bangalore welcomes you to a webinar, titled:

'Improved Nonparametric Empirical Bayes Estimation using Transfer Learning'

by

Dr. Gourab Mukherjee

Date: 3rd November, 2021

Time: 6:30 p.m. to 7:30 p.m.

Abstract:

We consider compound estimation of normal means with auxiliary data collected from related source domains. The empirical Bayes framework provides an elegant interface to pool information across different samples and construct efficient shrinkage estimators. We propose a nonparametric integrative Tweedie (NIT) approach to transferring structural knowledge encoded in the auxiliary data from related source domains to assist the simultaneous estimation of multiple parameters in the target domain. Our transfer learning algorithm uses convex optimization tools to directly estimate the gradient of the log-density through an embedding in the reproducing kernel Hilbert space (RKHS), which is induced by the Stein's discrepancy metric. Most popular structural constraints can be easily incorporated into our estimation framework. We characterize the asymptotic Lp risk of NIT by first rigorously analyzing its connections to the RKHS risk, and second establishing the rate at which NIT converges to the oracle estimator. The improvements in the estimation risk and the deteriorations in the learning rate are precisely tabulated as the dimension of side information increases. The numerical performance of NIT and its superiority over existing methods are illustrated through the analysis of both simulated and real data. This is joint work with Jiajun Luo and Wenguang Sun. The manuscript can be found in

https://gmukherjee.github.io/pdfs/nit.pdf.