

**Indiana University-Purdue University
Indianapolis**
Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, March 27, 2018
SL 137

Speaker: Ruixuan Zhang (PhD student)
Department of Mathematical Sciences, IUPUI

Title: A Linear-Time Kernel Goodness-of-Fit Test

Abstract:

We propose a novel adaptive test of goodness-of-fit, with computational cost linear in the number of samples. We learn the test features that best indicate the differences between observed samples and a reference model, by minimizing the false negative rate. These features are constructed via Steins method, meaning that it is not necessary to compute the normalising constant of the model. We analyse the asymptotic Bahadur efficiency of the new test, and prove that under a mean-shift alternative, our test always has greater relative efficiency than a previous linear-time kernel test, regardless of the choice of parameters for that test. In experiments, the performance of our method exceeds that of the earlier linear-time test, and matches or exceeds the power of a quadratic-time kernel test. In high dimensions and where model structure may be exploited, our goodness of fit test performs far better than a quadratic-time two-sample test based on the Maximum Mean Discrepancy, with samples drawn from the model.

Reference:

Jitkrittum, W., Xu, W., Szabo, Z., Fukumizu, K., & Gretton, A. (2017). A linear-time kernel goodness-of-fit test. In *Advances in Neural Information Processing Systems* (pp. 261-270). **NIPS Best Paper 2017**