Department of Mathematical Sciences

Spring 2018

Colloquium Series

April 6, 2018 at 3pm in Bell Hall 143

Dr. Michael Pokojovy

The University of Texas at El Paso

A Nonparametric Density-Based k-Sample Omnibus Test

The 'k-sample' problem consists in detecting the presence of statistical differences among several populations based on k samples each independently drawn from respective population. A statistical test capable of detecting any departure from the null hypothesis of 'statistical equality' such as equality in distribution is typically referred to as an 'omnibus test.' Depending on seminal probabilistic and statistical concepts employed to put forth the test statistic, omnibus tests are usually categorized into those based upon the empirical distribution, characteristic or probability density function, etc. Due to their power advantage, density-based tests are often viewed as the more prominent omnibus tests. Typically incorporating kernel probability density function estimators, the performance of most density-based tests is critically dependent upon the choice of smoothing parameter (bandwidth) and can exhibit poor local adaptivity properties if a single global bandwidth is employed. We propose a novel density-based omnibus test based on nonparametric total variation regression techniques. In contrast to most competitors, our approach is data-driven and locally adaptive. In addition to theoretical considerations, a simulation study was performed to compare our new approach with eight representatively selected omnibus tests under various 'archetypal' scenarios to demonstrate the power of our test. This is joint work with Su Chen, The University of Memphis, TN.

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