Mathematics, Statistics, and Computer Science **@ UIC**

Statistics and Data Science Seminar

BET and BELIEF

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Abstract: We study the problem of distribution-free dependence detection and modeling through the new framework of binary expansion statistics (BEStat). The binary expansion testing (BET) avoids the problem of non-uniform consistency and improves upon a wide class of commonly used methods (a) by achieving the minimax rate in sample size requirement for reliable power and (b) by providing clear interpretations of global relationships upon rejection of independence. The binary expansion approach also connects the symmetry statistics with the current computing system to facilitate efficient bitwise implementation. Modeling with the binary expansion linear effect (BELIEF) is motivated by the fact that wo linearly uncorrelated binary variables must be also independent. Inferences from BELIEF are easily interpretable because they describe the association of binary variables in the language of linear models, yielding convenient theoretical insight and striking parallels with the Gaussian world. With BELIEF, one may study generalized linear models (GLM) through transparent linear models, providing insight into how modeling is affected by the choice of link. We explore these phenomena and provide a host of related theoretical results. This is joint work with Benjamin Brown and Xiao-Li Meng.

Wednesday, April 5 at 4:00 PM in 636 SEO