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Adaptive Confidence Intervals for Non-smooth Parameters

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 Digital Media Center Theatre
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Abstract:

Non-regular, aka "non-smooth" parameters are of scientific interest occur frequently in modern day inference. In particular when scientific interest centers on a non-smooth function of regular parameters such as in the assessment of a machine learning classifier's performance, in the estimation of multistage decision making policies and in the use of methods that use assumptions of sparsity to threshold estimators. If confidence intervals are considered at all, most research assumes potentially implausible "margin-like" conditions in order to justify the proposed confidence interval method. We describe a different approach based on constructing smooth upper and lower bounds on the parameter and then basing the confidence interval on the smooth upper and lower bounds. In particular two settings will be discussed and contrasted, that of a confidence interval for the mis-classification rate and a confidence interval for a parameter in multistage decision making policies.

Speaker's Bio:

My current primary interest concerns clinical trial design and the development of data analytic methods for informing multi-stage decision making in health. In particular for (1) constructing individualized sequences of treatments (a.k.a., adaptive interventions) for use in informing clinical decision making and (2) constructing real time individualized sequences of treatments (a.k.a., Just-in-Time Adaptive Interventions) delivered by mobile devices. See [Workshop on Just in Time Adaptive Interventions](#). Adaptive Interventions, also known as dynamic treatment regimes, are composed of a sequence of decision rules that specify when to alter the therapy and specify which intensity or type of subsequent therapy should be offered. The decision rules employ variables such as patient response, risk, burden, adherence, and preference, collected during prior therapy. These regimes hold the promise of maximizing treatment efficacy by avoiding ill effects due to over-treatment and by providing increased treatment levels to those who can benefit.

My work has been funded by [National Institute on Drug Abuse](#) and by [National Institute of Mental Health](#). I work with researchers at [The Methodology Center](#) on these topics.

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