University of California, Irvine
Statistics Seminar

Spatially-dependent Multiple Testing under Model Misspecification, with Application to Detection of Anthropogenic Influence on Extreme Climate Events

Mark Risser
Postdoctoral Fellow, Berkeley National Lab
Visiting Scholar, Department of Statistics, UC Berkeley

Thursday, May 18, 2017
4 p.m., 2011 Bren Hall*
(Bldg. #314 on campus map)
***Note room change**

The Weather Risk Attribution Forecast (WRAF) is a forecasting tool that uses output from global climate models to make simultaneous attribution statements about whether and how greenhouse gas emissions have contributed to extreme weather across the globe. However, in conducting a large number of simultaneous hypothesis tests, the WRAF is prone to identifying false "discoveries." A common technique for addressing this multiple testing problem is to adjust the procedure in a way that controls the proportion of true null hypotheses that are incorrectly rejected, or the false discovery rate (FDR). Unfortunately, generic FDR procedures suffer from low power when the hypotheses are dependent, and techniques designed to account for dependence are sensitive to misspecification of the underlying statistical model. In this paper, we develop a Bayesian decision theoretic approach for dependent multiple testing that flexibly controls false discovery and is robust to model misspecification. We illustrate the robustness of our procedure to model error with a simulation study, using a framework that accounts for generic spatial dependence and allows the practitioner to flexibly specify the decision criteria. Finally, we outline the best procedure of those considered for use in the WRAF workflow and apply the procedure to several seasonal forecasts.

For directions/parking information, please visit https://uci.edu/visit/maps.php and http://www.ics.uci.edu/about/visit/index.php