Spatial variable selection methods for investigating acute health effects of fine particulate matter components

by
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Abstract:

Previous research has suggested a connection between ambient particulate matter (PM) exposure and acute health effects, but the effect size varies across the United States. Variability in the effect may partially be due to differing community level exposure and health characteristics, but also due to the chemical composition of PM which is known to vary greatly by location and over time. The objective of this paper is to identify particularly harmful components of this chemical mixture. Because of the large number of potentially highly correlated components, we must incorporate some regularization into a statistical model. We assume that at each location the regression coefficients come from a mixture model, with the flavor of stochastic search variable selection, but utilize a copula to share information about variable inclusion and effect magnitude across locations. The model differs from current spatial variable selection techniques by accommodating both local and global variable selection. The model is used to study the association between fine PM components, measured at 115 counties nationally over the period 2000-2008, and cardiovascular emergency room admissions among Medicare patients.

Laura is a candidate for a faculty position in our department. She joins us from North Carolina State University, where she is currently working on her Ph.D. in Statistics.

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3:45PM
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