

Spatial urban analytics: big data, methodologies, and behavioural implications

Speakers: René Westerholt, Institute of Geography, Heidelberg University

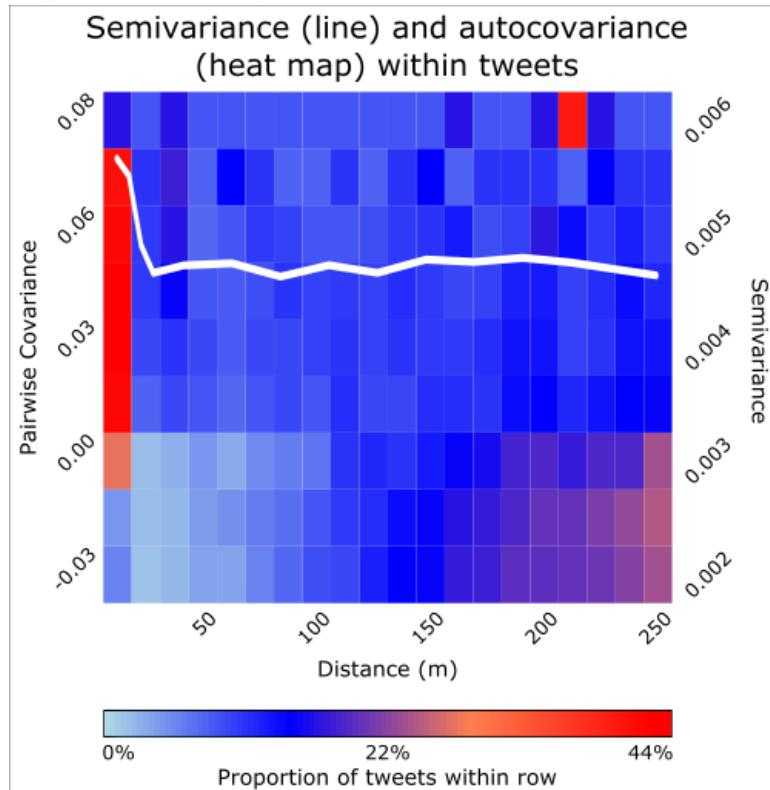
Guibo Sun, Faculty of Architecture, The University of Hong Kong

Section 1: The role of topological outliers in the spatial analysis of georeferenced social media data

Georeferenced social media data contain spatial, temporal and semantic urban information. The inherent heterogeneity of this data raises questions about the applicability of traditional spatial statistical methods. Topology is thereby one important issue. This talk focusses on the role of topology in the spatial analysis of Twitter data. Measures of autocovariance are applied to demonstrate how topological outliers may lead to unexpected results. An eigenvalue analysis of the geographic layout shows how topological outliers are affecting different designs of spatial weights. Moran scatterplots are further used to show the effect of topological outliers on the assessment of spatial correlations. We reveal that topological outliers cause artificial spatial processes, and therefore alter the interpretations of assessed spatial patterns. We also analysed the impact of scale differences between overlapping patterns on statistical results. The findings show that respective outcomes can become chaotic and unpredictable if the involved scales differ too much.

Speaker biography: René Westerholt is a Research Fellow in the GIScience Research Group of the Institute of Geography at Heidelberg University. His PhD research focuses on the interplay between spatial statistical methods and the characteristics of social media data.

Representative image:



Section 2: Uncertainty in measuring high density built environment for health research

A basic work of urban health studies is measuring the built environment. Uncertainty in the design and spatial scales of the measurements is evidenced from low density city contexts. The built environment of high density cities is widely known for being geographically heterogeneous. However, there are few studies on the uncertainty in measuring the high density built environment. Our study case is Hong Kong, which is a typical high density city, and little research has been done about its built environment. We use geocoded home addresses from a health project to extract the exposed built environments of the subjects. We construct measures of land use pattern, transportation and urban design across six spatial scales using an international built environment framework. A geographic information system (GIS) is used to map the variability of the built environment. Spearman's rank correlation is calculated to assess how well the relationships among indicators are persevered across designs of method and between spatial scales. This study revealed extreme variations and uncertainty for 180 measures of the high density built environment using comprehensive data and advanced GIS modeling techniques. We highlight implications for selecting proper methods and spatial scales of the measures based on the results.

Speaker biography: Guibo Sun is a Postdoctoral Fellow at the Faculty of Architecture of The University of Hong Kong. His research focuses on the linkage of the high density built environment with health outcomes. He is working on constructing a HK Urban GIS platform to facilitate health studies (e.g., walking, physical activity, obesity, mental health and well-being).

The representative image:

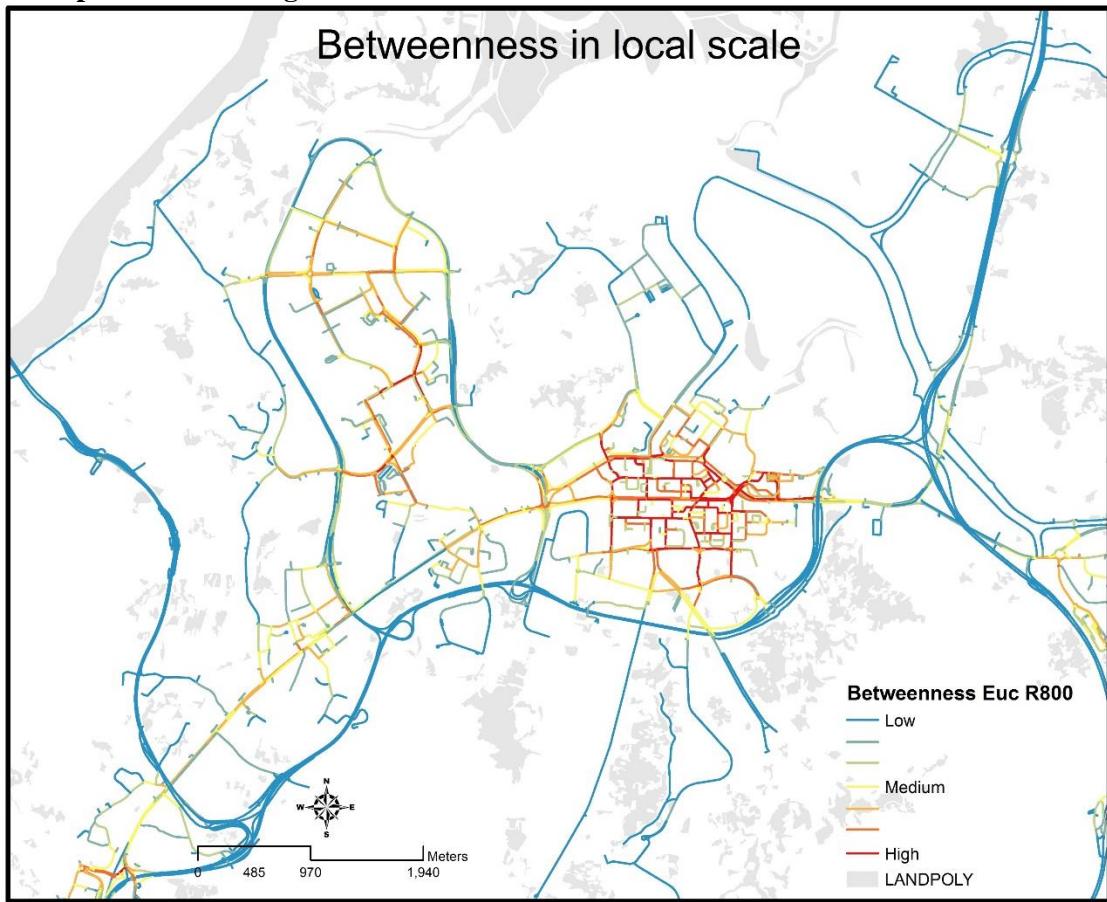


Figure 1. Network modeling in Hong Kong