

URBAN ANALYTICS: A CHALLENGE FOR STATISTICAL MODELING AND ESTIMATION

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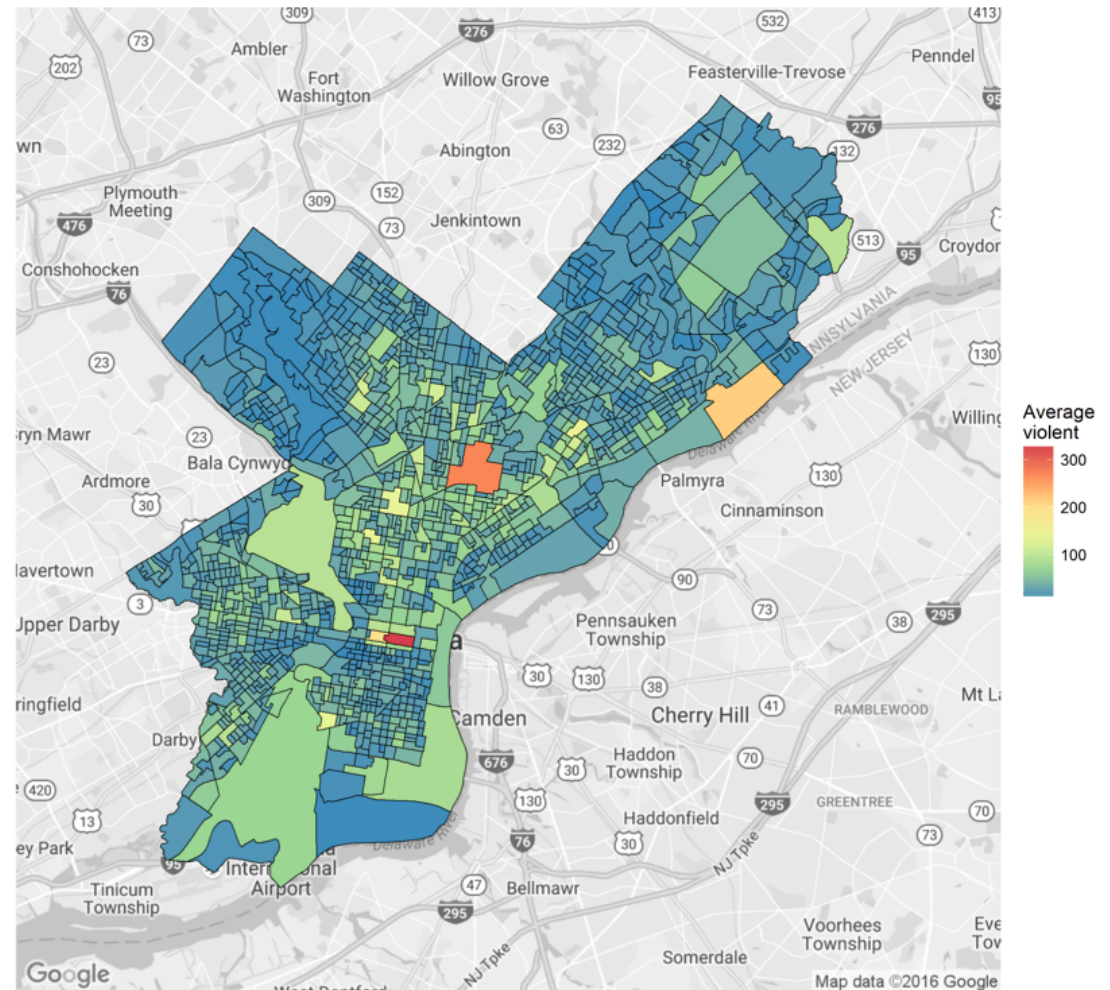
Urban Analytics

- Due to ever increasing amounts of data collected in cities all over the world, we can begin to examine the link between **economics**, **demographics**, the **built environment** and **safety**
- In particular, we are interested in how the **built environment affects vibrancy** and how **vibrancy affects safety**
- Philadelphia is an interesting case study for studying contemporary issues in urban planning in a **rapidly evolving city**

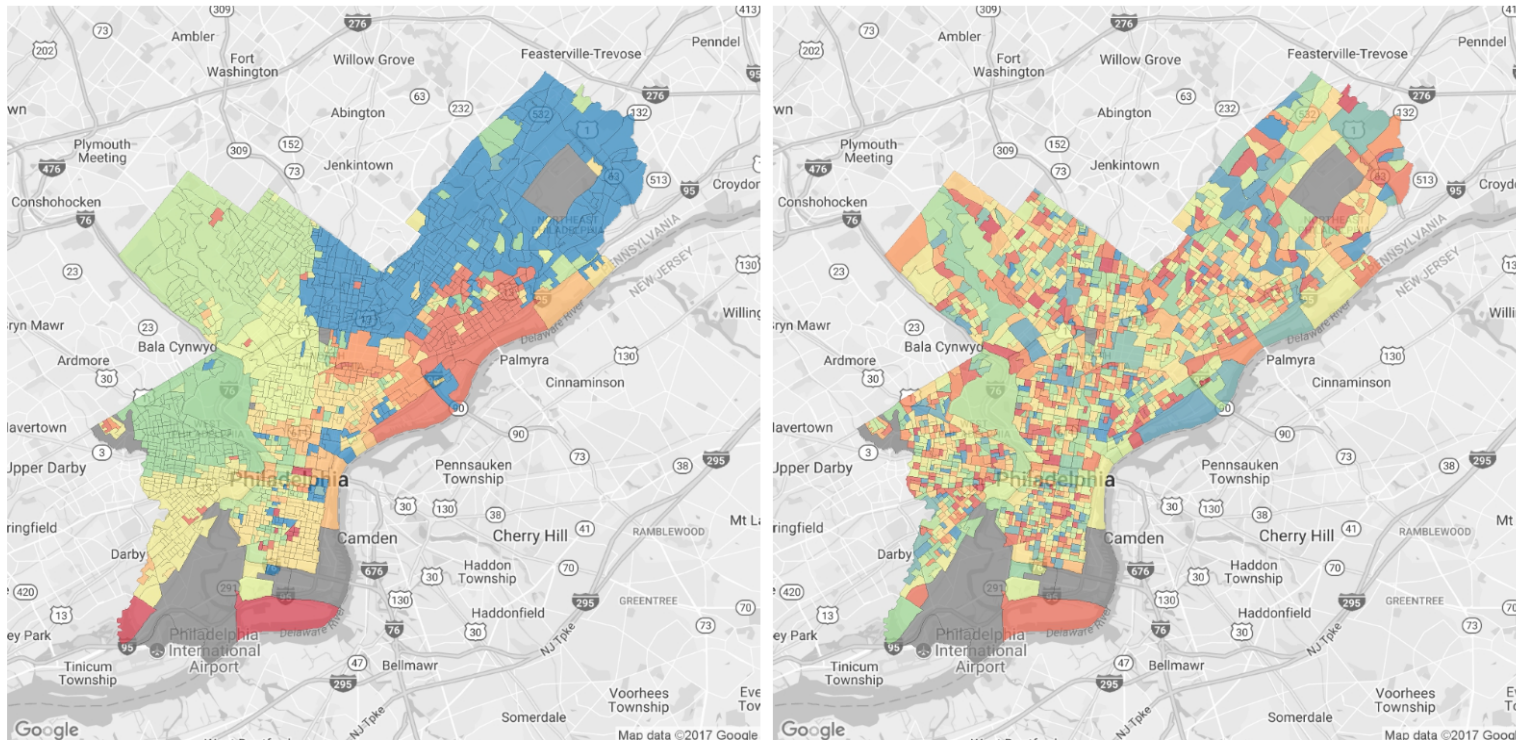


Crime and Neighborhoods in Philadelphia

- Philadelphia is divided into 1336 block groups, which we will use as our definition of **local neighborhoods**
- We are interested in how local characteristics predict both the **level of crime** and **change in crime over time** in each neighborhood
- How do we appropriately model these relationships at a neighborhood level and **share information** across the city?



Non-Parametric Spatial Models for Crime



- Current work: non-parametric Bayesian priors for estimating the **linear change** in crime over time in different neighborhoods
- Would love to use **non-linear models (like trees)** for crime but how to model **time series data** using tree models?

Exploring Predictors of Crime through Matching



- **Matching of intersections** across city to control for economics and demographics but imposing differences in number of cafes, etc. to try to isolate the association between **vibrancy and safety**
- How can we do this in the best possible way?