

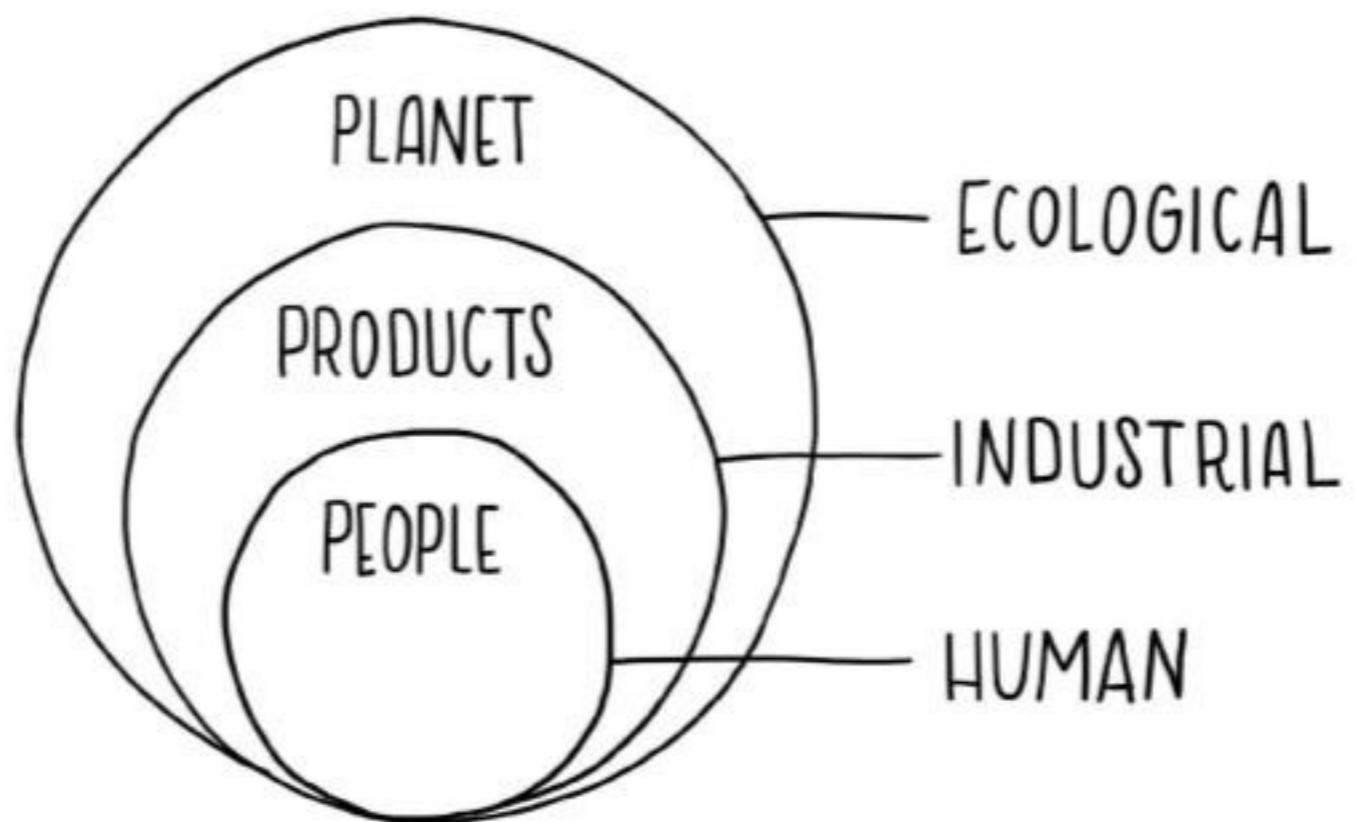
Social Complexity

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COMPLEX SYSTEMS



Societies are complex, connected,
interdependent groups of individuals



1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



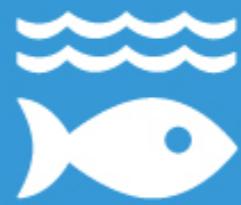
12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



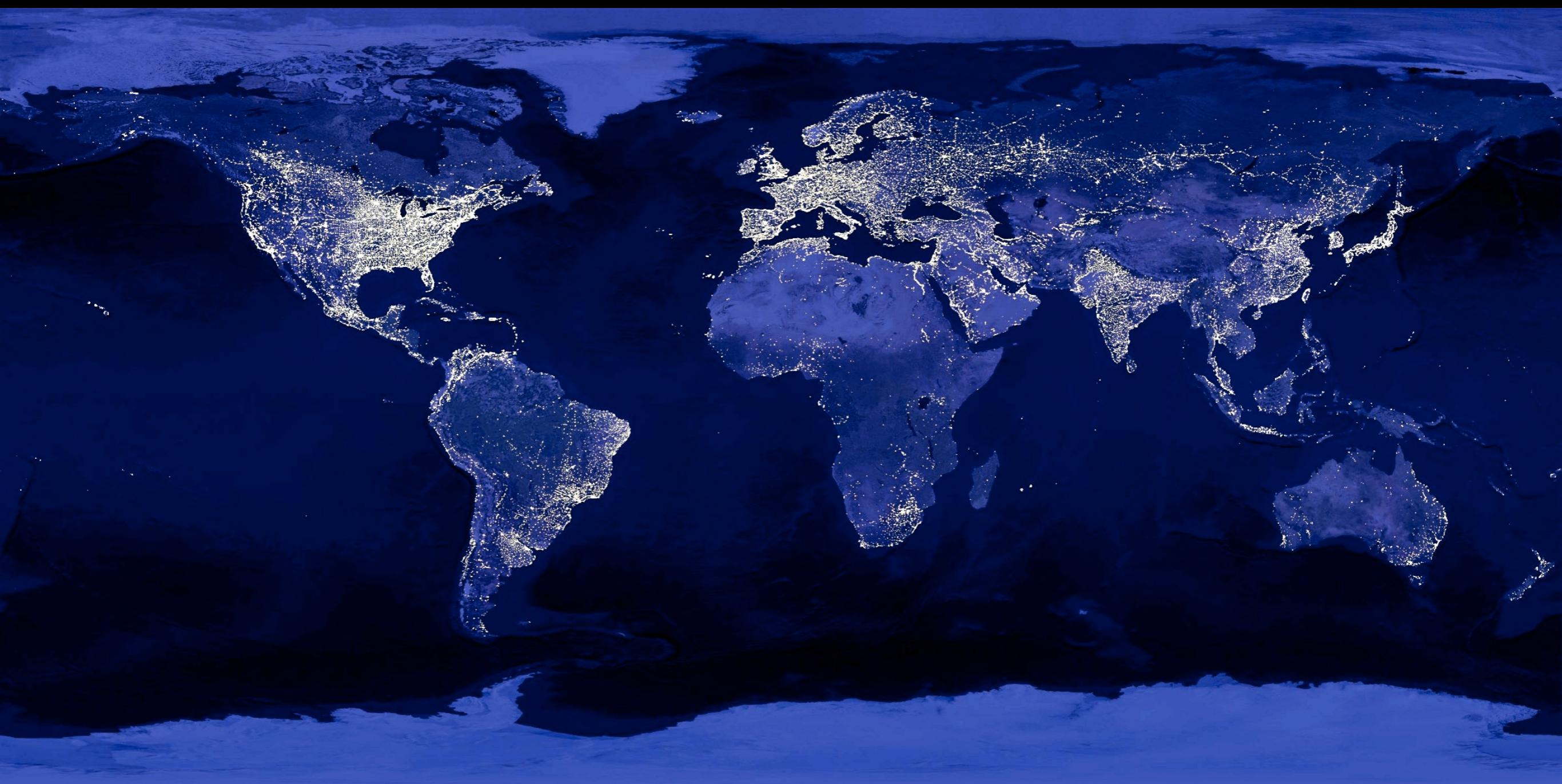
16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



SUSTAINABLE DEVELOPMENT GOALS



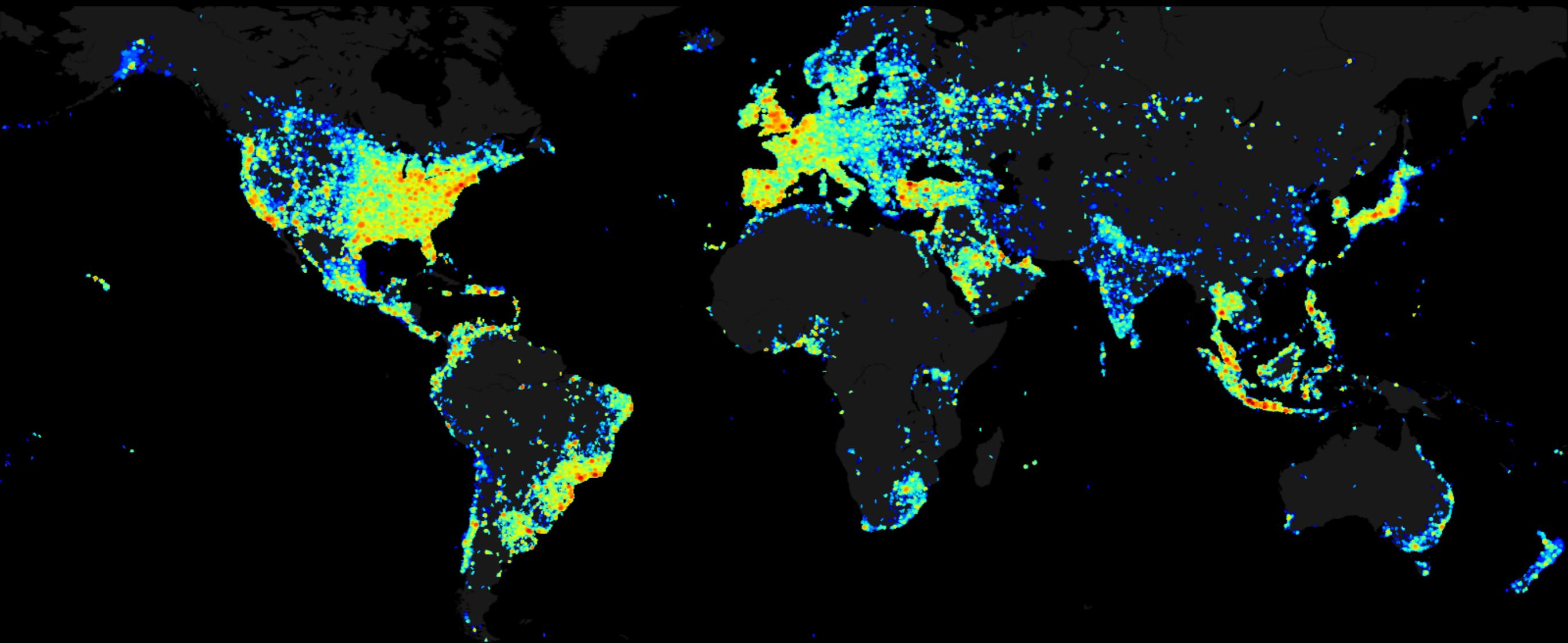
Twitter Activity

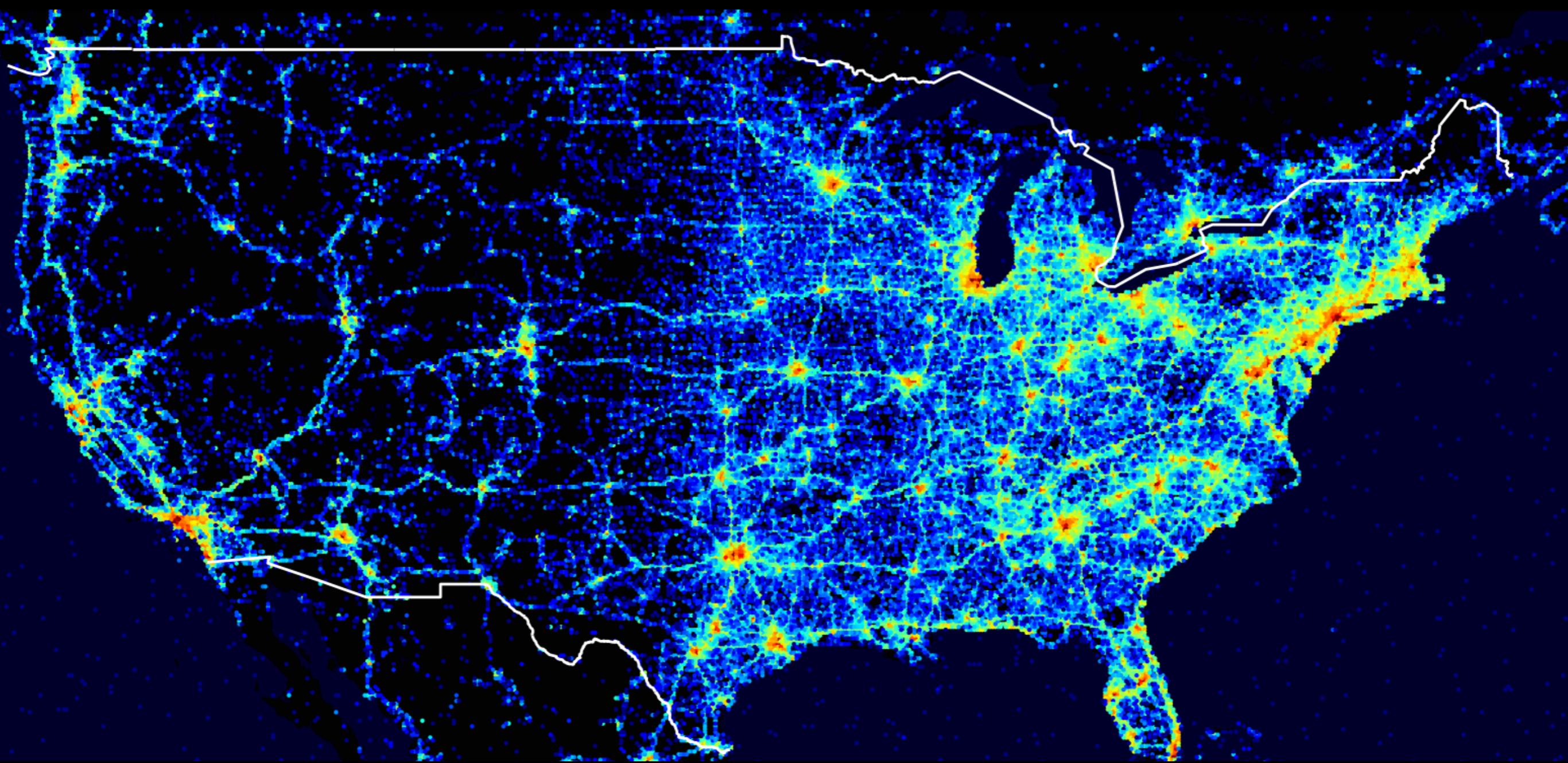


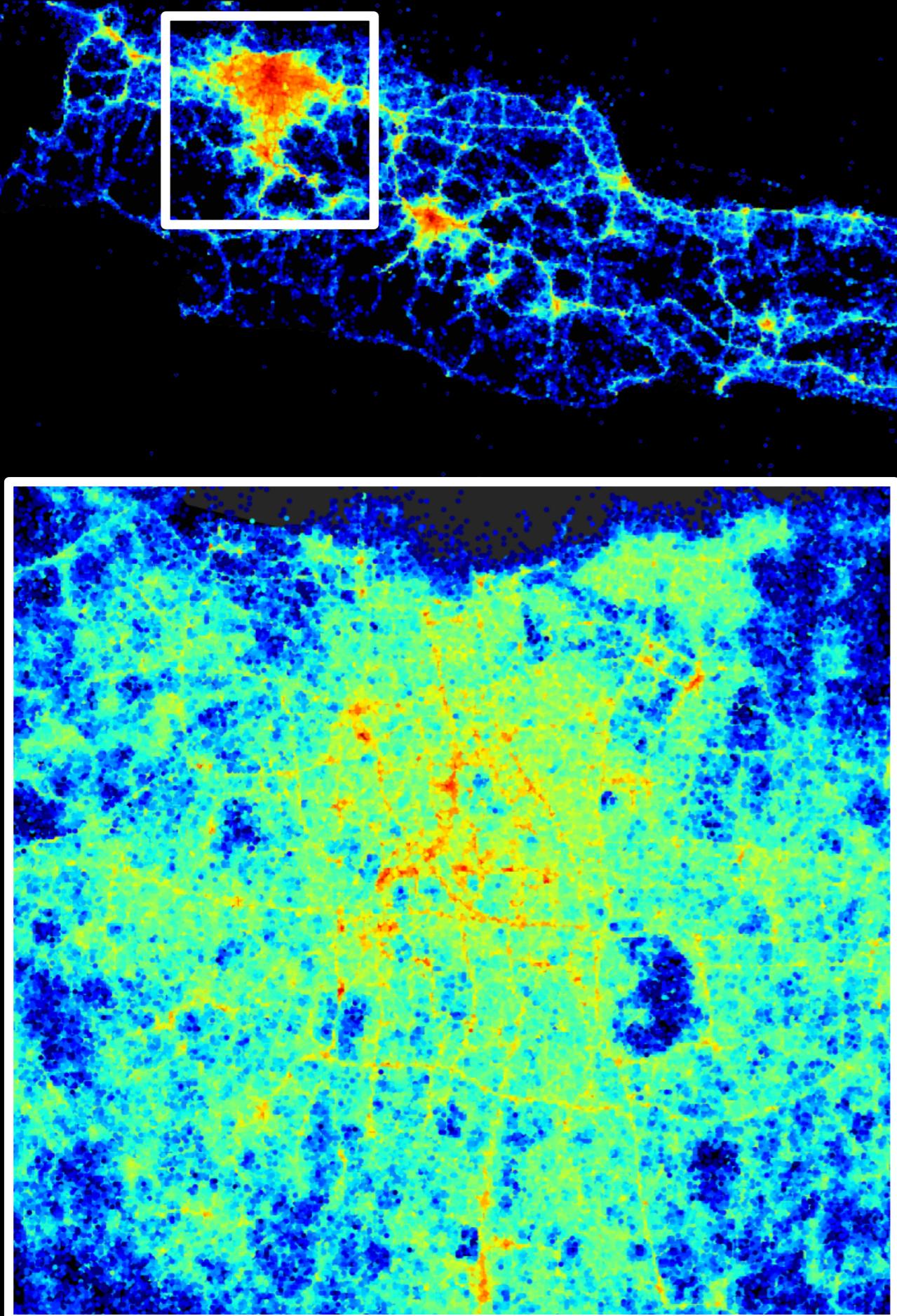


2013-12-07 00:00

Twitter Activity



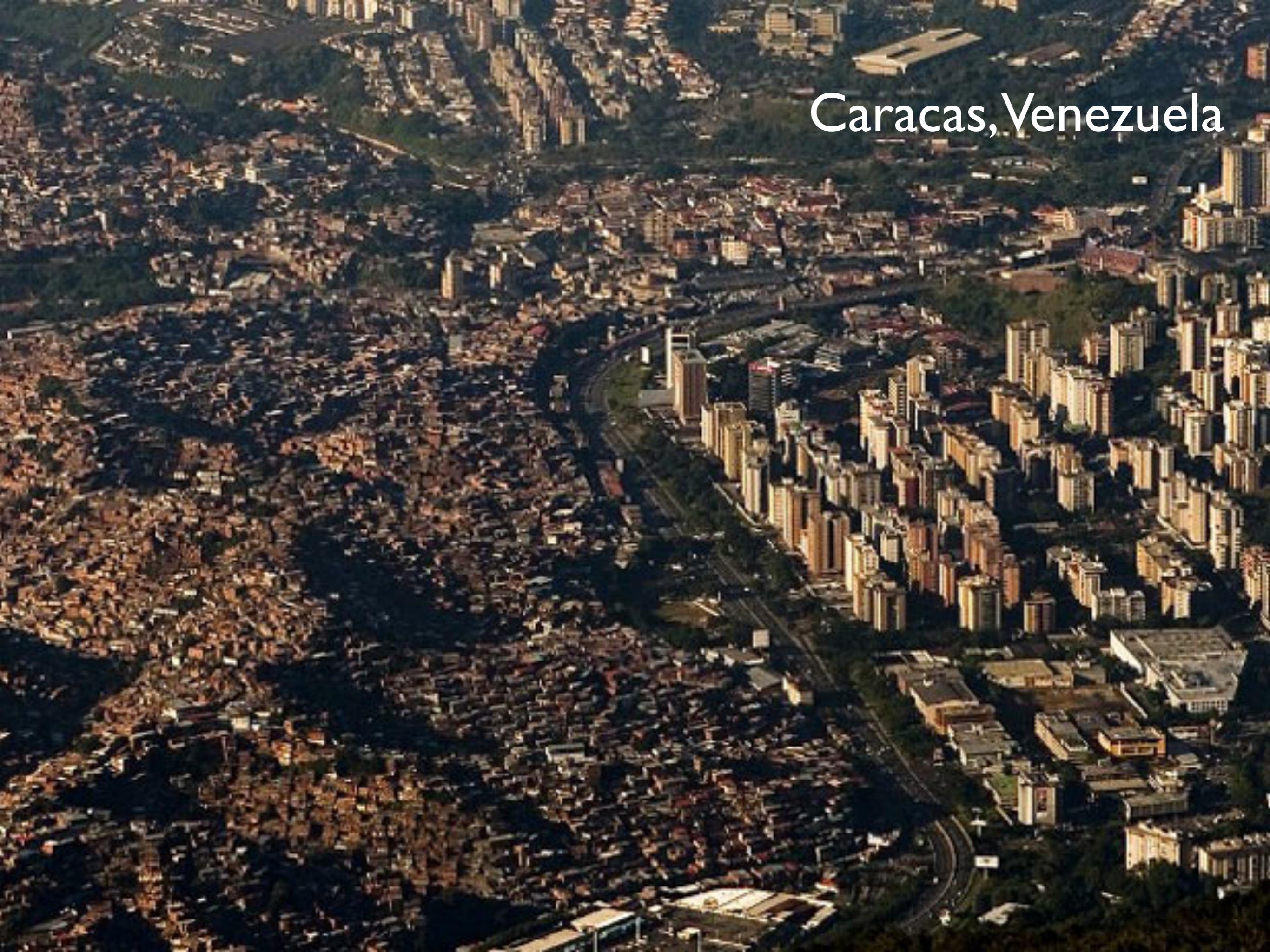




Jakarta, Indonesia



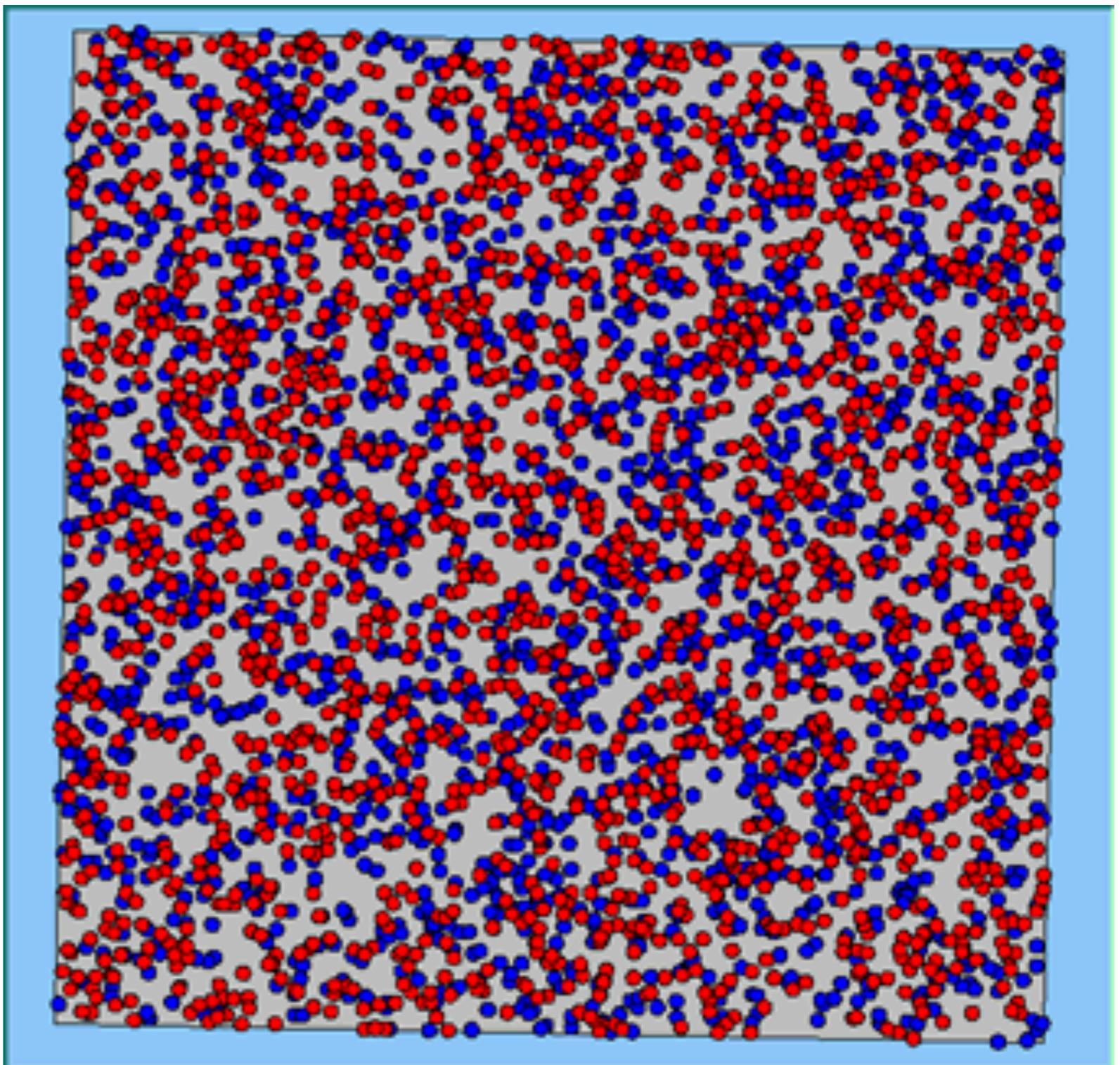
Istanbul, Turkey

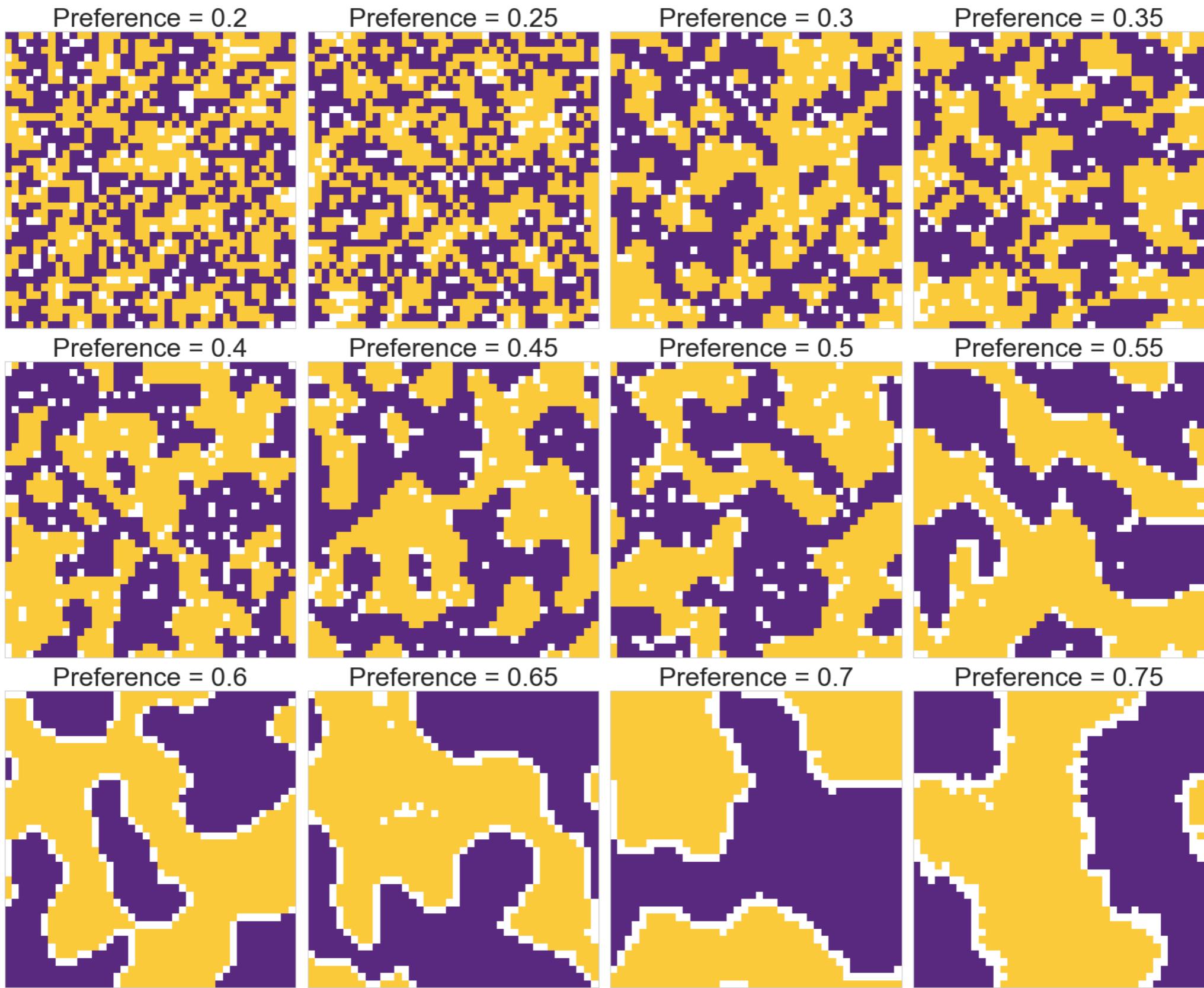
An aerial photograph of Caracas, Venezuela, capturing the city's sprawling urban landscape at dusk or night. The city is densely packed with buildings of various heights, from small residential houses to large skyscrapers. The lighting is dramatic, with streetlights and building windows glowing against the darkening sky. A major highway or railway line cuts through the city, visible as a bright, winding path of light. The overall scene conveys a sense of a large, bustling metropolis.

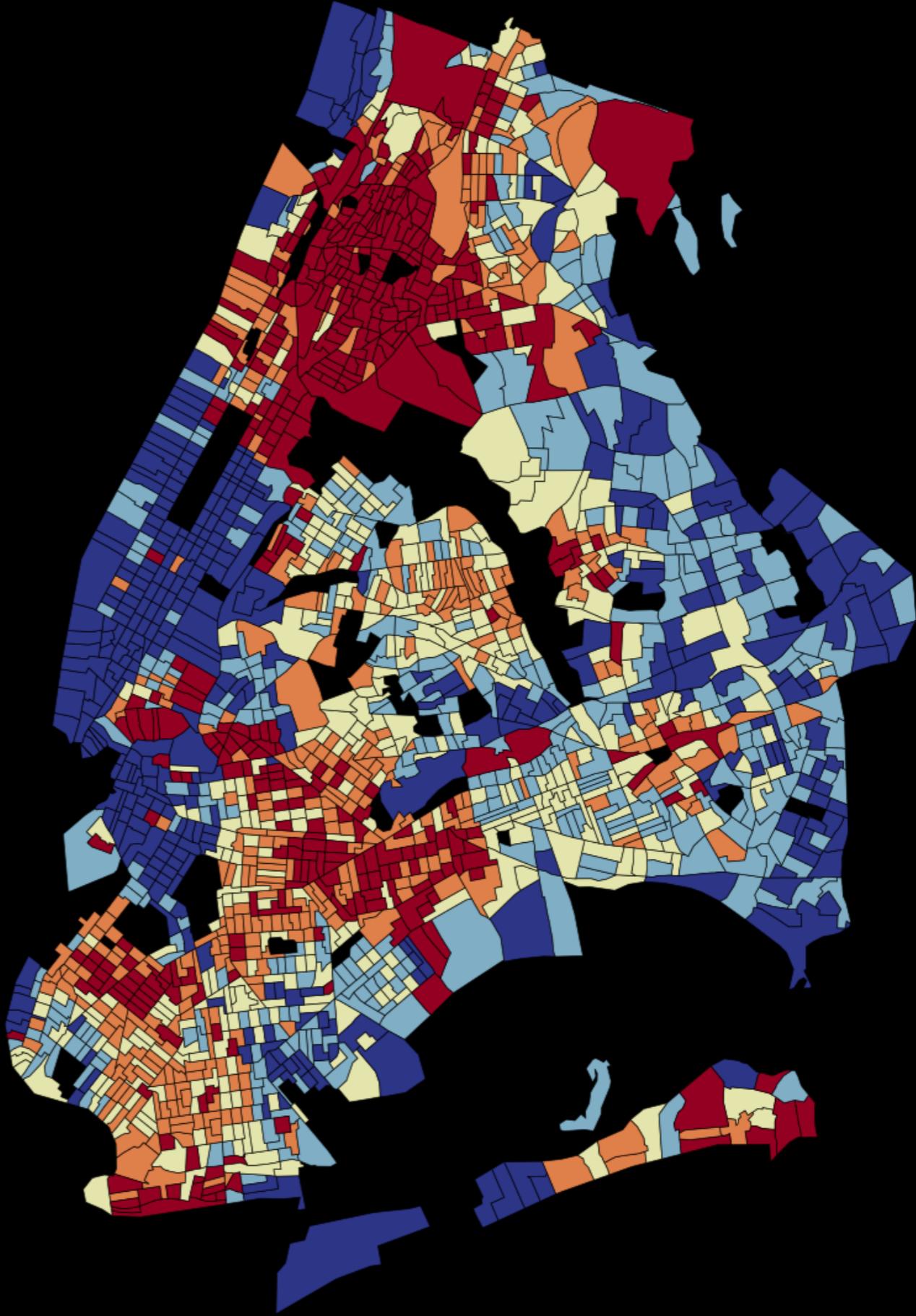
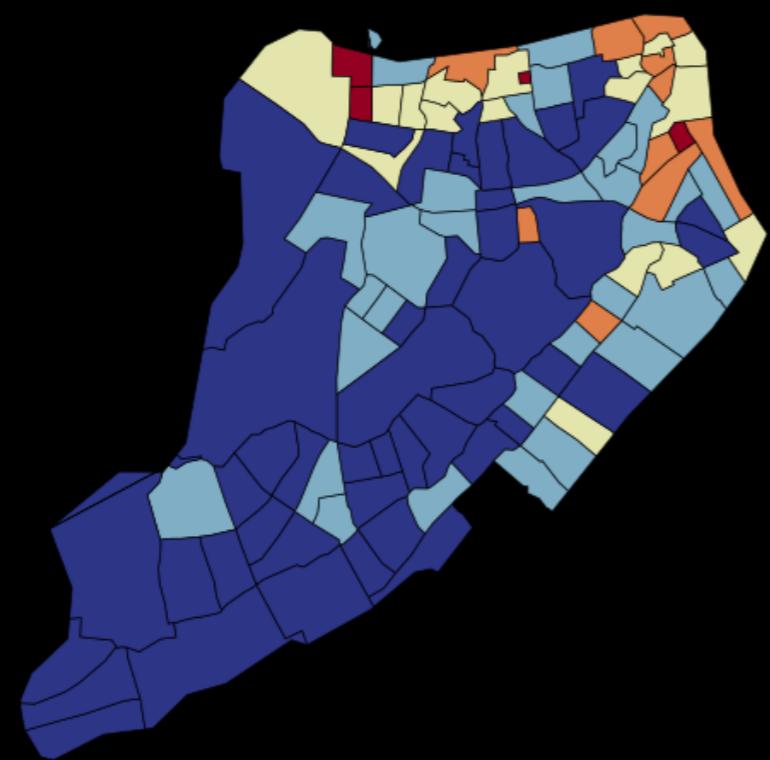
Caracas, Venezuela

Segregation

Schelling Model:
Tolerance thresholds
make people move

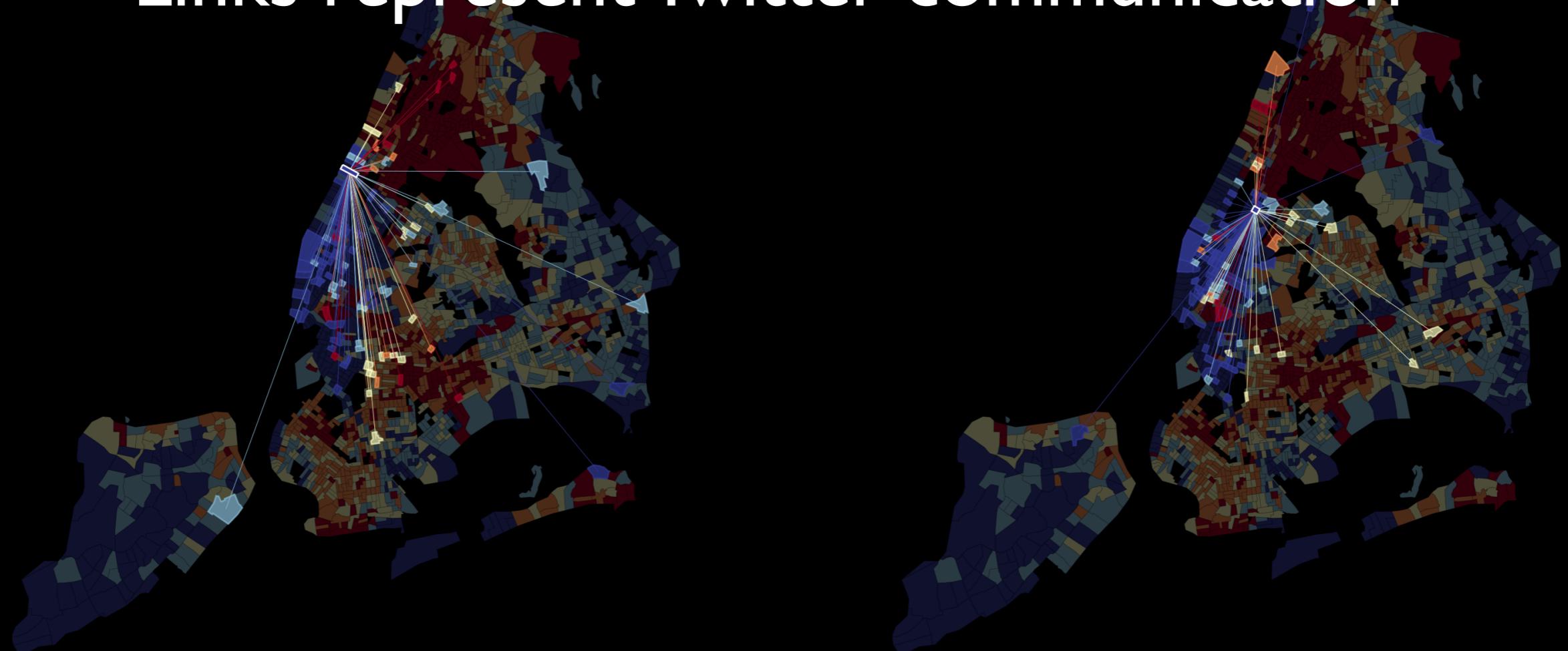




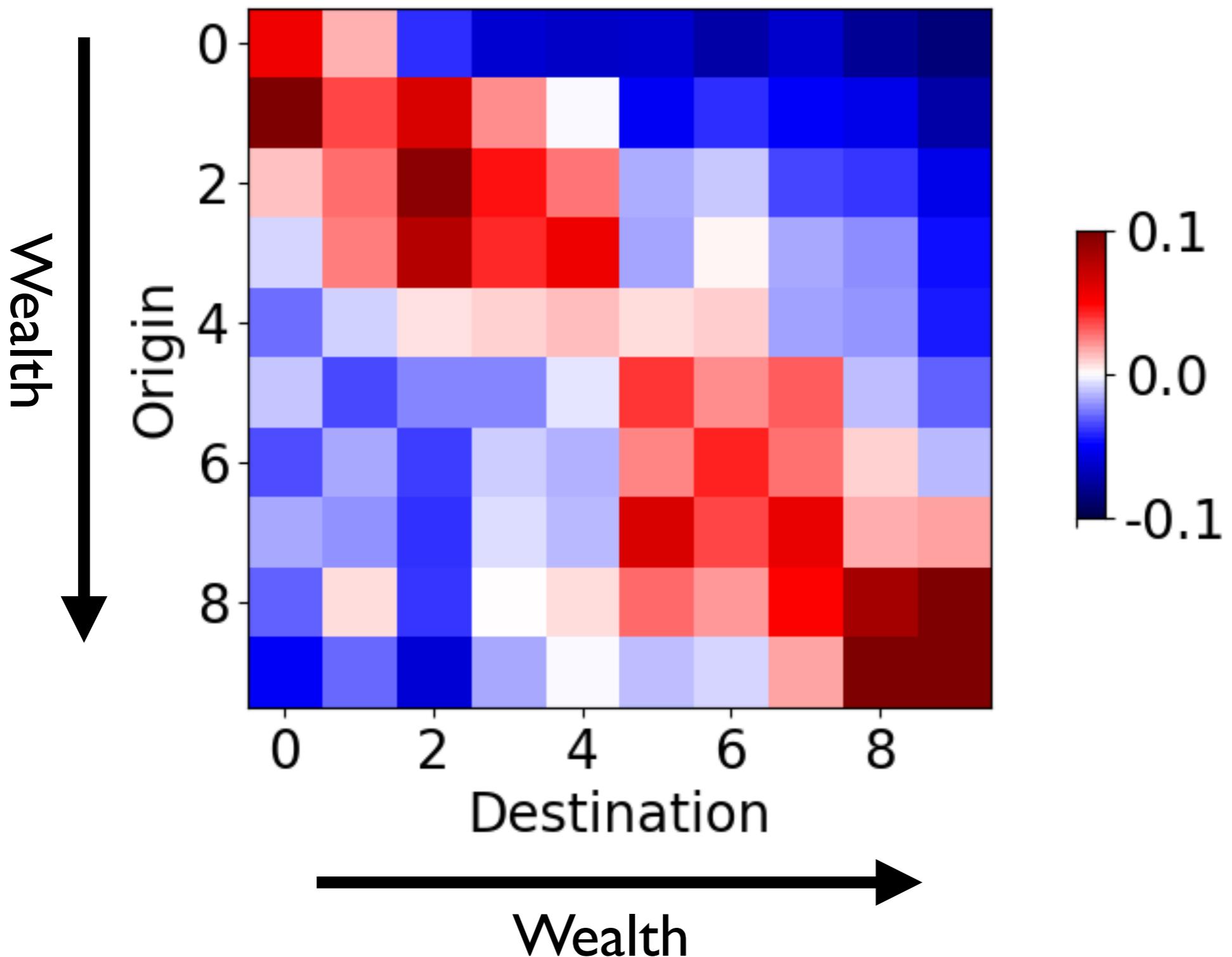


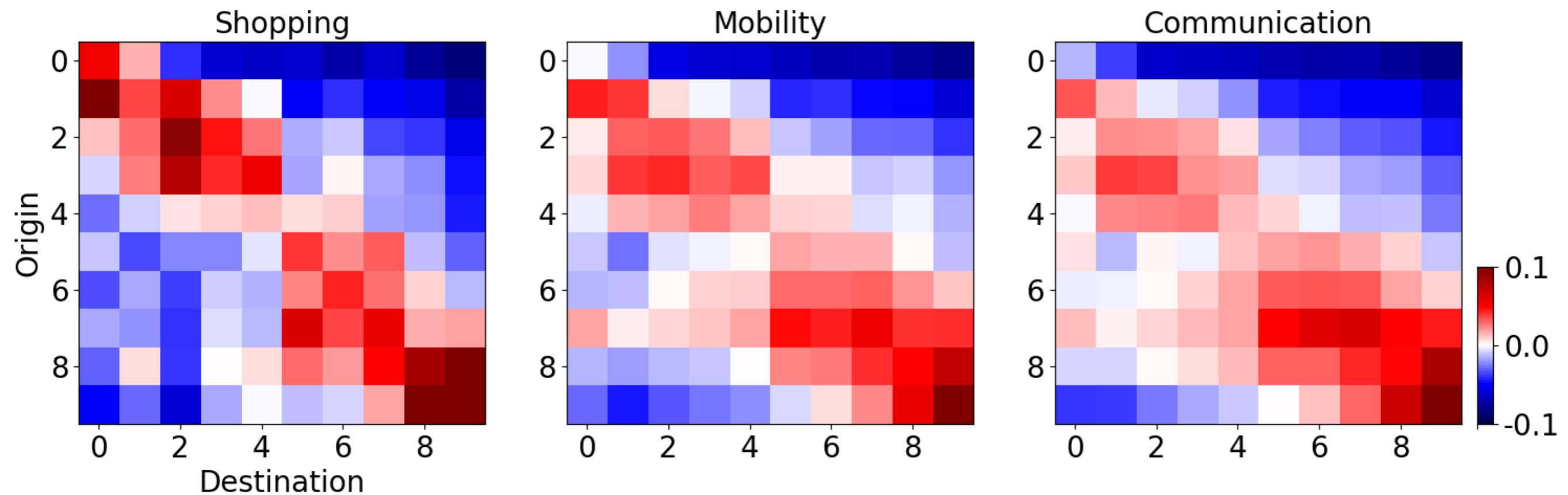


Links represent Twitter communication



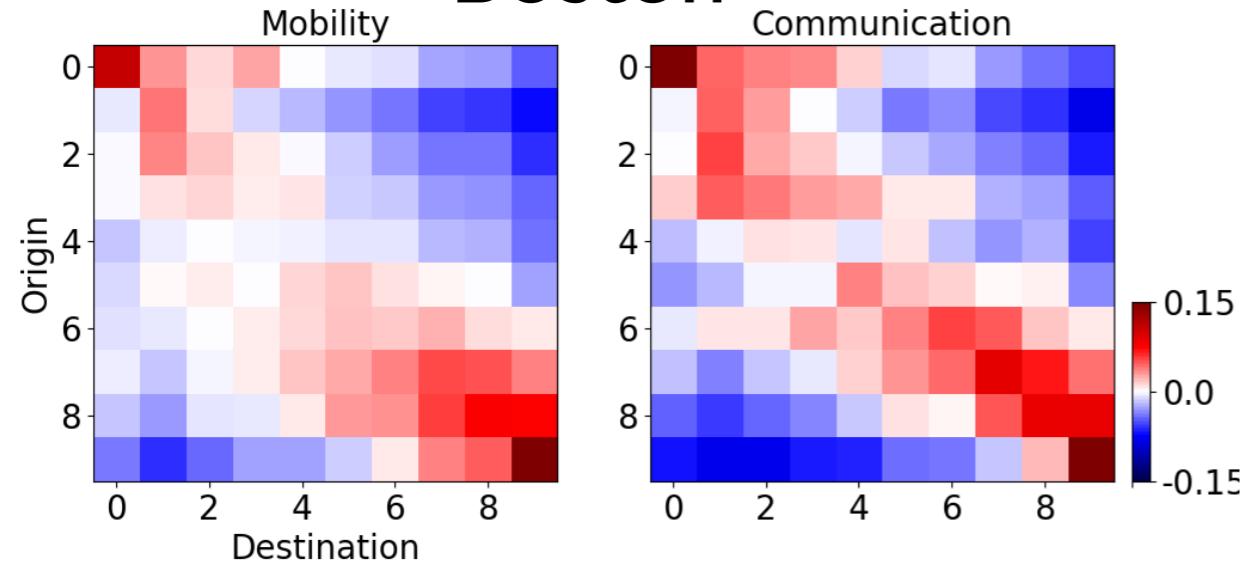
Matrix of neighborhood interactions ordered by income



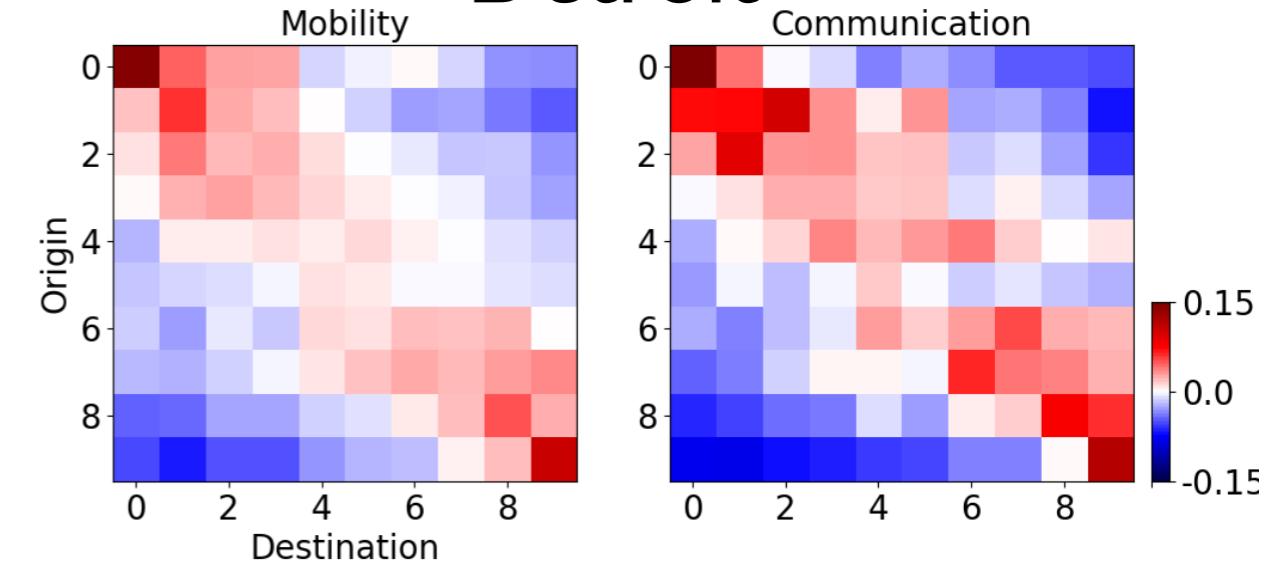


- Networks of mobility and communication show patterns of segregation by income
- Particularly high at the extremes

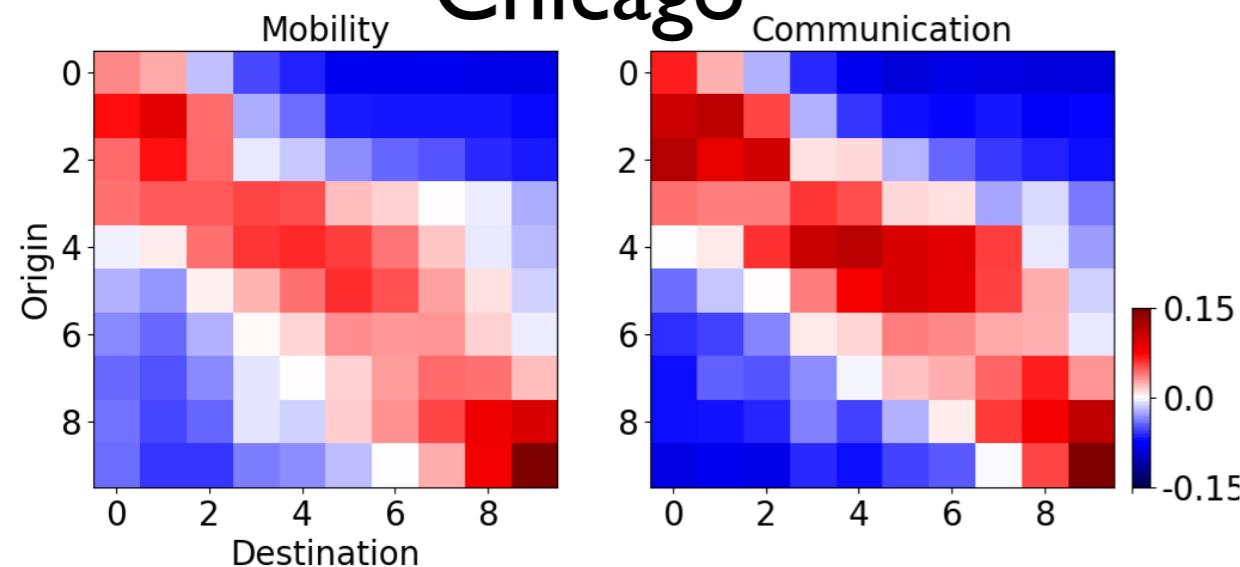
Boston



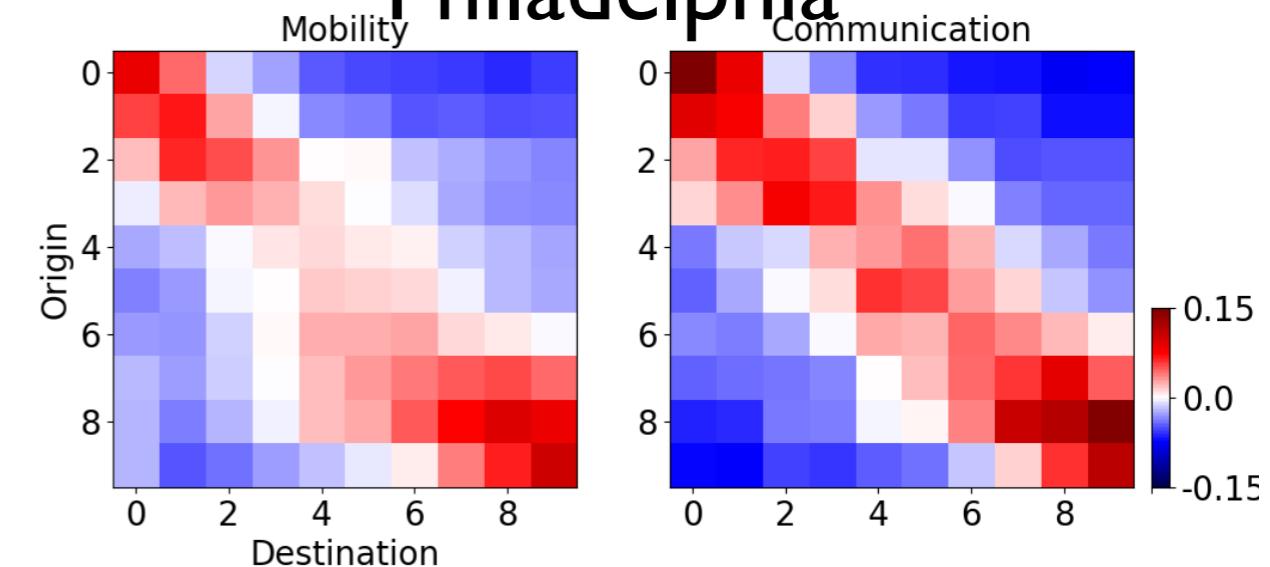
Detroit



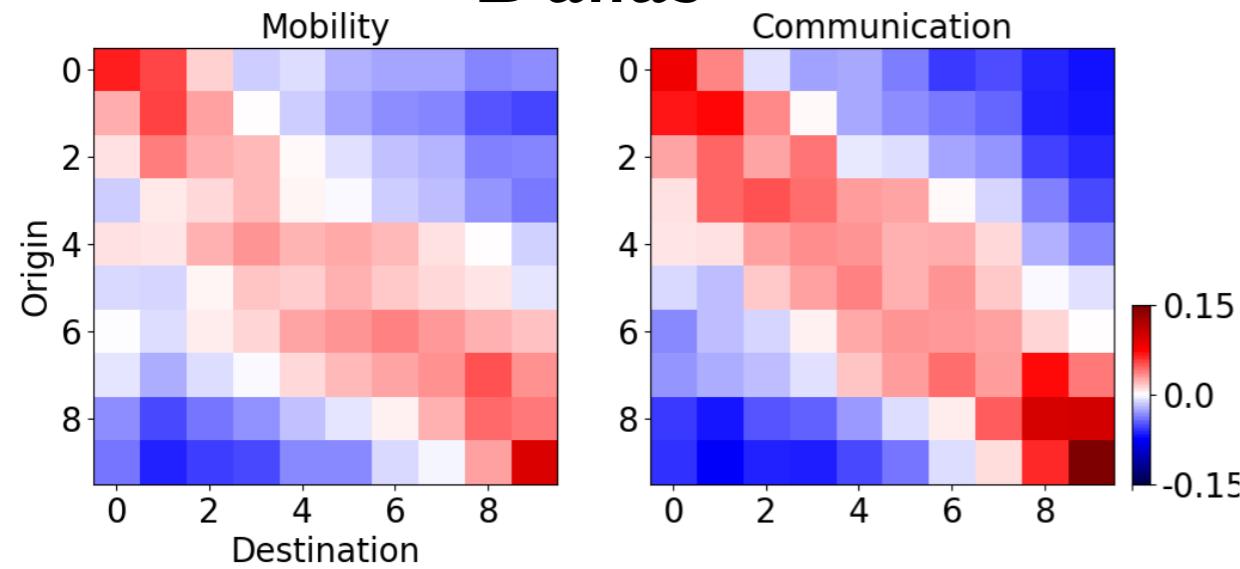
Chicago



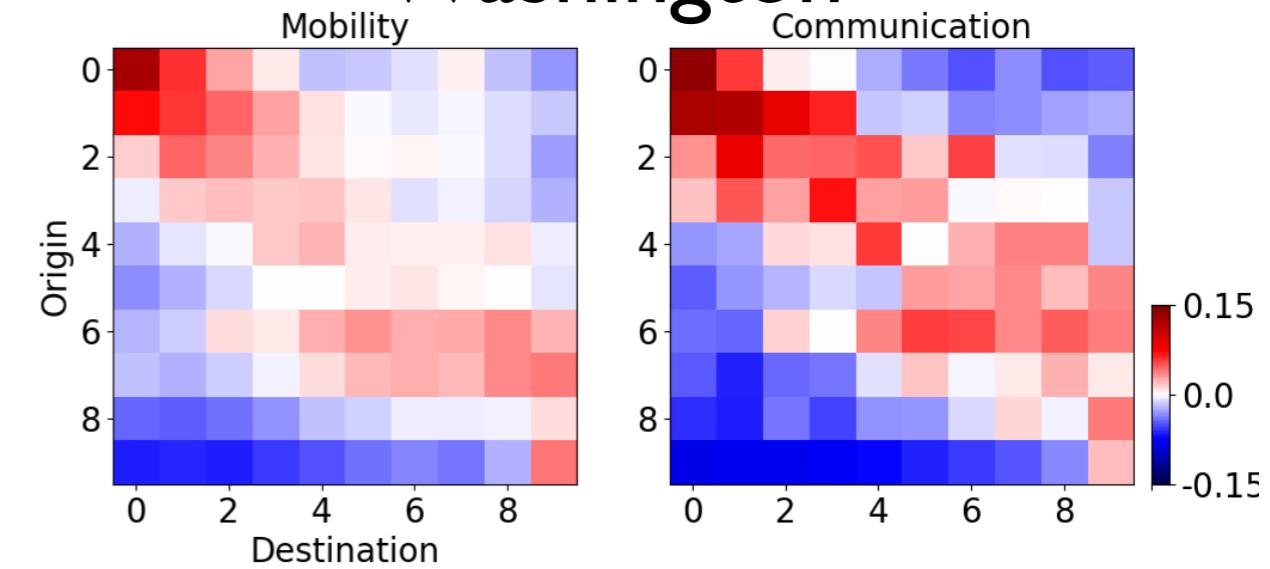
Philadelphia



Dallas



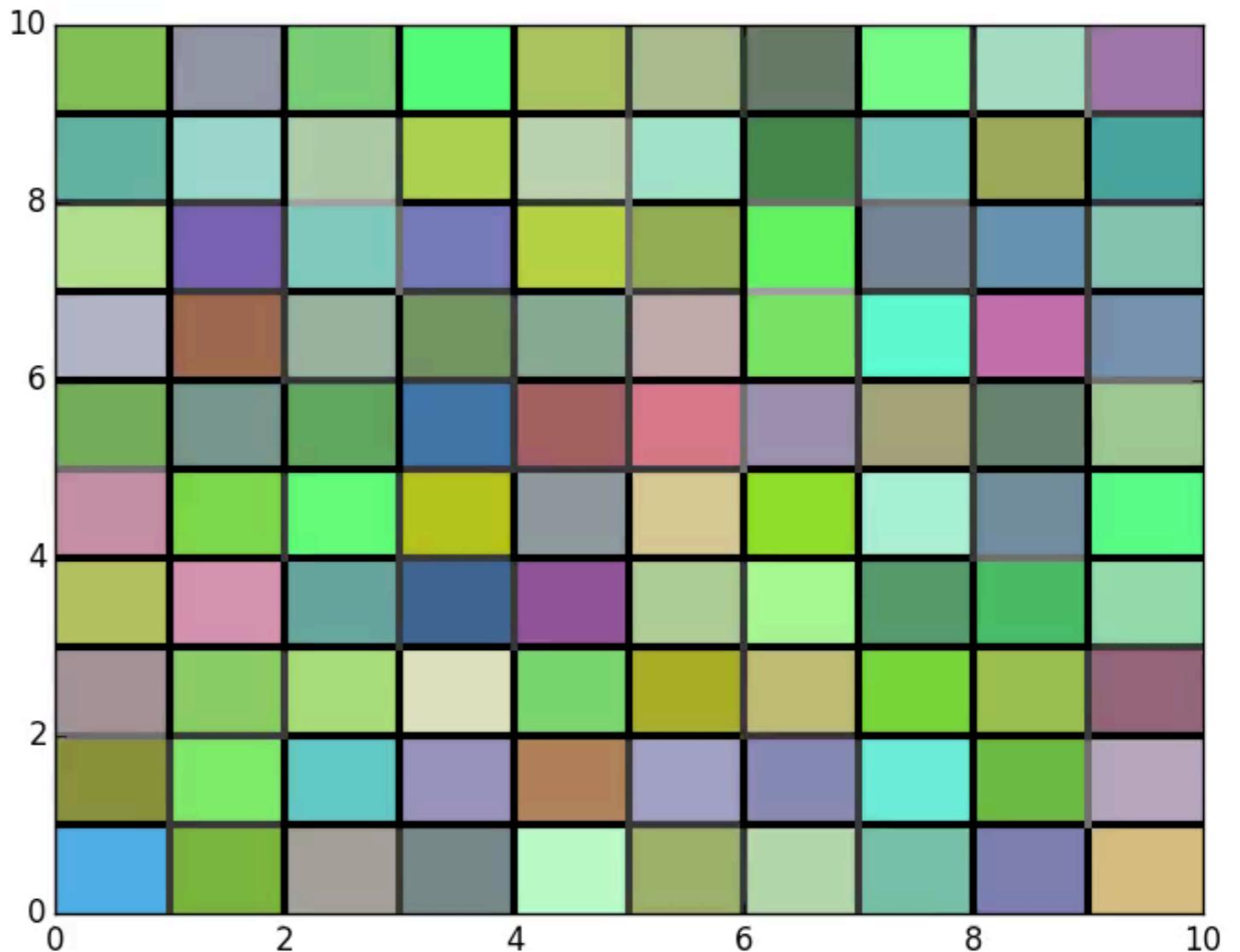
Washington



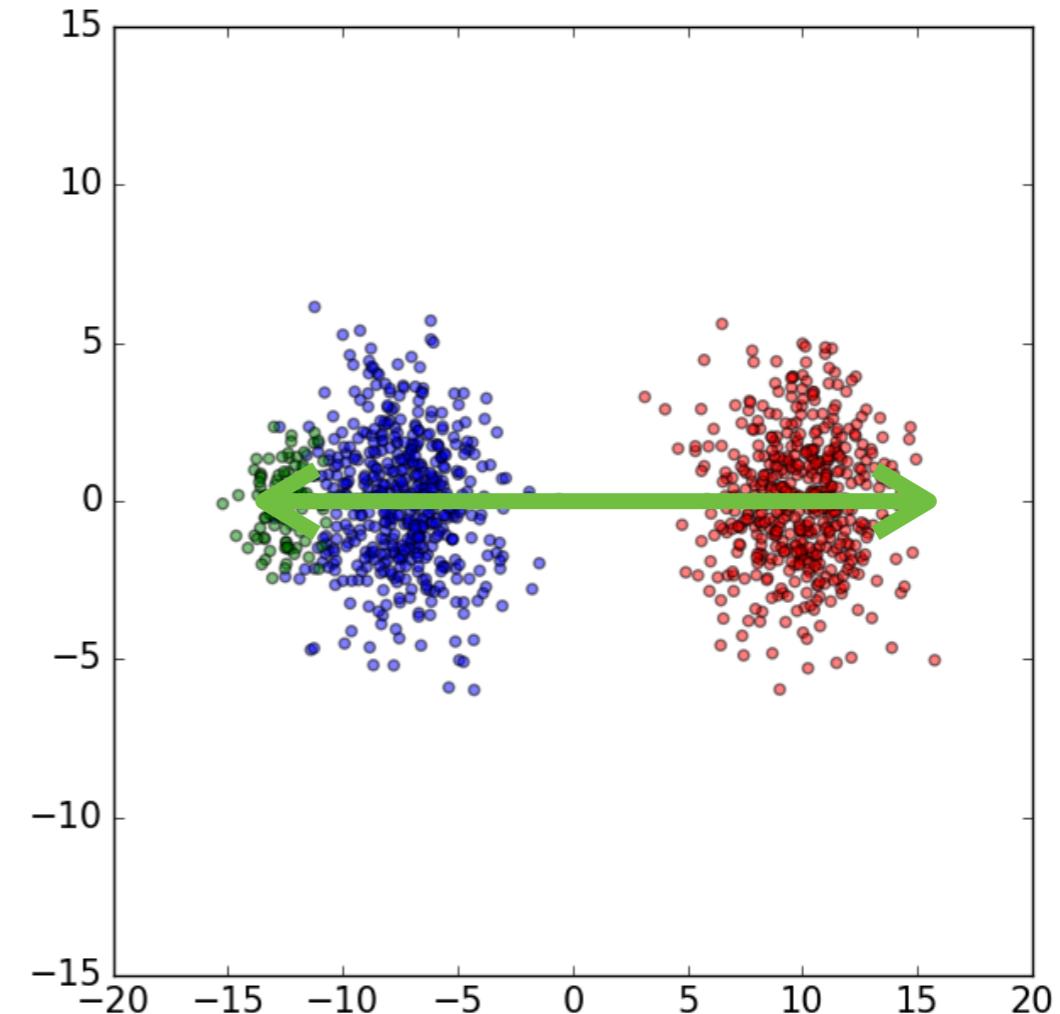
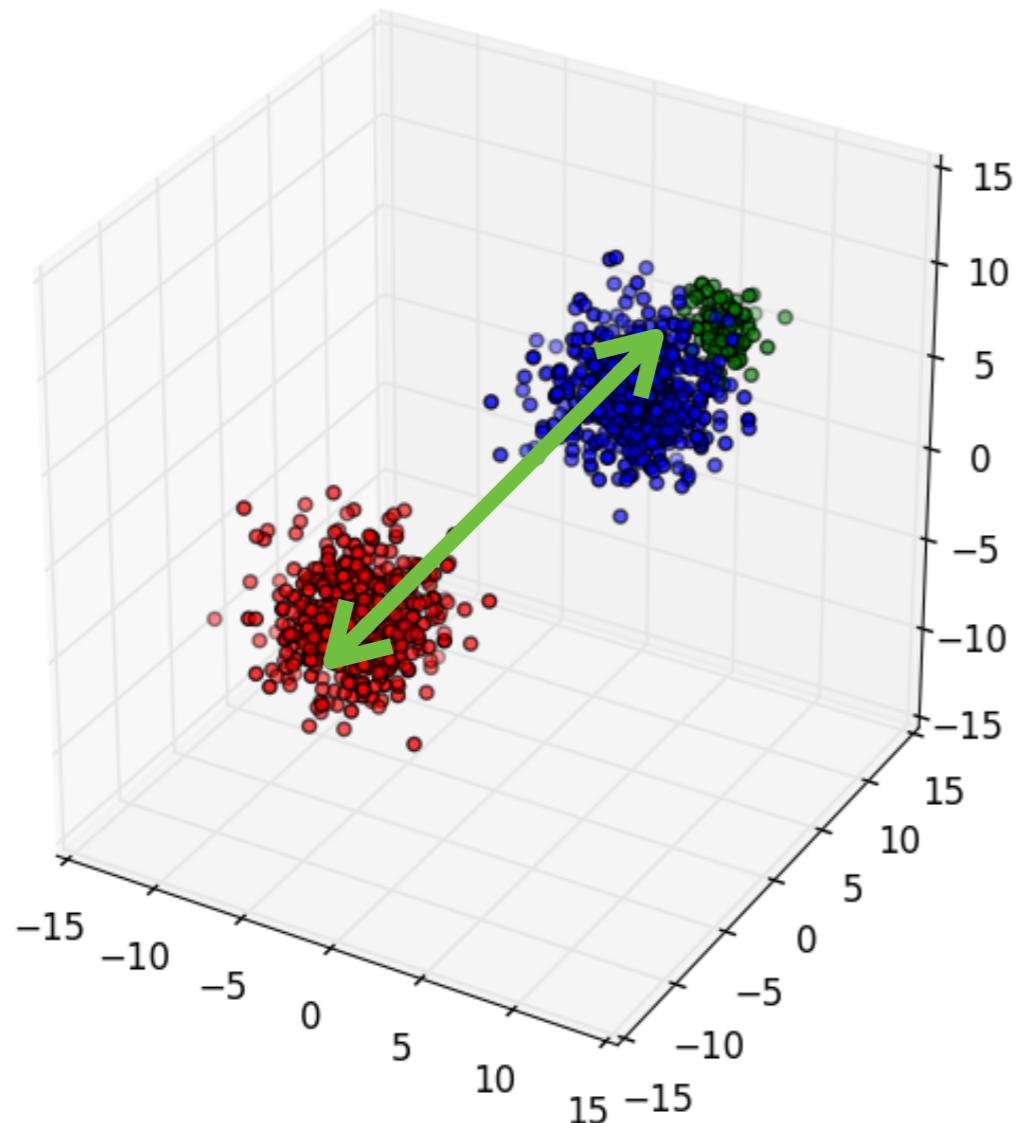
Does segregation affect social behaviors?

Axelrod Model of Cultural Emergence

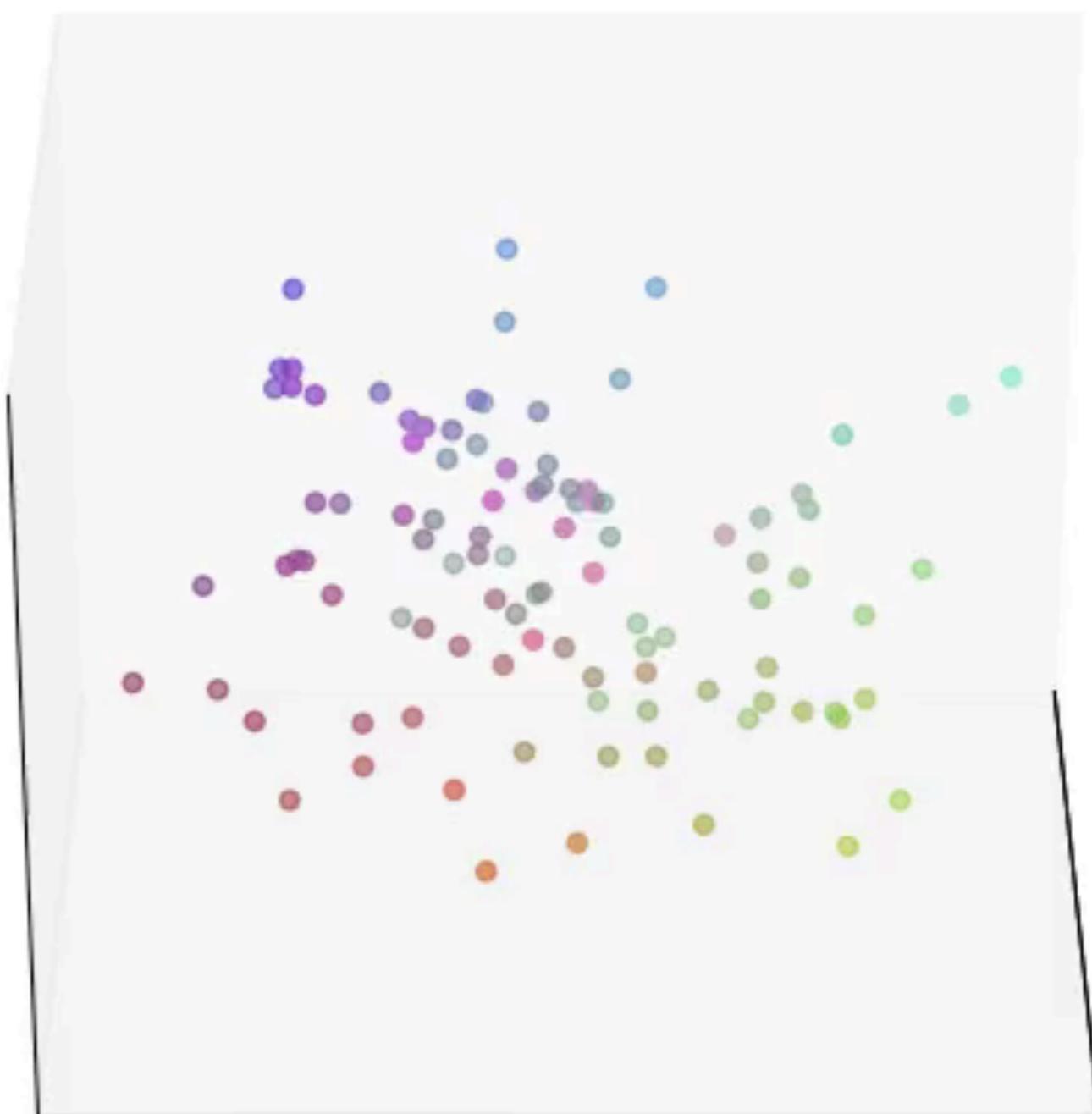
Cultural groups emerge
when people imitate
each other



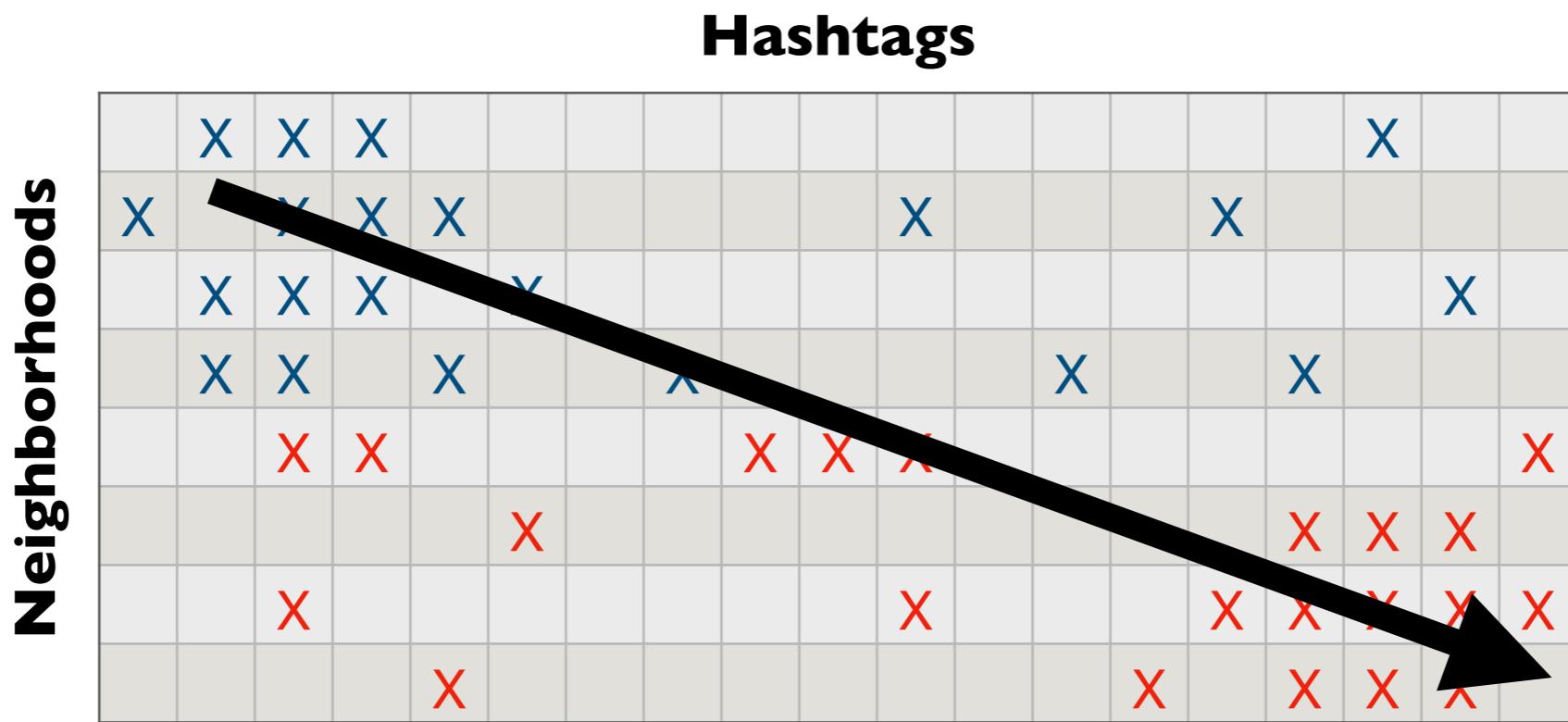
PCA



PCA finds the directions
where variance is highest

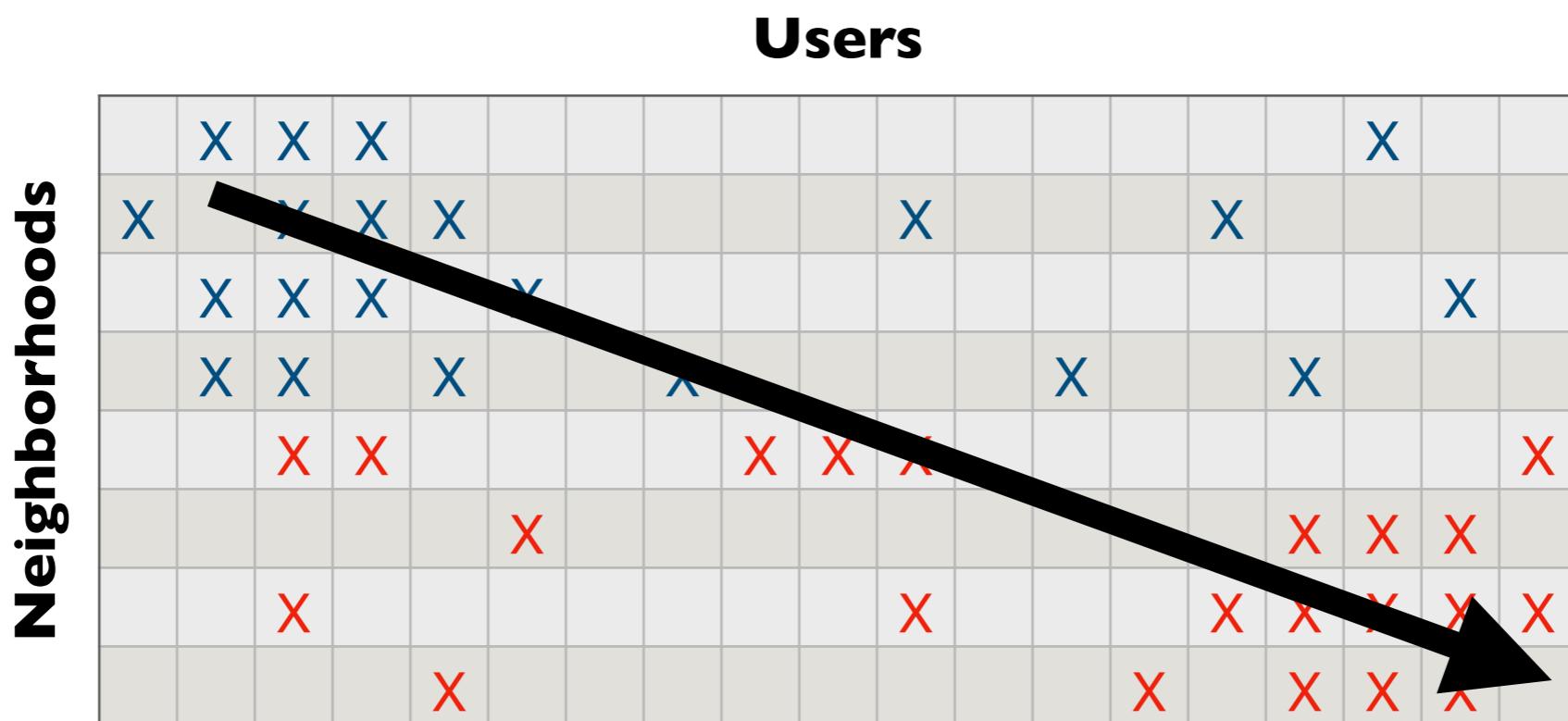


PCA on Hashtag Usage

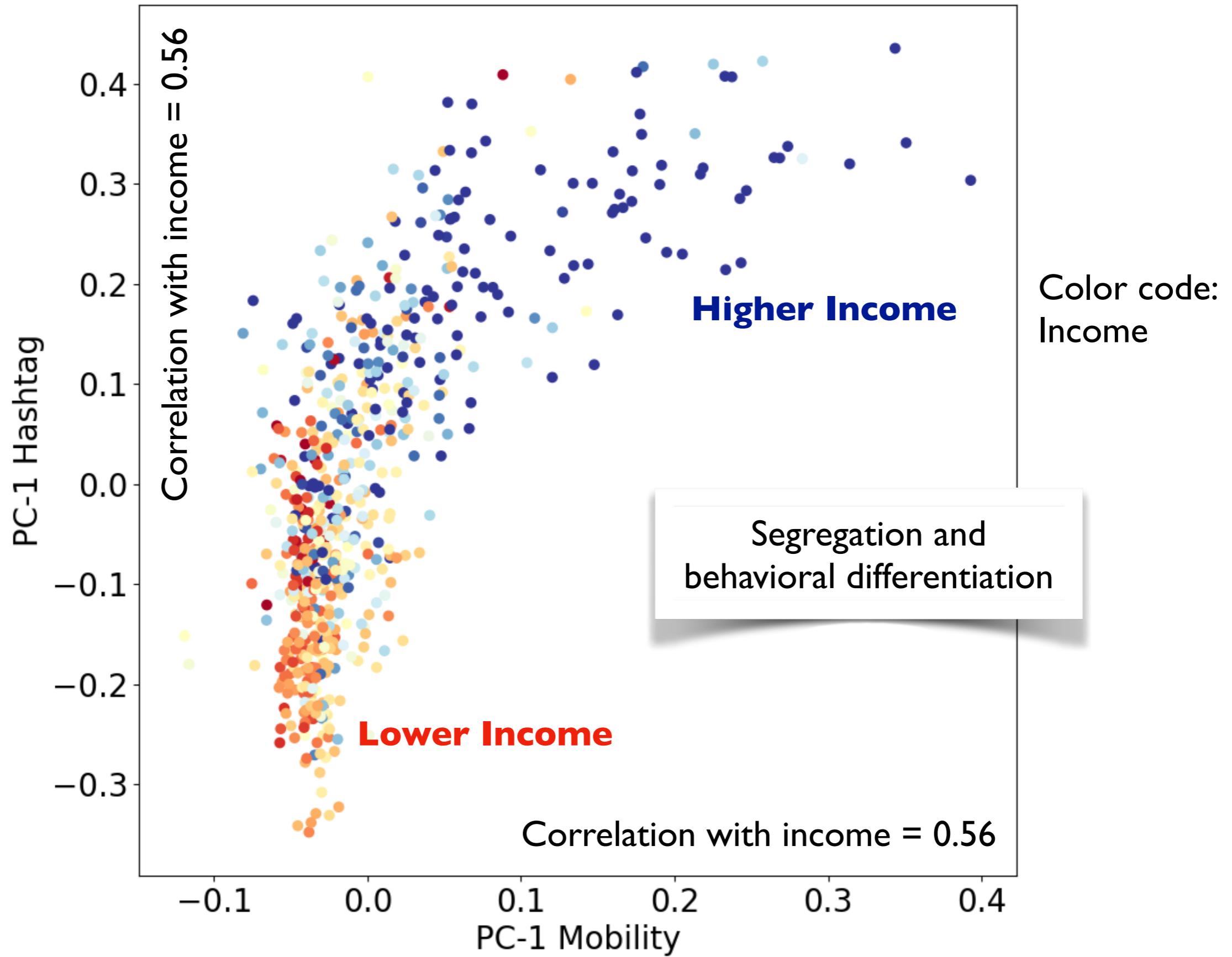


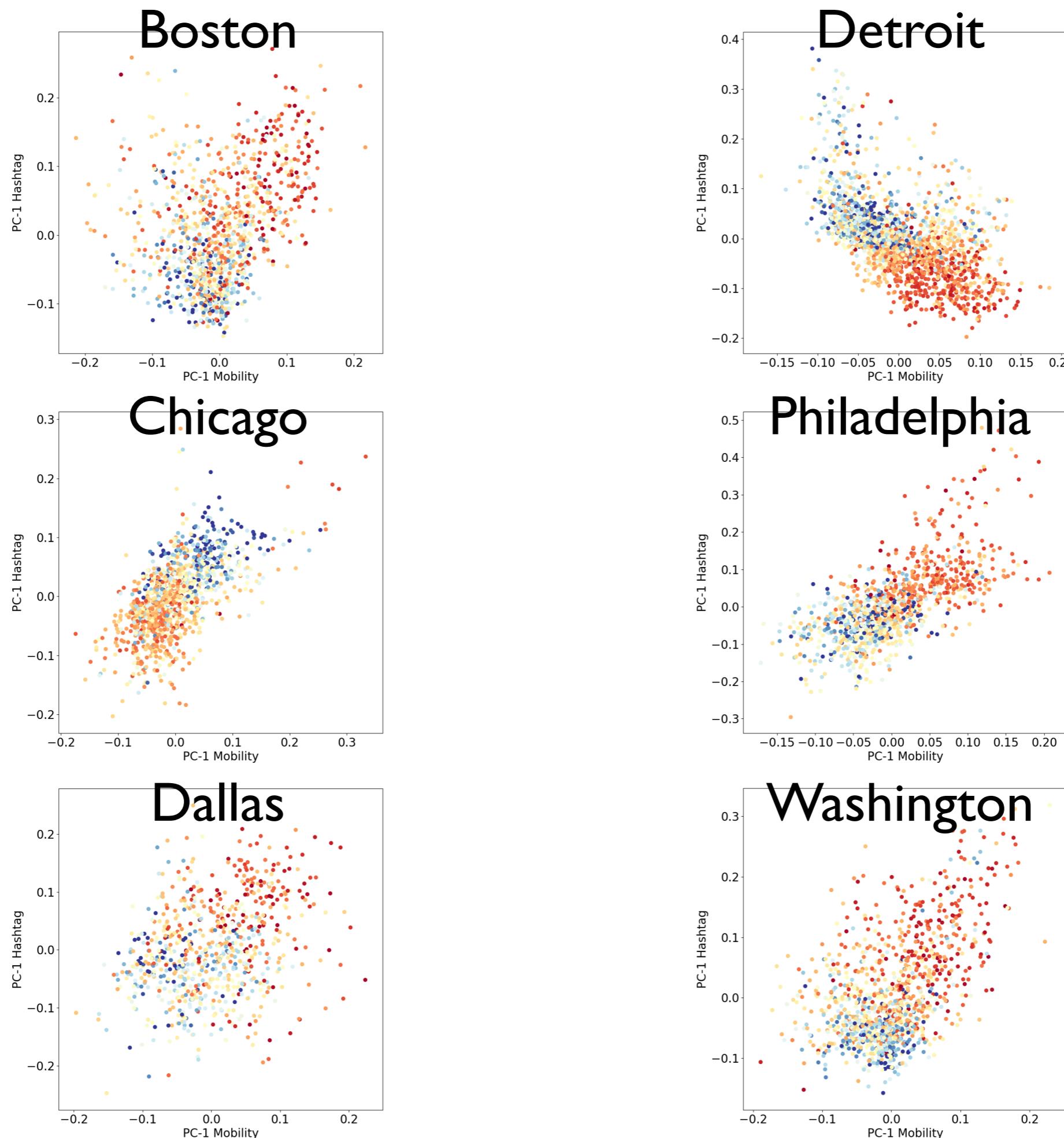
Is there a dominant direction of hashtag usage?

PCA on Mobility Patterns



Is there a dominant direction of travel patterns?





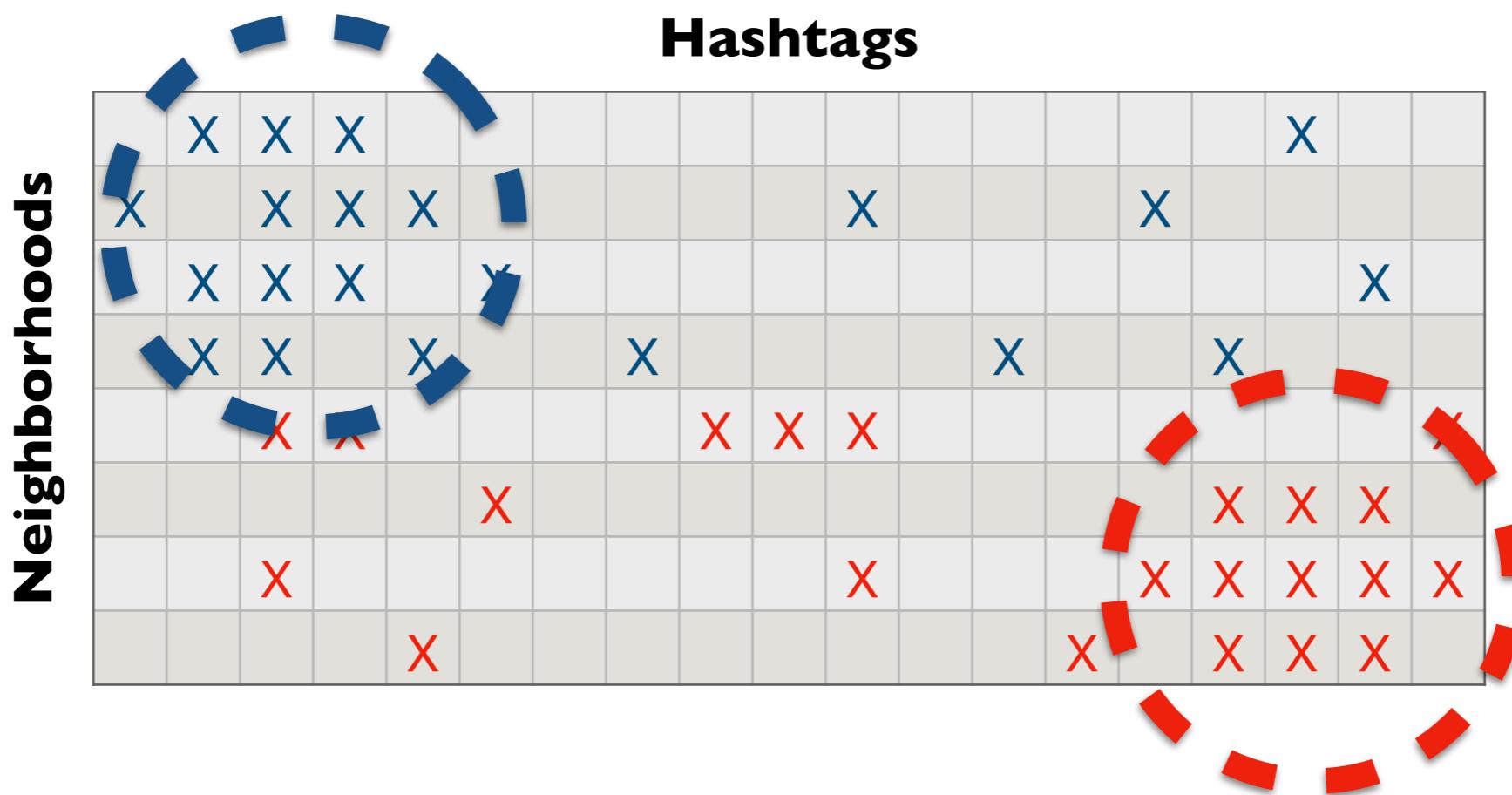
**What are these neighborhoods talking
about?**

Topic Model

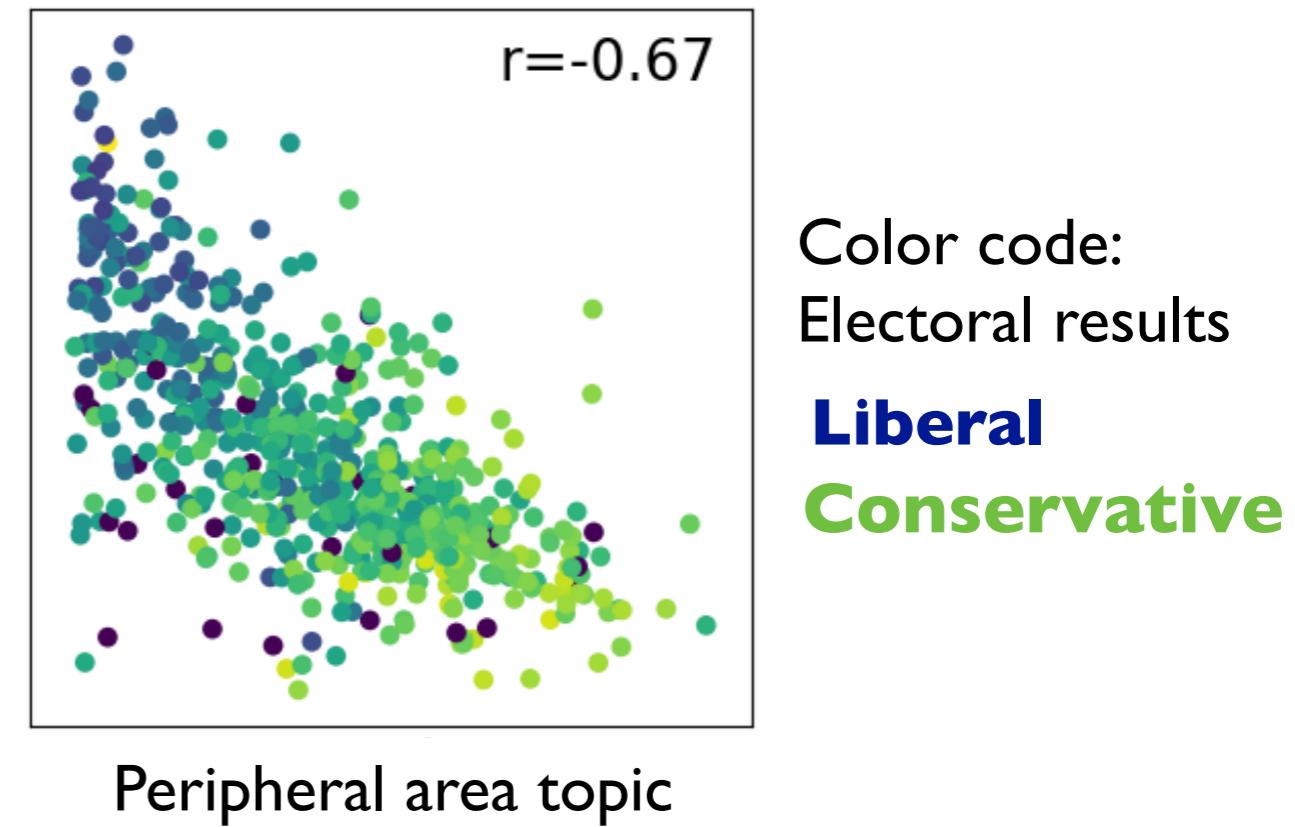
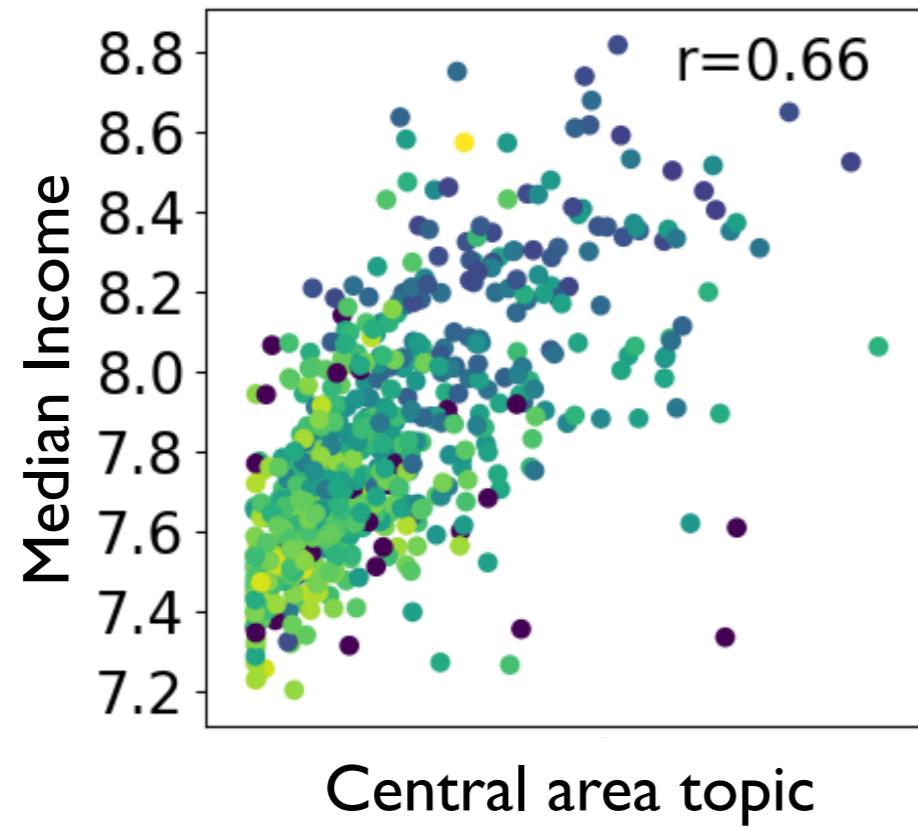
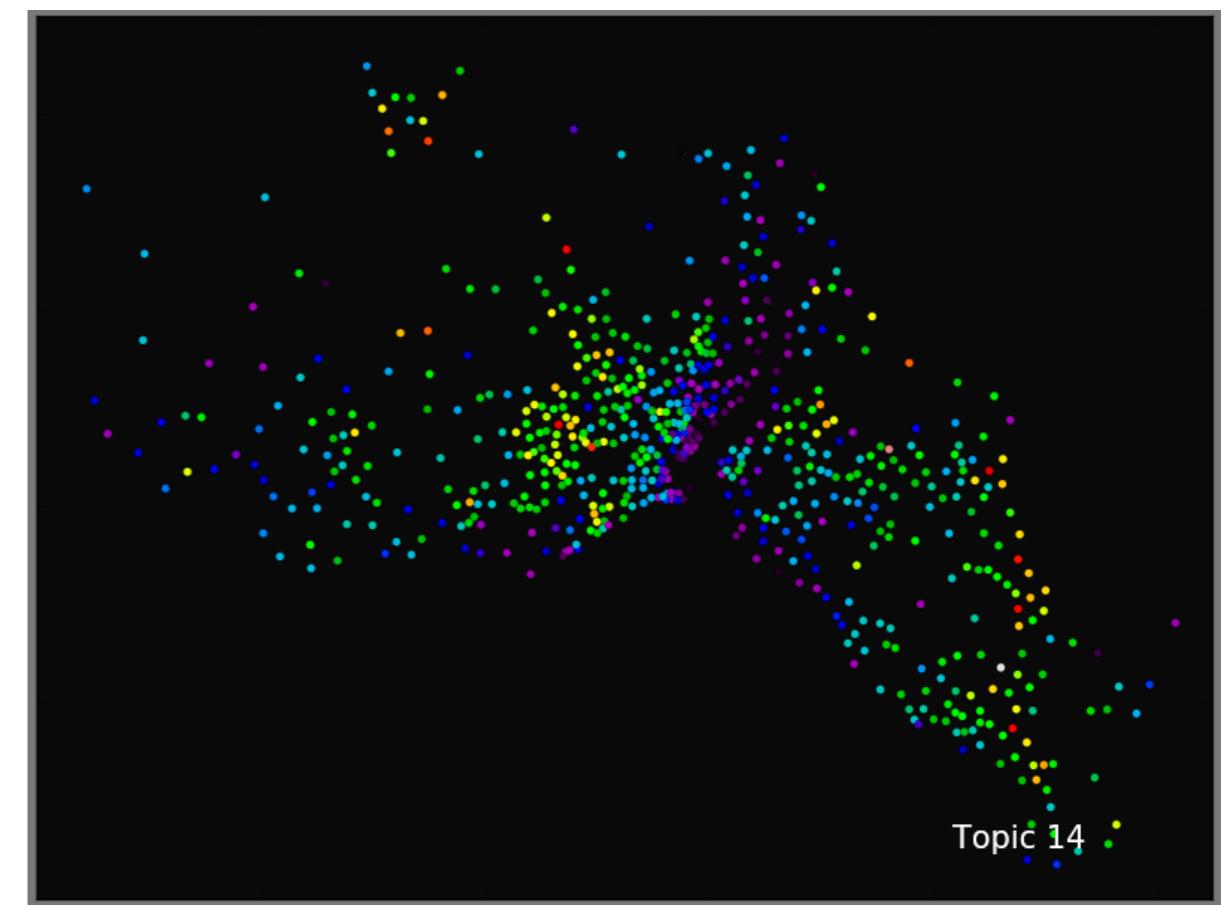
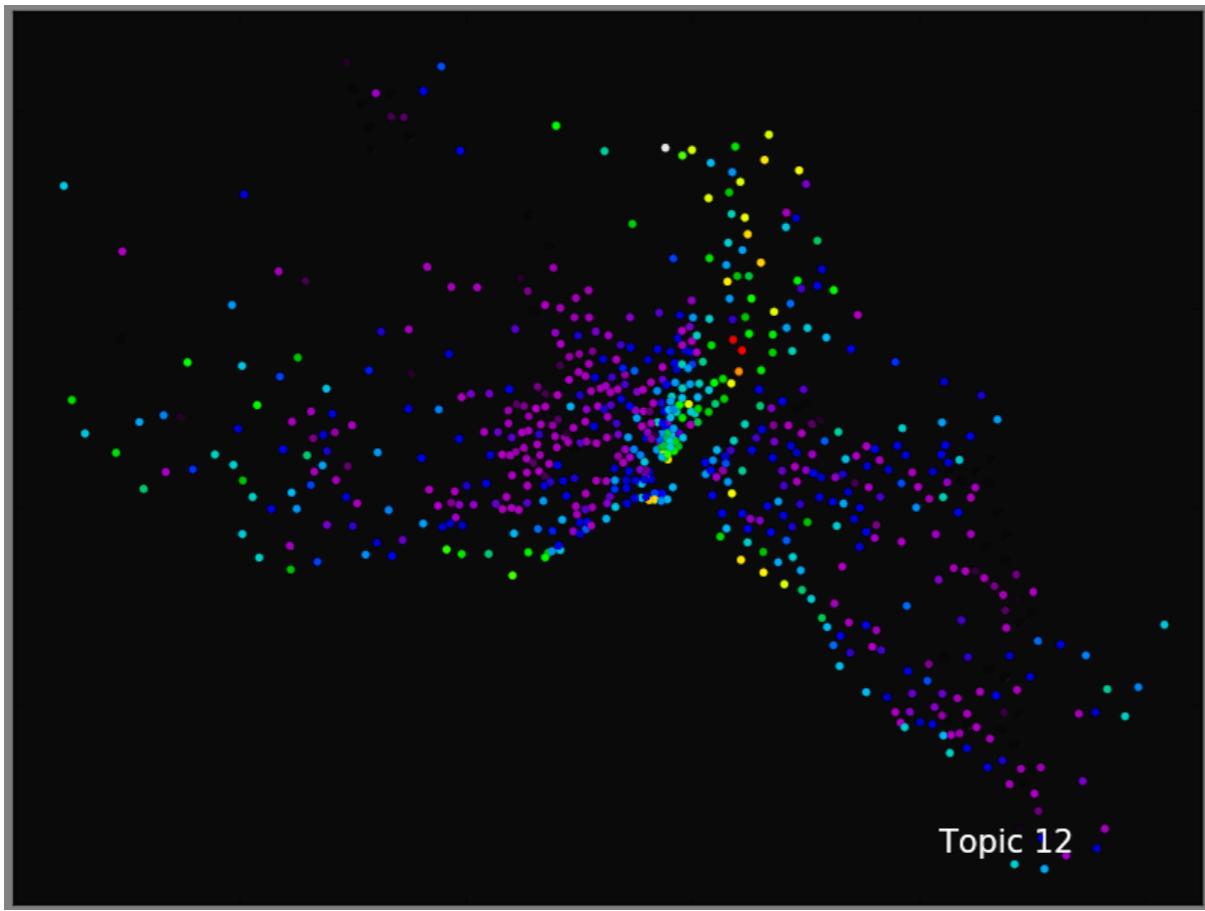
Unsupervised Machine Learning Algorithm
Cluster documents based on word frequency

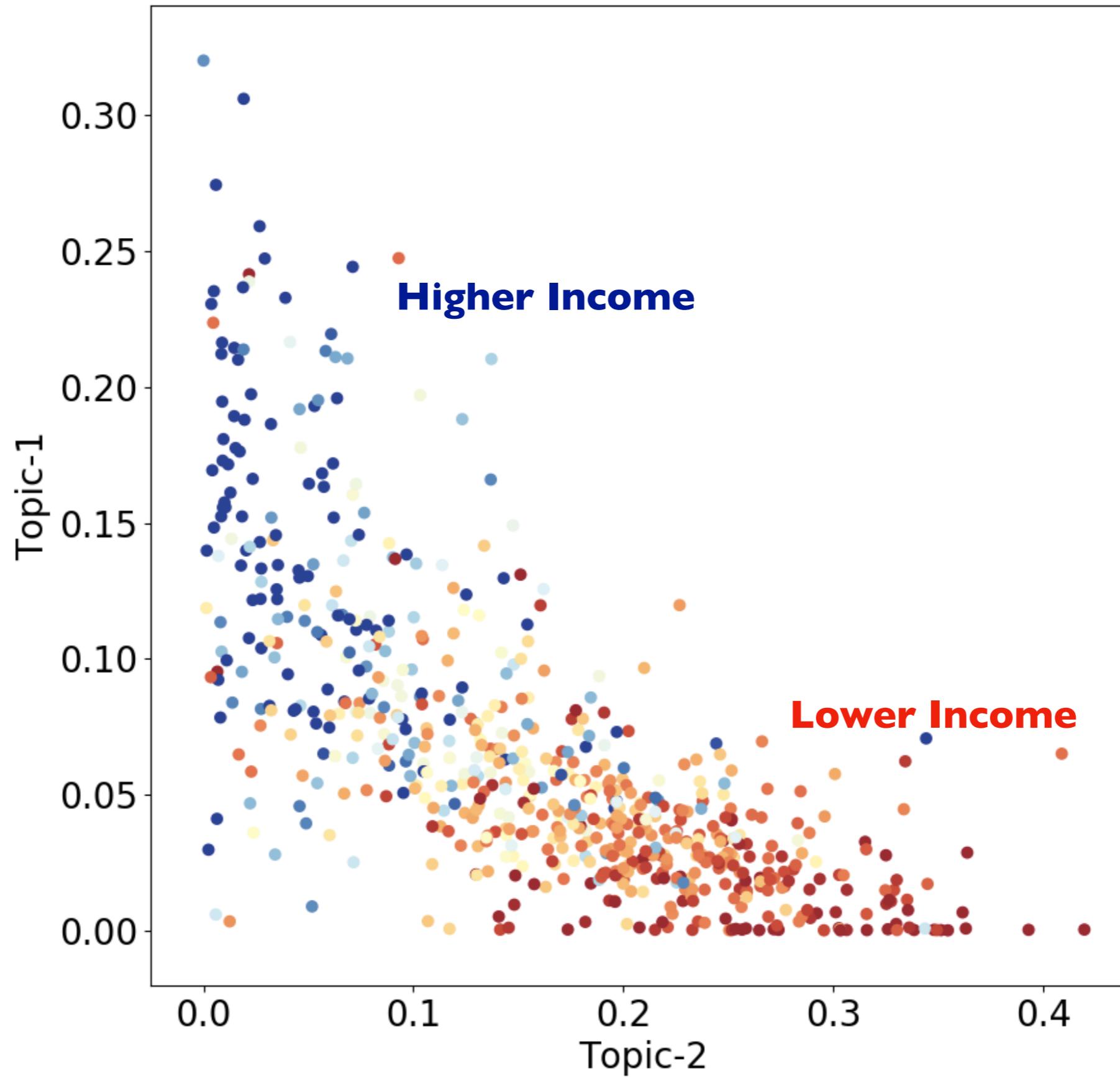


Urban Topic Model



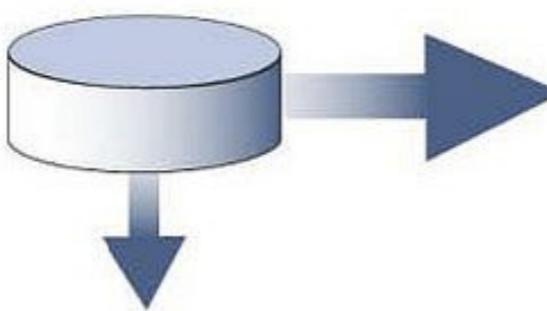
Find content characteristic of locations



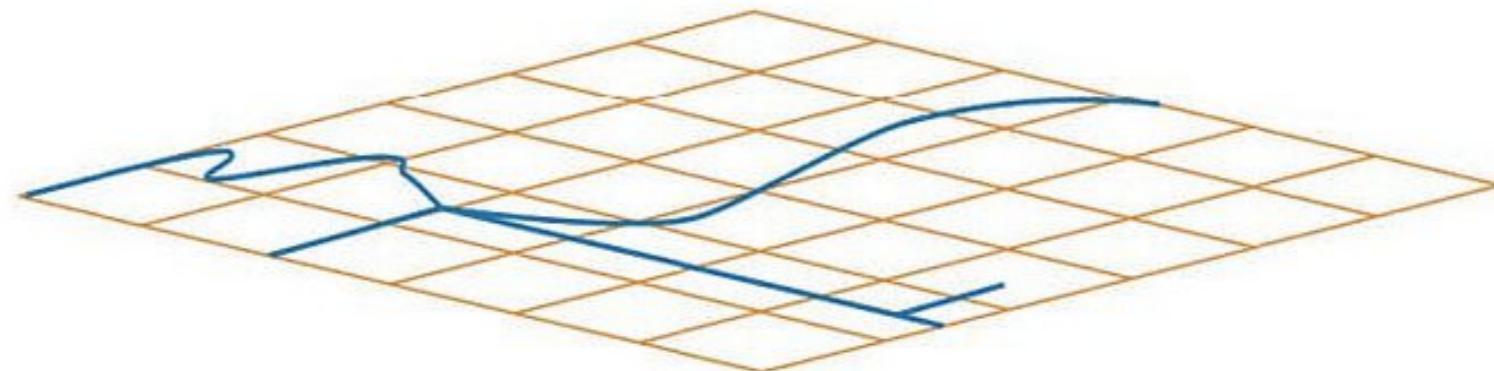


Data source

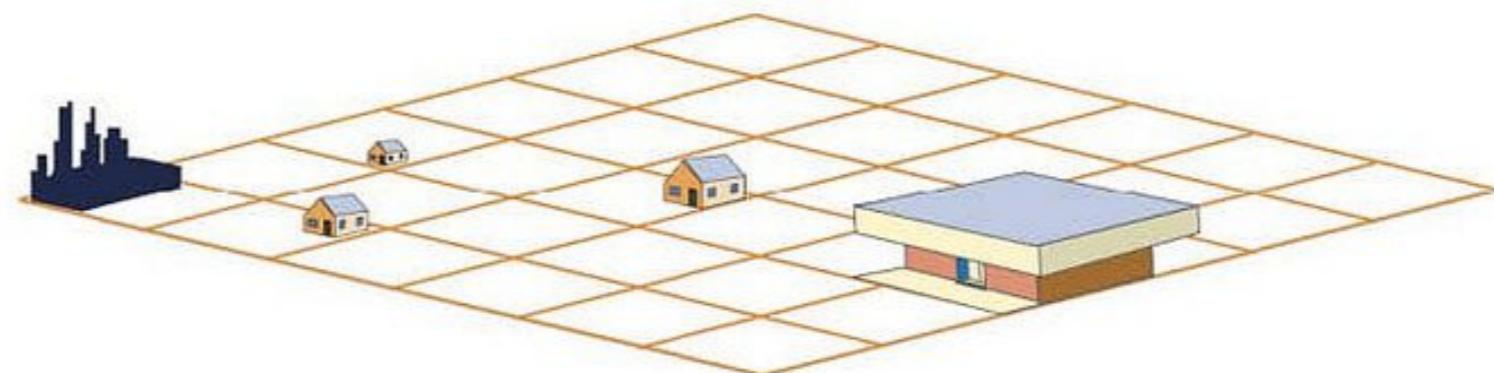
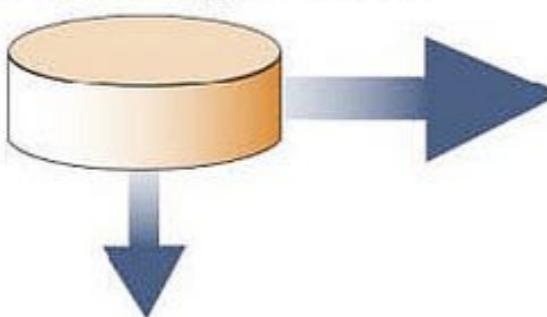
Street data



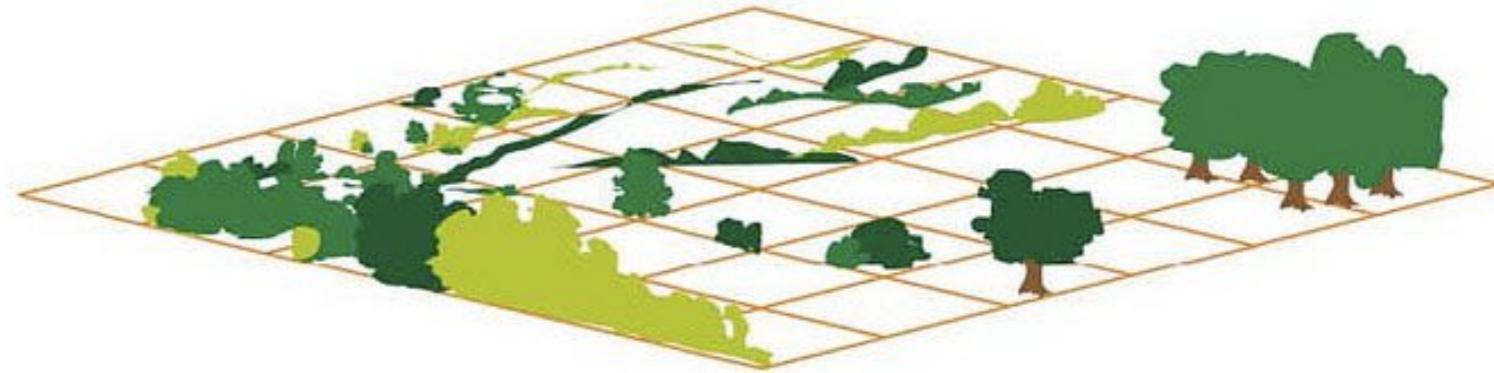
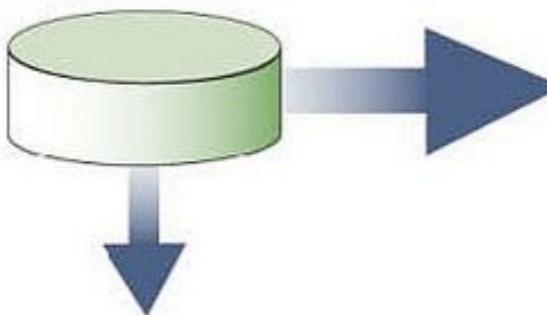
Data layers



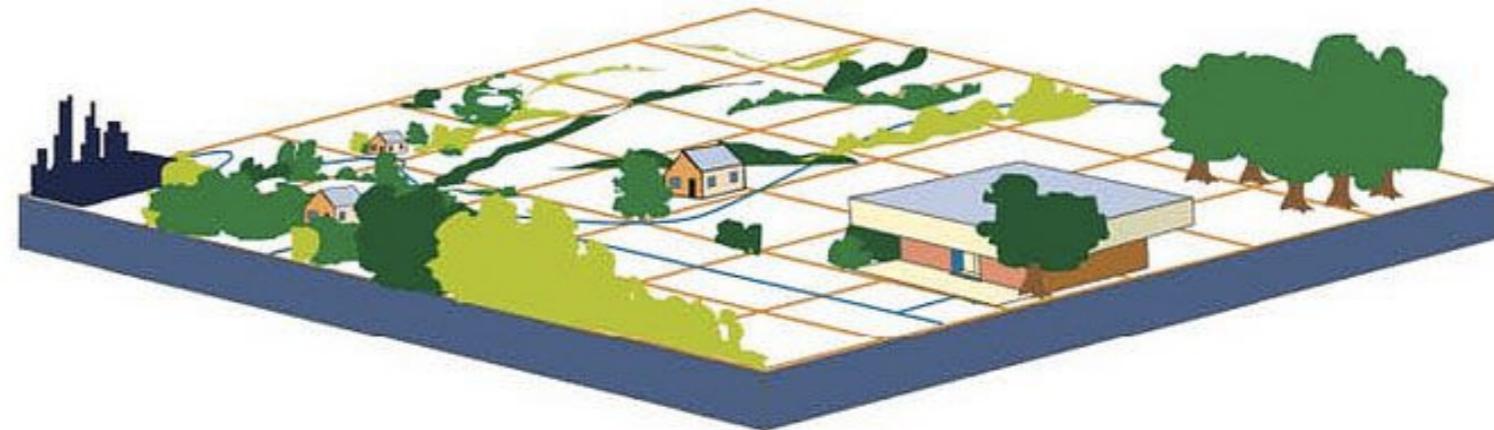
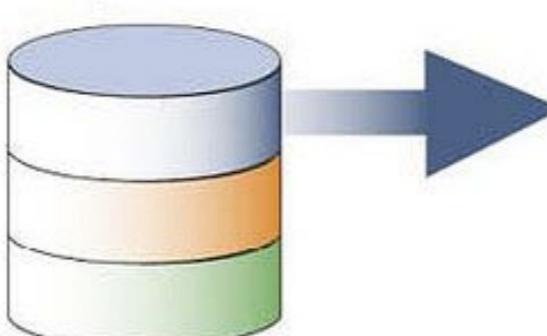
Buildings data

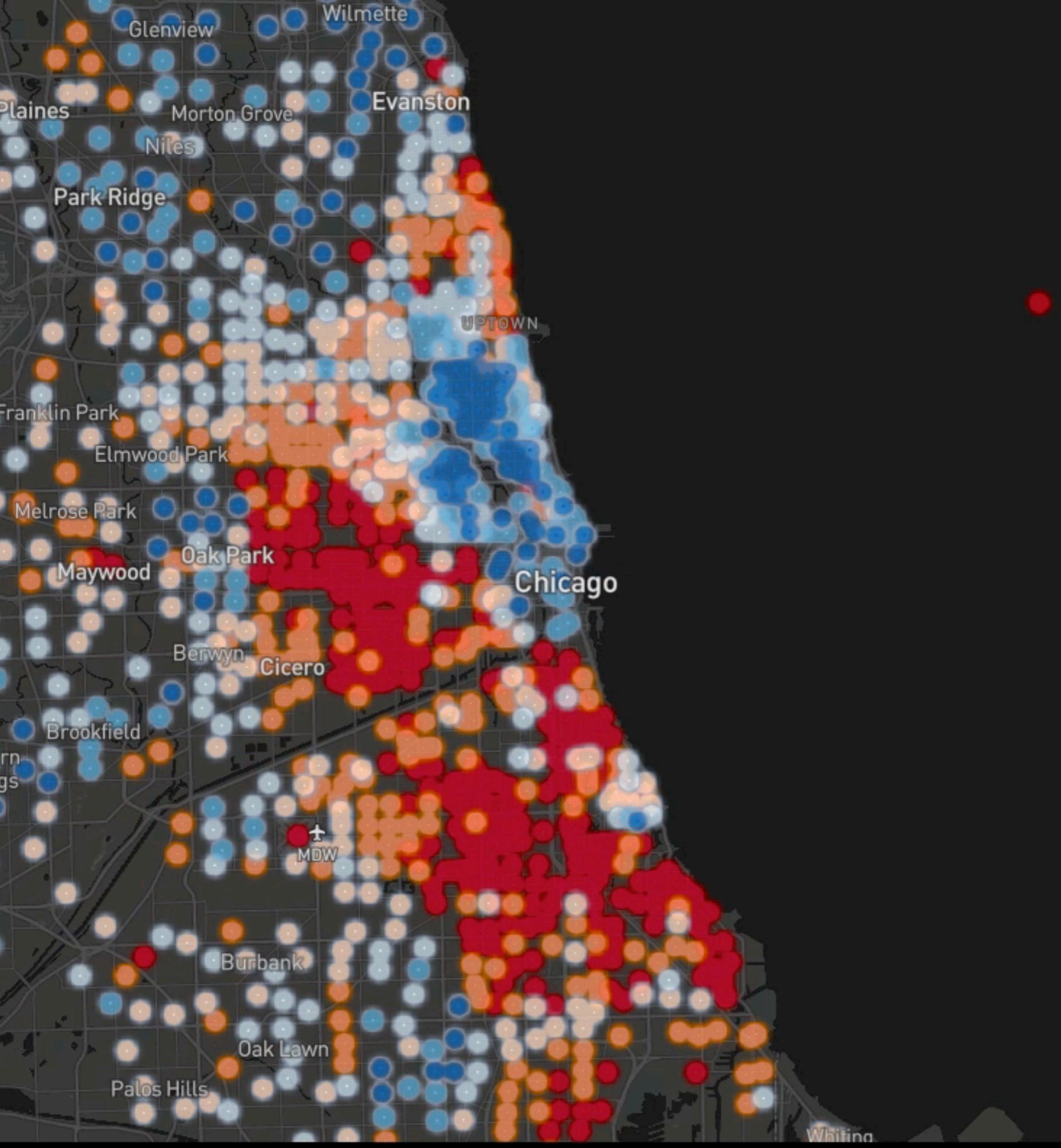


Vegetation data



Integrated data



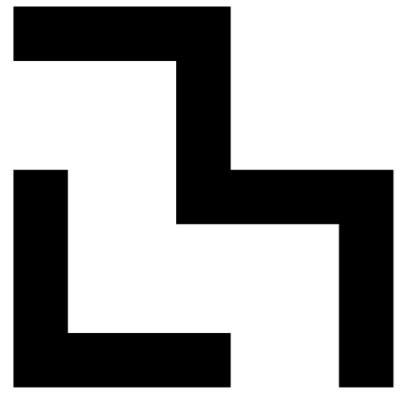


Chicago
In relationships

Mobility network Mentions network

Income Quantiles

-0 -1 -2 -3 -4 -5



mit
media
lab

Thanks!

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