

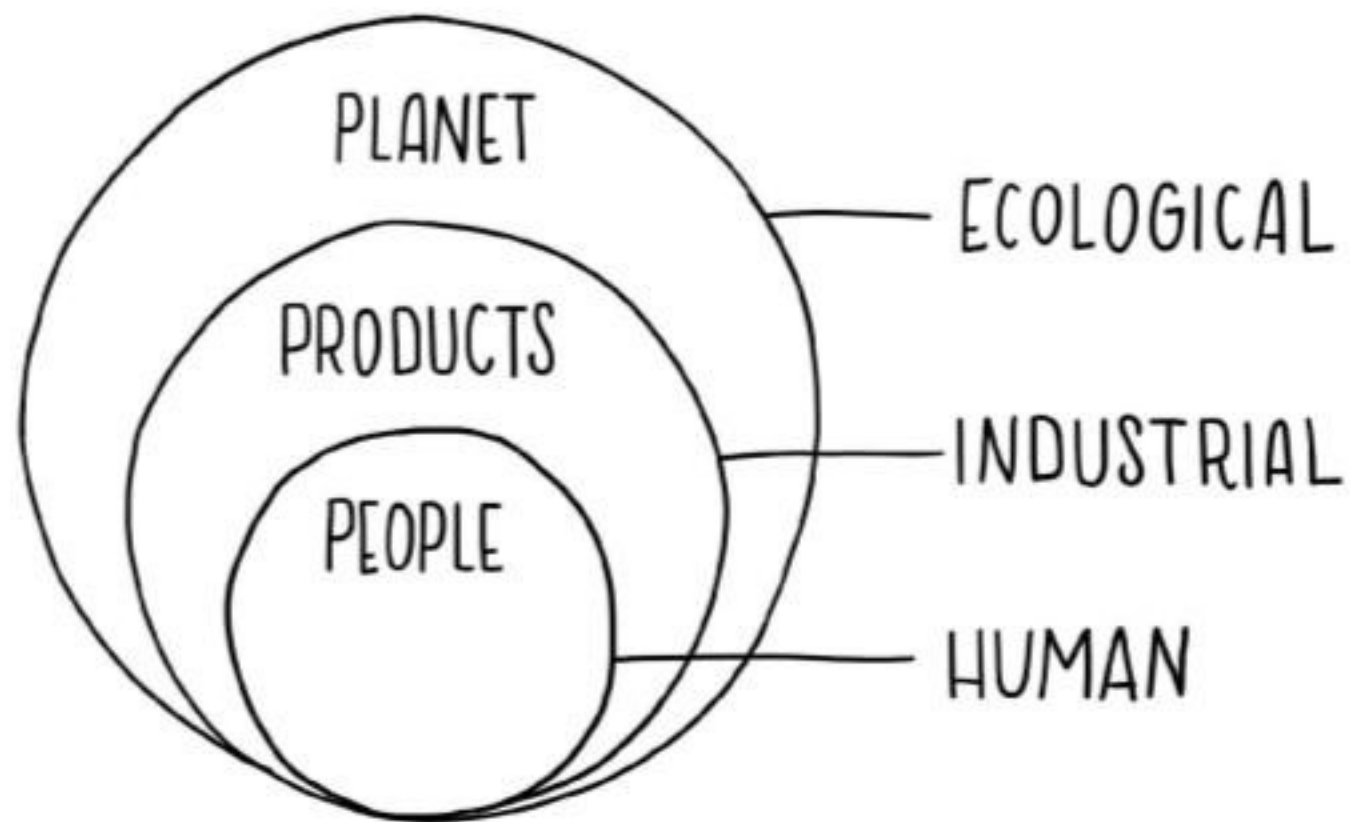
Social Complexity

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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



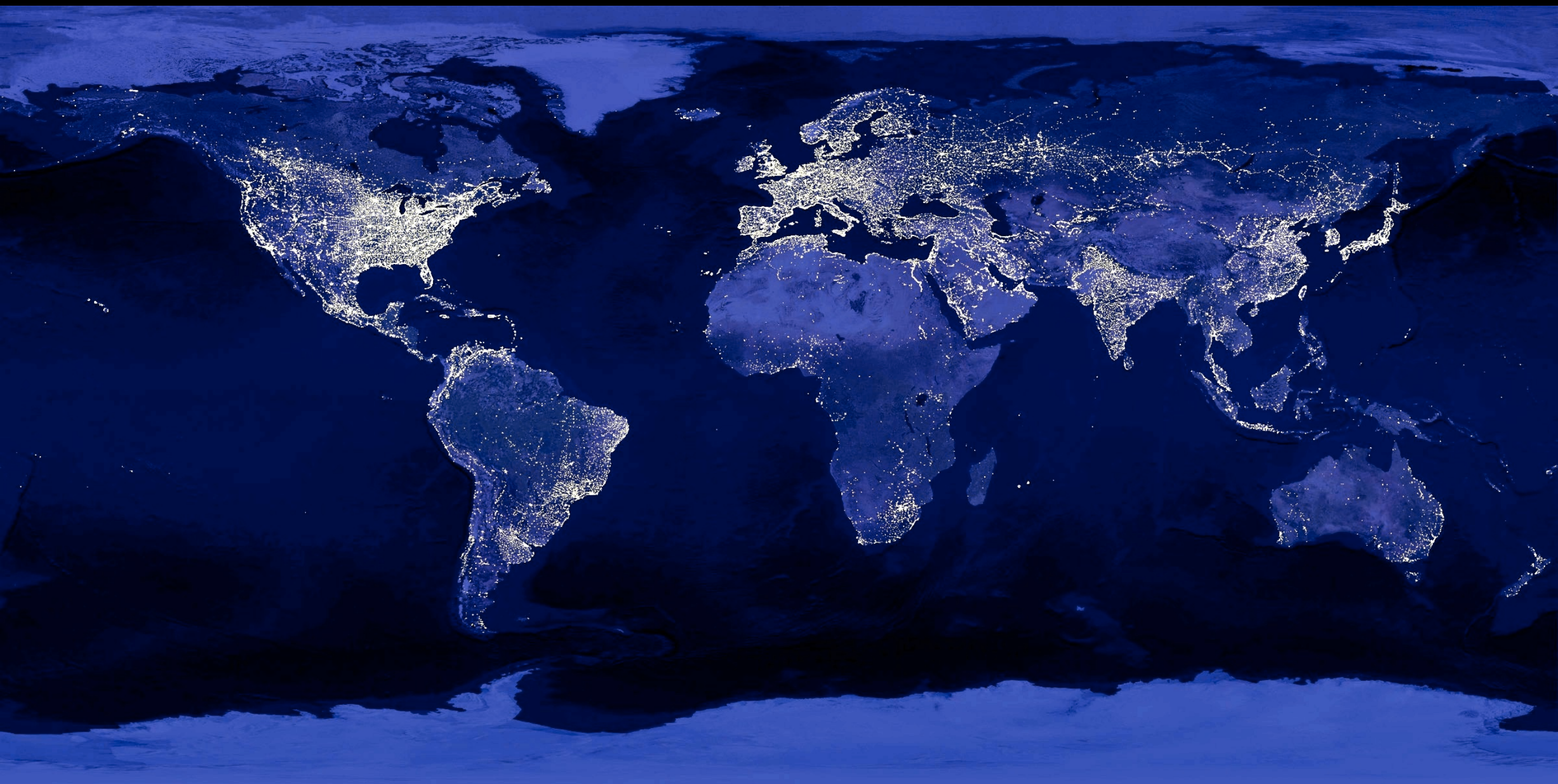
16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS

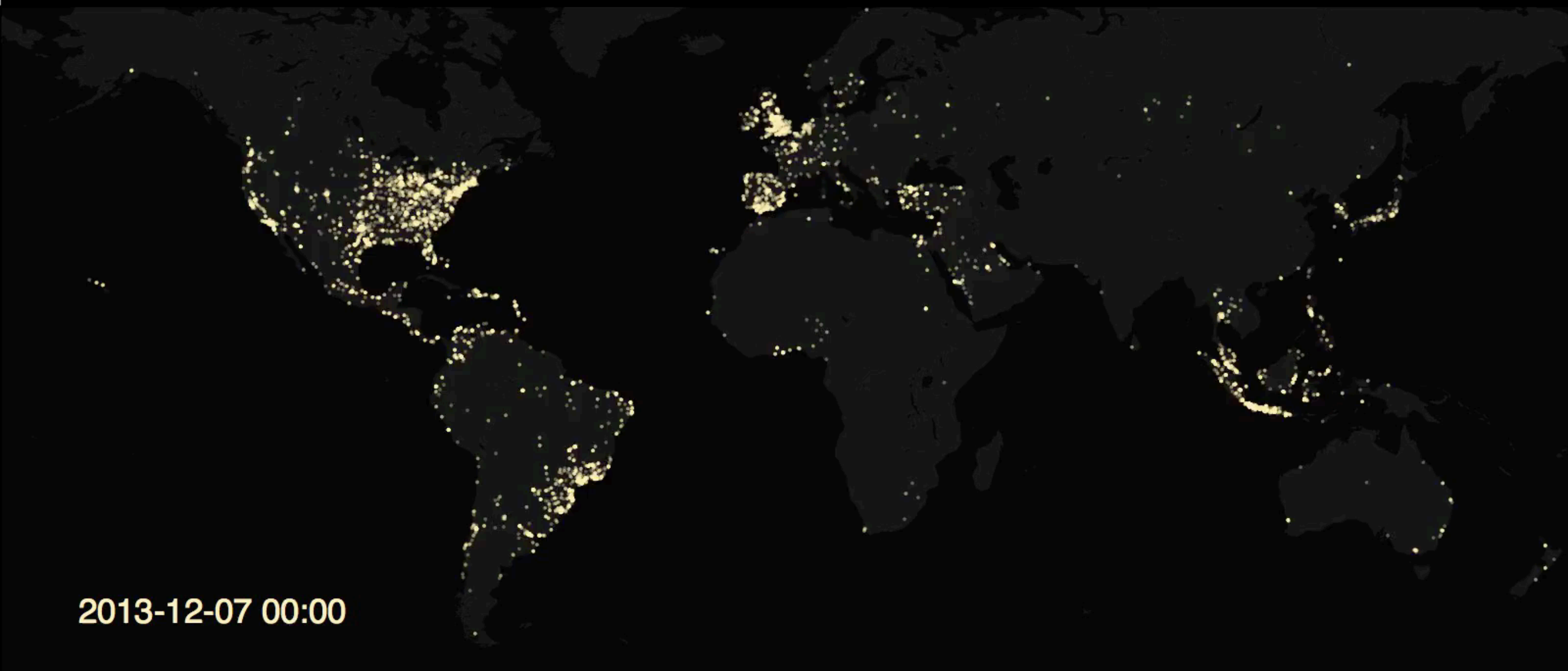



**SUSTAINABLE
DEVELOPMENT
GOALS**



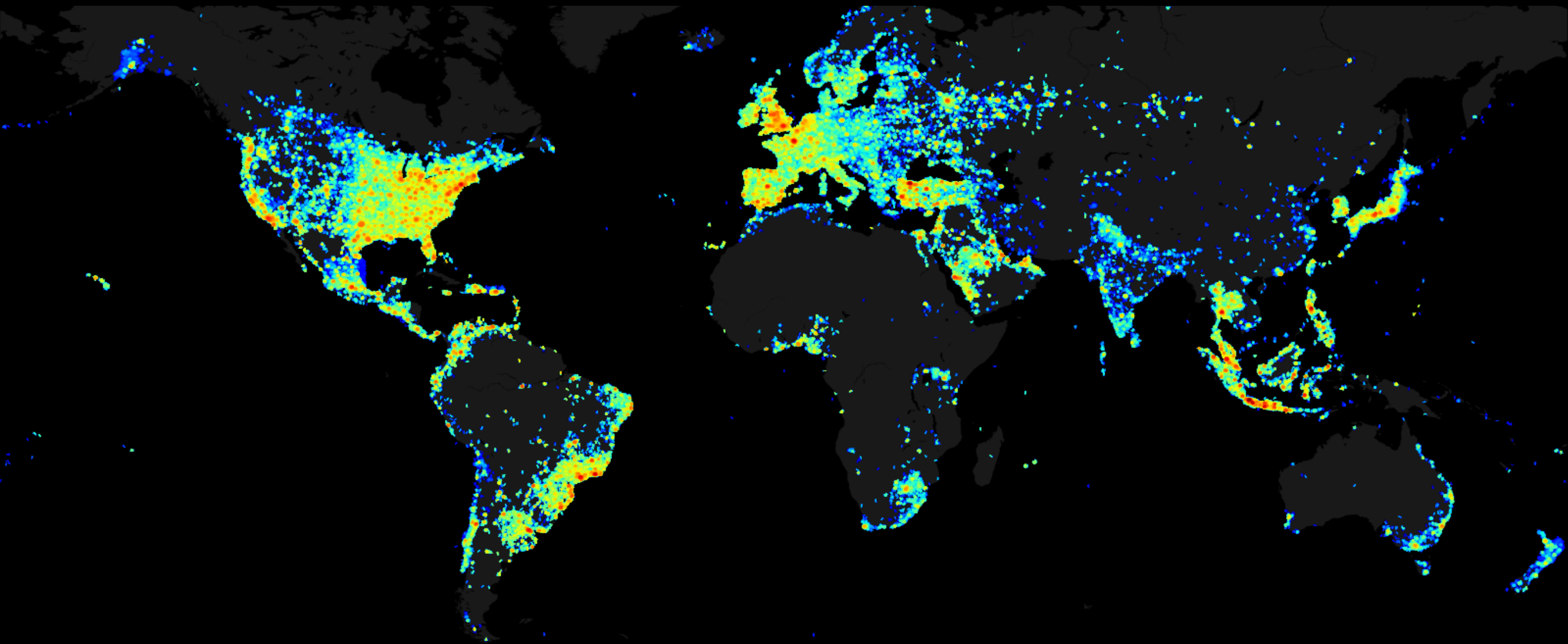
Twitter Activity

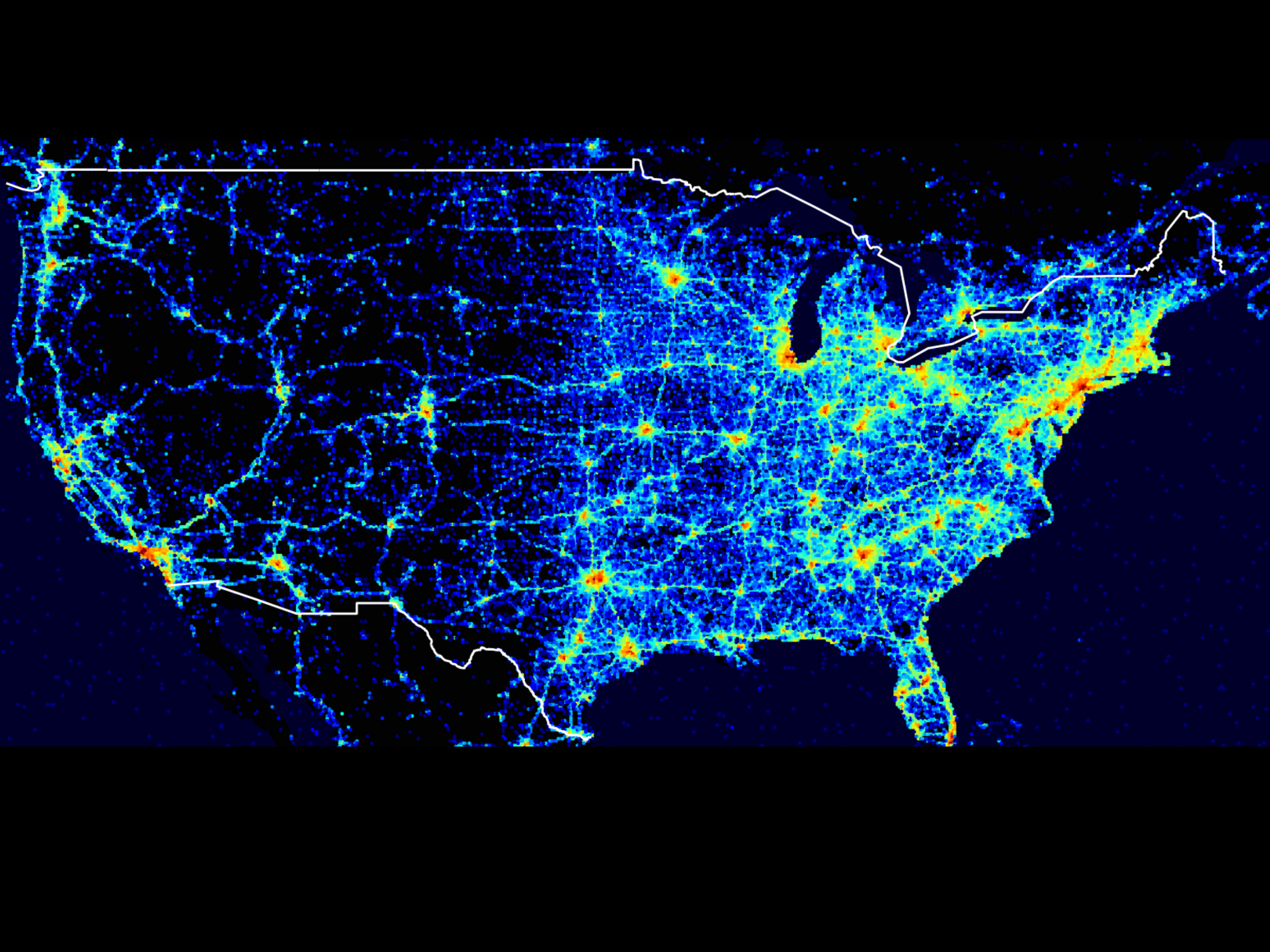


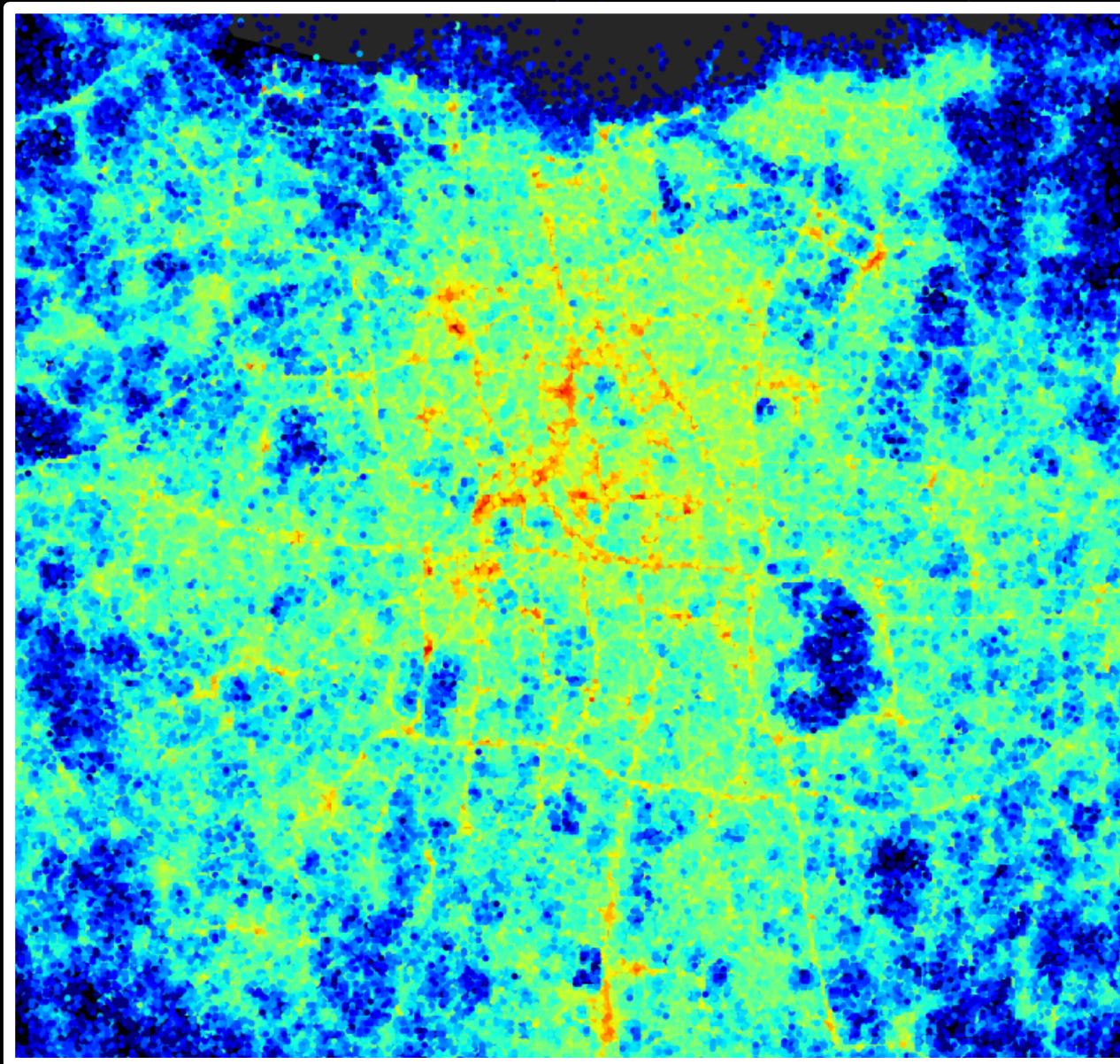
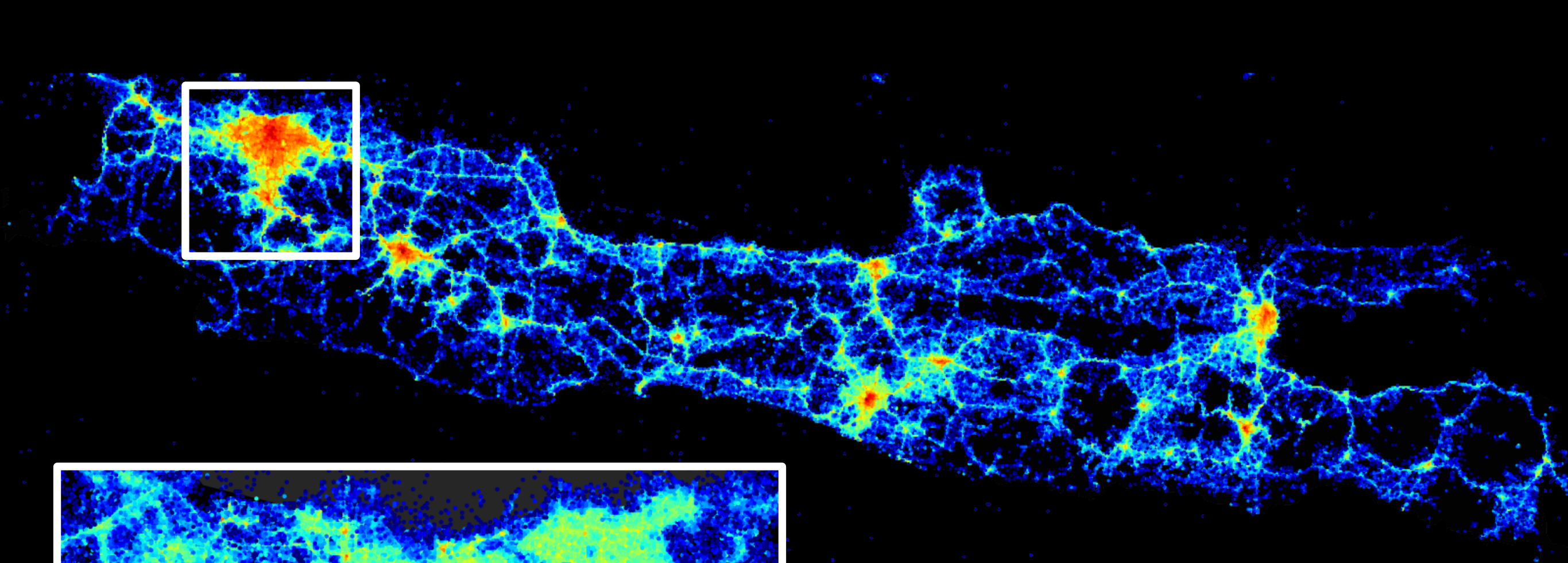


2013-12-07 00:00

Twitter Activity





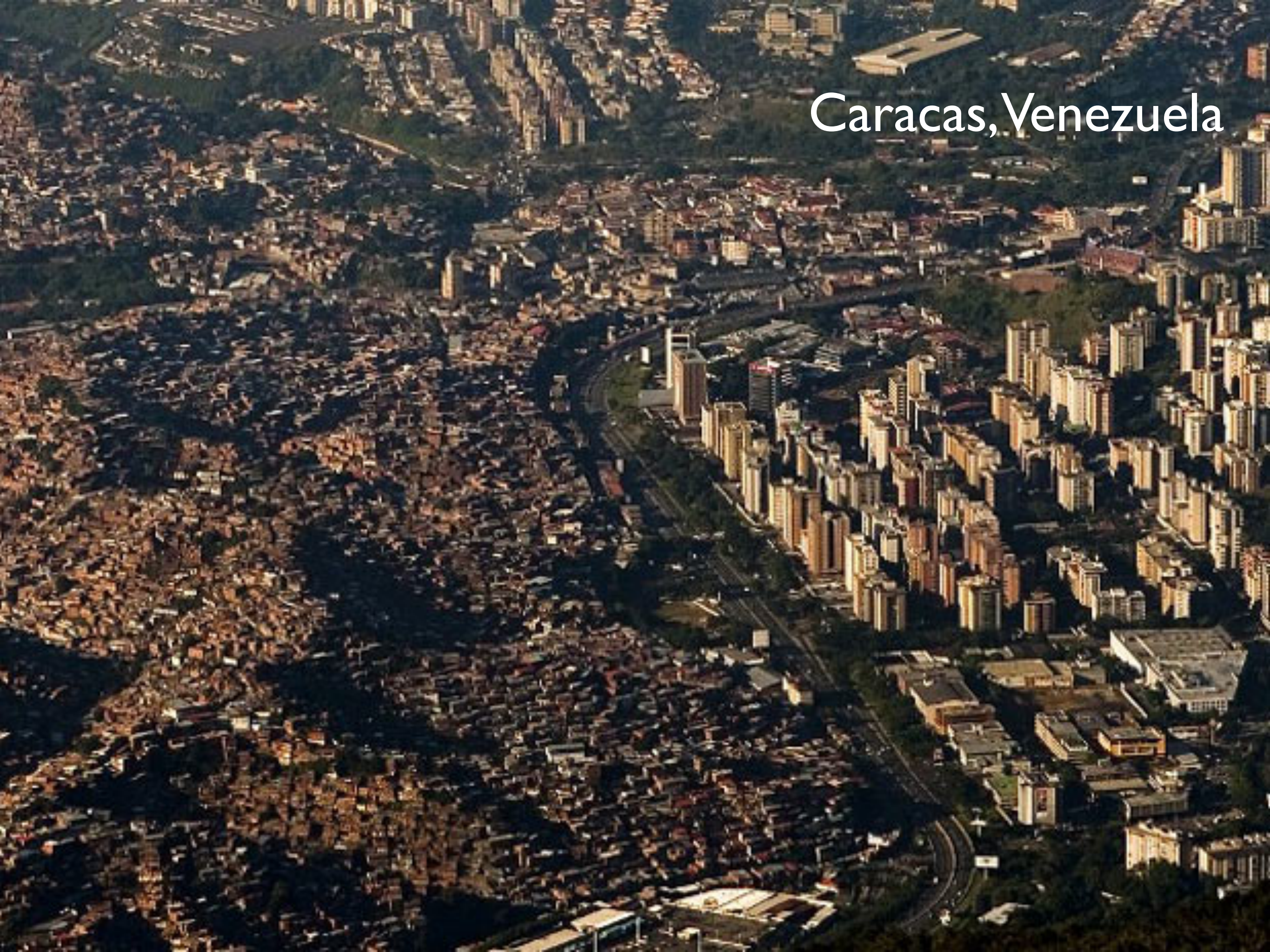


Jakarta, Indonesia



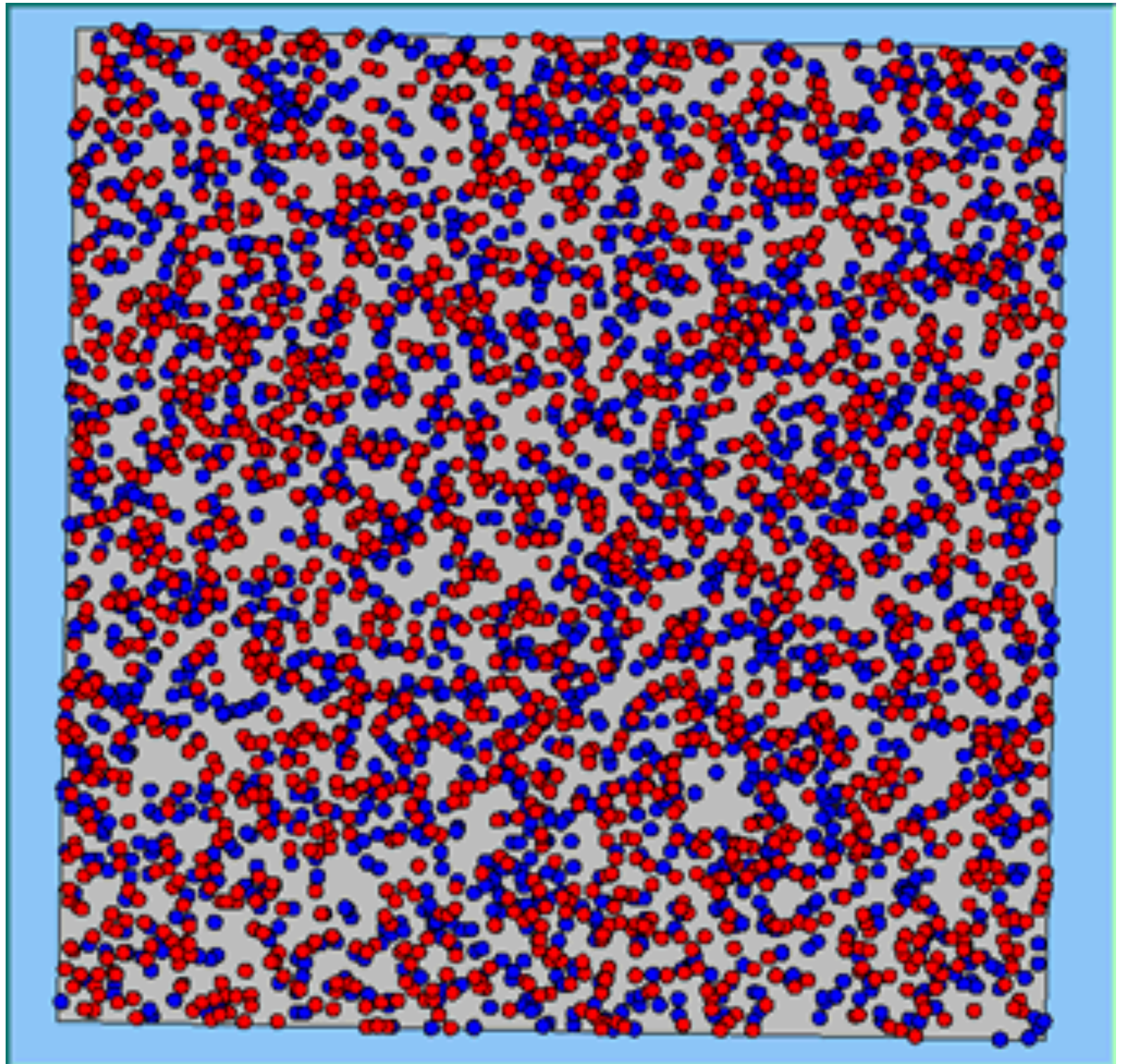
Istanbul, Turkey

Caracas, Venezuela

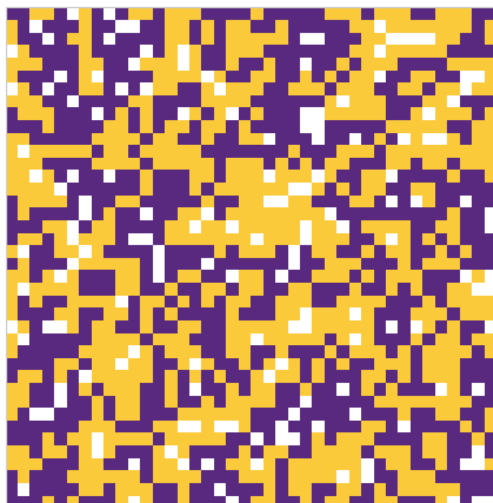


Segregation

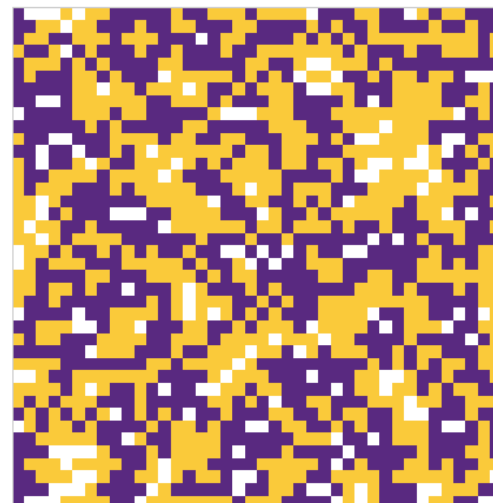
Schelling Model:
Tolerance thresholds
make people move



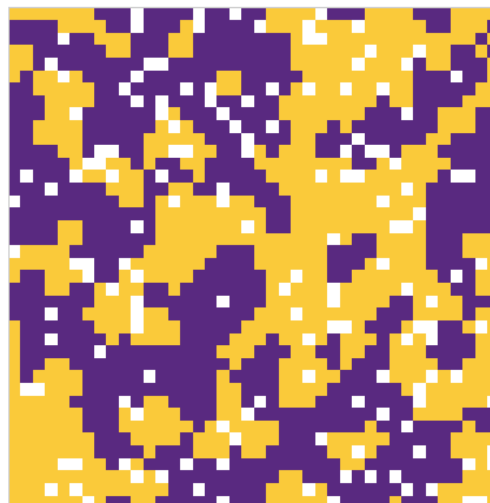
Preference = 0.2



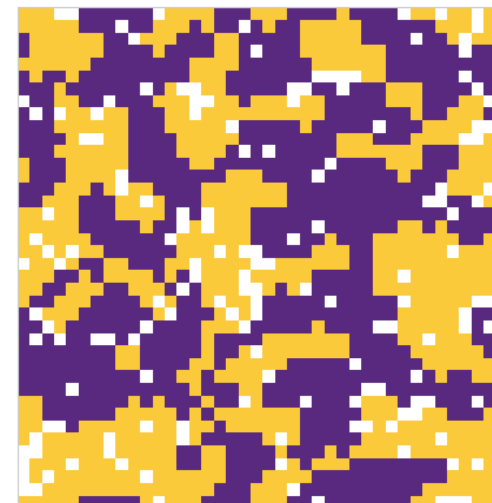
Preference = 0.25



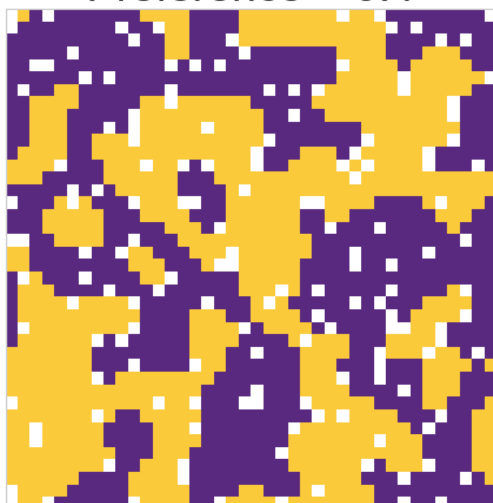
Preference = 0.3



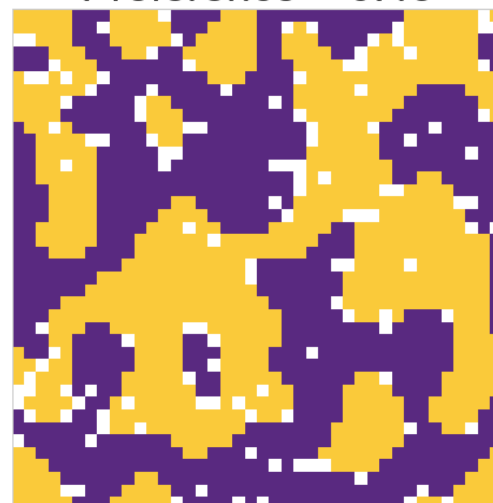
Preference = 0.35



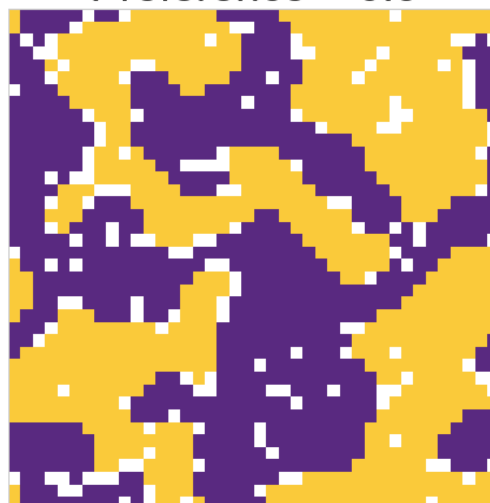
Preference = 0.4



Preference = 0.45



Preference = 0.5



Preference = 0.55



Preference = 0.6



Preference = 0.65

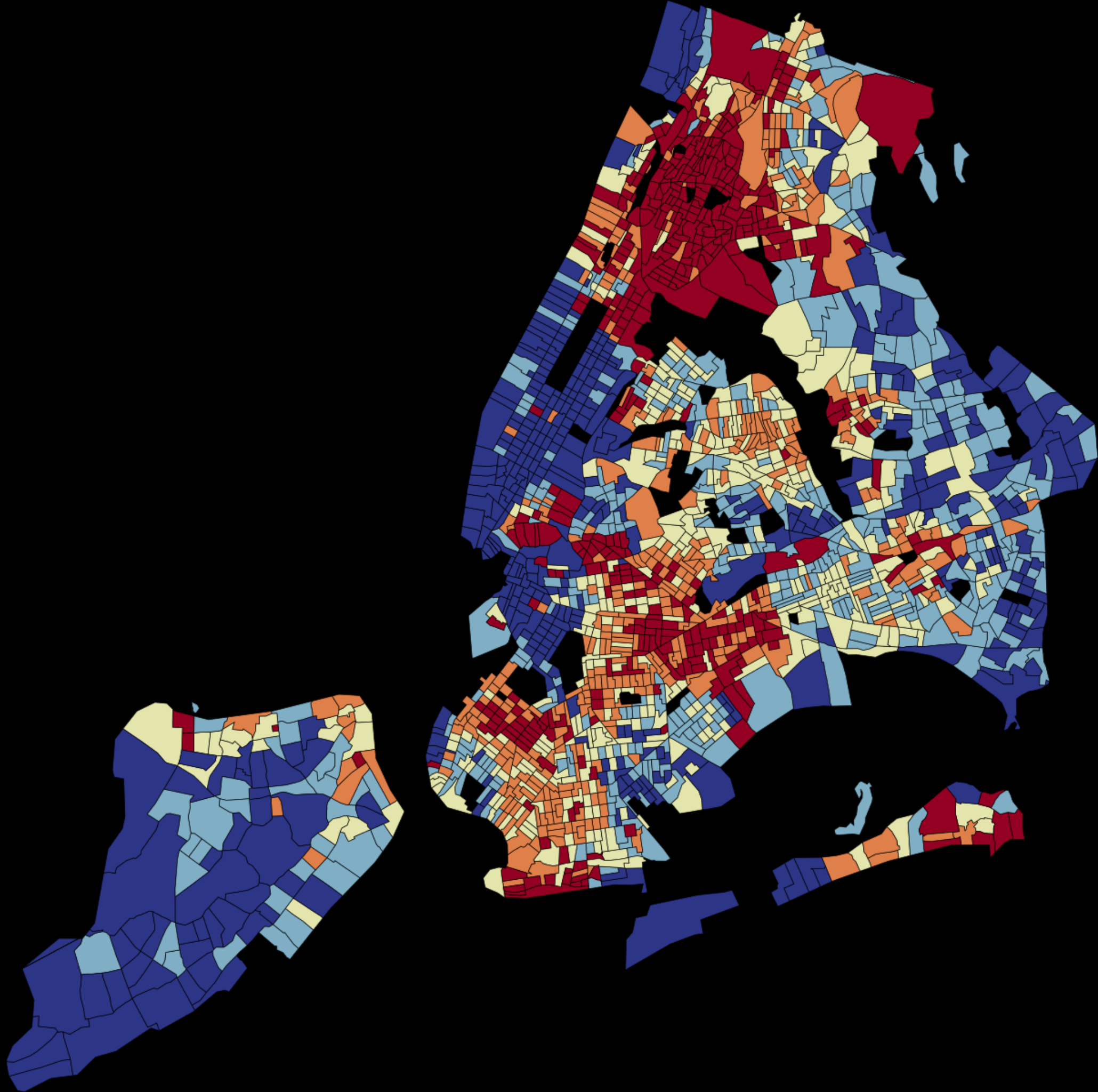


Preference = 0.7



Preference = 0.75



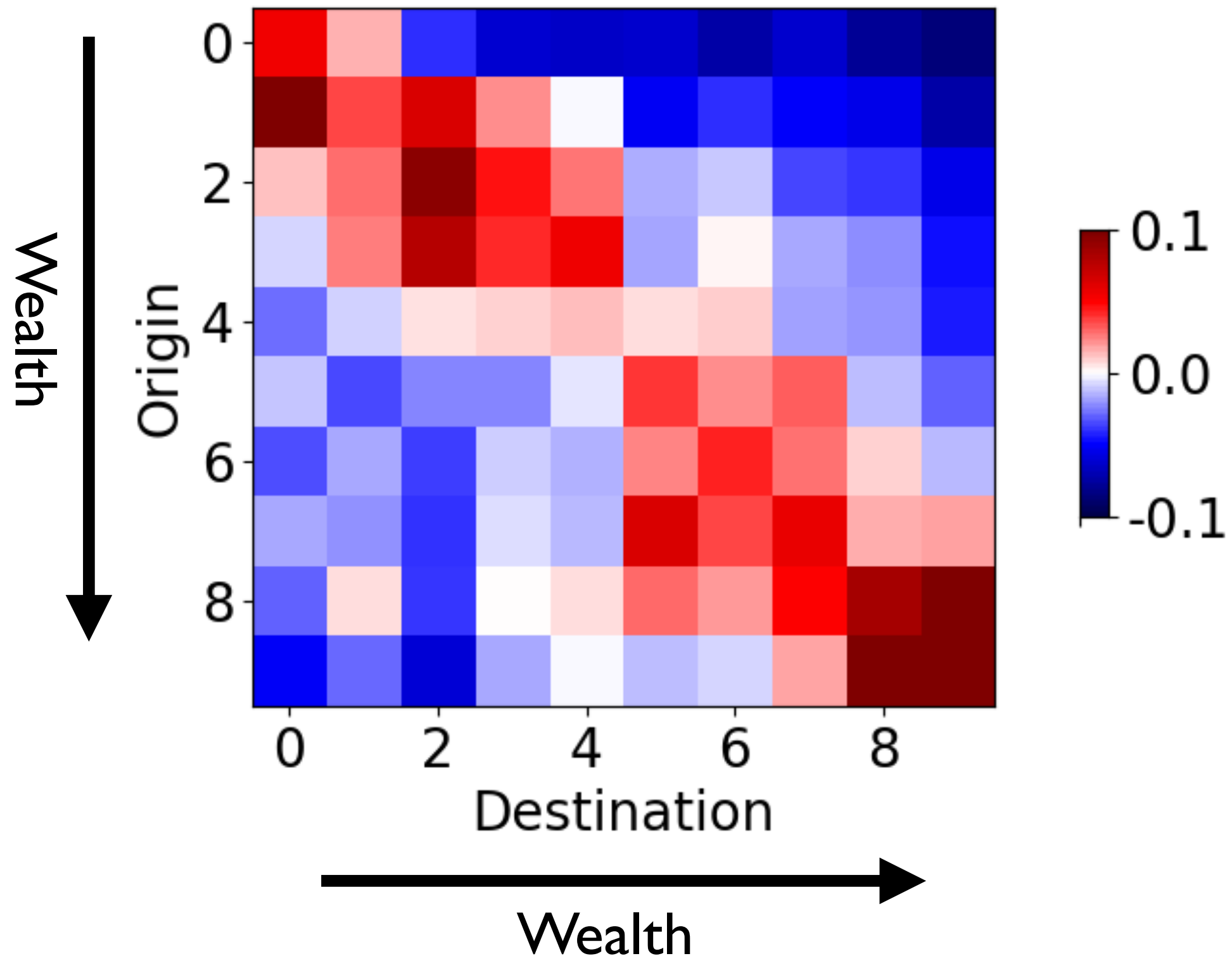


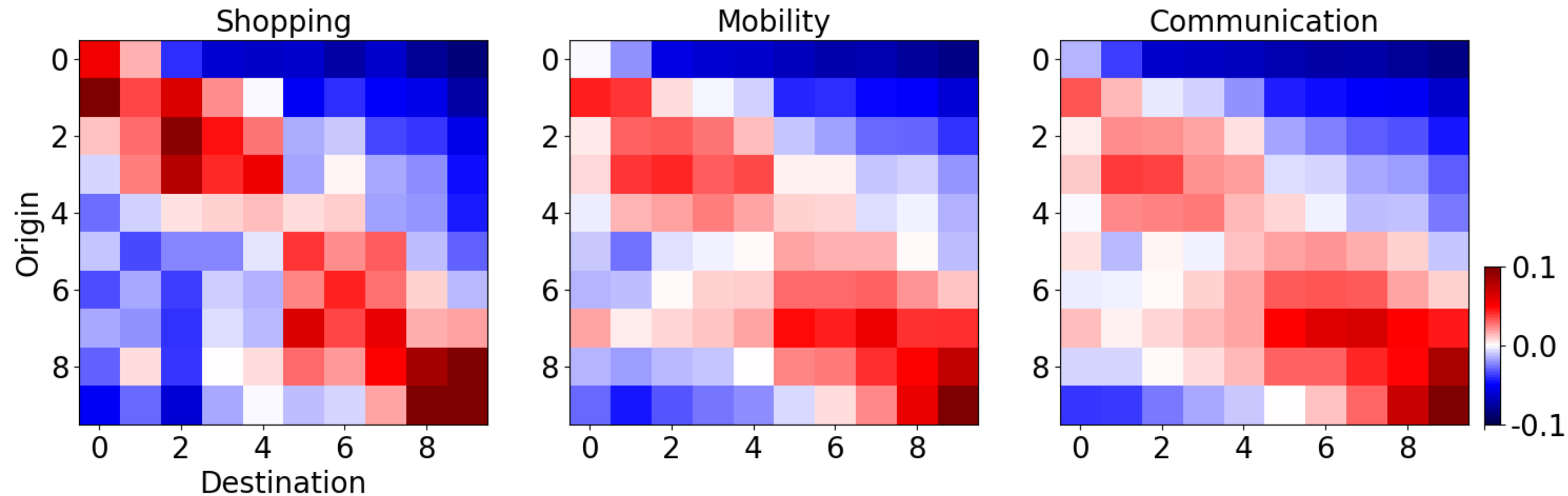


The image displays four maps of New York City, each showing a different network of Twitter communication links. The maps are arranged in a 2x2 grid. Each map features a color-coded geographic background, with colors ranging from dark blue to red. Overlaid on these maps are numerous small, colored squares (nodes) and lines (edges) representing communication links. The links are most concentrated in the central and northern parts of the city, with some extending to the surrounding areas. The text 'Links represent Twitter communication' is centered in the middle of the image.

Links represent Twitter communication

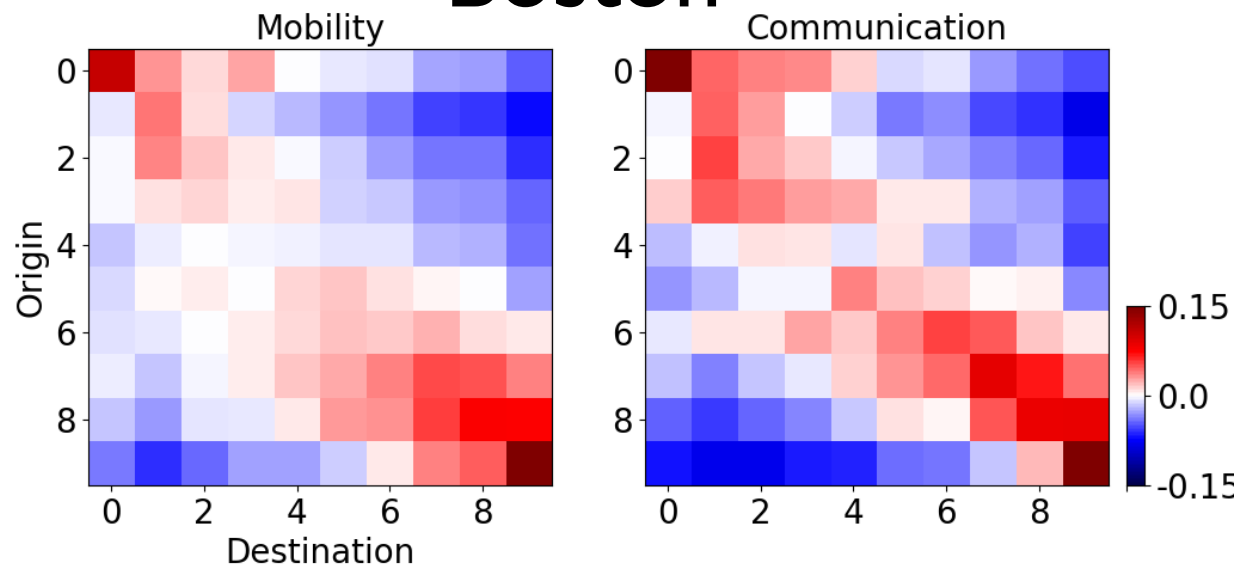
Matrix of neighborhood
interactions ordered by income



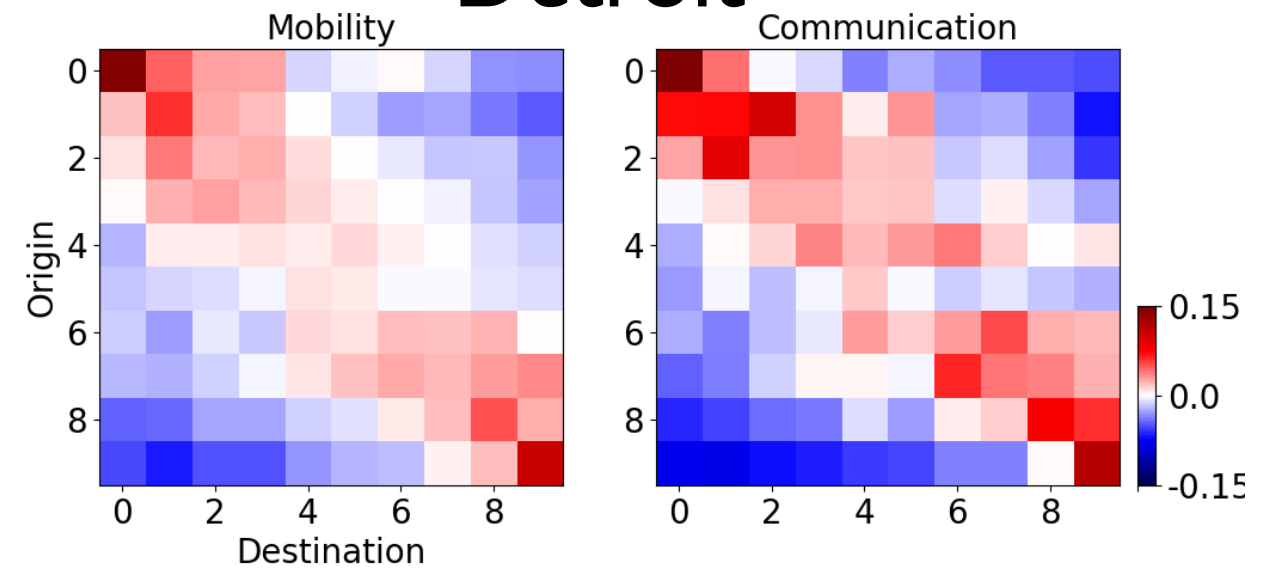


- Networks of mobility and communication show patterns of segregation by income
- Particularly high at the extremes

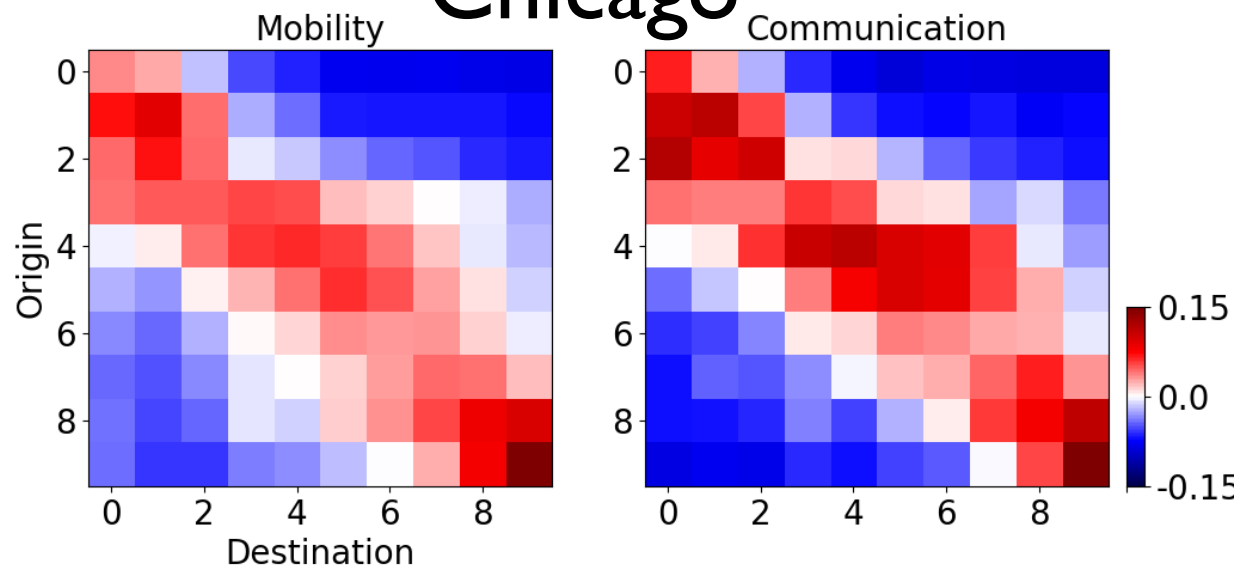
Boston



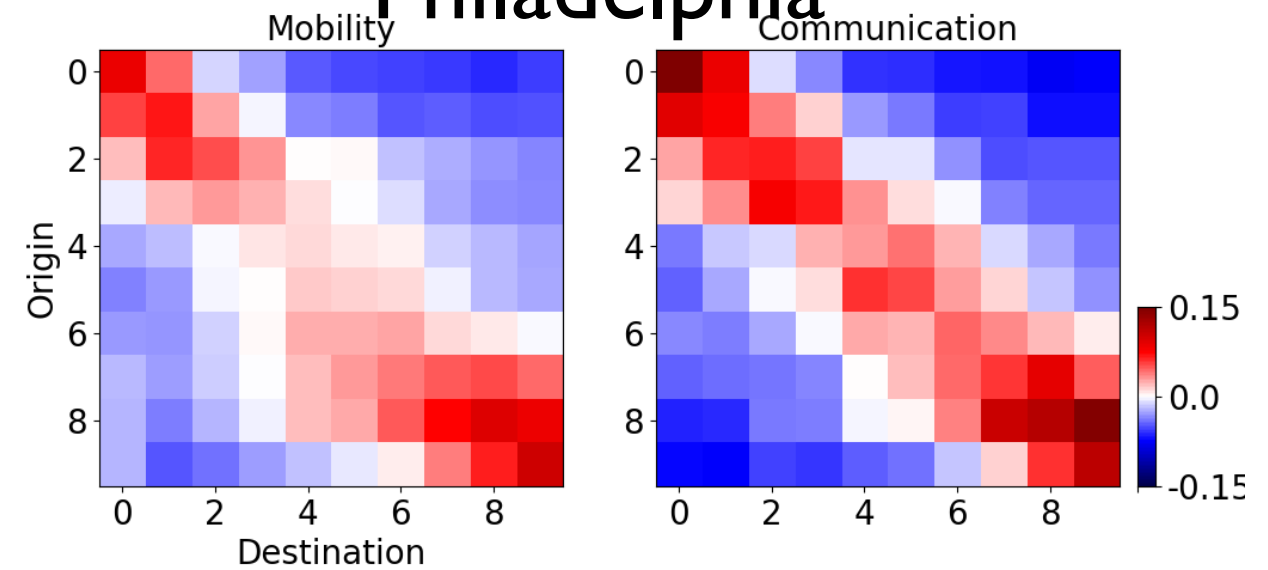
Detroit



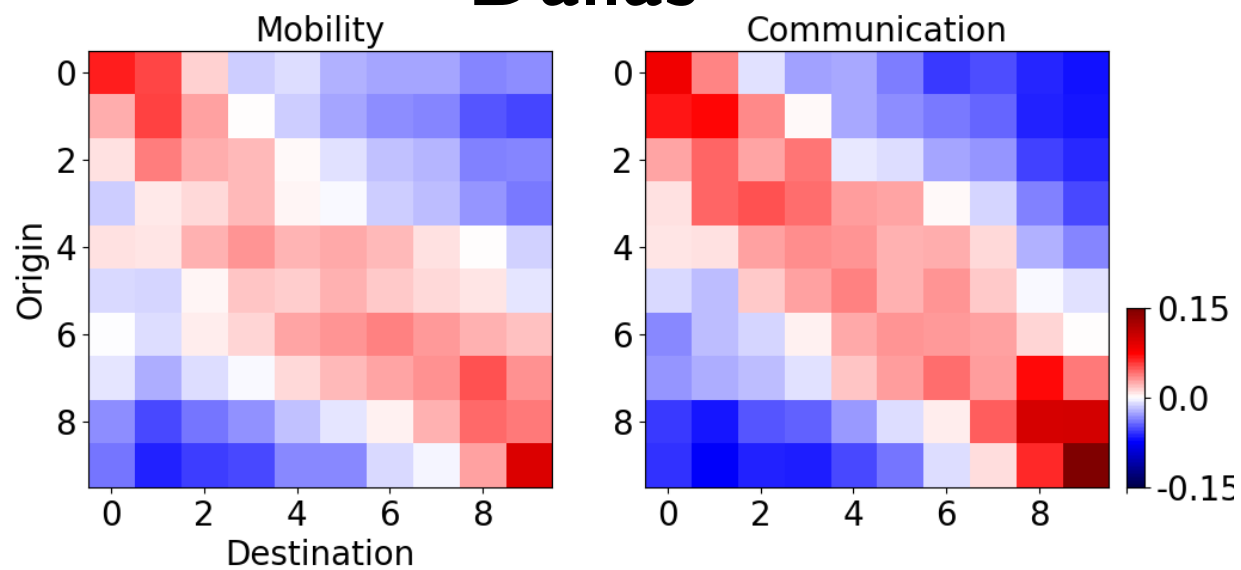
Chicago



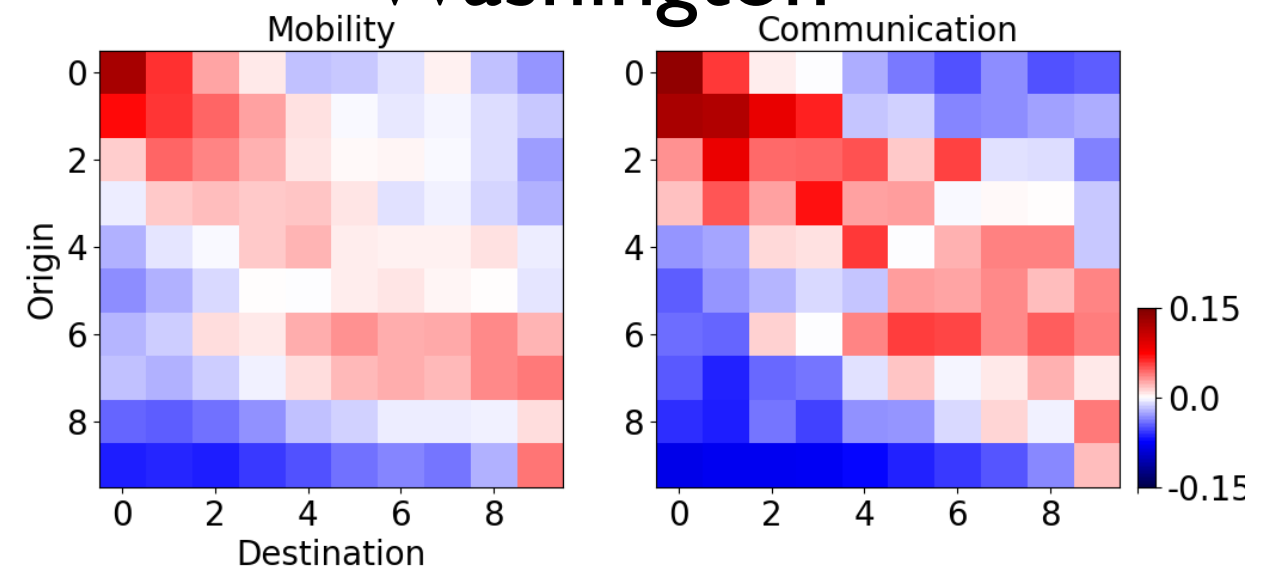
Philadelphia



Dallas



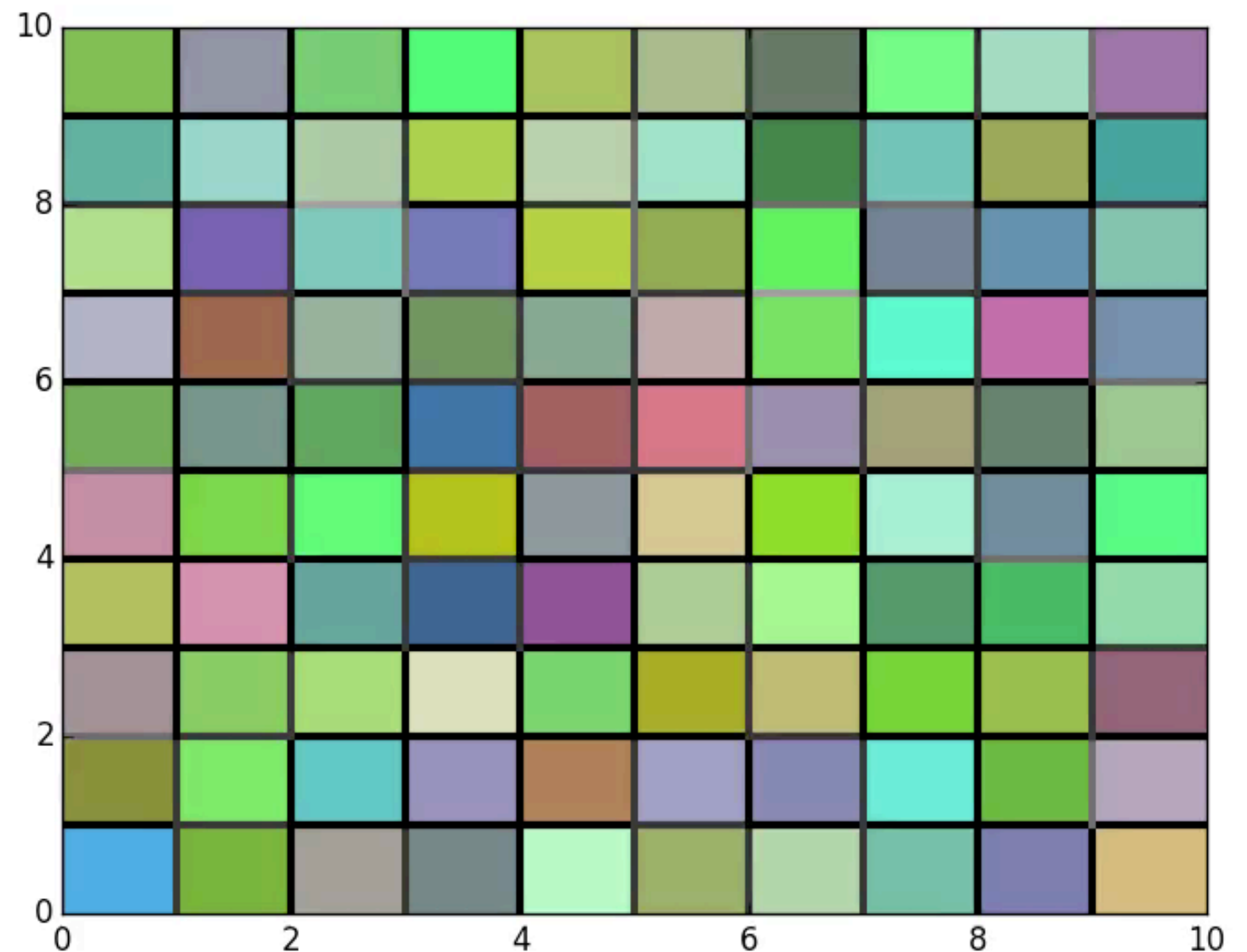
Washington



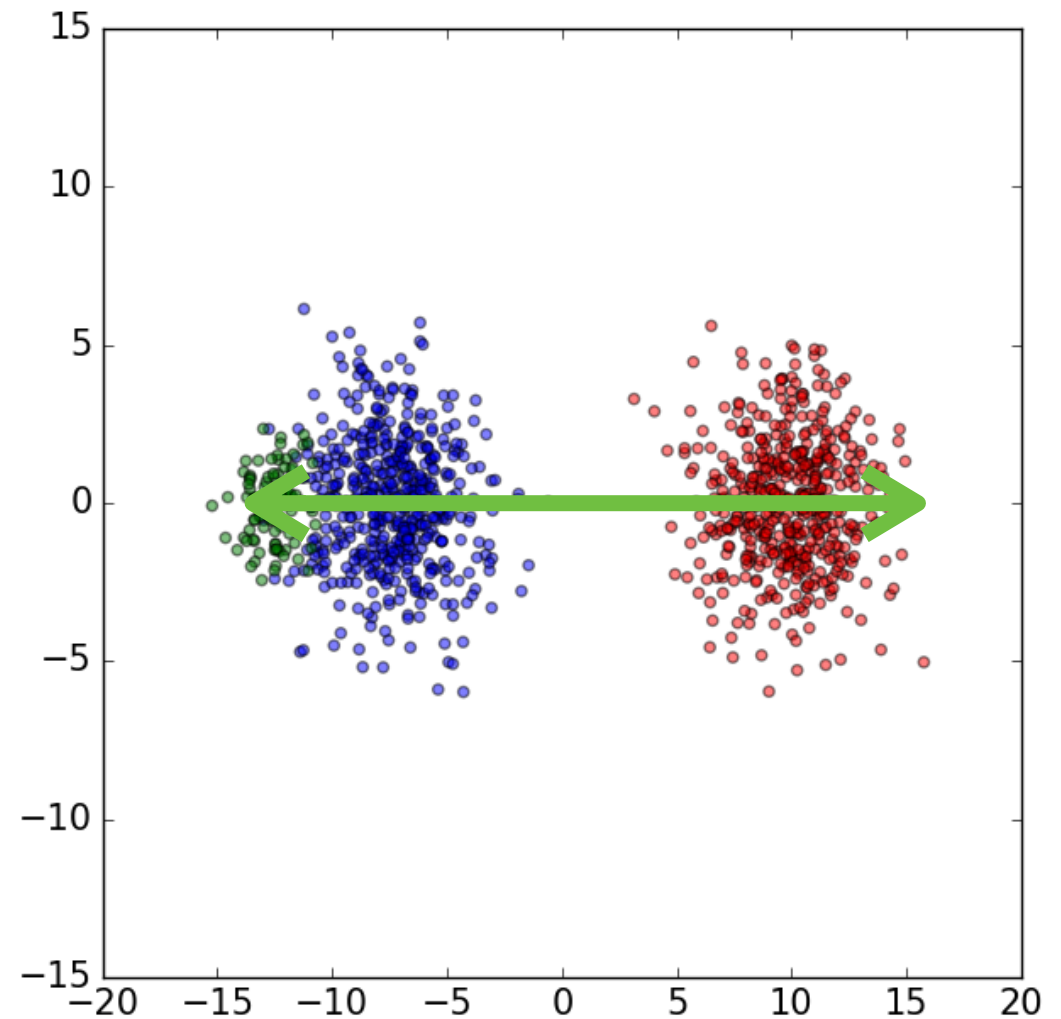
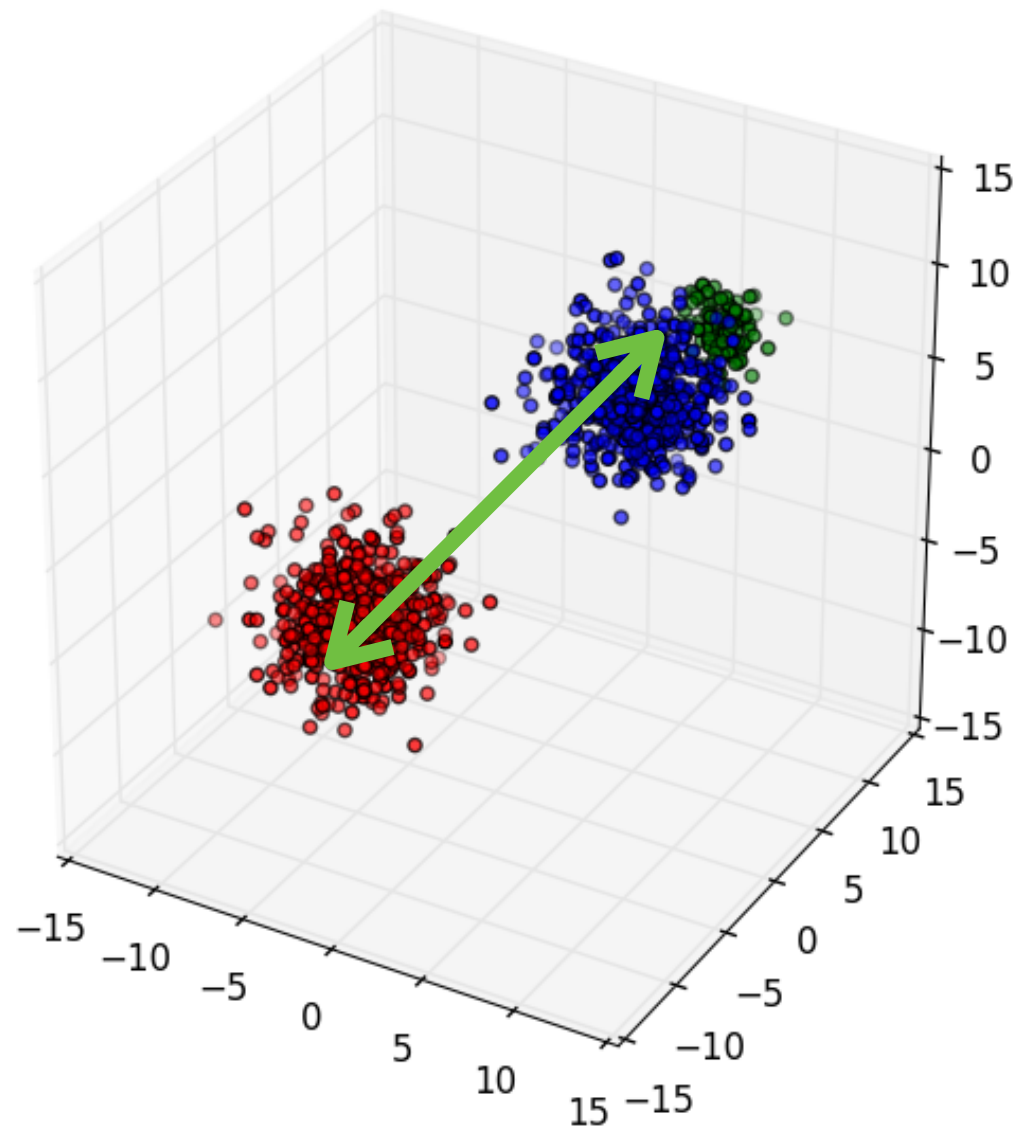
Does segregation affect social behaviors?

Axelrod Model of Cultural Emergence

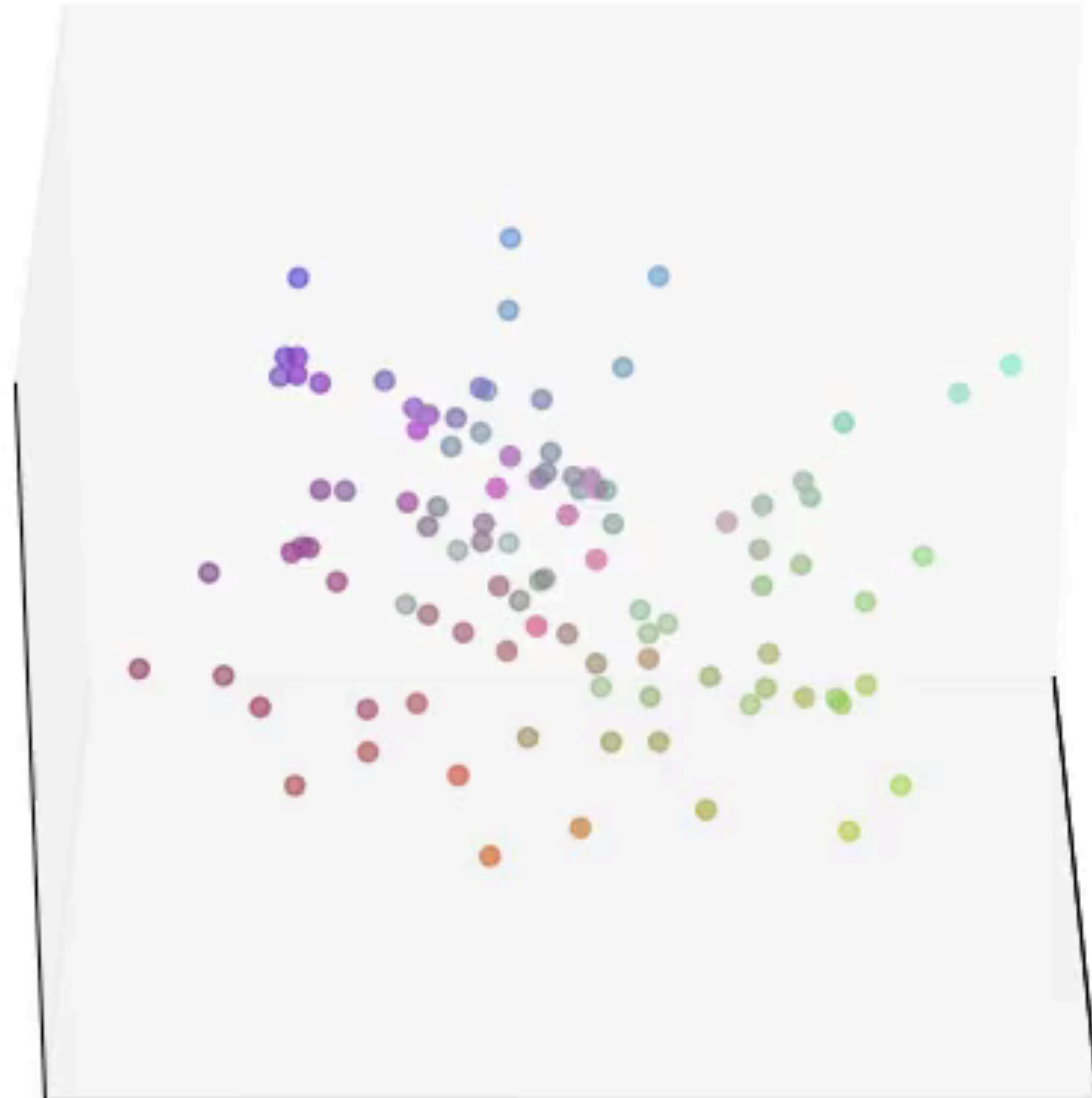
Cultural groups emerge
when people imitate
each other



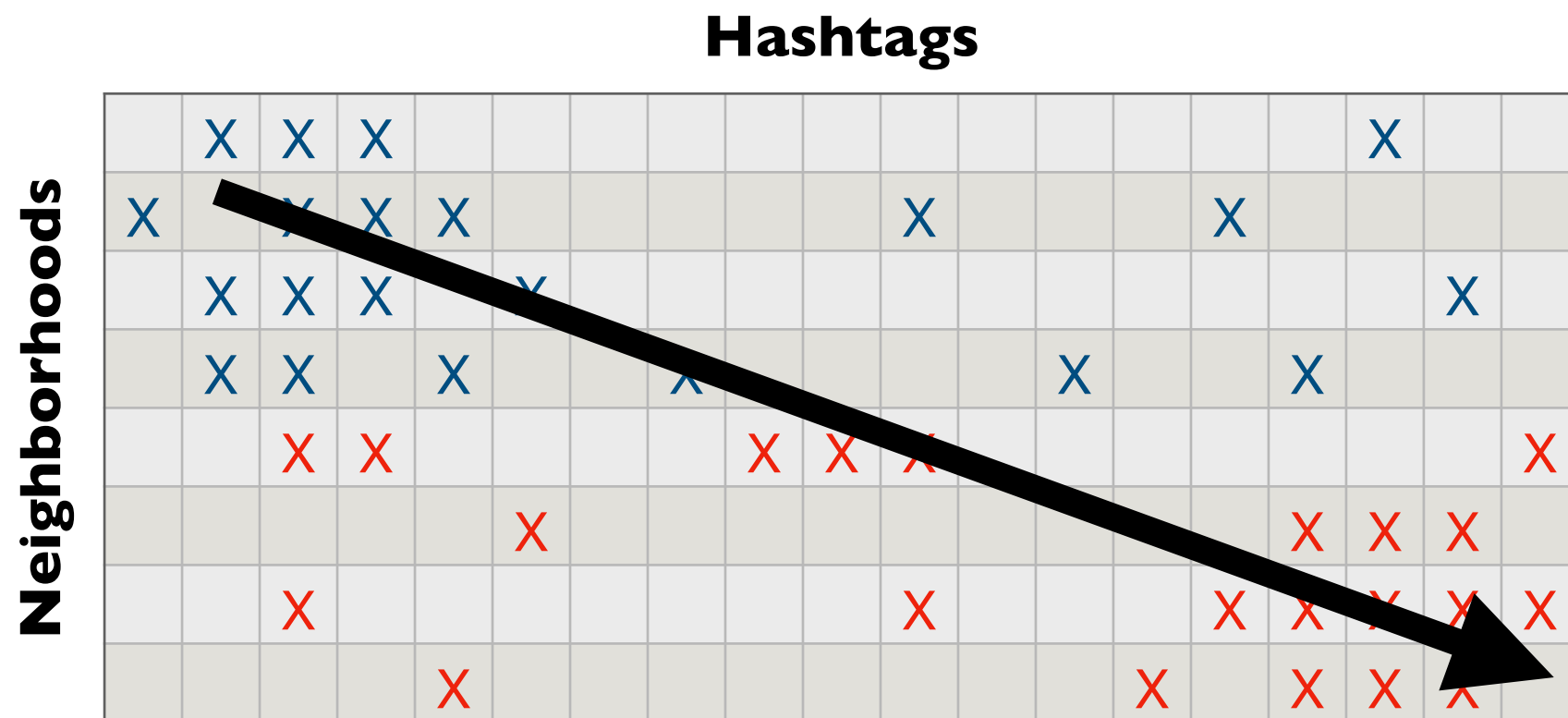
PCA



PCA finds the directions
where variance is highest

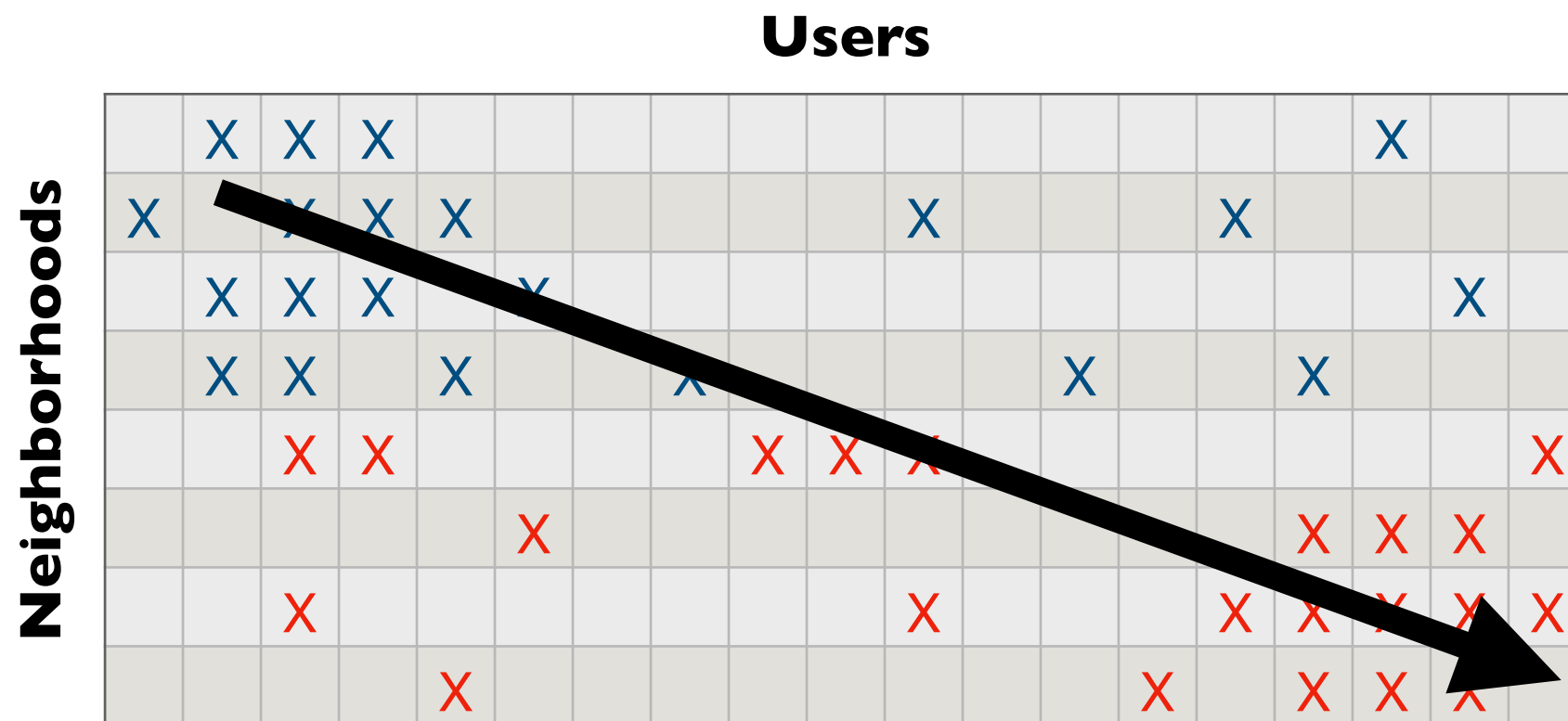


PCA on Hashtag Usage

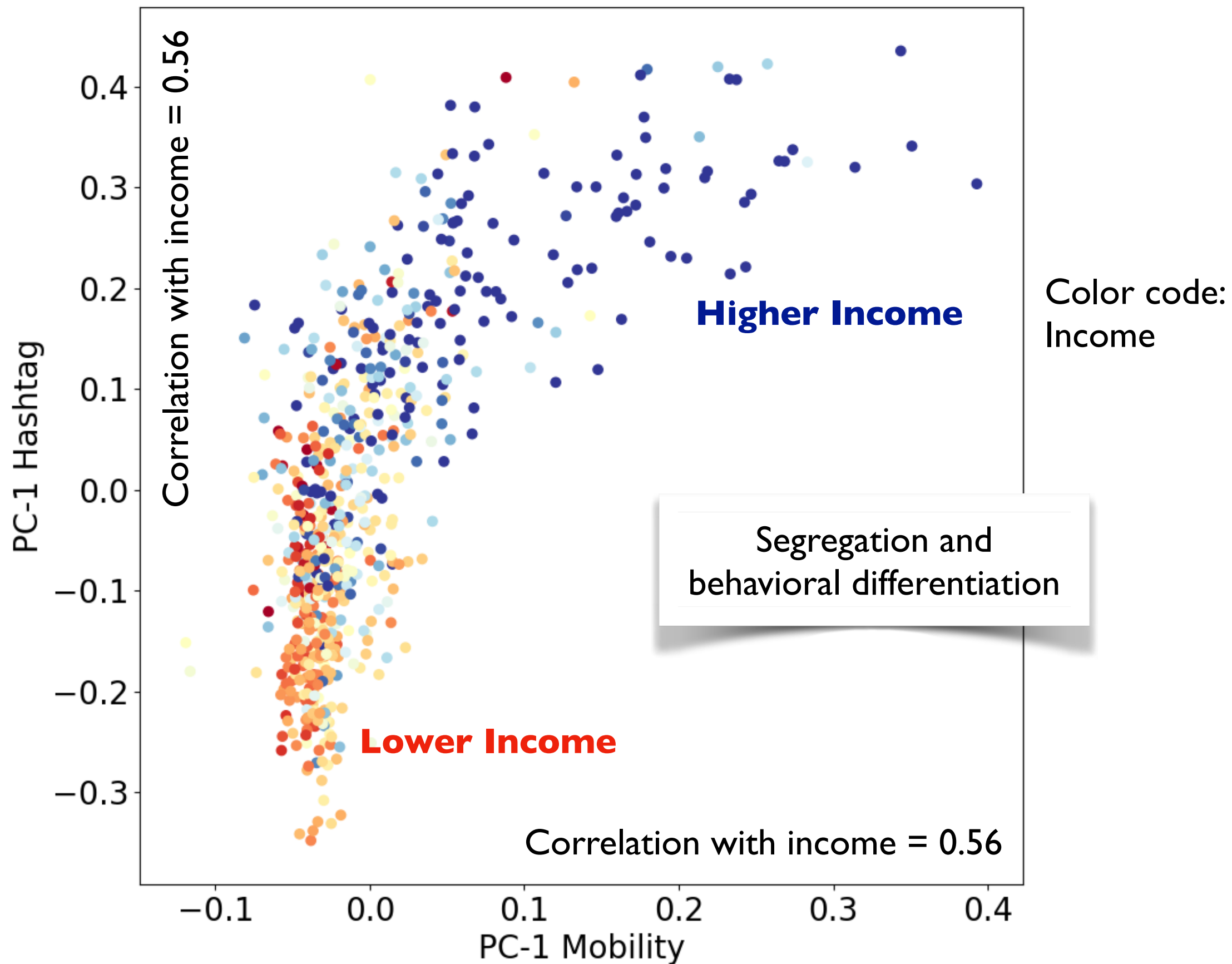


Is there a dominant direction of hashtag usage?

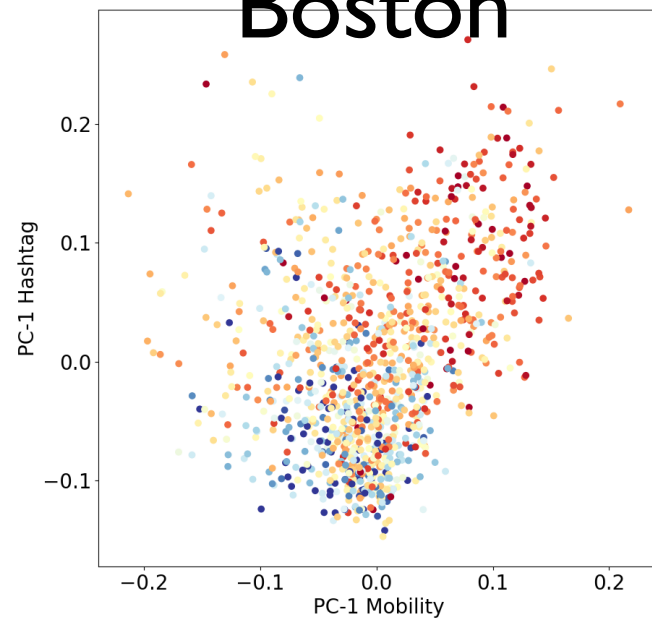
PCA on Mobility Patterns



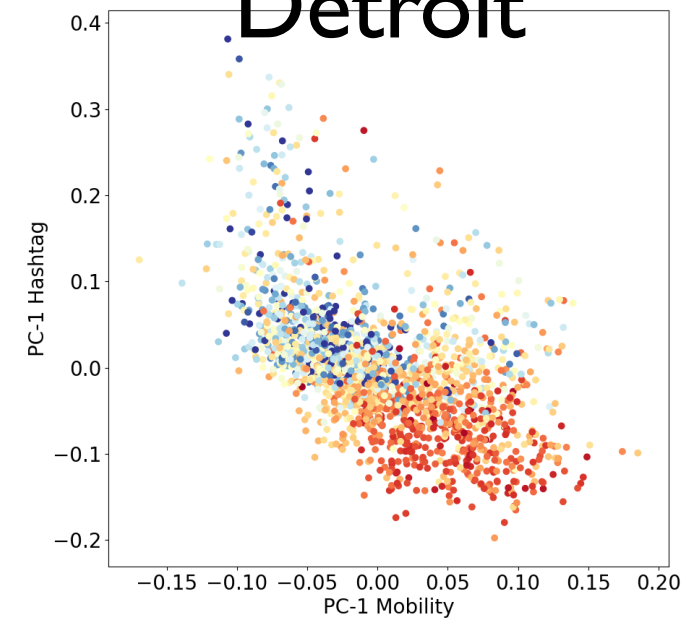
Is there a dominant direction of travel patterns?



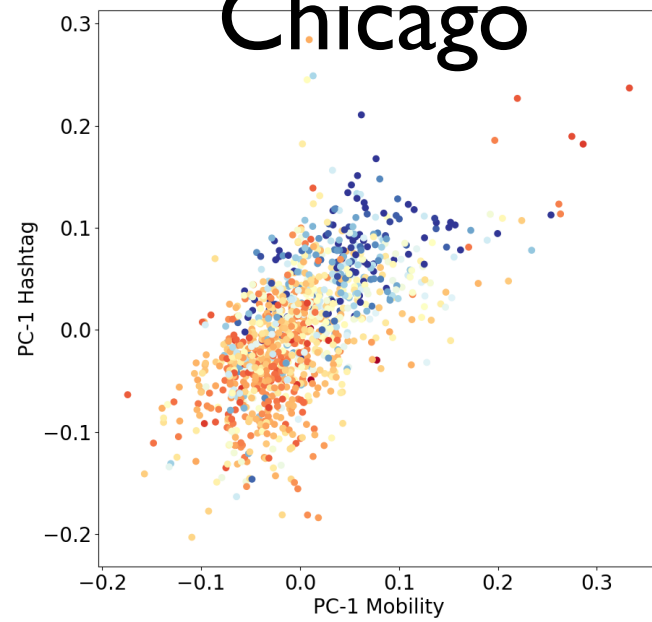
Boston



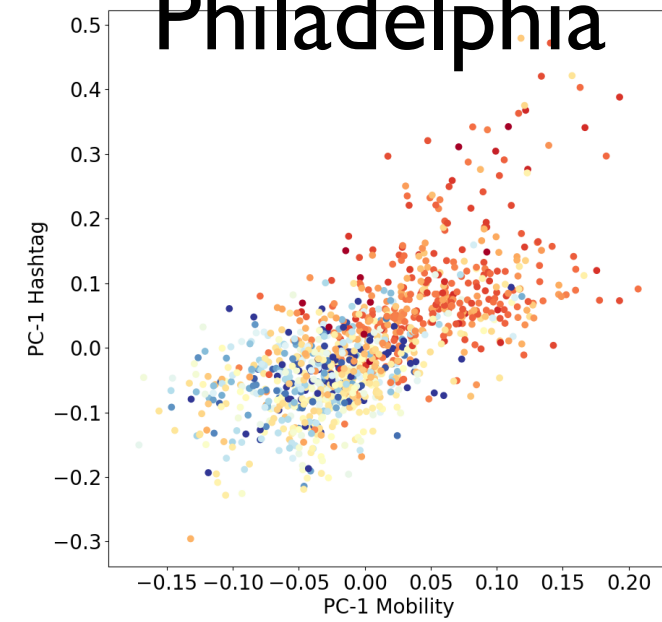
Detroit



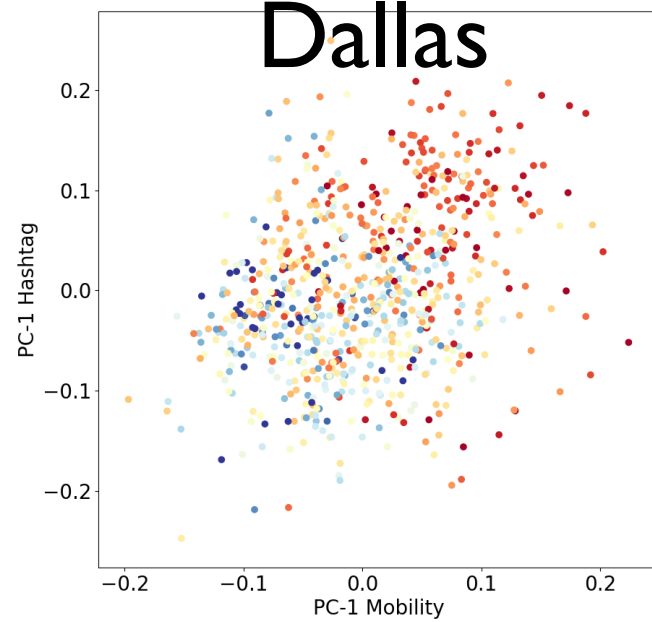
Chicago



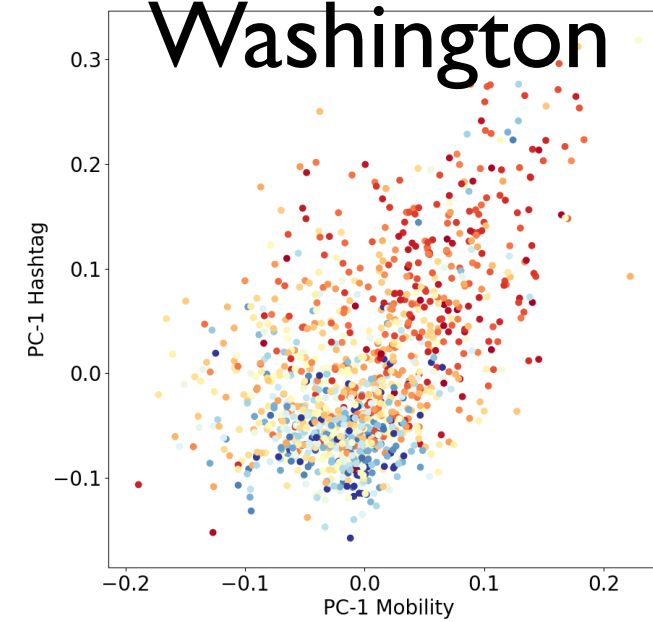
Philadelphia



Dallas



Washington



What are these neighborhoods talking about?

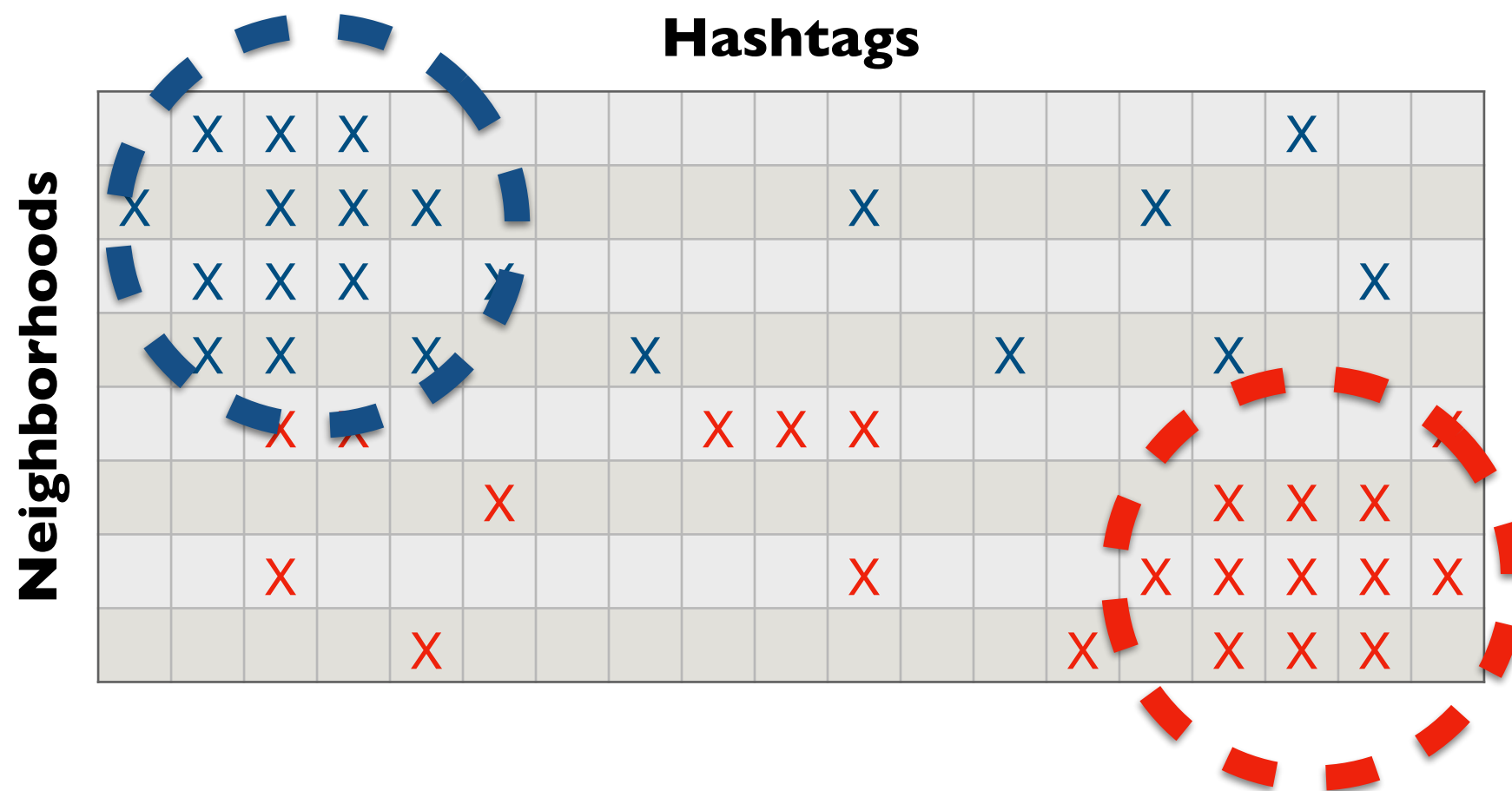
Topic Model

Unsupervised Machine Learning Algorithm

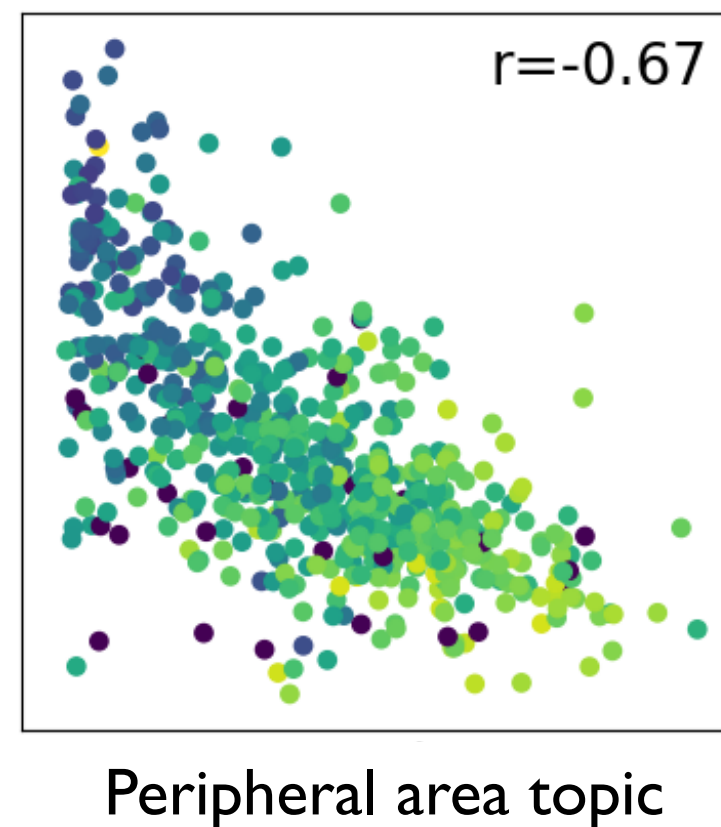
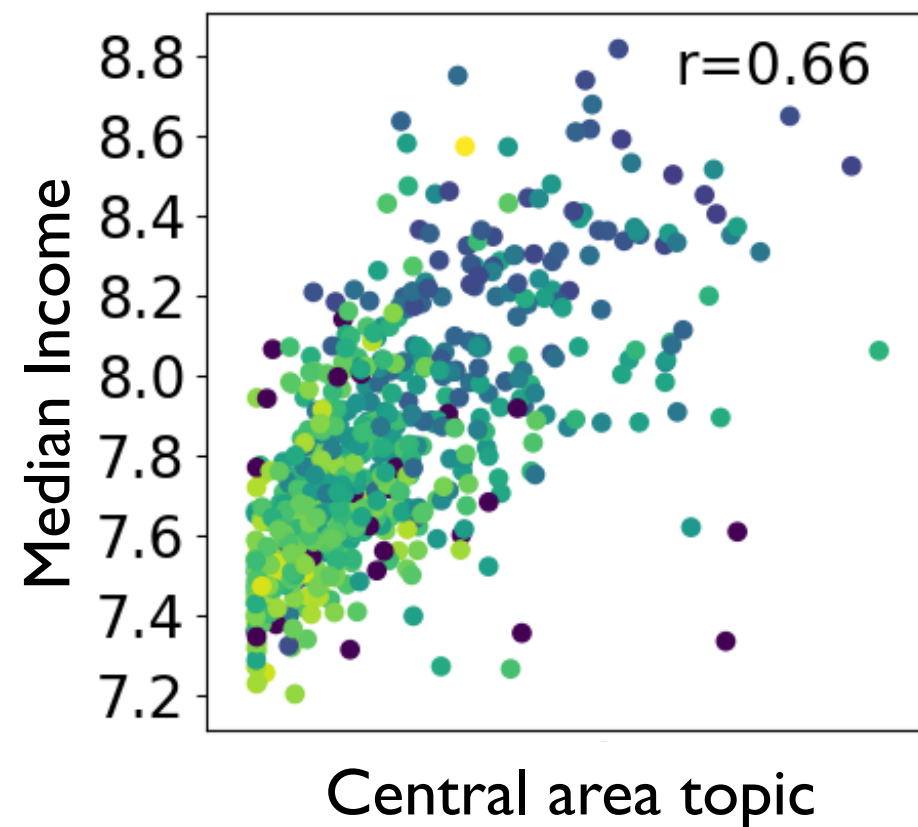
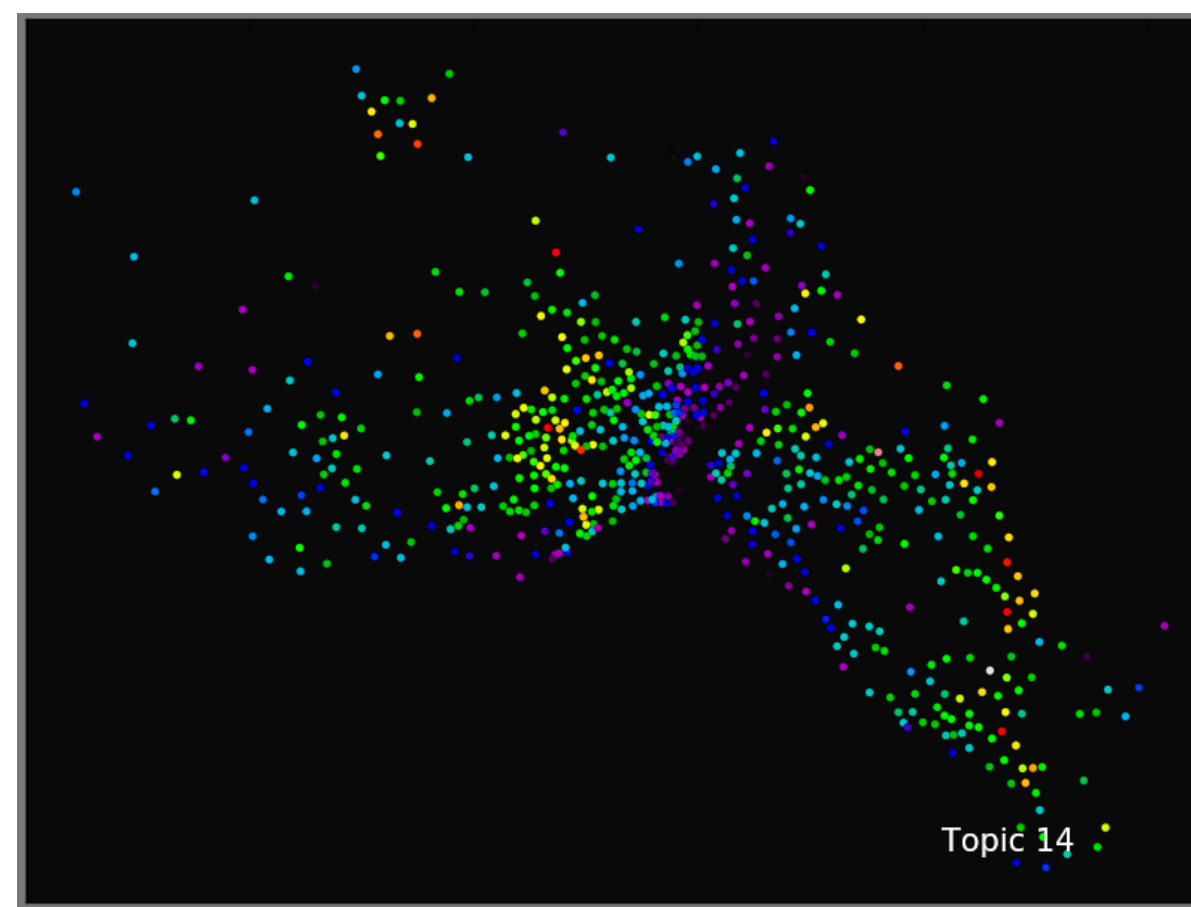
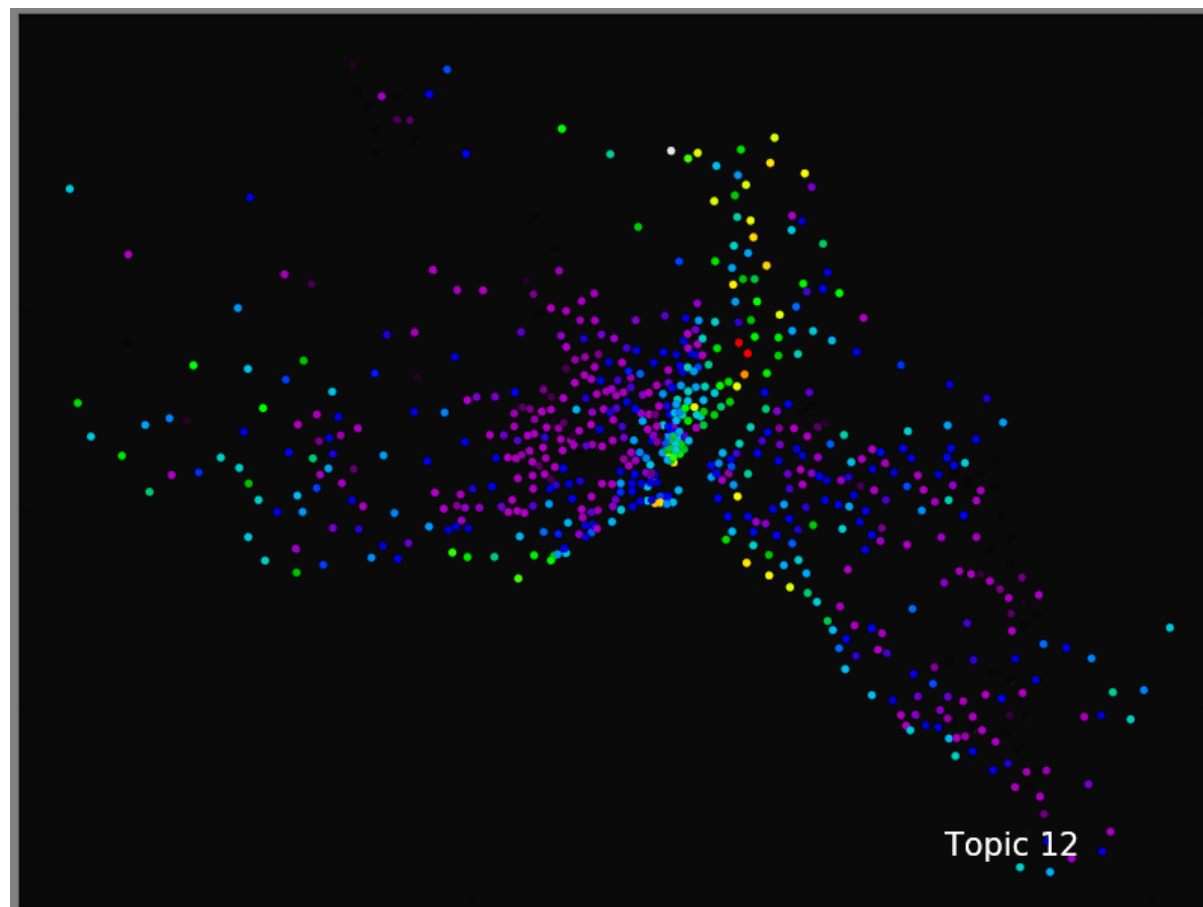
Cluster documents based on word frequency



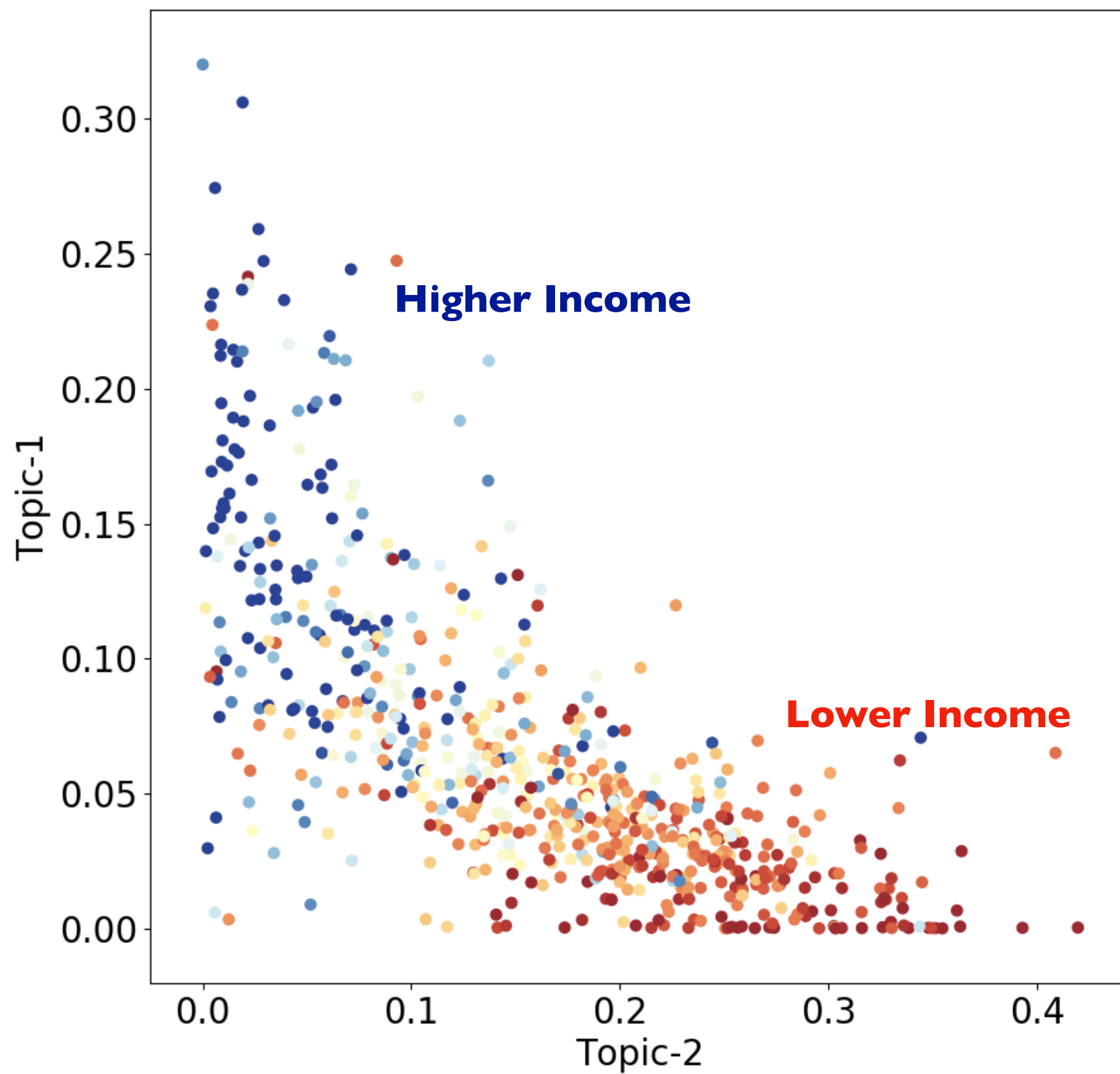
Urban Topic Model



Find content characteristic of locations

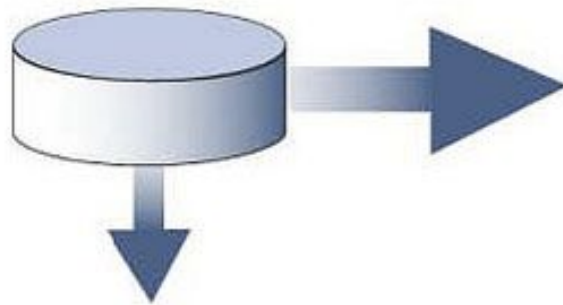


Color code:
Electoral results
Liberal
Conservative

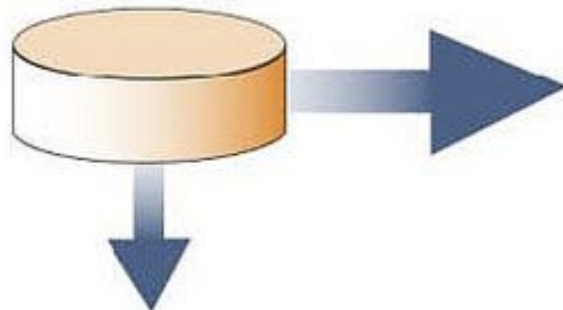


Data source

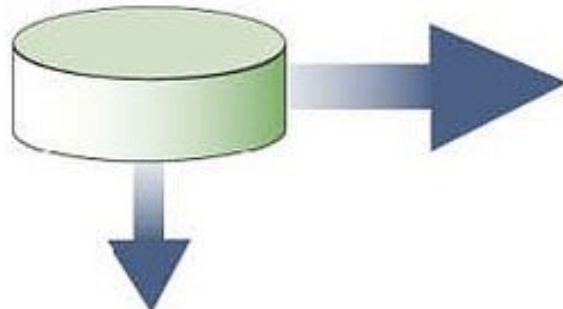
Street data



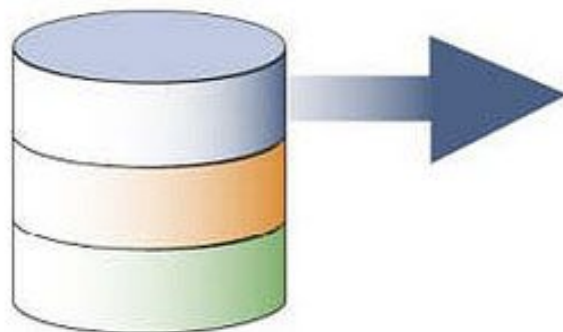
Buildings data



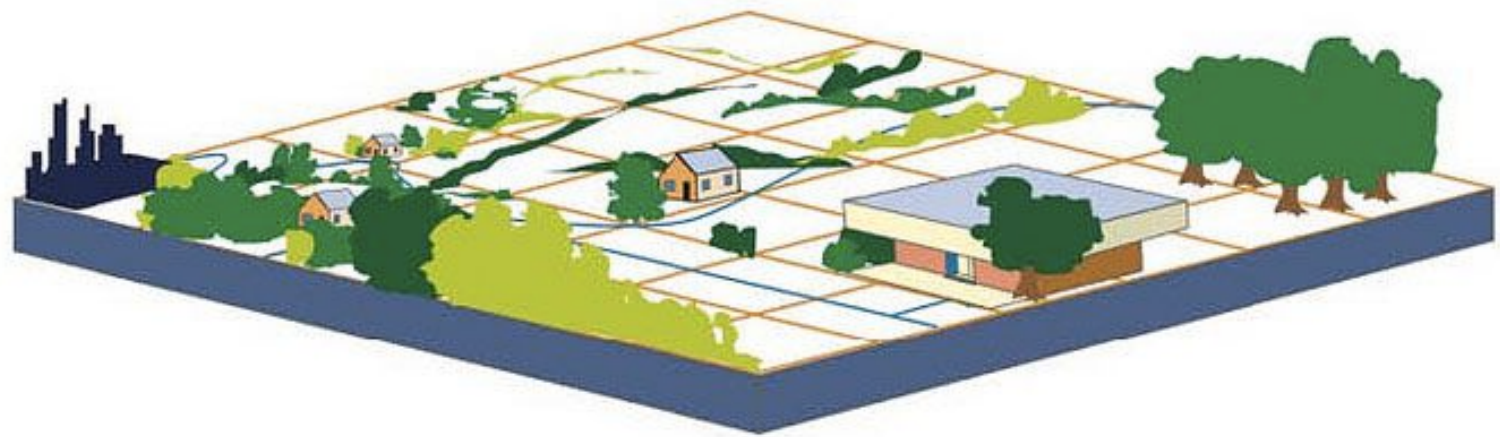
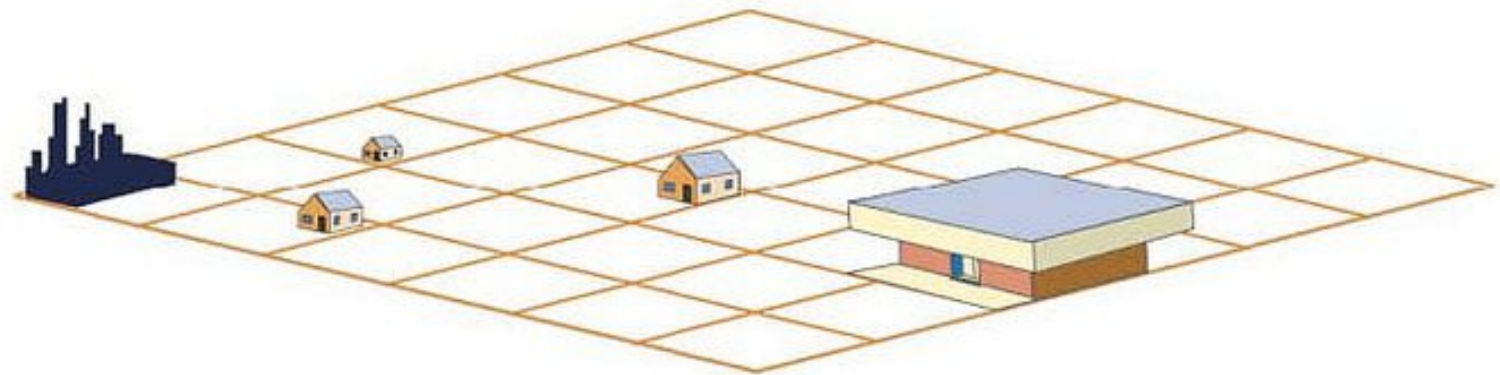
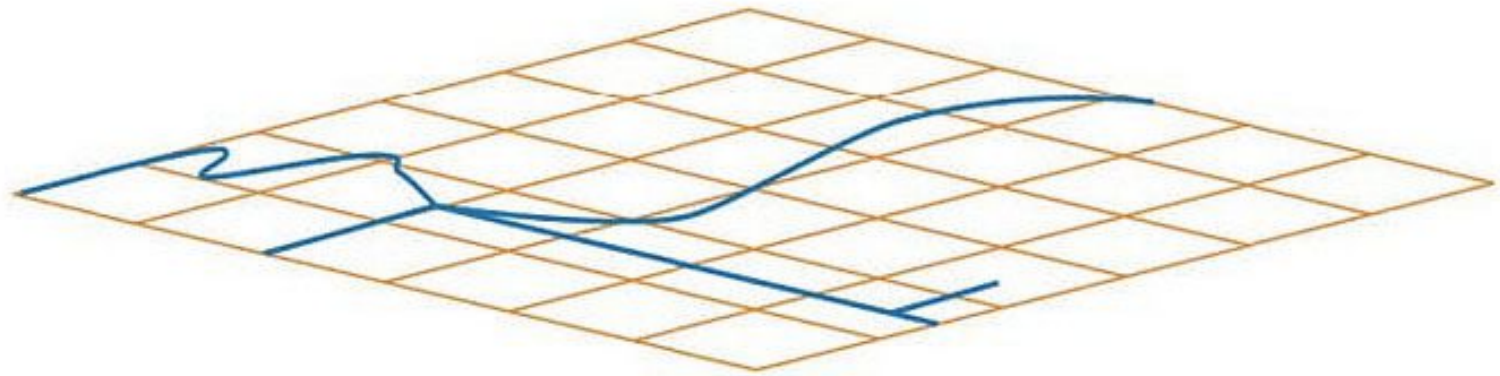
Vegetation data

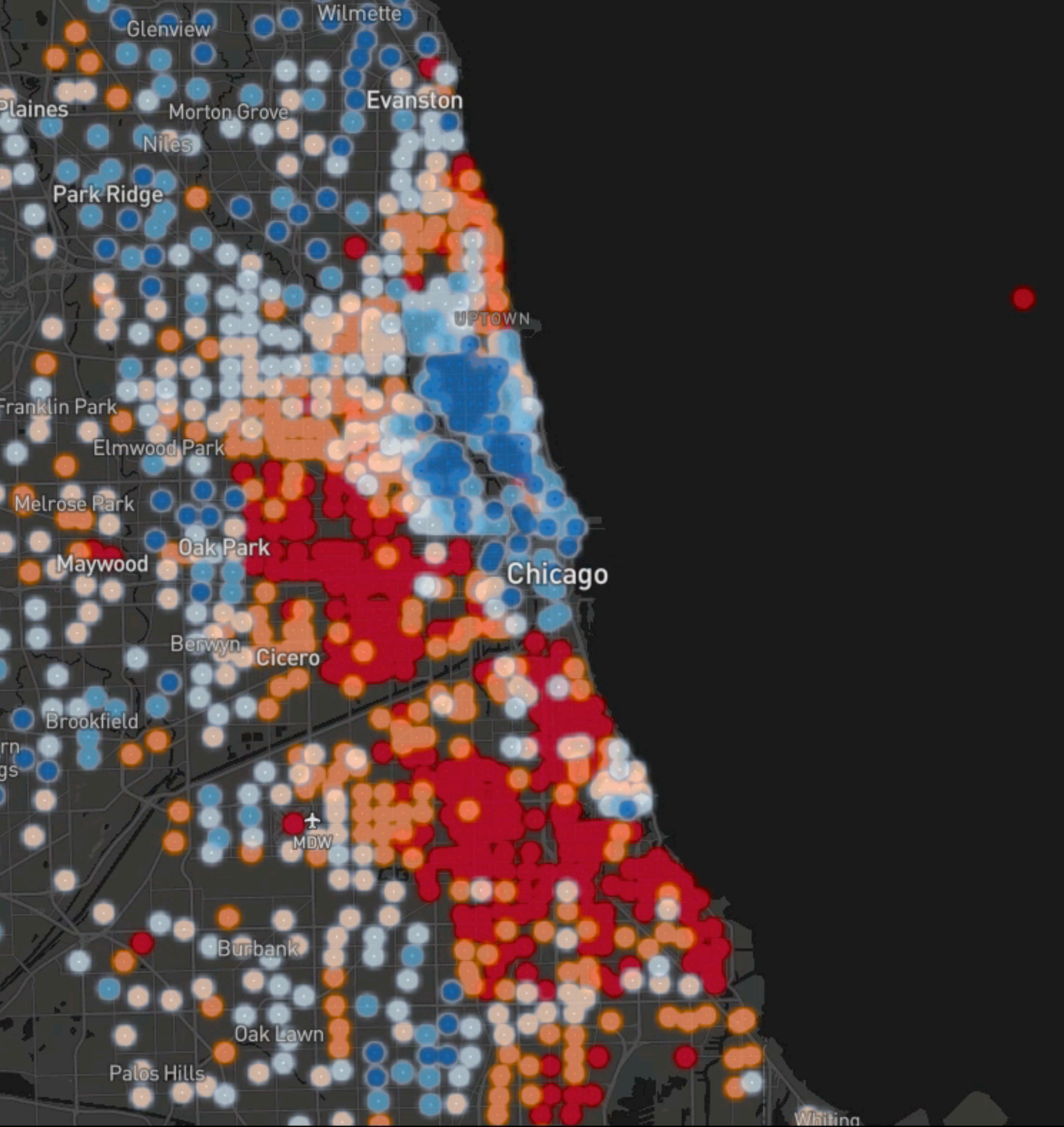


Integrated data



Data layers





Chicago

In relationships

☒ Mobility network ☐ Mentions network

Income Quantiles

- 0

- 1

- 2

- 3

- 4

- 5

© Mapbox © OpenStreetMap Improve this map



Thanks!

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