

Geographic Data Science

Regionalisation

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Regionalization

Unsupervised Spatial Machine Learning

*Aggregating basic spatial units (**areas**) into larger units (**regions**)*

Regionalization

Split a dataset into groups of observations that are similar within the group and dissimilar between groups, based on a series of attributes...

...with the additional constraint observations need to be spatial neighbors

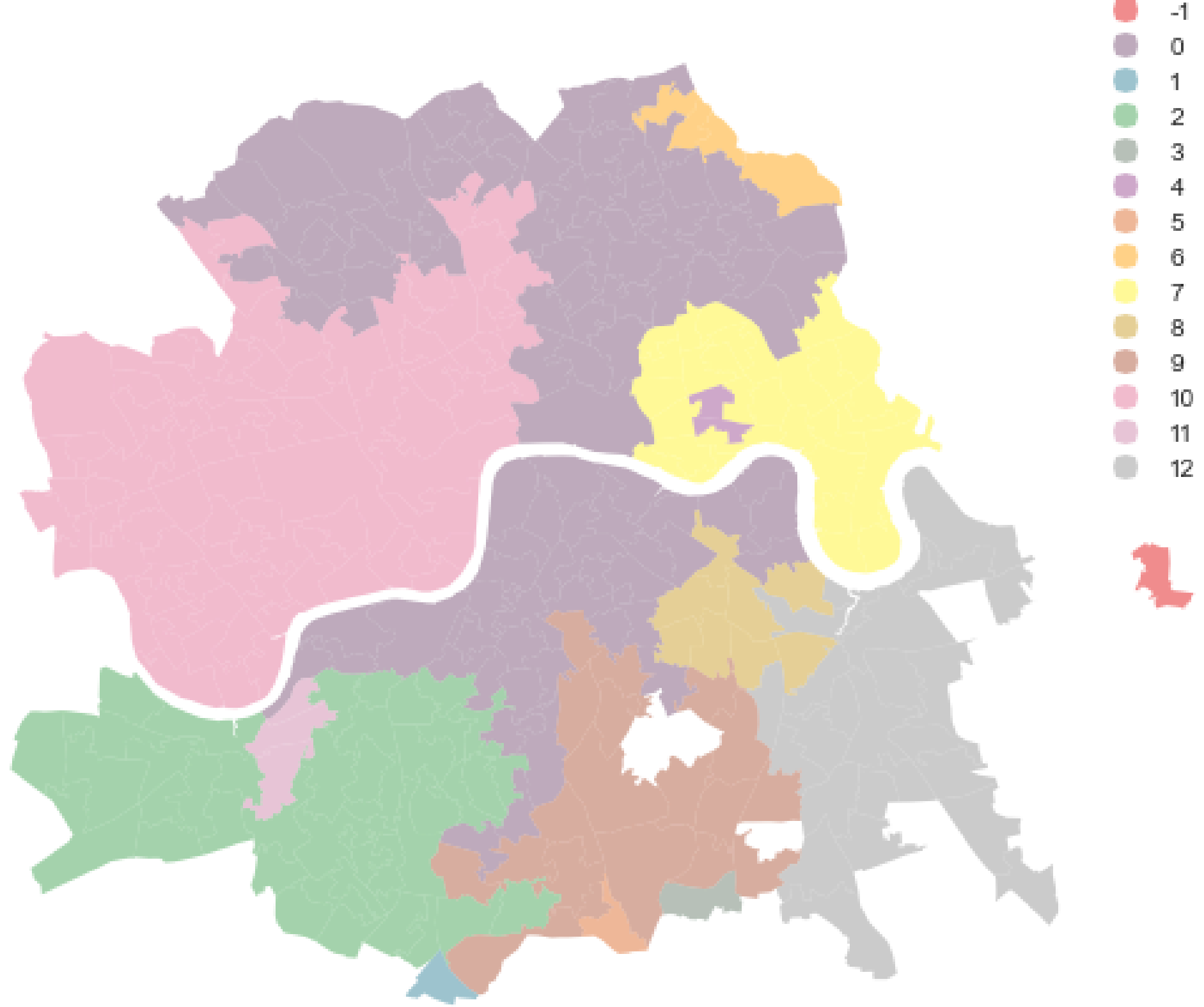
Regionalization

Duque et al. (2007)

Regionalization

- All the methods aggregate geographical areas into a predefined number of regions, while optimizing a particular aggregation criterion;
- The areas within a region must be geographically connected (the spatial contiguity constraint);
- The number of regions must be smaller than or equal to the number of areas;
- Each area must be assigned to one and only one region;
- Each region must contain at least one area.

Duque et al. (2007)



Algorithms

- Automated Zoning Procedure (AZP)
- Arisel
- Max-P
- ...

See [Duque et al. \(2007\)](#) for an excellent, though advanced, overview

Examples

Census geographies

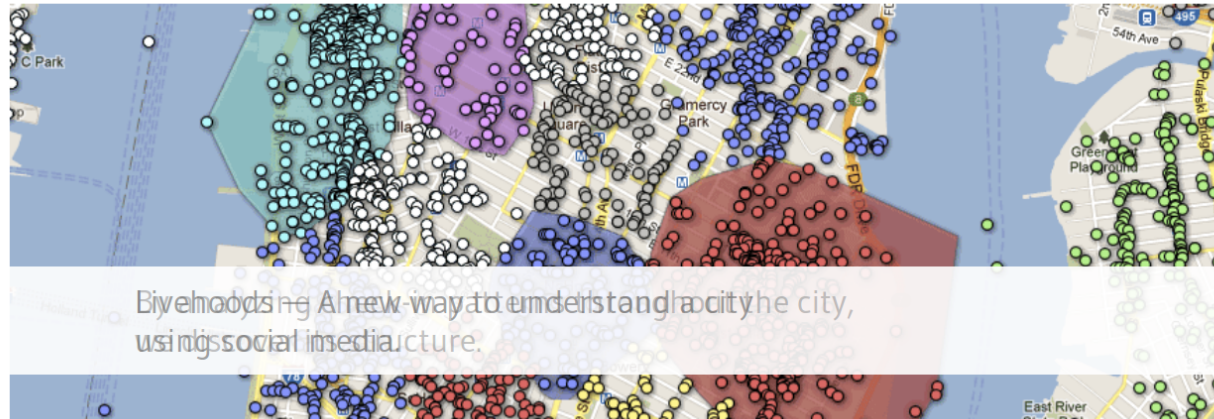
Environment and Planning A 1995, volume 27, pages 425–446

Algorithms for reengineering 1991 Census geography

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Received 22 April 1994; in revised form 6 October 1994



Bye neighborhoods. A new way to understand the city, using social media structure.

Re-Imagining the City in the Age of Social Media

Livehoods offer a new way to conceptualize the dynamics, structure, and character of a city by analyzing the social media its residents generate. By looking at people's checkin patterns at places across the city, we create a mapping of the different dynamic areas that comprise it. Each Livehood tells a different story of the people and places that shape it.

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Using Machine-Learning to Study Cities

Our research hypothesis is that the character of an urban area is defined not just by the the types of places found there, but also by the people that make it part of their daily life. To explore this idea, we use data from approximately 18 million check-ins collected from the location-based social network foursquare, and apply clustering algorithms to discover the different areas of the city.

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Livehoods

Current Maps



> New York City



> San Francisco



> Pittsburgh



> More Maps

News and Press

Livehood at ICWSM

Our work with Livehoods won the best paper award at ICWSM in Dublin this June! **Watch the video from our presentation.**

Livehoods on CBC Radio

Justin was on the CBC Radio program Spark talking with host Nora Young about the Livehoods Project. **Listen to the full interview.**

Livehoods in the Atlantic

Livehoods appeared as the Map of the Day on the Atlantic's Cities blog. **See their post about us.**

Wired Insider

Wired's Insider blog says Livehoods is "taking a big swing" at minining insights into "cultural habits and how societies flow."

Read the full post.

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Recent Tweets

@tiffehr

Best map/location mashup I've seen in quite some time: <http://livehoods.org/maps/nyc#> (Via <http://roomthily.tumblr.com>)

@Werner

Livehoods is a cool CMU research project to visualize cities through the use of social media (@foursquare in this case) <http://ww.ly/DZ3We>

@tomcoates

The 'Related' tab on <http://livehoods.org> is the best. See which neighboring places people travel too. Algorithmic divination of commuting!

@brainpicker

Forget neighborhoods, it's about Livehoods — Carnegie Mellon maps the dynamic character of cities through social media <http://j.mp/HzmkoN>

@kellan

clearly i live on the wrong side of the bqe - <http://livehoods.org/maps/nyc>

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