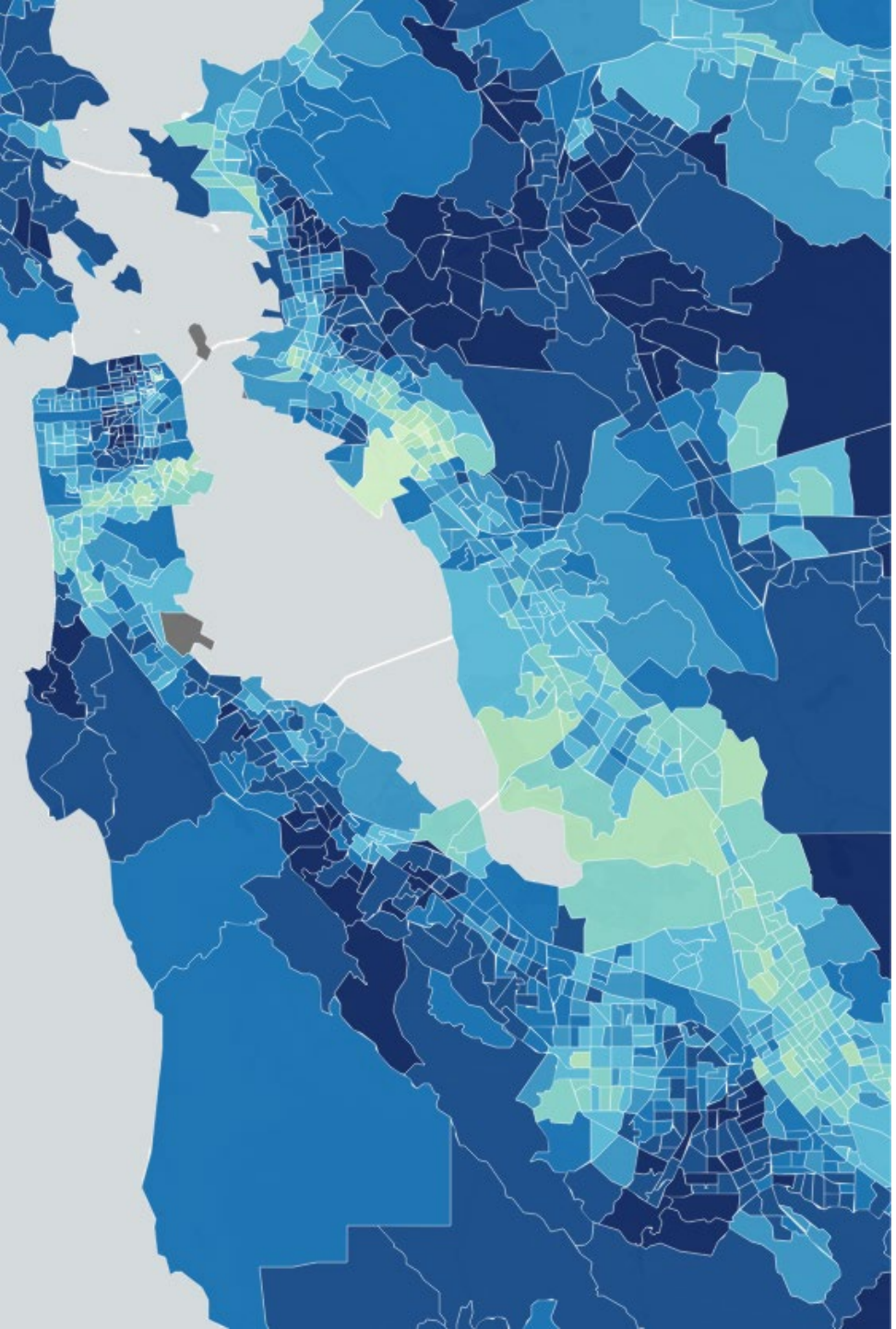


MixMap

Exploring User-Driven Semantic Similarity of Places

Grant McKenzie

Platial Analysis Lab
Department of Geography
McGill University

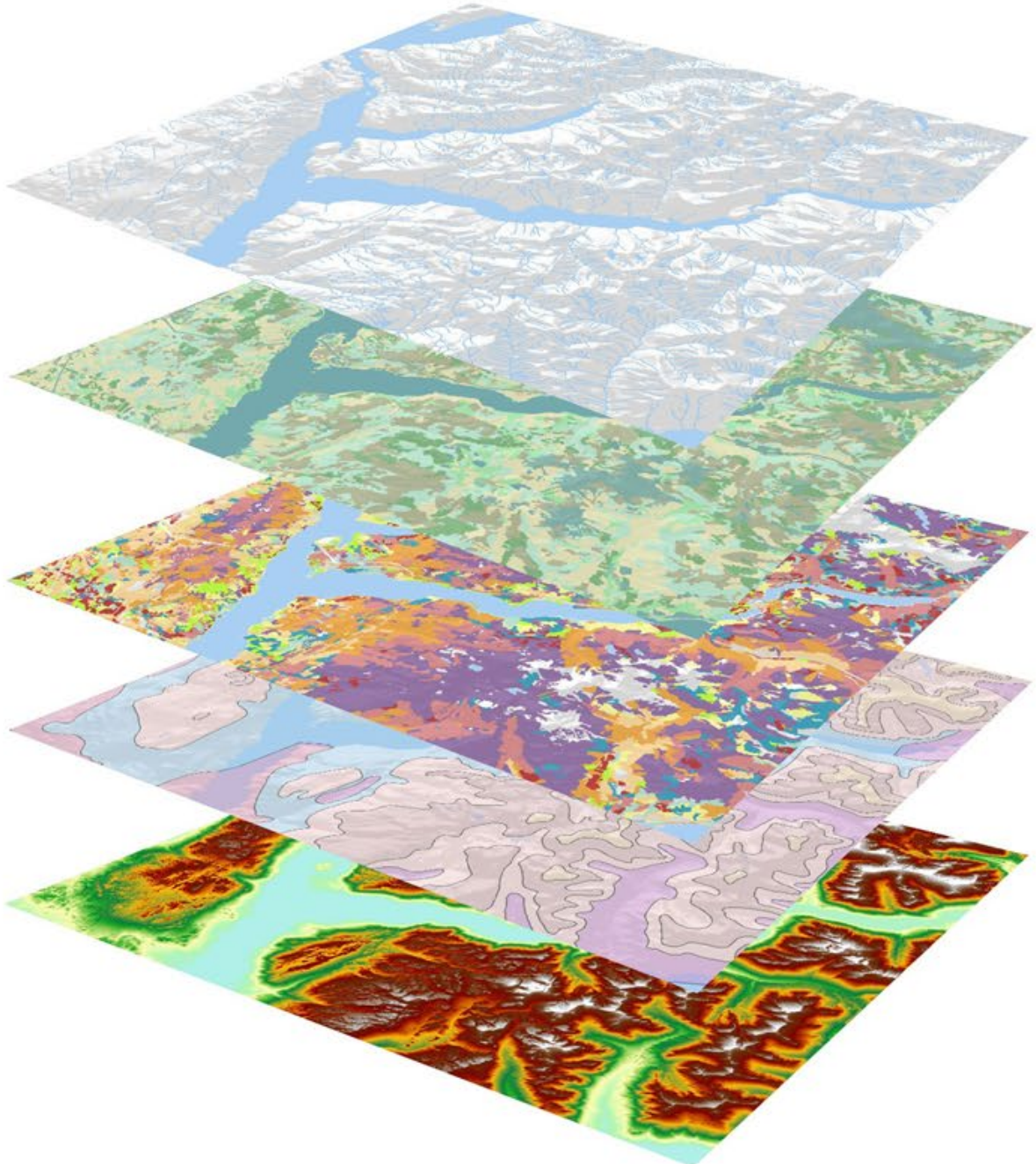
Sarah Battersby
Vidya Setlur

Tableau Research
Salesforce, Inc

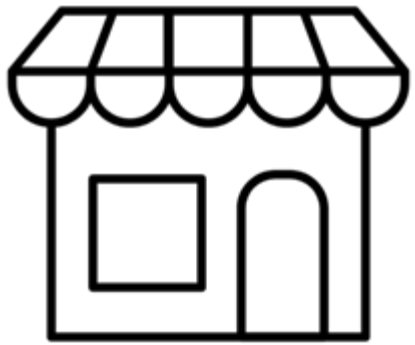
Place

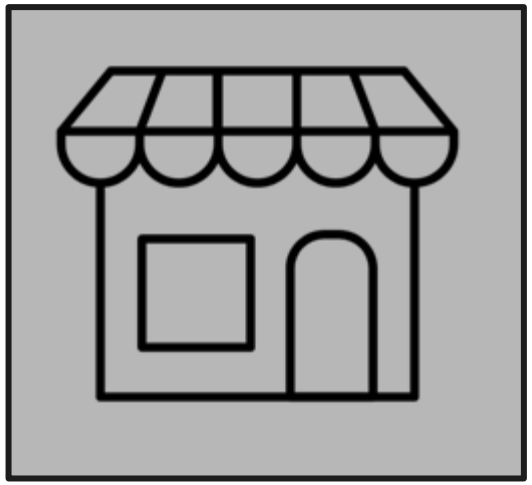
Place consists of multiple dimensions

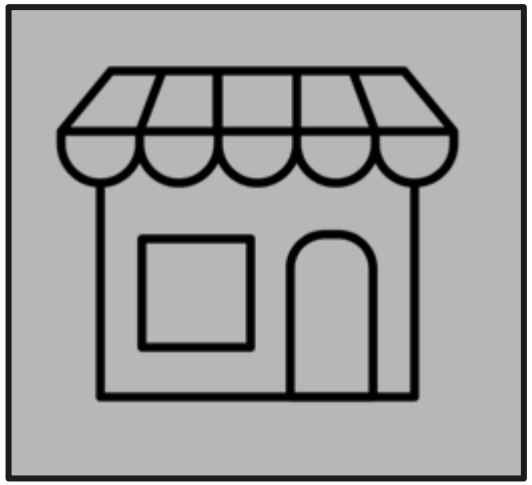
… only one of which is geographic **space**

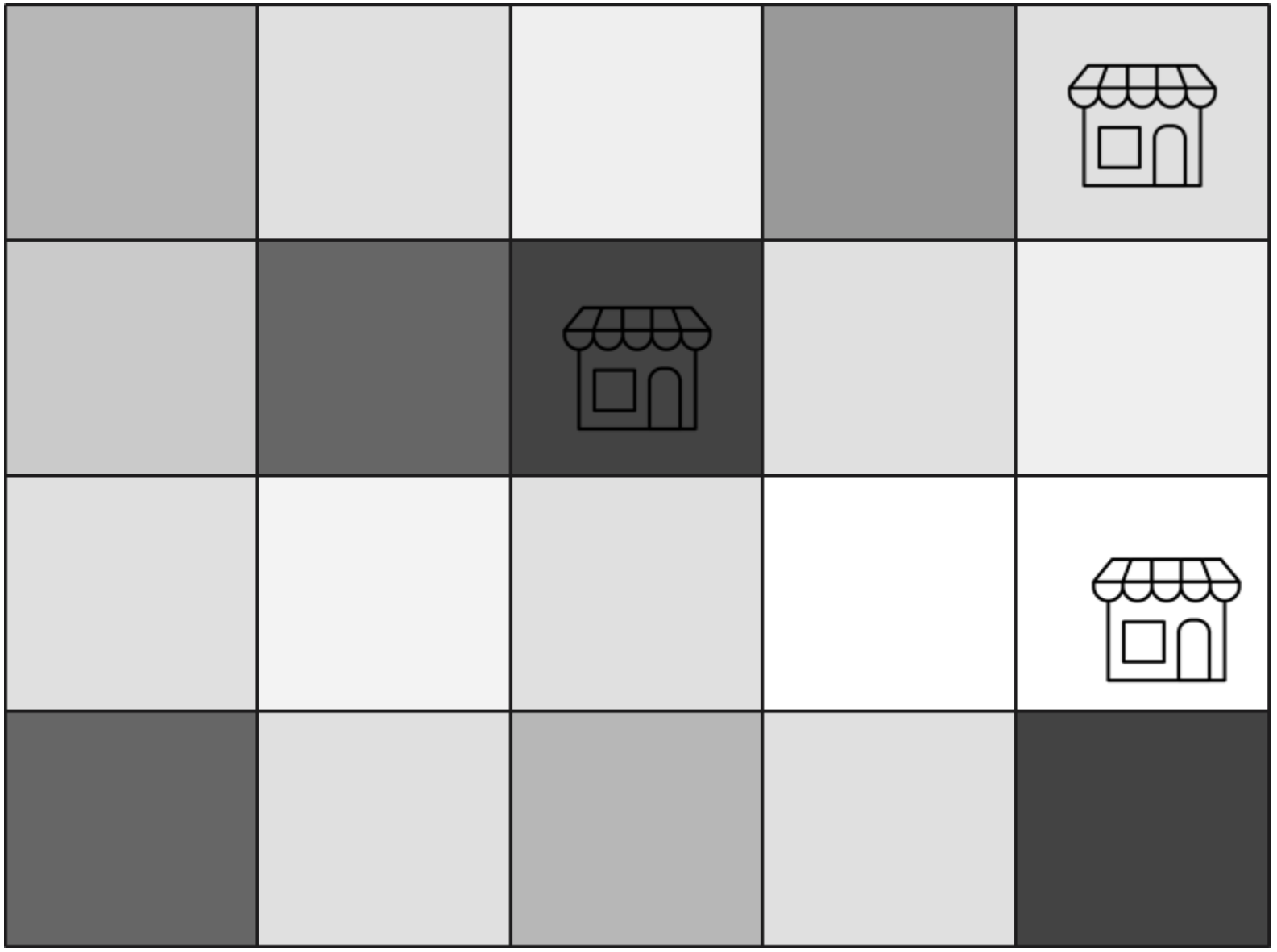


```
WHERE population_density < 100

AND household_income > 50,000

AND …
```

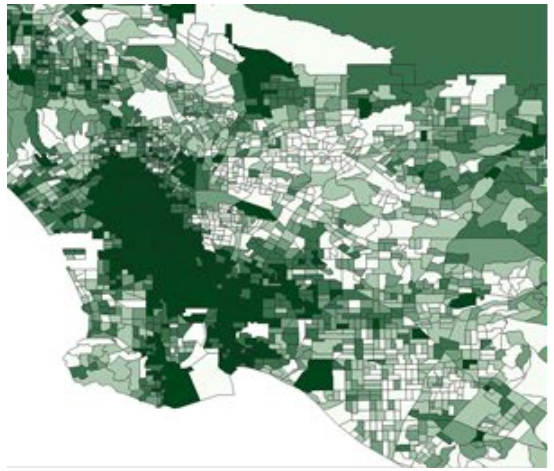


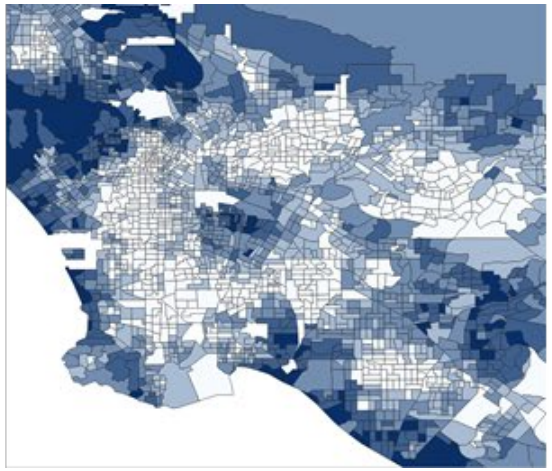


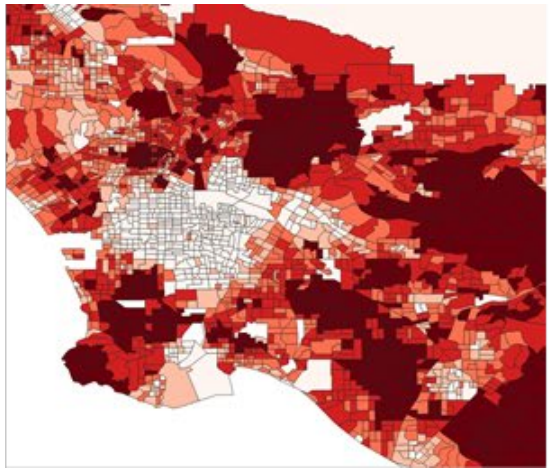




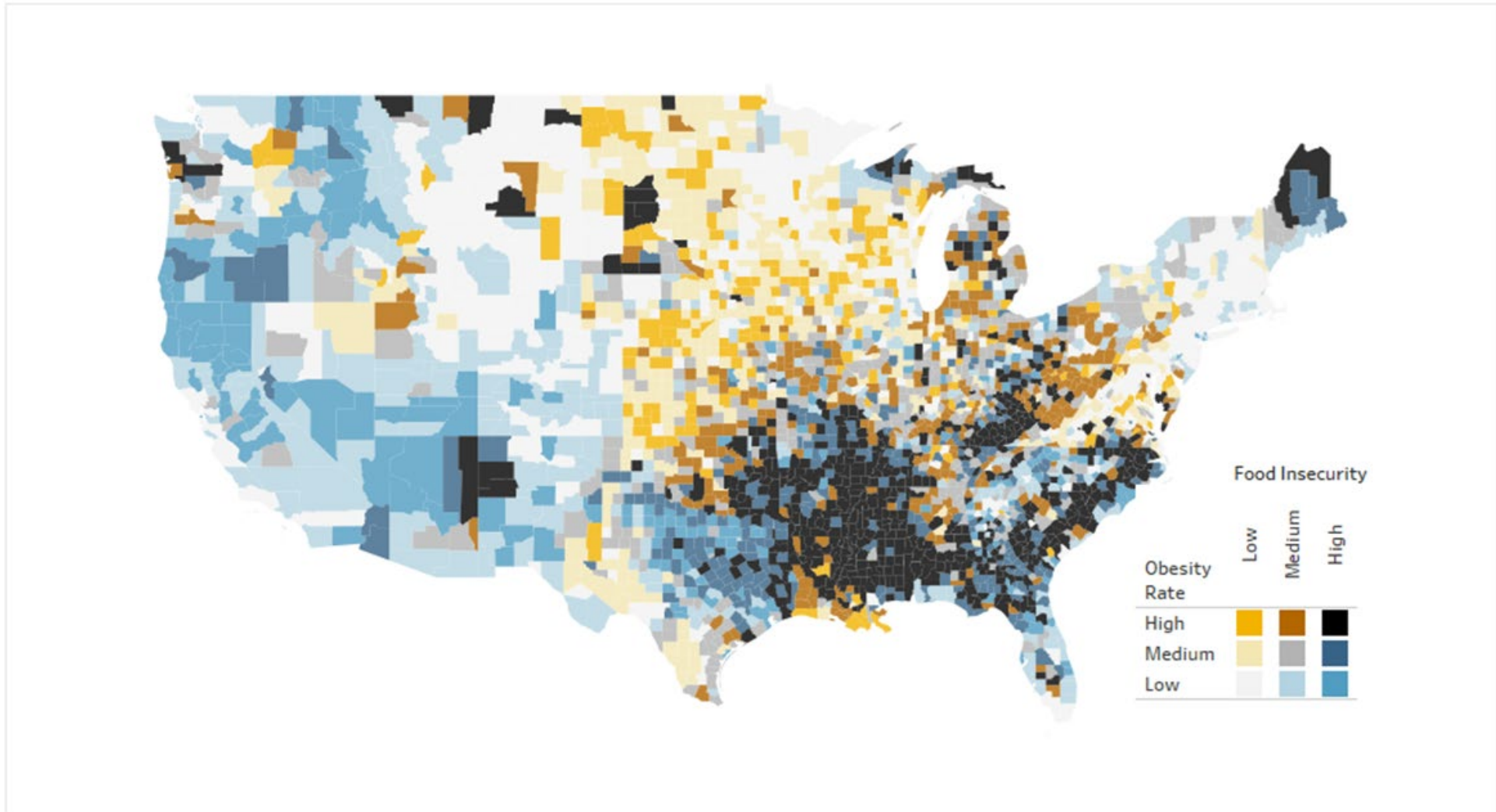
Similarity is intuitive but can be complex







Food insecurity vs. Obesity



MixMap

MIXMAP

Mixer

Age (50)

Race (50)

Income (50)

Education (50)

Commute (50)

Proximity (50)

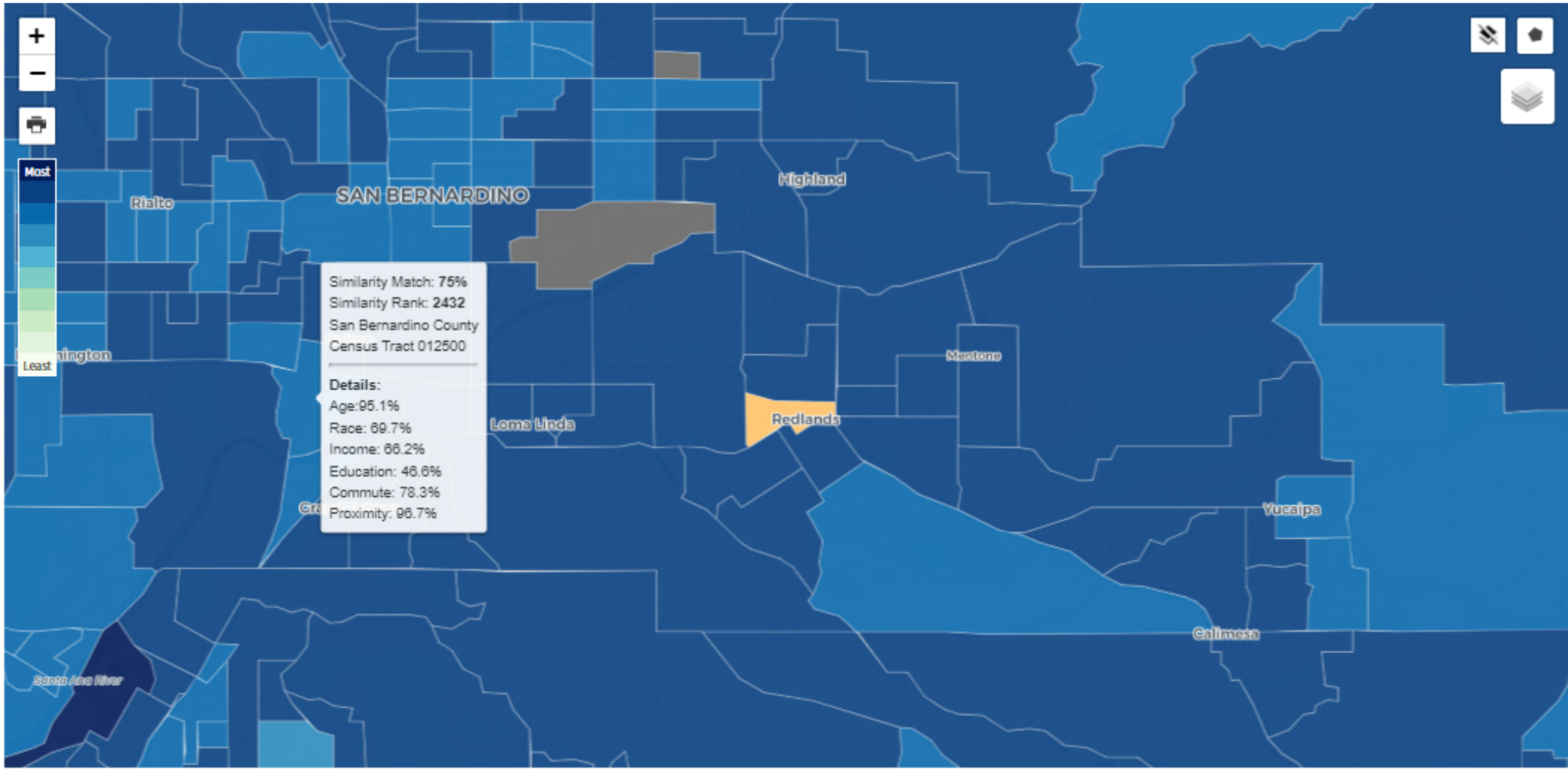
Save as new preset | Reset

Map Type

Presets

Location Bookmarks

Geographic Filters



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Rank	Census Tract	County	Similarity	Location	Zoom
1	042206	Riverside	91%	9 miles southwest	
2	030200	Riverside	90%	10 miles west	
3	008602	San Bernardino	89%	3 miles east	
4	007800	San Bernardino	88%	Adjacent (northwest)	
5	030800	Riverside	88%	12 miles west	

EXPORT

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Race (50)

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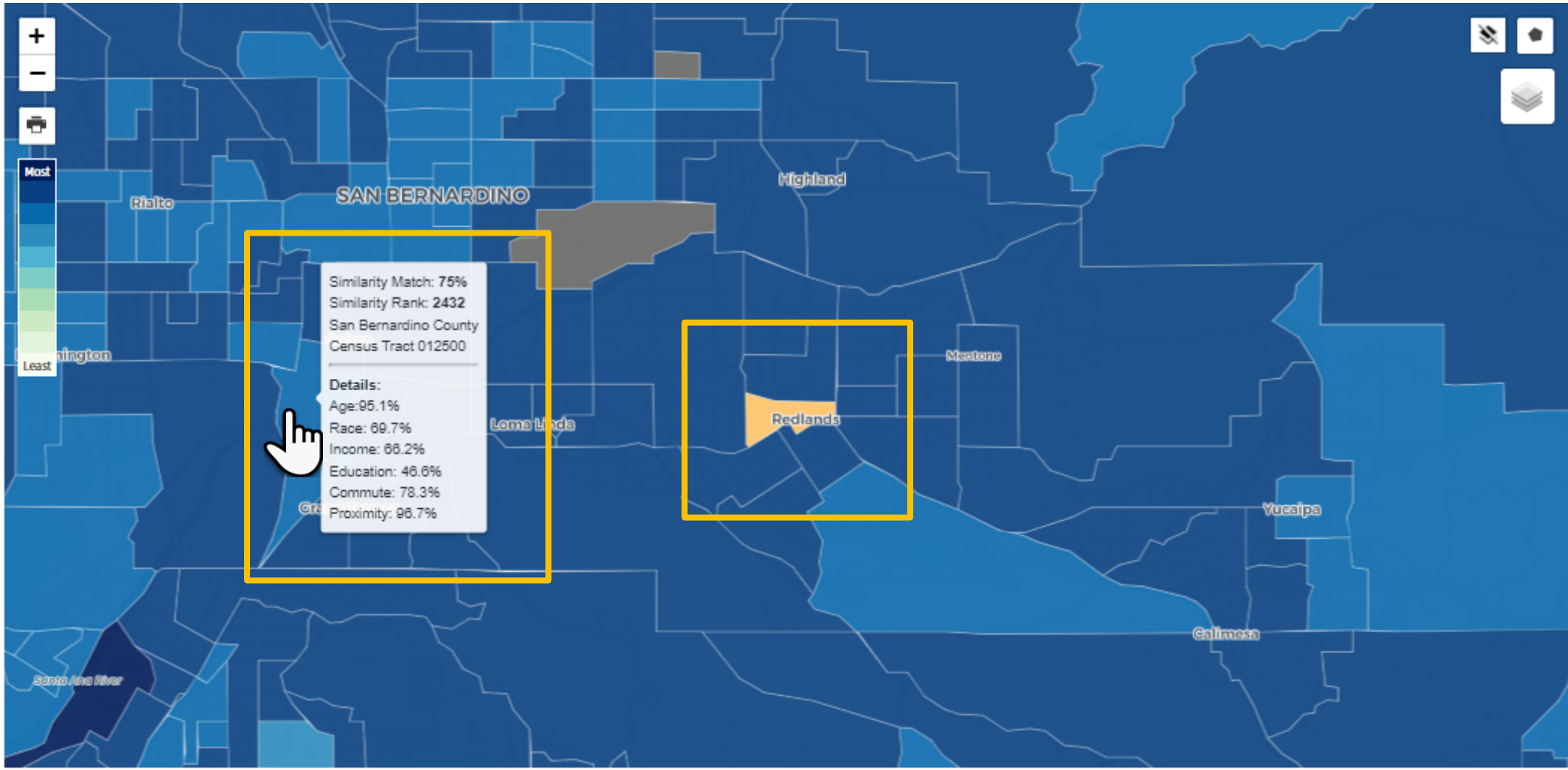

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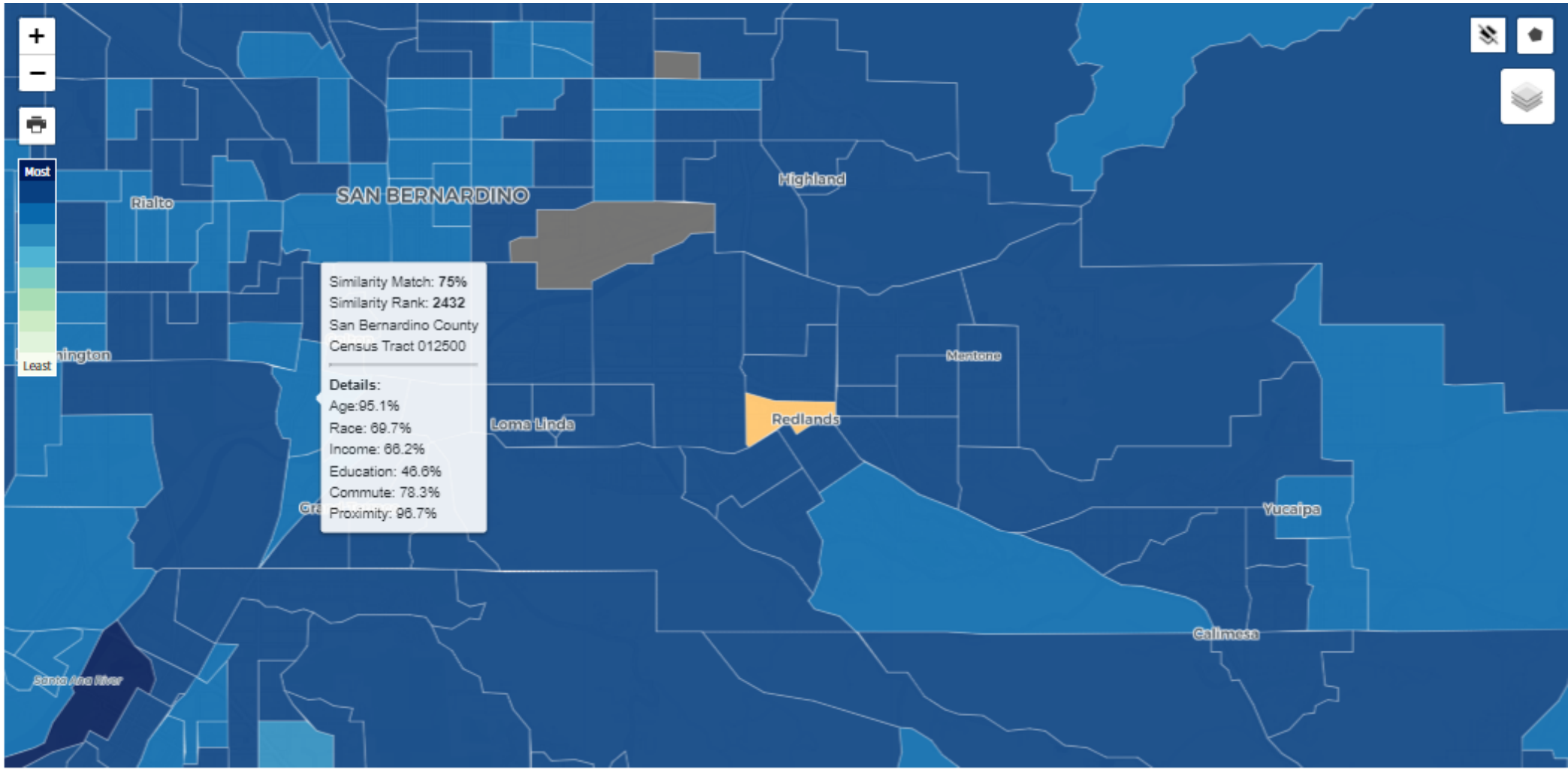

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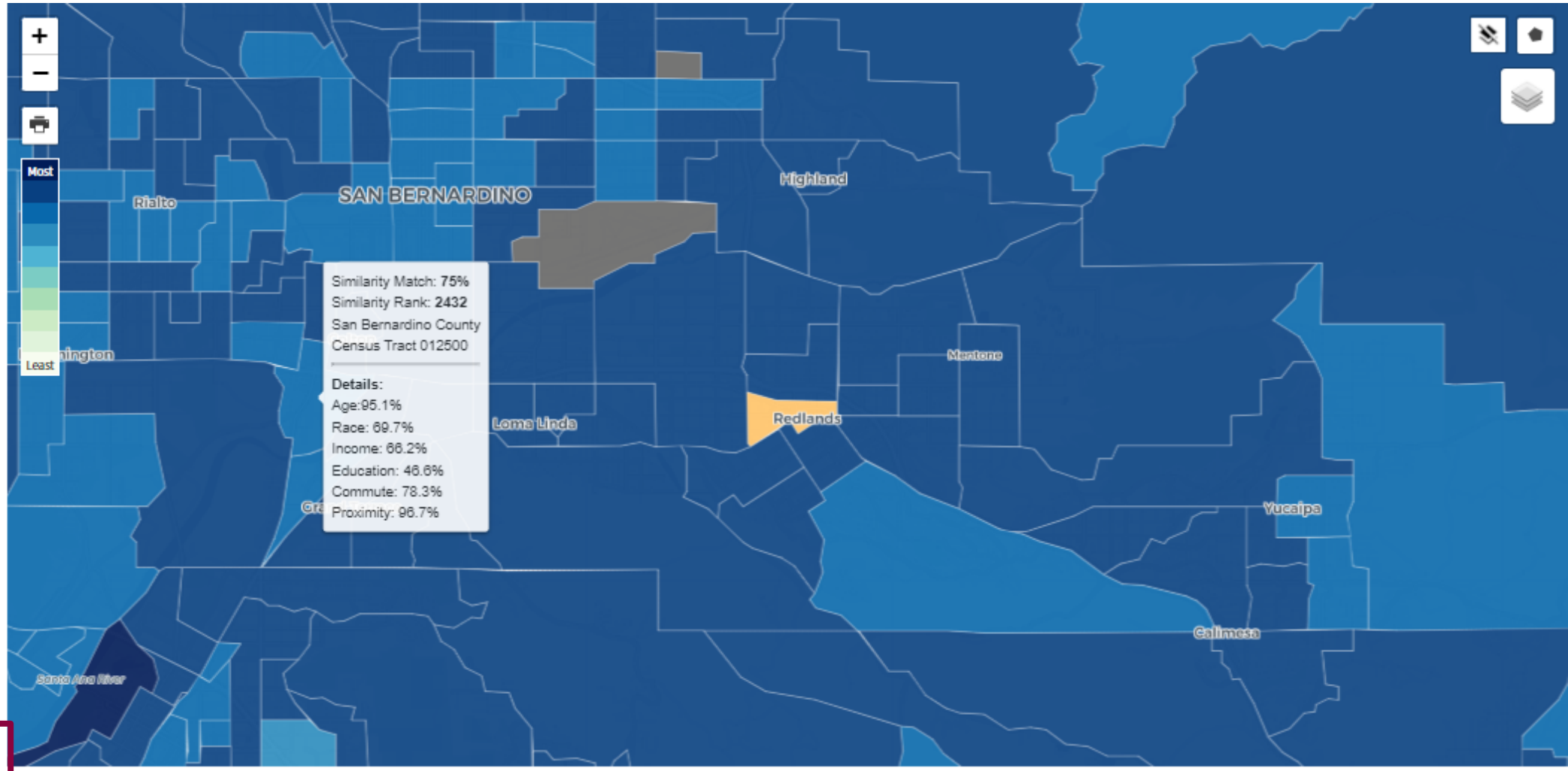

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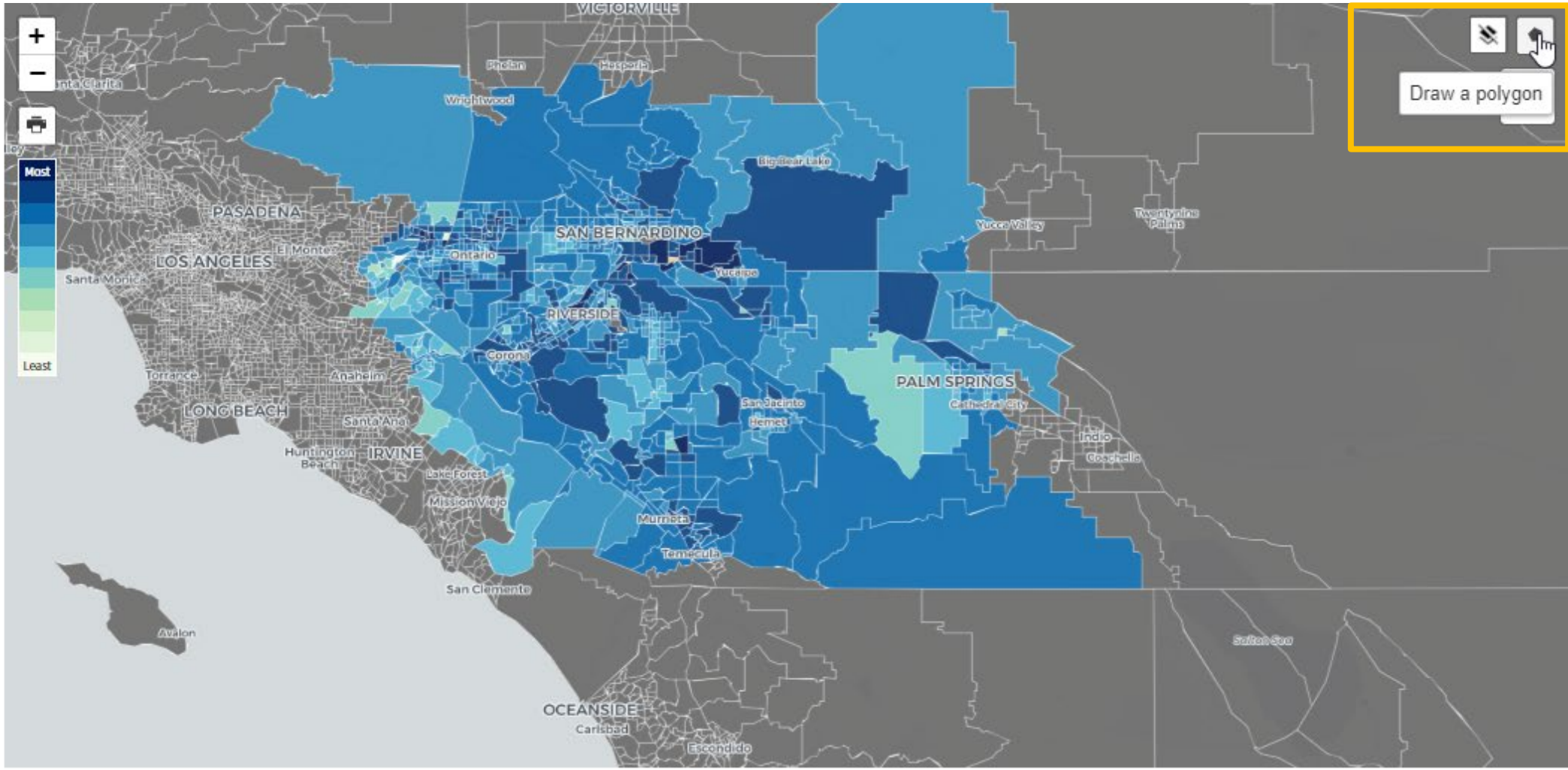

You have selected Census Tract 008100 in San Bernardino County and have 785 Census Tracts chosen for similarity analysis. There are 407 census tracts in 4 counties that are very similar (>80%) to your selection. 168 of these are in the same county as your selection. The most similar regions are shown below. Click a row to zoom to that region.

Rank	Census Tract	County	Similarity	Location	Zoom
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EXPORT

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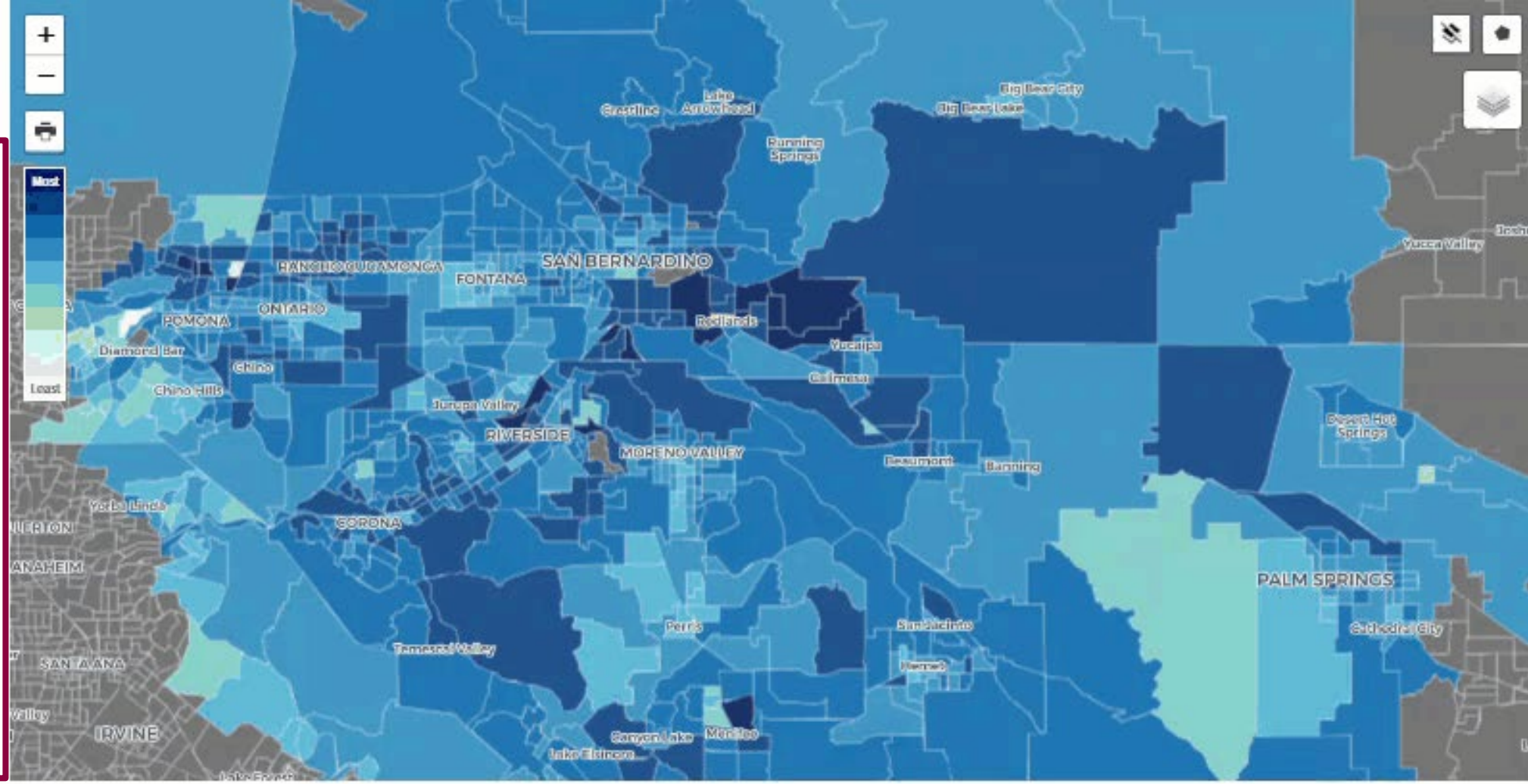
MIXMAP



Mixer

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Race (50)

Income (50)

Education (50)

Commute (50)

Proximity (50)

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EXPORT

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User-Driven Semantic Similarity of Places

User control over

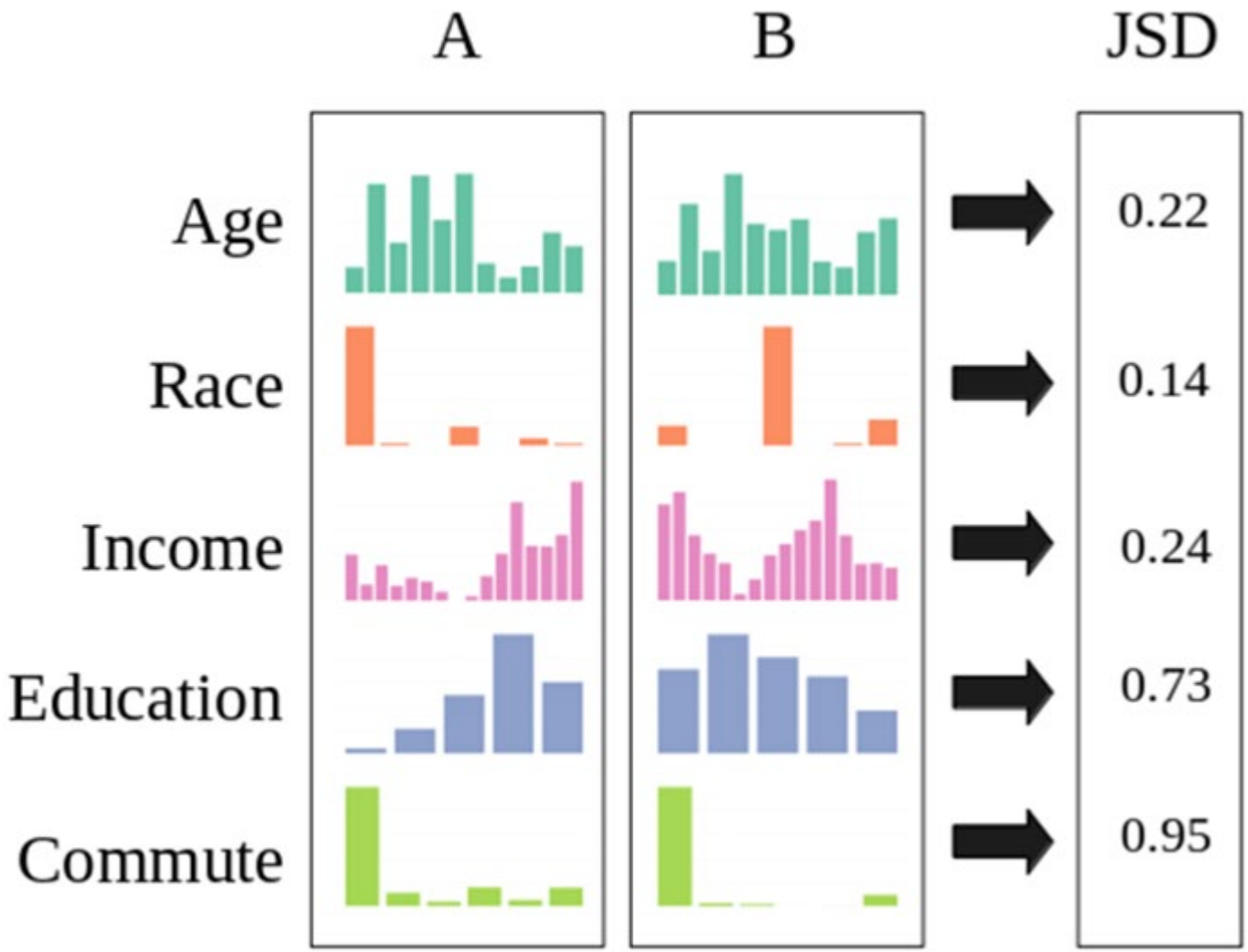
- Input
- Weight
- Geographic filters (location or attribute)
- Map type (choropleth or top / bottom N)

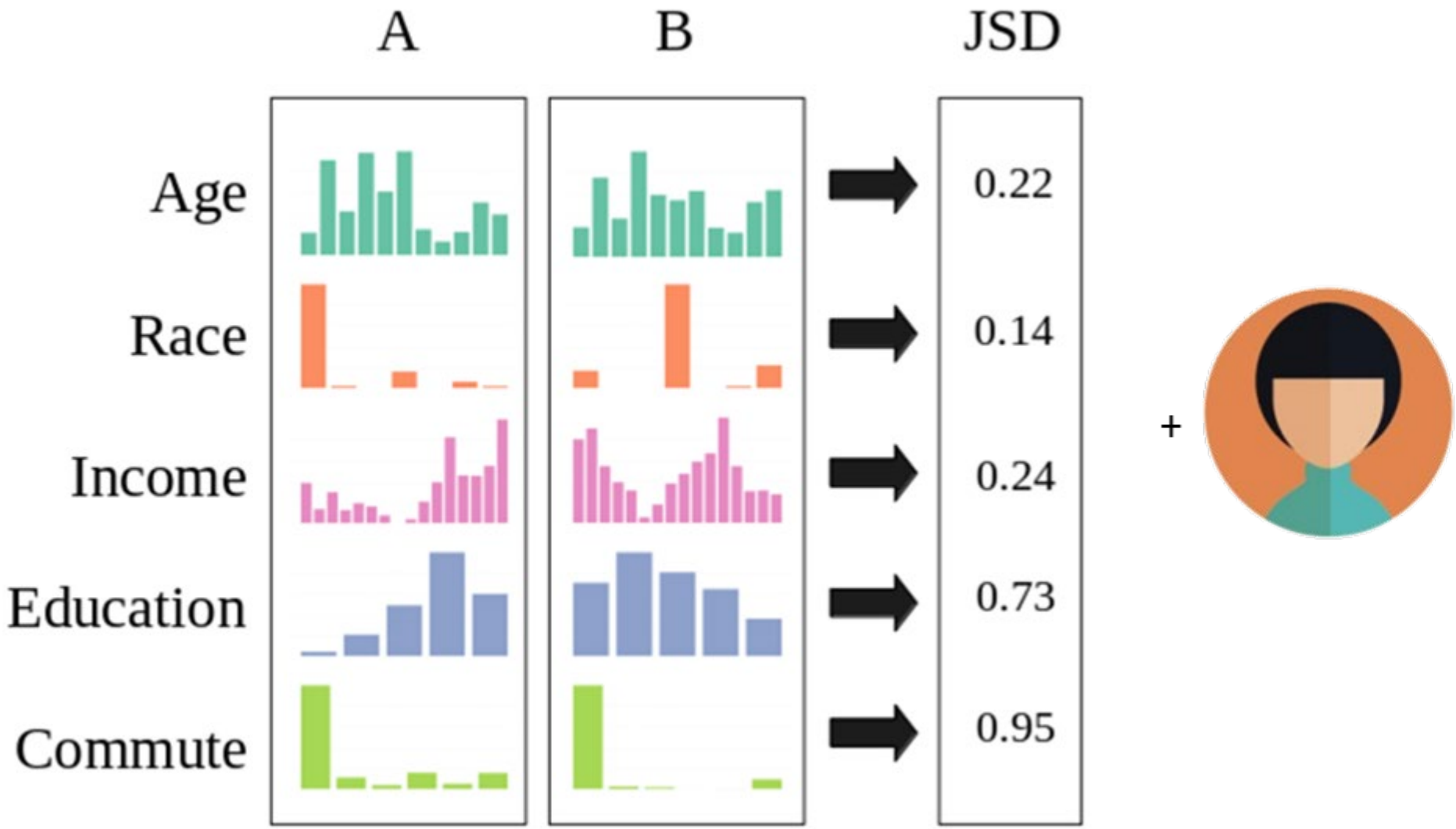
Collaborative

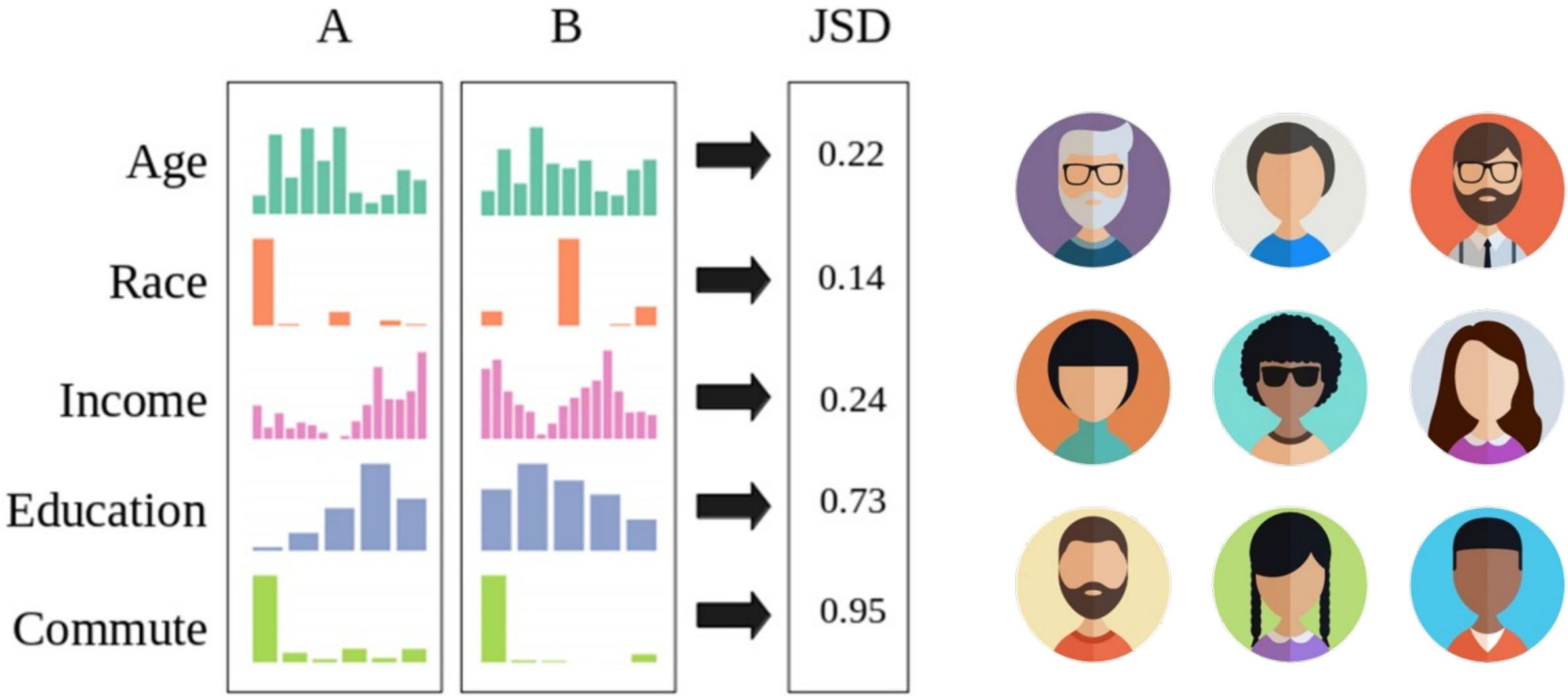
- Save and share “mixes” and filters

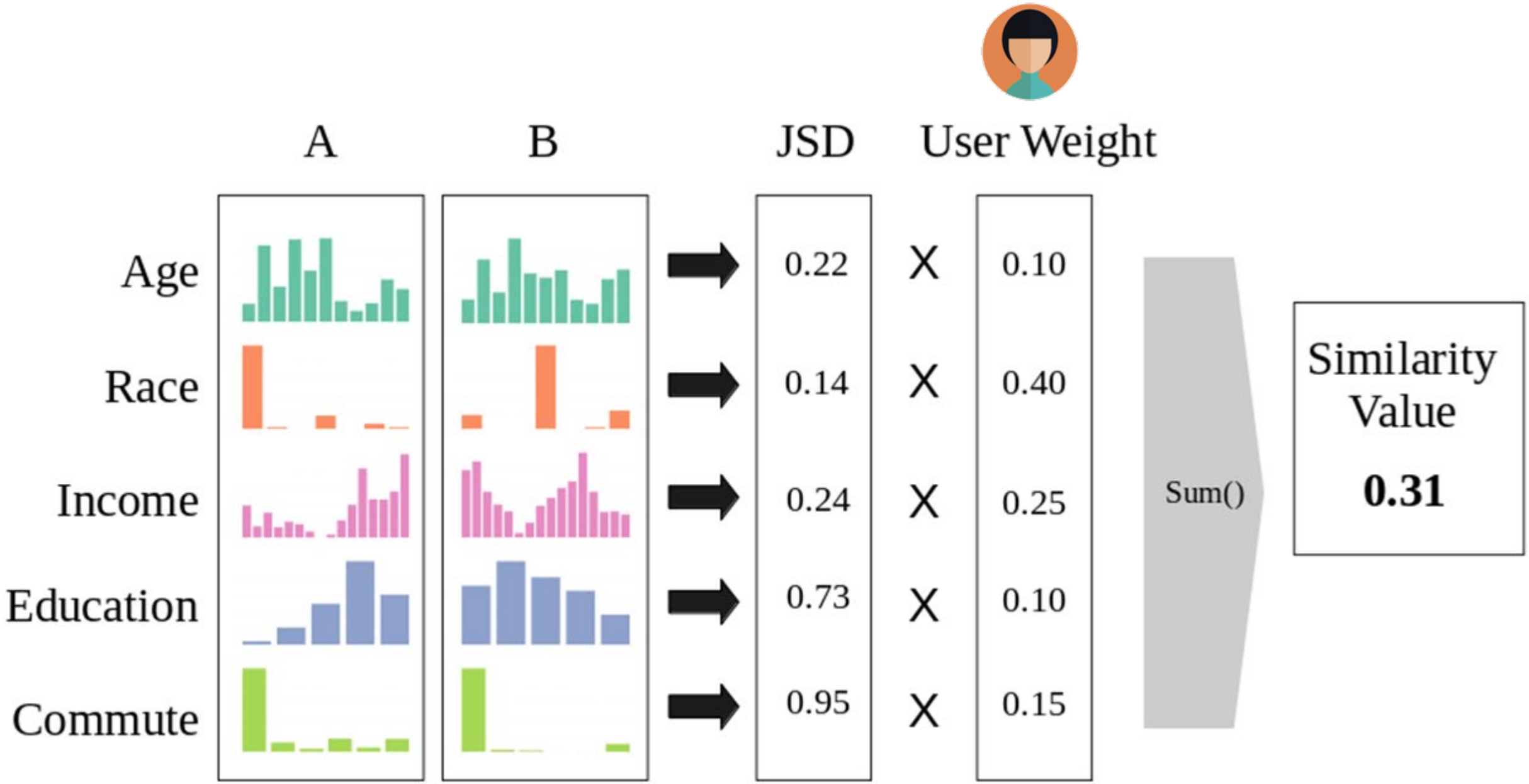
The magic under the hood

Jensen-Shannon Divergence


A
B
JSD
Age
Race
Income
Education
Commute
0.22
0.14
0.24
0.73
0.95


A
B
JSD
Age
Race
Income
Education
Commute
0.22
0.14
0.24
0.73
0.95
+


A
B
JSD
Age
Race
Income
Education
Commute
0.22
0.14
0.24
0.73
0.95


A
B
JSD
User Weight
Age
Race
Income
Education
Commute
0.22
0.14
0.24
0.73
0.95
X
X
X
X
X
0.10
0.40
0.25
0.10
0.15
Sum()
Similarity Value
0.31

MIXMAP

Mixer

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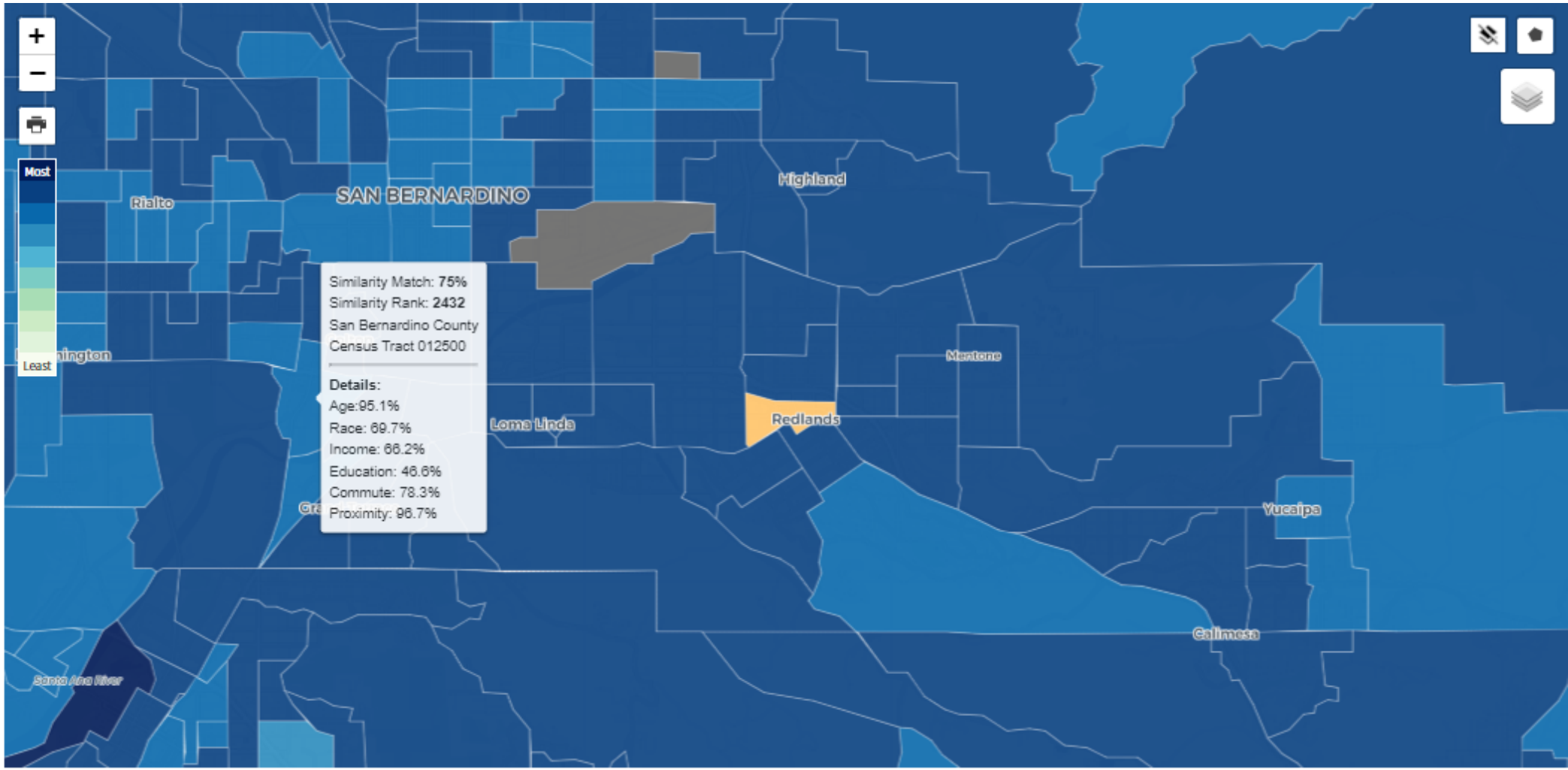

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Participant Study & Feedback

- 18 participants (9 female)
- Various backgrounds
- Some technical / some non-technical
- Fluent in English
- At least basic experience with web mapping

- Open exploration & series of directed tasks
- Video recording and encouraged to “think out loud”
- Mixed Methods: Qualitative and quantitative assessment

Participant Study & Feedback

“This is more informative than a static demographic plot and I learned about the census data more deeply. I can see being helpful for making policy decisions

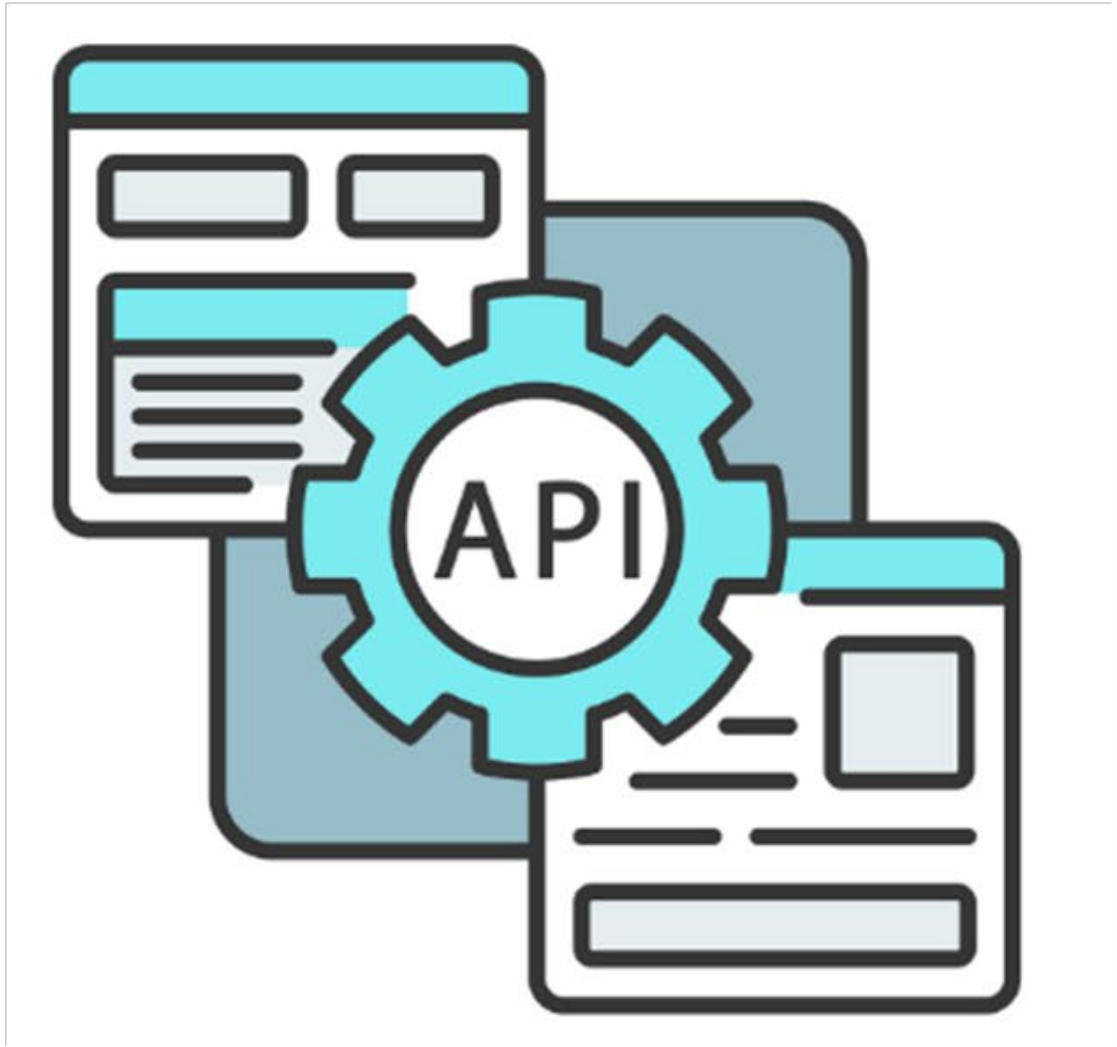
“It was really easy to get an immediate view of the most similar and likely similar areas, even when I was just exploring the data.

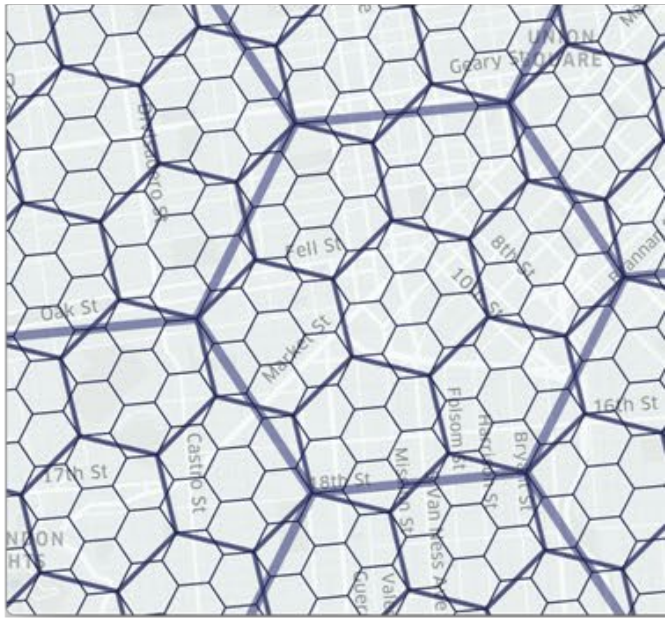
“It’s nice to see options like age, race as they help me navigate the data with a small set of options as opposed to showing 100 different things in the data. I can get some preliminary conclusions very quickly.

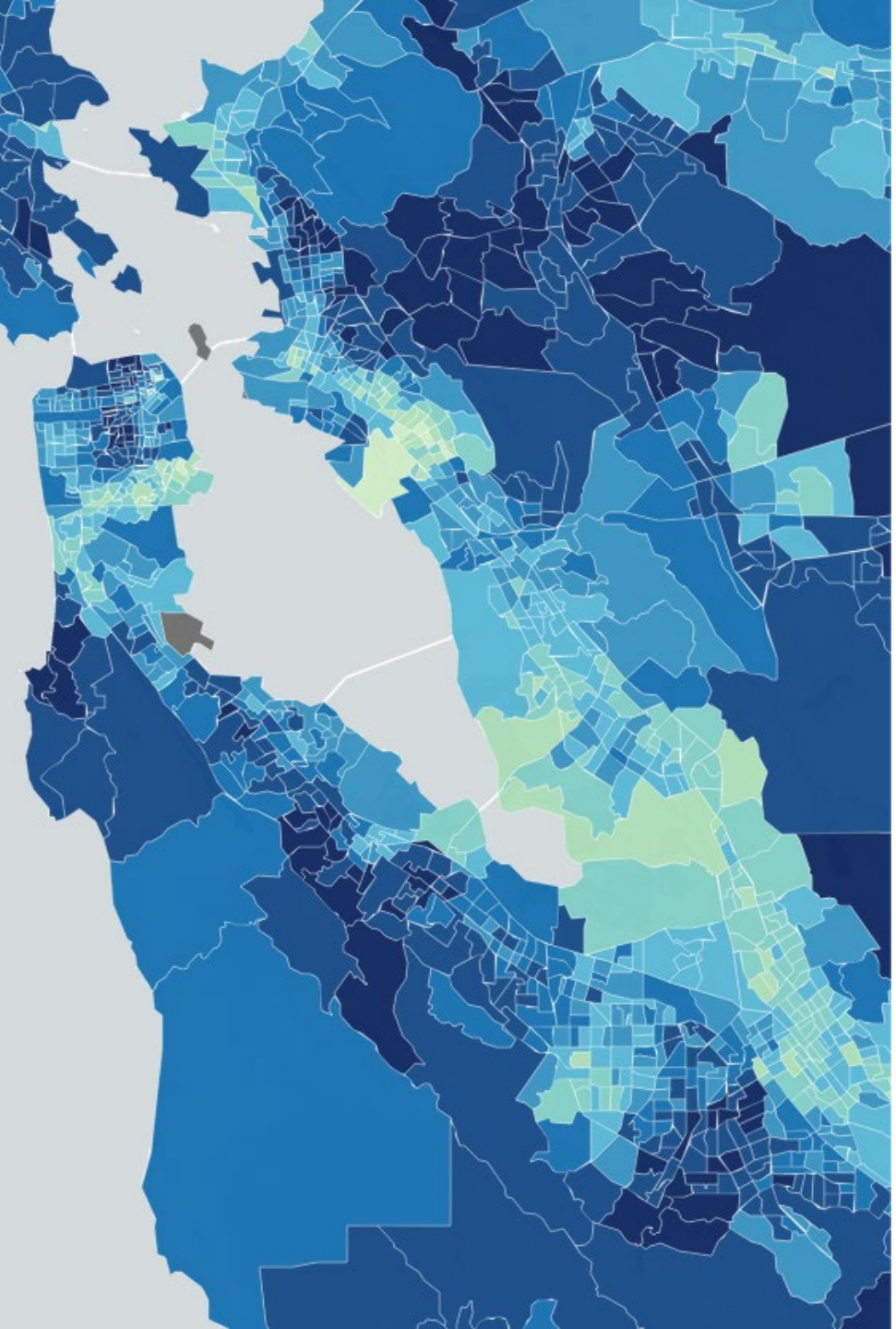
Applications

Next Steps

DATA
Geographical
Cultural
Scientific
Financial
Statistical
Meteorological
Natural
Transport


API


Geary St
Bell St
Oak St
Market St
16th St
17th St
Castro St



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