

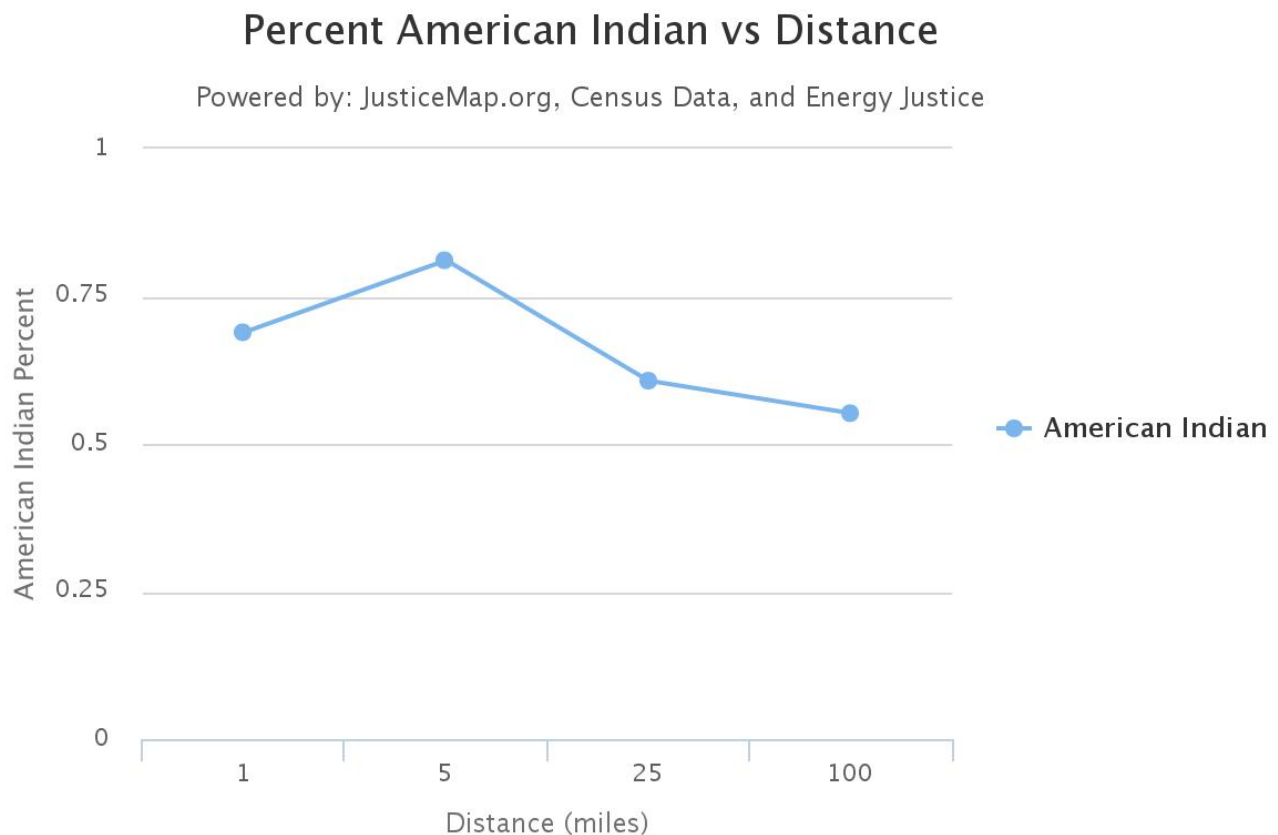
How to Do Your Own Spatial Justice Tests

www.spatialjusticetest.org

By Aaron Kreider, Energy Justice Network

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Email: aaron@energyjustice.net



This spatial justice test shows how American Indians are more likely to live close to operating coal power plants.

Introduction

This guide explains how to use the Spatial Justice Test to analyze how race and income varies at different distances from a set of points. For instance, you might want to test for environmental injustice by comparing who lives near a dirty facility compared to who lives further away. You can do this with either www.energyjustice.net/map or www.justicemap.org by using the Advanced Mode, checking the Compare box, and then clicking on the map to choose your starting point. You may want to zoom in to the community as that makes the comparison distances smaller. You can also add a

custom distance with “Add a Distance”.

The Spatial Justice Test takes it a step further by allowing you to analyze a set of points. This lets you analyze an entire sector - like all of the operating coal power plants in the US. Other things I've analyzed are who lives near Philadelphia Broad Street (subway) line stops, who lives near Bernie Sanders campaign events, and I'm interested in who lives near public schools that are being closed. You could use this tool to analyze access to parks, schools, mass transit, grocery stores, banks, community centers, hospitals, affordable housing, and many other services or places.

Who is this guide for?

The goal of the Energy Justice Network is to empower people to fight for justice in their community. We strive to create tools for regular people, not experts. We believe that most people can do spatial justice tests and if you want any help don't hesitate to email Aaron =)

Getting Your Data

You start by deciding what you want to analyze. So you need a set of points with longitude and latitude. If your data does not have longitude and latitude then you need to add them by geocoding it. For geocoding to work, you will need street addresses.

If you are analyzing a large area, like a landfill or large power plant, this may require that you estimate or assign a street address to an area that might take up one or more blocks. One way of looking at this is that you have to convert from a polygon (aka area) to a point - so that we can run the test.

If you want to test the tool without getting your own data, you can use our power plant data.

If you are using your own data, you will want to start a spreadsheet that has columns for name (ex. the Dirty Power Plant in Windy City), address (can be one field or split into several), latitude, and longitude.

Free Tools for Geocoding

Geocoding is the process of converting an address into a longitude and latitude. There are many free tools for geocoding. Here are two:

GPS Visualizer (handles single addresses or batches)

<http://www.gpsvisualizer.com/geocoder/>

TAMU geocoder

<http://geoservices.tamu.edu/Services/Geocode/Interactive/>

Store the results in your latitude and longitude columns.

Making a Comma Separated Value (CSV) file

Your data is probably in a spreadsheet. You need to create a new spreadsheet with at least two columns: latitude and longitude. You can also add an optional “weight” and/or “ID” column. The first row must include the column titles. The accepted column titles are: 'ID', 'latitude', 'longitude', and 'weight'. You

MUST use these names. Then save this as a CSV file. The CSV file should use a comma to separate the data (eg. using tab delimited will not work).

If you don't have a spreadsheet software, I recommend installing the Open Office suite and using its spreadsheet :“Calc”.

<https://www.openoffice.org>

Your CSV should be smaller than 192 mb and should have approximately 1.3 million rows or less. Otherwise the file size will exceed our limits. If you want to run analysis on larger data samples, you can hire us to do so.

Running the Basic Test

Open the test webpage:

<http://www.spatialjusticetest.org>

You have the option of describing what you are analyzing: “What are you analyzing?”.

Now the big choice is between using power plant data from Energy Justice or uploading your own file. If you upload a file, it is only stored temporarily for the duration of the test and then deleted.

Hit submit and wait for the results.

Running the Advanced Test

<http://www.spatialjusticetest.org/index.php?giAdvanced=1>

There are two optional questions which let you give useful information that will be used in the Results page.

“What are you analyzing?”

“Describe your data”

We ask for your email - so that we can ask how you are using the test and get ideas to make it better.

Now the big choice is between using power plant data from Energy Justice or uploading your own file. If you upload a file, it is only stored temporarily for the duration of the test and then deleted.

If you use our power plant data, you can apply a state filter. For instance, you could test coal power plants in PA.

Then you have several optional questions that let you choose several parameters. Basically you can do more complex analysis, but it will be slower.

Number of Distances to Analyze

-Normal - includes 1, 5, 25, and 100 miles. I recommend trying this one first (as it is fastest).

-More Distances 0.1 - 250 miles - the most options

-More Distances 0.1 - 25 miles - lots of options below 25 miles

-More Distances 1 mile -250 miles - lots of options above 1 mile

Single Distance: You can choose to analyze a single distance. This overrides the “number of distances” option and is several times faster. This lets you pick a distance which isn't one of the default options. If you do not want to use the default distances, you could run the test several times in a row using your own custom “single distances” one at a time.

Accuracy

The geographical unit of analysis depends on the Distance and the Accuracy options. For most people, the default “Normal” setting is fine.

The geographical units come from the Census. Blocks are the smallest unit and typically are the size of 1-2 city blocks in urban areas, and much larger in rural areas. Block groups include approximately 50 blocks. The largest unit of analysis is the census tracts and they have approximately 4000 people.

-Normal: blocks up to 5 miles, then block groups up to 50 miles, then census tracts.

-Higher: blocks up to 10 miles, block groups up to 100 miles, then tracts.

-Very High: blocks up to 25 miles, then block groups.

-Highest: blocks up to 50 miles, then block groups.

You can see how changing the unit of analysis will alter your results. In most cases, the normal level of accuracy is high enough.

Maximum Sample Size

By default, we limit the analysis to 1000 points to make analysis faster and to reduce the server load. Analyzing 1000 points with the default settings for distances and accuracy can take anywhere from ten seconds to two minutes (urban areas with more blocks are slower). We take a random sample of your points and only import that into the data set. So if you share the data with others or re-use it yourself then you will get consistent results.

You can choose a larger sample size. If you want to exceed the 50,000 sample size, then you can split your data set into smaller ones or you can email us.

The test is already an approximation as it relies upon several year old data (race is from 2010, and income is averaged over a five year period). Also income data is already based on an survey and typically has a 10-30% confidence interval at the census tract level.

Weighing Results

You can choose to apply a weight to the test. For power plants, the default weight is the generating capacity (in MW). If you have uploaded data, you can apply a weight if you choose this option AND have a “weight” column in your uploaded file. The weight should be a number. If it is blank, a zero weight will be assigned.

In the case of power plants, the use of a weight lets you say that living near a 10 MW power plant is ten times worse than a 1 MW power plant.

Weight: What points to include

Another approach to analyzing points of different weight is to run separate tests. For instance for power plants, you might want to run separate tests for 0-9.9 MW, 10-99.9 MW, 100-999 MW, and 1000+ MW.

Saving Results

If you choose to save the results, they will be saved in a small html file. This file can be shared with others and also saved to your computer.

Sharing Data

You can choose to share the data. This is especially useful if you have uploaded your own data. This gives you a link where others can run tests on your data set. You can also delete the data set.

CSV

You can choose to export the results for each point to CSV. This is useful if you want to do further data analysis. While the regular results are summarized for the set of points, this provides demographic data for each point. For instance, you can get the percent Black at distances of 1, 5, 10, 25, 50 miles from every operating coal power plant. This export will take significantly longer than a regular test.

Submitting and Waiting

When you have chosen your options, hit Submit and wait for the results. The more points and the more complex the analysis is, the longer it will take. With 500 points and the normal resolution, it can take two minutes to finish. I recommend first trying it with the fastest options, and you may want to use a subset of your dataset if you have over 1000 points.

Once the waiting is done you will get the results page. The results are public and can be shared with others.

Analyzing the Results

You can see my example:

Bernie Sanders 2016 Campaign Events (from November 2015)

<http://www.spatialjusticetest.org/test/315.html>

You can use these results to determine whether the race and income of people who are near the points is different from those who are further away.

The results include several charts all of which can be saved by clicking on the top-right corner. So you can include them in an email, webpage, press release, article, or report.

The first chart, “Ratio of Percent Race to US Mean vs Distance” compares the percent of people from each race to the US average. For instance if you have 32% white people within 1 mile of your set of

points and the US population is 64% white - then you will get a ratio of 0.5 on the chart.

The exact values are also available in a table at the bottom of the page.

The graphs use the national averages for a baseline. So if your region has twice as many Hispanics as the national average - you should expect that there would be twice as many Hispanics at 1, 5, 10, 25 miles from the set of points. An easy way to check this is to see whether the lines are flat or sloped. A flat line (same percent of a race at each distance, or same income) is likely indicator of relative equality. By contrast a sloped line is a likely indicator of inequality. This method only works within a range of distances where the demographics of the population are relatively unchanged. For instance, in Philadelphia at 25 miles you start to add a lot of people from the suburbs and that changes the baseline. But if you are using 0.1 to 10 mile distances, you are mostly sampling Philadelphia residents.

You can also use the raw numbers and compare them to the baseline demographics for your region.

Other Examples: [HTTP://www.spatialjusticetest.org/examples.php](http://www.spatialjusticetest.org/examples.php)

A Methodological Note on Income

Using the American Community Survey data it is impossible to determine a median household income for two or more geographical areas. Instead we do our best to approximate the value by calculating a weighted average of the median household income in the geographical areas.

For instance if there are 1000 people in a census tract with a median household income of \$50k, and 2000 people in a census tract with a median household income of \$100k - the weighted average is: $((1000 * \$50,000) + (2000 * \$100,000)) / (1000+2000) = \$83,333$.

Creating Your Own Map

You can also create a visual representation of the data by creating your own map. You can use JusticeMap.org - Advanced Mode - and then click "Draw Mode On". Then you can add markers, lines, and polygons to the map. You can choose your underlying layer (race or income). You can save the map as an image or save a link to it (Note: As of December 9, 2016 we fixed a bug with saving drawn objects).

Conclusion

If you have any questions or suggestions, please contact me. I'm happy to assist with your projects (and I'm also available for hire at very reasonable rates). Also, I would love to hear how you are using this tool and would be happy to compile a list of projects (and link to them).

Related Resources

<http://spatialjustice.org>

<http://www.justicemapping.org>