spatial statistics with geoda

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outline

geoda basics and visualizations

presentations

- volunteers?

reference

- `https://geodacenter.github.io`
- there are tutorials and data for practice:
  - `https://geodacenter.github.io/documentation.html`
  - `https://geodacenter.github.io/data-and-lab/`

why another software?

- because geoda is unique!
- it's not full-fledged gis software like qgis
  - but can have multiple maps/figures and they're linked
- and it can do spatial statistics
- let's start with visualizations

outline

geoda basics and visualizations

let's fire it up

- start-search for-"geoda"
- the main visual difference with qgis are:
  - geoda has only top menu/icons
  - can do many maps and figures at the same time

first, let's get some data

- again, lots of datasets at
  `https://geodacenter.asu.edu/sdata`
- get columbus data
  - `http://geodacenter.org/downloads/data-files/columbus.zip`
- and unzip somewhere

and load to geoda

- File-New Project-Input file-'open file icon'-ESRI Shapefile
- and navigate to wherever you have unzipped columbus data
- so we have neighborhoods in columbus
- there is 'Open Table' icon, just below of 'Table' menu
- like in qgis, can select u/a either in table or in map

Table menu

- again, typical things that you have already seen in qgis
- merging, variable calculator, etc
  - can use those instead of those in qgis if you like...
- but typical gis (what we have done so far) works little better in qgis
- here, we'll focus on what qgis cannot do:
  - visualization
  - spatial stats

histogram (again, always have it for your key var!)

- Explore-Histogram
  - and select INC (income)
- okay, we got a histogram
  - but it is a super histogram!
- can right-click and save-as, change num of int, etc
- we've got a range for each bin
  - num of obs for each bin
- really cool: click bar to highlight features in the map!
  - and can rectangle select more than one bin
- typical city: poor in the middle; rich on the fringe

thematic map–quick and easy

- Map-Themeless Map is just another map
  - note: can have several maps at the same time
- Map-Quantile Map, do '5', 'INC'; just like qgis
- again, note: everything is linked–click class in quantile map and it will highlight in both thematic and themeless map
- Map-Percentile Map: good for detecting outliers/extremes
  - compare it with quintile map
  - even though none in top/bottom 1%, there are 5 in each top/bottom 10%

more about thematic maps

- Map-Unique Values Map would be good for categorical var
- yet, it does some clustering into bins
- kind of like 'categorized' (not 'graduated') ramp in qgis

more about thematic maps

- Map-Cartogram
- circle size=CRIME; circle color=INC
- in general hi income is low crime;
- but note little blue circle in top left: low inc, low crime
- i don't like it, i'm old fashioned
- try other things in map menu
  - explore, use them–convince me to nonstandard maps!
  - as long as it makes sense, and you can explain it, it's great!

Explore-Scatter Plot

- like in regular, non-GIS stats package
- do INC against CRIME, as expected negative relationship
- note that obs with low income and crime
  - rectangle-select it

    aha same place as we identified in cartogram
- very interesting to both correlate and map
- a great addition to your final project
- rectangle selecting a subset gives you an idea of slope

  change!
  - say lets just select in map western columbus–slope is flat