Class 4 November 3: intro to mapping

GIS: geographic information systems

* Harnessing the power of geography
* Cost distance….how google does maps: least **cost distance** and least **cost pathway.**
  + Algorithm:: doesn’t include logic
* Post-Sandy’s maps
* Business intelligence: foot traffic in the mall (or cell phone data)
* High-rise: satellite around mars: elevation
  + Moons
* Maps are intuitive: understand distance, space, relationships
  + Its very easy for people to misinterpret the data…
  + Issue: non-representative distribution of population
  + Confounding variable: show poverty or population, when really want to show other things
* Spatial research group: Columbia: social justice, mass incarceration
* GIS Principles
  + Things that are closer together and more related to each other
  + interpolation: giving something a value based on another value
    - a type of prediction (weather map, presidential map)
    - if you have two values, you assume there is a type of gradation between them…like elevation. (but wouldn’t make sense for crime necessarily, because how do you know the spaces in between)
  + Spatial autocorrelation: the danger of interpolation. Don’t necessarily know what makes sense. Takes a confounding value
    - Regressions specific to spatial data can be used to take auto correlation into account
    - Example: County level data shades the entire county but its based on samples/weighting
    - If you are working with census data, the weights should already be included,
    - but if you are creating your own data be careful that you are using county level data with county level weights (see if you can replicate it)
  + Scale
    - Use a correct scale so as to understand where things lie
    - Small, medium, large: scale- if more material, less detail
      * World: small detail, city: more detail
  + Time
    - PLUTO data: geo shape file, tax lot, year building was built
    - % change over time
    - Torque feature:: plays like an animation (over time played out): time lapse tool on carto db
    - Time and mapping works well: we intuitively understand that
  + Things that change over time
    - Majorative: most of the time
    - Continuous:
    - Sporadic:
    - Unique:
  + Is the data continuous or discrete?? Imortant to know about
  + Think long and hard about whether its important to show things over time
    - GPS: triangulate to tell us where we are. (But also space junk): same way to see where earthquakes are
    - Indoor wifi, tracking where you are within a building
    - Accuracy changes depending on gps used
    - Really good ones can measure tectonic plates in terms of millimeters
    - Lat/Long: really hard to do math with, good for displaying
      * X, y is better for you to do math with
      * Directional datasets
    - Asameth: direction of globe cutting
  + Vector data: three ways to make things in maps
    - Points
    - Lines
    - Polygons
  + Raster data: grids, made of cells, look like pixels: spatial resolution (land use).
    - Pictures are a matrix of values (jpg files): also used in science &
    - Discrete: land use (is this a lake or not a lake?)
    - Continuous variable
  + Attribute data
    - Describes vectors (aka describes a feature, aka a house)
    - Looks like an excel spreadsheet
    - Data with columns (fields)
    - Geo file: shapes/map
    - Attribute file: which things will be associated with various shapes
    - QGIS: Free open source, ARC does the same thing
    - Don’t put lots of layers on maps, because its slow
      * But you can, which is what google maps looks like
      * Generally organize by theme ( soil, water, streets)
  + Carto::
    - Use my github login: nerissaclarke, I8thec@ke
    - Ask Jessie about the ability to lock data using SAVI status
    - <https://carto.com/learn/guides>
  + NYC Open data
    - Assignment:
      * Lat/long