**Layouts – Geo-mapping**

Mapmaking, or cartography, is the visualization of geospatial data. It’s an art in that it seeks to represent data in a form that can be more easily understood and interpreted by non-technical audiences. But it’s also a science in making sure the visuals accurately conform to the data that they’re based on.

Whether you get your data from SafeGraph or your own research, it’s much more impactful when it’s mapped out to more directly describe the locations it’s referring to.

But maps, like many things, are not all the same. Based on their advantages and limitations, some styles of maps are better at representing certain types of information than others. So to help you choose the right map for the data you want to illustrate, we’ve compiled a list of 12 common methods for visualizing geospatial data.

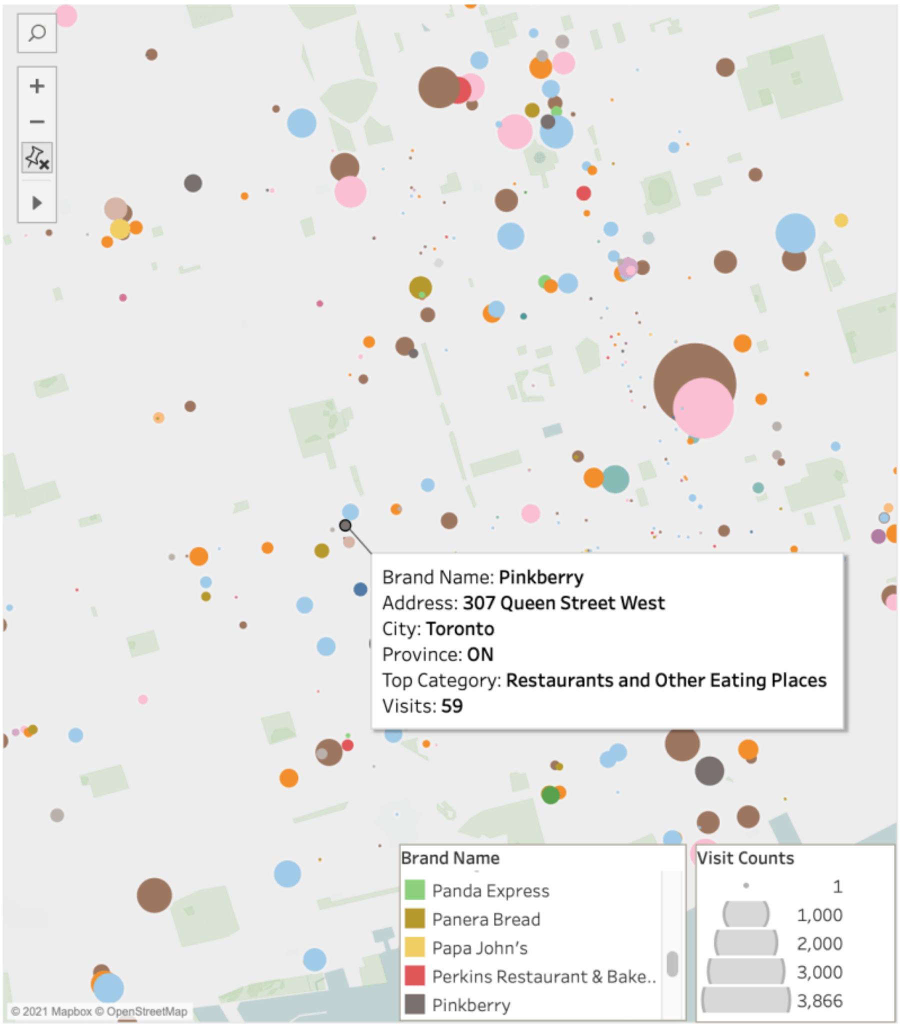
Demonstrate, here are 12 examples of mapping strategies, with explanations regarding their strengths, weaknesses, and best use cases.

1. Point map


A point map is one of the simplest ways to visualize geospatial data. Basically, you place a point at any location on the map that corresponds to the variable you’re trying to measure (such as a building, e.g. a hospital).

It’s useful for showing distribution and density patterns of things, but it requires you to collect or geocode location data accurately so you can identify each location precisely on the map. The point technique can be difficult to use with large-scale maps, as points may overlap each other at certain zoom levels.

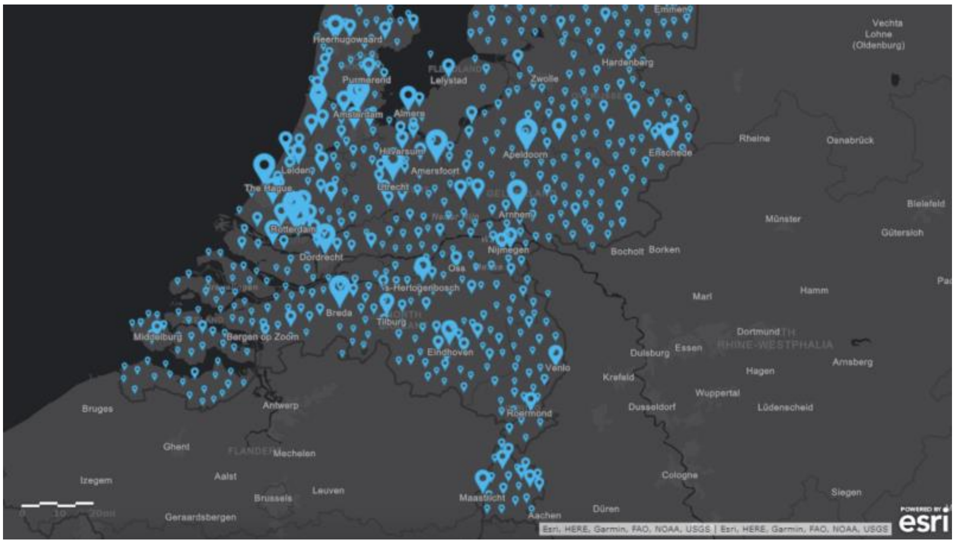
2. Proportional symbol map




This is a variation of the point map. It uses a circle or other shape to represent data at a particular location. However, based on the point's size and/or color, it can be used to represent multiple other variables at once (such as population and/or average age).

This makes proportional symbol maps good at conveying several types of information at the same time. They can still suffer from the same issue as point maps, though: trying to cram too many data points onto a large-scale map – especially across small geographic areas – can lead to overlapping.

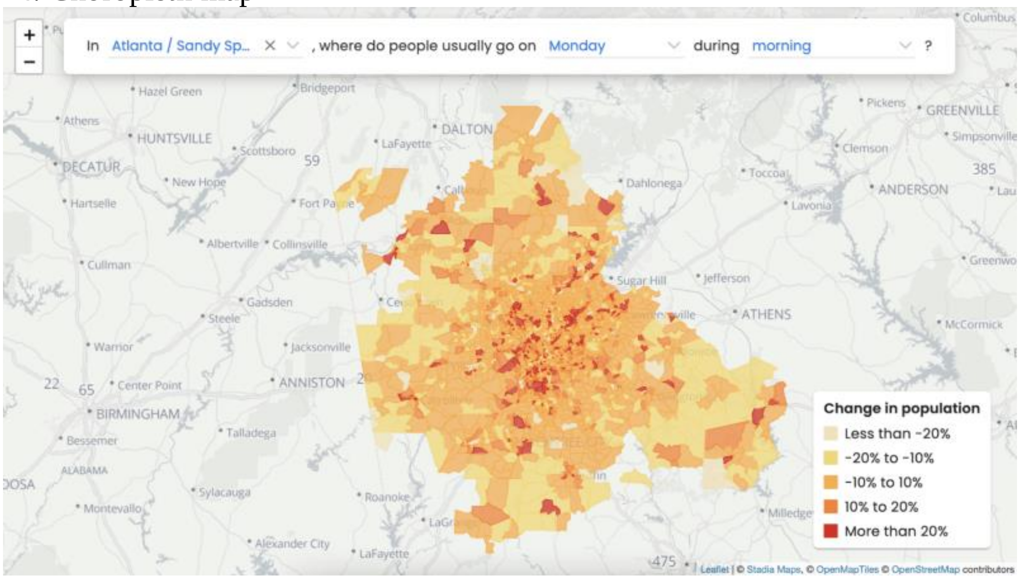
3. Cluster map



(Image source: Esri ArcGIS)

This is a proportional symbol map with a twist. It features a similar concept of using points of varying sizes and colors to represent multiple types of data at a location at once. However, these larger points serve as stand-ins for smaller points, which become visible if you increase the map's scale. This gets around the main issue of overcrowding in point maps, but requires special geospatial data visualization tools such as GIS software.

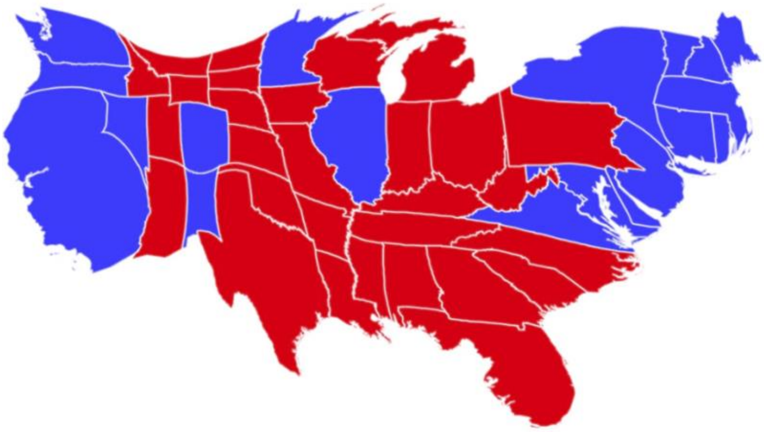
4. Choropleth map




A choropleth map is another common type of map. It's made by separating the area being mapped, such as by geographic or political boundaries, and then filling each resulting section with a different color or shade. Each color or shade represents a different variable, and/or a different value or range for a single variable. This makes choropleth maps useful for visualizing clusters of data across a geographic area while maintaining the context of regional boundaries.

Just be careful using this style with areas where regions differ markedly in size, as the size of a region may not necessarily have any relationship to the data attributed to it. For example, on a map of the United States, states with larger land masses – like California and Texas – tend to draw attention. However, on a choropleth-style map, they may not have a high concentration of a measured variable or have traits that are important to a particular form of analysis, compared to smaller states like Maryland, Delaware, or Rhode Island. If you are trying to point out something in a smaller area that could be dwarfed by larger areas, you may need to include an inset map to make sure the color is called out.

5. Cartogram map



(Image source: Esri ArcGIS)

This variation of the choropleth map is a hybrid of a map and a chart. It involves taking a land area map of a geographic region and dividing it into segments in such a way that sizes and/or distances are proportional to the values of the variable being measured. Then each segment is given a different color or shade to relate it to its corresponding value. In this way, the data more directly correlates with the land area it's referring to.

However, trying to line up size and distance proportions with a region's actual land area often results in distortions that can make it difficult to recognize what location a cartogram map actually represents. For this reason, it can be helpful to include a land area map of the location alongside the cartogram map, for reference's sake.

6. Hexagonal binning map

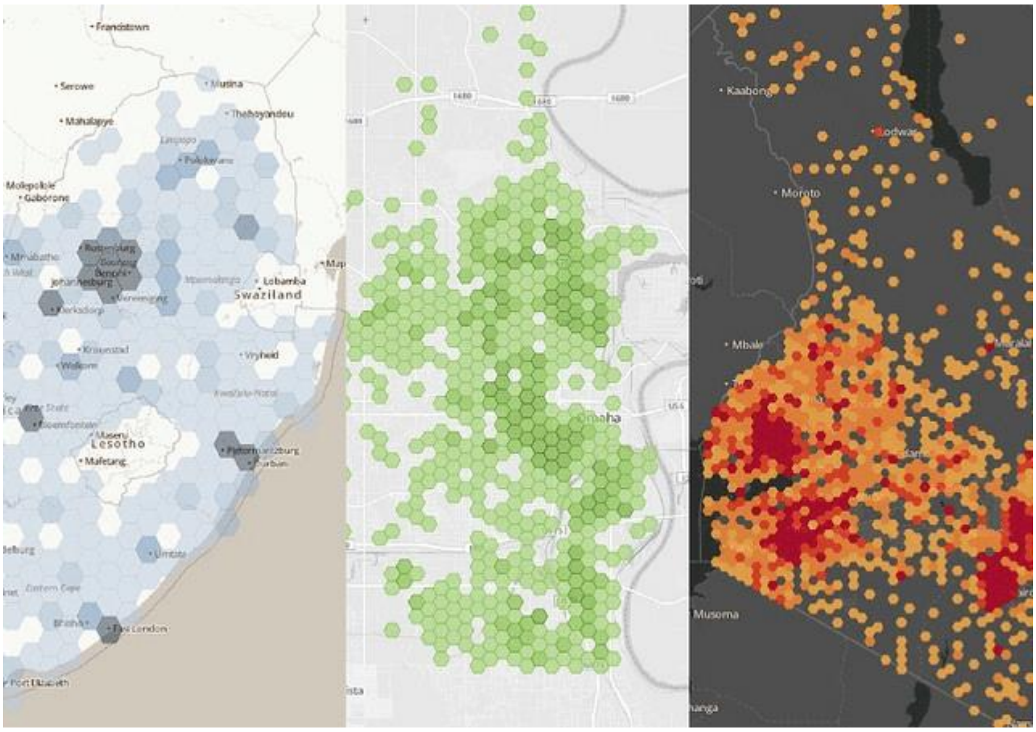
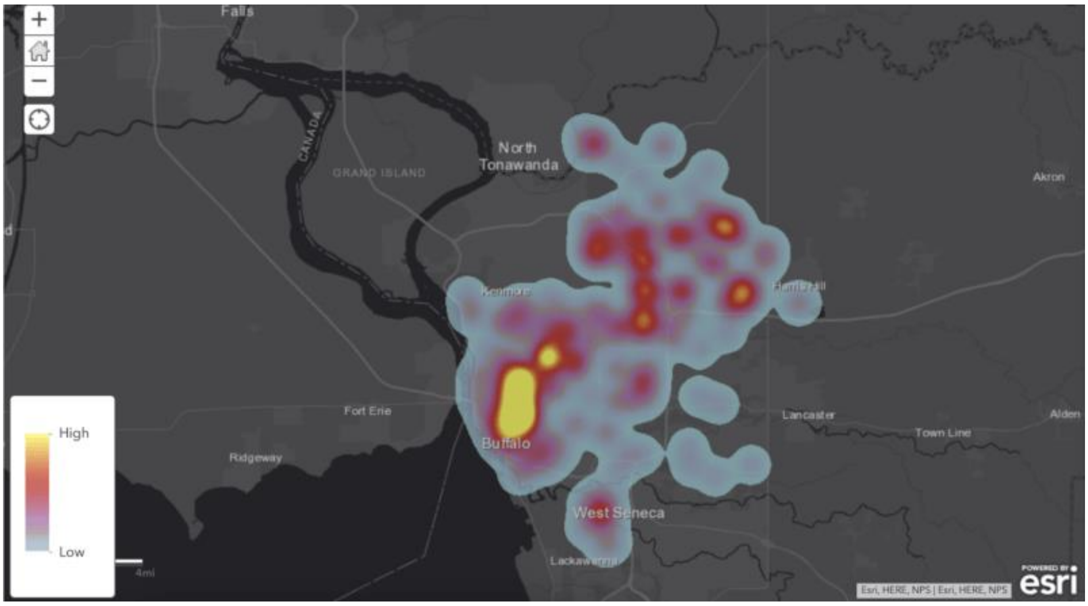



Image source: Mapbox

Hexagonal bin maps are another choropleth map variant that divide a geographic area into a grid made of regular hexagons and derivative figures. This easily creates a continuous shape while still covering land area with accuracy. Then each cell in the grid is given a color or shade to represent a value of a variable, much like in a regular choropleth map.

This type of geospatial data visualization provides a good balance of precisely mapping a set of granular data points without losing accuracy through converting discrete data into continuous data. However, it can be difficult to scale up or down without combining or separating cells.

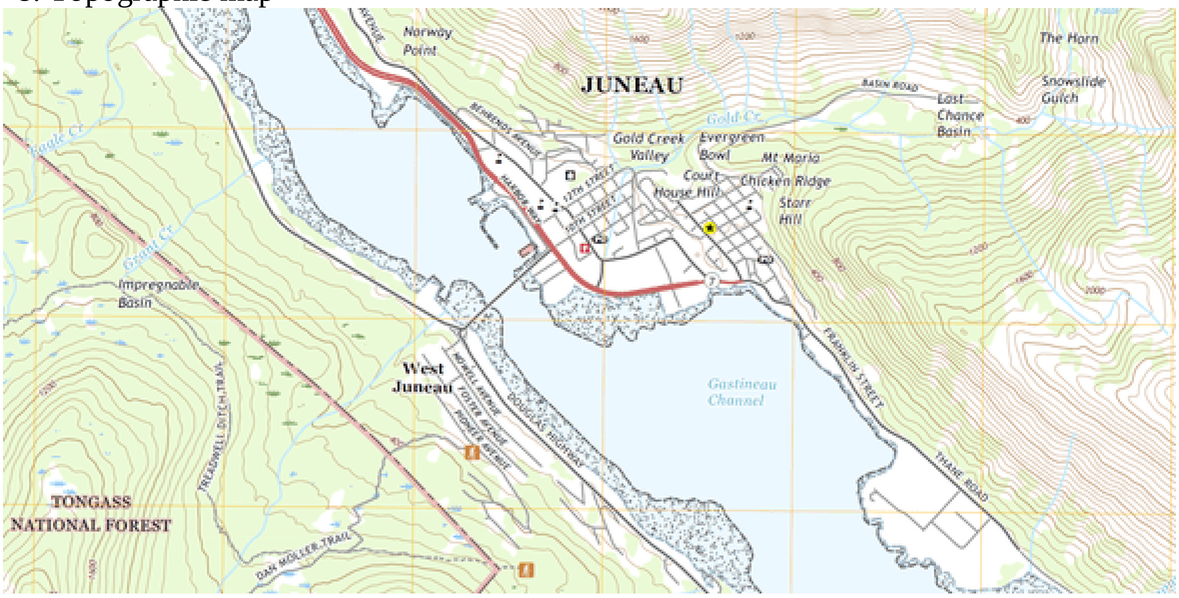
7. Heat map




A heat map is somewhat like a choropleth map in that it uses colors or shades to represent different values or value ranges. However, it presents these values and ranges as a continuous spectrum, rather than as discrete cells constrained by geographical or political boundaries.

In this way, a heat map is useful for more precisely visualizing patterns of high ("hot spots") and low concentrations of a variable. This can come at the cost of accuracy, however, as it often requires converting discrete data points into a continuous spectrum via algorithms.

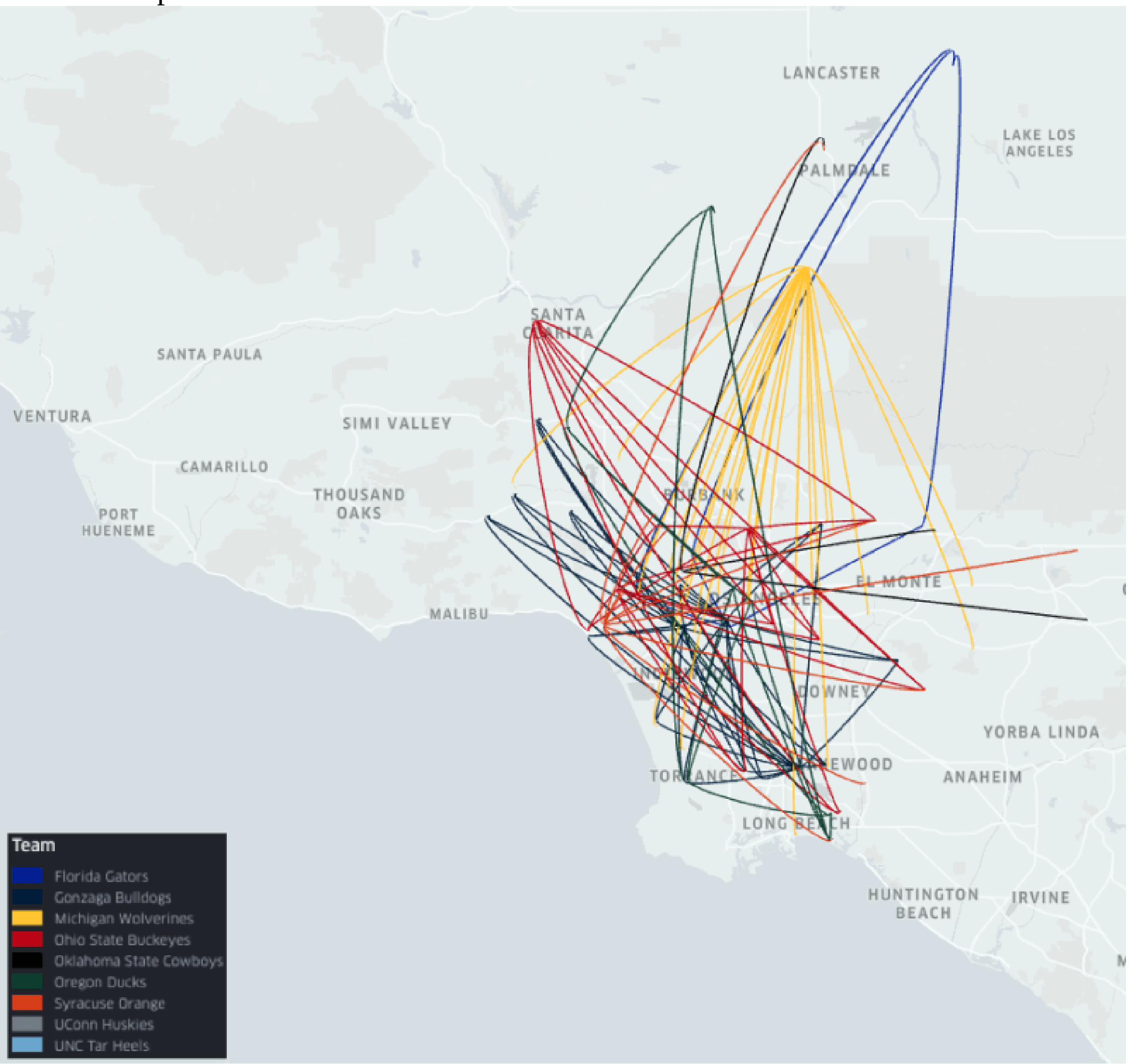
8. Topographic map




(Image source: US Geological Survey)

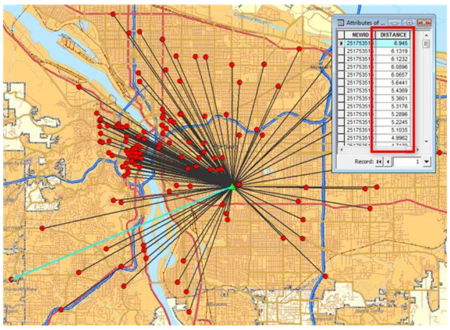
A topographic map is another fairly standard form of geospatial data map. Often, topographic maps are used to represent physical land features that are spread out over an area. These include terrain elevation (especially mountains, volcanoes, and other high landmarks) and river systems. They can also include man-made things such as roads, railways, or other transportation networks.

9. Flow map




Flow maps, also known as 'path' maps, are more specialized versions of line maps. Instead of focusing on physical features of the earth, they are used to represent the movement of things across the earth over time. These can include migrating humans or animals, resources and other goods for trade, vehicle traffic, and weather patterns (especially severe storms such as hurricanes). They are usually constructed as sets or pairs of origin and destination data points.

10. Spider map

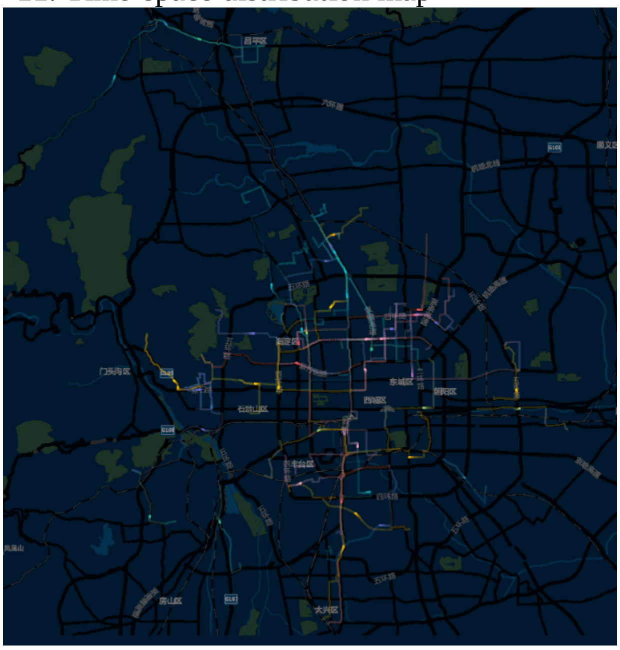


(Image source: Esri ArcGIS)

The spider map is a variation of the flow map. Instead of focusing on discrete pairs of origin and destination data points, the spider map looks at the relationships between origin points and multiple destination points – some of which may be held in common.

An example of a spider map may be a route map for buses, streetcars, subways, trains, or other modes of transportation that have series of predetermined stops between multiple vehicles. You could also use a spider map to display how frequently ride-sharing vehicles, like bikes or scooters, are picked up from specific parking stations and dropped off at others.

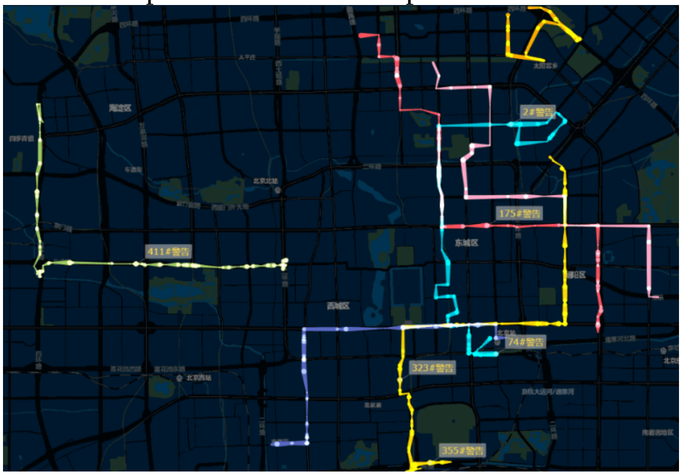
11. Time-space distribution map



(Image source: Towards Data Science)

This is an advanced form of geospatial data mapping that combines the precision of a point map with the dynamism of a flow map. It seeks to accurately determine the locations of objects at any point in time as they move. Naturally, this is only possible through GIS software and other forms of non-static mapping. The most common usage of this type of map is in monitoring the locations of vehicles or mobile devices through global positioning systems.

12. Data space distribution map




(Image source: Towards Data Science)

This is another variant of the flow map that aims to not only represent the movement of things over time, but also how variables dependent on that movement change over time.