Mini Project One- Planning Bike Share Stations

CPLN 503- Modeling Geographic Objects

2024-10-01

Background

You are an intrepid planner for the city of Philadelphia. You are at your desk one morning when you receive an email from your manager requesting some information a city councilmember has requested. The councilmember wants information on the city's bikeshare, IndeGo. Specifically, the councilmember wants to know ridership patterns by neighborhood, including those areas of low ridership, and would like your recommendations on potential future sites for IndeGo stations.

In order to produce your metrics you will need to collect data on the latest ridership data from IndeGo (in this case Q2 2024). Bike station location data is also available from Indego here. Additional bike station information is located here (you will need to pull info from all three of these tables: ridership, station locations, and additional station info).

Datasets For Part 1

- Philly Neighborhoods
- Ridership Data
- Station locations
- Additional station info

Part 1- Metrics to Report

In order to answer the request of the councilmember you will need to report the following metrics:

1. The 10 stations with the HIGHEST number of STARTS (stations that are origins) and the 10 stations with the LOWEST number of STARTS
2. The 10 stations with the HIGHEST number of ENDS (stations that are destinations) and the 10 stations with the LOWEST number of ENDS
3. The 5 STARTING STATIONS with the longest AVERAGE trip durations and the 5 STARTING stations with the lowest AVERAGE trip durations
4. What stations, BASED ON THE YEAR THEY WERE ACTIVATED, had the most trips?
5. What are the 5 neighborhoods with the most TOTAL TRIPS and what are the 5 neighborhoods with the most TRIPS PER STATION?

   1. Note: you will need to figure out the number of stations by neighborhood to help solve this

Part 2- Maps to Produce

In addition to the tables you will also have to prepare a series of maps for the councilmember:

1. A map that displays WHAT YEAR each station was activated
2. A map that displays the number of STARTS by station that shows the range of values
3. A map that displays the number of ENDS by station that shows the range of values
4. A map that shows me both STARTS and ENDS by station where I can see both (Charts, hint hint)
5. A categorical map that colors the stations by three categories for trip duration. You determine what values correspond to which class, but the map should have three categories: short, medium and long.

Part 3- Planning Sites for the Future

The final part of your report is to visualize station usage data alongside two other datasets, and then to use these visualizations to help you draw 3-4 "future zones" where you think bike share stations should be located.

How you choose to do this is up to you, but there are some parameters you **must** meet. You need to use at least one of each of the following kinds of data:

1. Stations

   1. One piece of your data should include trip usage and station locations and the role they might play in where future stations should go (e.g. should stations be more closely clustered, in your opinion? Or do you want to extend stations into more peripheral, less well covered areas?)

2. Demographics

   1. Collect census data to help you visualize where future stations should go (e.g. should you prioritize areas with larger or smaller shares of bike commuters or does age structure matter for you?)

3. Physical Conditions

   1. Pull data from Open Data Philly, PASDA, OpenStreetMap or some other third party and make use of it in your analysis. This could include info on parks, streets, building types etc…just include some form of data based on the physical or built environment

Analysis and Mapping

After mapping your varied data layers you will need to create a new polygon shapefile or feature class. Using the edit tools you will draw 3-4 "zones" where bikes should go in the future. The zones should be well drawn and follow the street grid, or large natural features, where possible (i.e. trace a basemap, if need be).

Once the zones are drawn I want you to create **AT LEAST** two maps:

1. One map at a broader extent that shows existing stations, demographics, physical/built variables and zones layered together. Be sure to organize the map in such a way that one can see why you made the decisions you did.
2. At least one map zoomed in on a particular zone to see how your variables mesh together in this particular zone.

Final Submission

Your final submission will be a memo addressed to the city council that will include the metrics and maps on the station data as well as the maps on your future zones. The memo should include some explanation of your methodology.

This is your first major graded assignment so take care with your writing and the presentation of your tables and maps. Make sure your maps and tables have labels, that you identify data sources and that your maps include the essential map elements.

Remember to make use of all of the skills you have picked up thus far. This mini-project will require all of your table chopping skills including grouping, filtering and joining tables.

The mini-project will be due 11:59AM on Thursday October 17. This gives you a little more than two weeks to finalize so please take your time! While I generally do not penalize you for turning you in-class assignments after the due date there **WILL** be penalties for late submission of the mini-project. In this case, each **DAY** will result in a **TWO** point deduction.

Extra Credit

In order to get the extra credit you need to attach a *zipped* R project that contains your script(s) to produce your final IndeGo dataframe. We should be able to produce the final dataframe by running your script(s).

If your scripts run and the expected output is produced, then you will get an additional **10 points**.