## Assignment 4 (Due April 2nd 2023)

## Project Preparation Guidelines (total 15 pts)

The goal for the final project is to evaluate how you create a story based on the analysis out of a dataset of your choice. The four parts of this problem will lead you to the content that you need to create a report and a mini project presentation

**Step I: Search (4pts)**

Select a problem of interest (write down why is important) (1pt)

* Transitioning to electric vehicle is an important step to mitigate the climate crisis. Low availability of charging station increases range anxiety and hesitates people from buying electric cars. As federal and state subsidies kick in, I want to assess the current charging station in terms of availability, equity, and efficiency.
* (Alternative direction, with no data found yet.)

With increasing adaptation of electric vehicles, power grids face more pressure to supply electricity. Some people argue that electric vehicles should be charged after midnight when power usage is low, while others claim that charging should happen in daytime to maximize solar power usage. I am trying to figure out when people charge their vehicles and how the public can use the power system without overload it.

Select a related data set that can be analyzed with the tools learned in class (spatial clustering or network analysis) (1pt)

* Selected a data set from Department of Energy
* Will utilize cenpy for demographic data.

Write the number of nodes and links and what they represent or

the spatial analysis units of your analysis (1pt)

* Number of nodes: 979 Number of edges: 38153
* Each node represents a charging station and each link represents the distance from a charging station to another charging station. The two charging stations are in different zip code area.

**Step II: Related Literature (5pts)**

* Lucas, A.; Prettico, G.; Flammini, M.G.; Kotsakis, E.; Fulli, G.; Masera, M. Indicator-Based Methodology for Assessing EV Charging Infrastructure Using Exploratory Data Analysis. Energies 2018, 11, 1869. https://doi.org/10.3390/en11071869
* This paper evaluates the EV charging infrastructure in Netherland with different indicators. Using spatial analysis, the author shows a relatively low energy use per charger in area with high energy demand.

**Step III: Data Analysis: (6 pts)**

Based on the methods learned in class, name at least 3 methods of analysis that you plan to do with your data . Describe what you could learn from each of them

* Calculate degree centrality, betweenness, closeness, shortest path, etc.
* spatial clustering: allows me to find correlation between location of current charging station and income/education/race.
* random graph models: helps me to understand how networks evolve and how information spreads through networks