April 5, 2024

**Relations Between Non-English Speaking Populations to Urban Heat Islands in Worcester, Massachusetts**

Rory Dickinson

**OBJECTIVES**

Urban Heat Islands are a growing issue in many cities across the United States. In most studies, factors such as income and race used to examine inequalities in exposure to such harmful envrionemntal factors that heat can bring. These studies are often paired with historical data related to the practice of redlining, where certain neighborhoods were deemed poor for investment and because of this feel the effects of little investment to this day. In this analysis, I plan to look at the relationship between the distribution of communities with low English ability. To do this I plan to look at the overlap between census tracts with high proportions of populations with low English ability with historic redlinining data as well as census tracts that overlap with areas of higher heat on average. This can also be done in relation to areas with higher treecover. A comparison of the Language data can be done to a similar one based on Median Household income for comparison and analysis. An example way of doing this would be to select a column within a language demographics table, using WHERE to see how ti overlaps within a given section of the temperature variation. For example WHERE temperature > 86. Another possibility is to use run a distance query for the water body data for the different population groups as proximity to water can havinga cooling affect. Population and/or building density alaysis alongside the other spatial queries is also an option to measure where the affects would be being expereinced by the most non-english speakers. Lastly, another option would be to also include a comparison of the top 3 or so poulations of non-english speakers by language and see how urban heat islands affect the communities differently. The possible data layers for the project are listed below.

**ASSIGNMENTS**

Complete the following assignments. Deliverables will include pushing to your public GitHub and updating the README at every step.

**Project Proposal**

* **Fill in the highlighted portions of this prompt. Utilize the Group Prompts for inspiration.**
* Propose at least 5 vector datasets and 2 raster images that will address your topic.
* What relationships will you analyze? Propose at least 3 spatial queries.

**2. Create a new Final Project repository and invite Jon & Kunal to collaborate on GitHub.**

**Due Friday, April 5 @ 5 pm (10 Points)**

**Assignment 1 – Data Acquisition, Processing, & Database Setup**

* **Find and Process Geospatial Data**
* Acquire data for at least 5 vector layers & 2 rasters:
* **Vector Data**
* Massachusetts City Boundaries
* ACS Language demograhics by census tract
* Redlining
* Water
* Median Household Income Data
* **Raster Data**
* Temperature
* NDVI
* Be sure to provide sources, descriptions, and visualizations in your README.
* **Set Up Database Schema**
* Create schema for your chosen topic.
* What attributes should you be mindful of?
* **Pre-process the Data**
* Process the data to align different datasets temporally and spatially.
* Be sure to capture the details in your README.

**Due Friday, April 12 @ 5 pm (10 Points)**

**Assignment 2 – Import Spatial Data & Normalize Tables**

* **Import your data into PostgreSQL tables/schema created in Assignment 1.**
* **Normalize your tables (1NF up to possibly 4NF, depending on your data) and explain the logic in your README.**
* Even if normalization is not required, explain why in your README.

**Due Friday, April 19 @ 5 pm (20 Points)**

**Assignment 3 - Spatial Queries & Presentation**

Perform spatial analyses to determine:

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**Spatial Analysis & Presentation are Due Thursday, April 25 @ 10:15 am (40 Points)**

**Final GitHub Repo & README are Due Friday, May 3 @ 5 pm (30 Points)**

**Total: 110 Points**

**NO LATE SUBMISSIONS ACCEPTED AFTER MAY 3 -- Plan accordingly.**