Equitable Fire Hydrant Placement

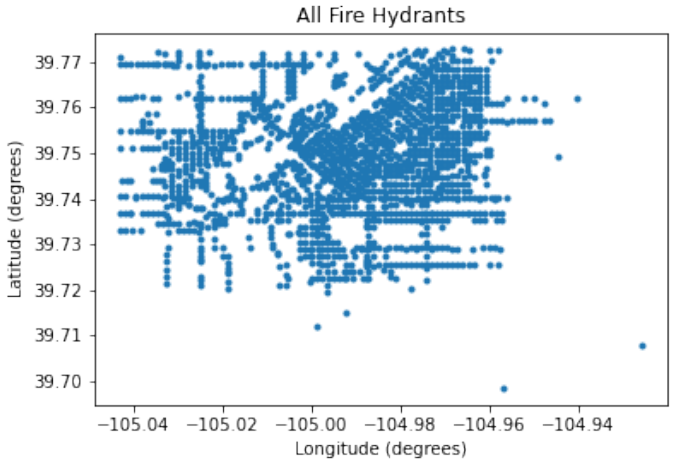
Johnathan Rhyne

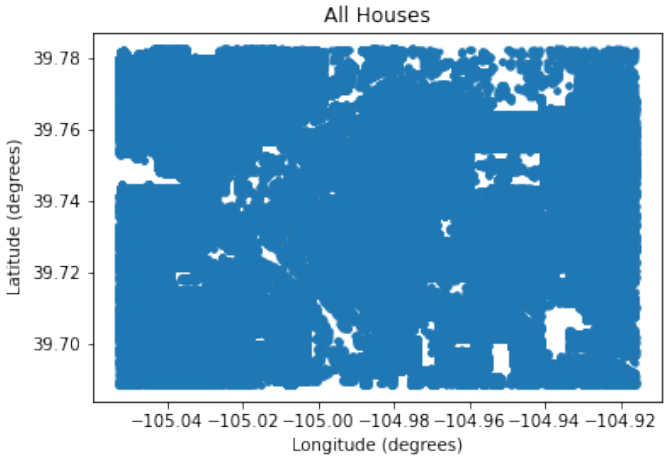
Motivation

- Building new housing incurs more costs than just the construction of the building itself
- Safety of inhabitants is important
- Can affect home insurance rates

Limitations

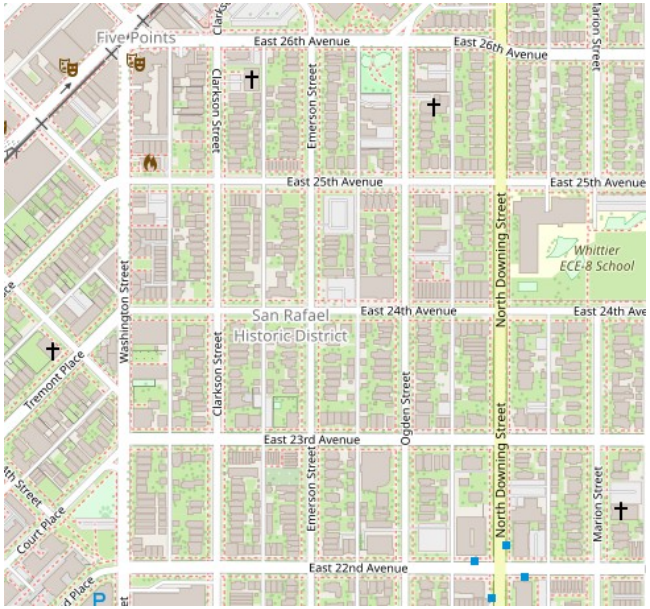
- A LOT of buildings in our data set
- Hard to access official data
- Sparse crowd sourced data outside Denver-Metro area





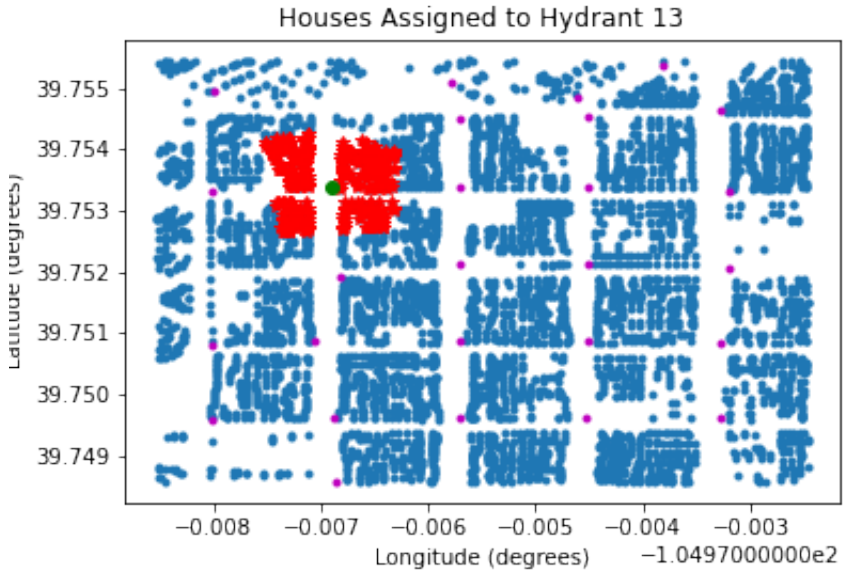
Region Selection Methods

- Selecting varying size regions distributed throughout our data set
- Could be refined based on other factors



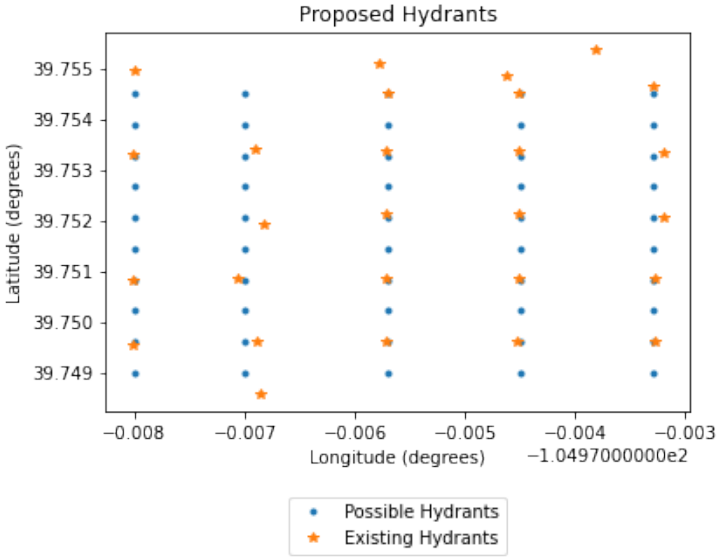
Current State

- Assigning every house to its closest hydrant



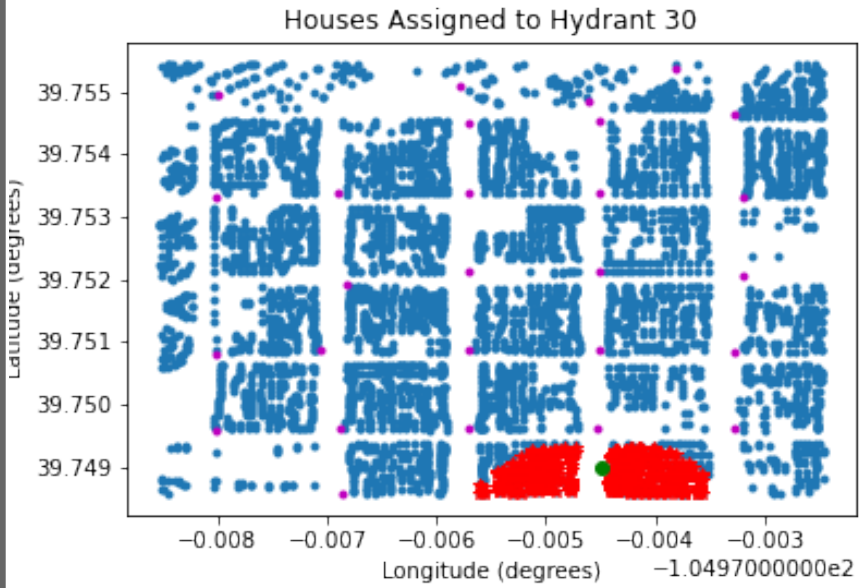
Methods

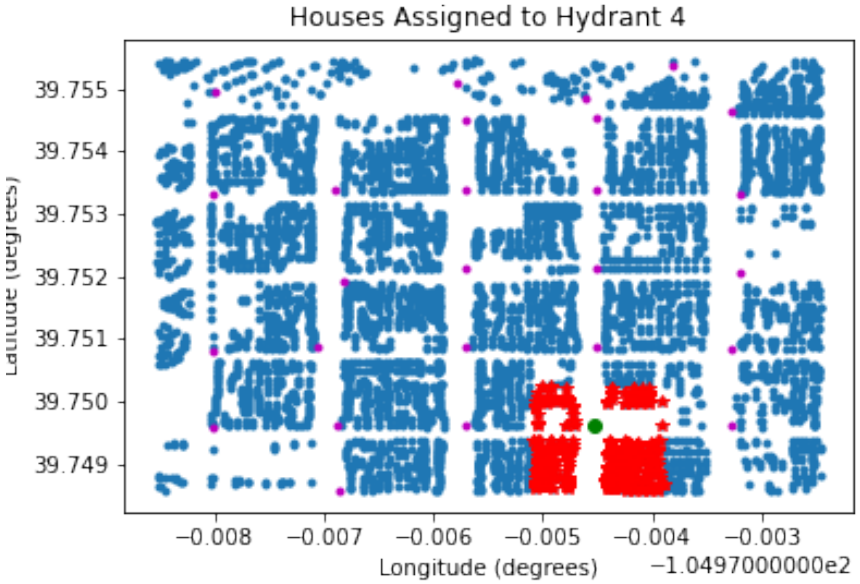
- In each region, determine placement of hydrants to minimize the distance from each building to its hydrant.
- Penalize creating new hydrants



Proposed Placement

- Very few differences in our testing





Analysis

- No real difference between “ideal” and actual
- Consider different penalization for adding new hydrants

Future work

- Better data: Clear distinction for homes and businesses
- Look at regions with clear disparities in socioeconomic status
- Better measure of equitability: Treat higher density apartments as more expensive than homes due to more people
- Consider fire risk

Citations

- Denver Fire code
- Overpass Turbo (Used for getting our data)
- Insurance rate increases
- Source Code