Machine Learning Informed Policy for Environmental and Climate Justice in Atlanta

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Environmental Justice

- Environmental hazards are not evenly distributed, in part due to zoning and planning of hazardous treatment, storage, and disposal facilities (TSDs) and toxic chemical releases into the air.
- Due to environmental racism, low-income people of color carry more environmental burden.
- Environmental justice asserts that environmental hazards and benefits should be fairly distributed.

Climate Justice Implications

- TSDs and toxic chemical releases emit carbon dioxide and methane into the atmosphere.
- Emissions from these TRIs combine with air pollutants to form ozone smog which can trigger and/or exacerbate respiratory illnesses, including asthma.
- Moreover, TRIs account for lead which is a criteria air pollutant (i.e. one of the most common air pollutants).
- These emissions and contaminants not only release into the air, but also water and food supply.

Problem/Motivation

- In Atlanta, 52.3% of the population is Black as of 2018.
- In 2016, Atlanta exhibited the highest rate of income inequality among major cities in the U.S.
- In August 2019, a smog alert was issued for Atlanta by the EPA due to air quality conditions being unhealthy for sensitive groups, such as people with lung disease or asthma.

Prior Work

- EJ has been studied using spatial analysis and linear regression.
- Studies on spatial disparities in TRIs and TSDs based on race/ethnicity and socioeconomic status (SES) in U.S. cities, such as Charleston, SC, San Joaquin Valley, CA, and West Oakland, CA showed that there are more TRIs and TSDs in non-White and low SES areas in those cities.
- The proposed work would augment these statistical analysis tools using machine learning.

Data

- Most recent U.S. Census Bureau data for Atlanta proper.
  - Demographic data such as race, income, gender, neighborhood, etc.
- U.S. Environmental Protection Agency's Toxic Release Inventories
  - Locations of hazardous waste facilities and toxic chemical releases

Machine Learning Pipeline

Policy Implications

This work would inform public policy on revitalization efforts and how environmental hazards are distributed in these cities.