

Nearest PurpleAir Sensor Hubs by Median Household Income Census Block Groups in Baltimore City, Anne Arundel, and Baltimore County Maryland from 2021

Air quality sensors distances and locations throughout median household income groups and Race/Ethnicities. Includes 2019 data from the US Census Bureau.

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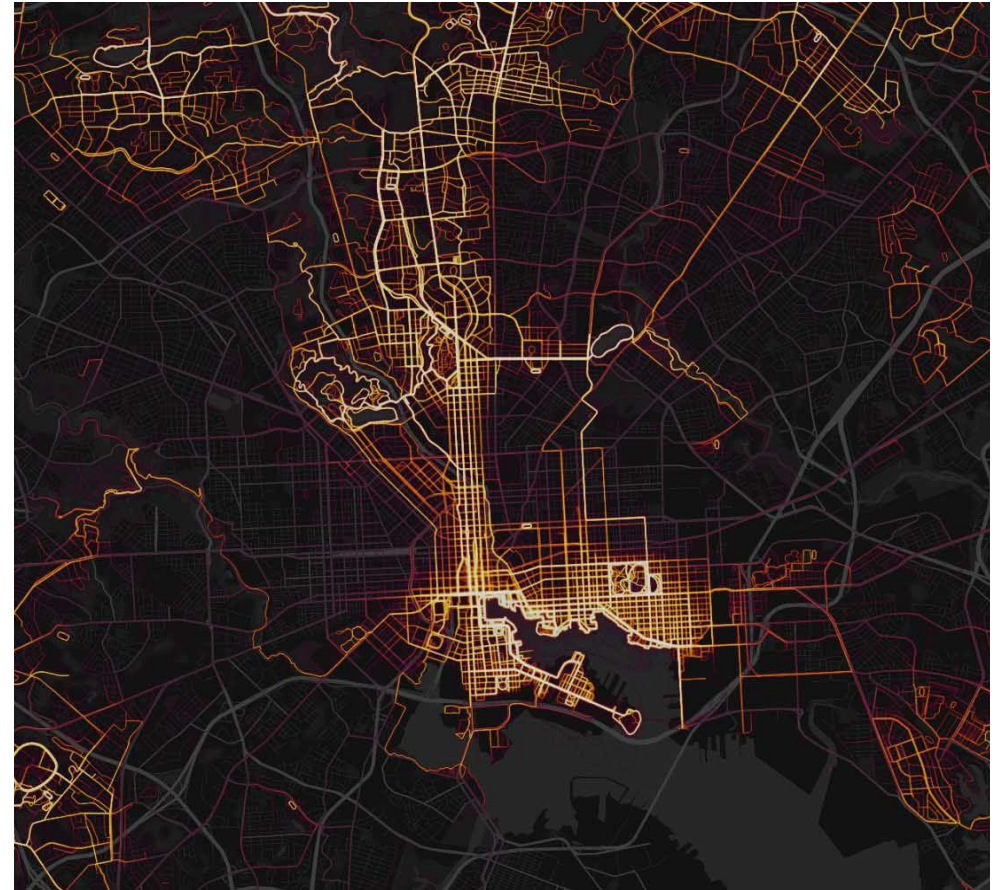
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Overview of Project/Background

- Baltimore City, Maryland is known for its Redlining and the White L/Black Butterfly disparities of living situations. White L is more affluent, Black Butterfly are low-income individuals (Brown 2019).
- Racial disparities and crime are higher in the Black Butterfly areas.



The Strava Heatmap of Baltimore's White L and Black Butterfly. From the article, "Two Baltimores: The WHITE L vs. the Black Butterfly."

Motivation

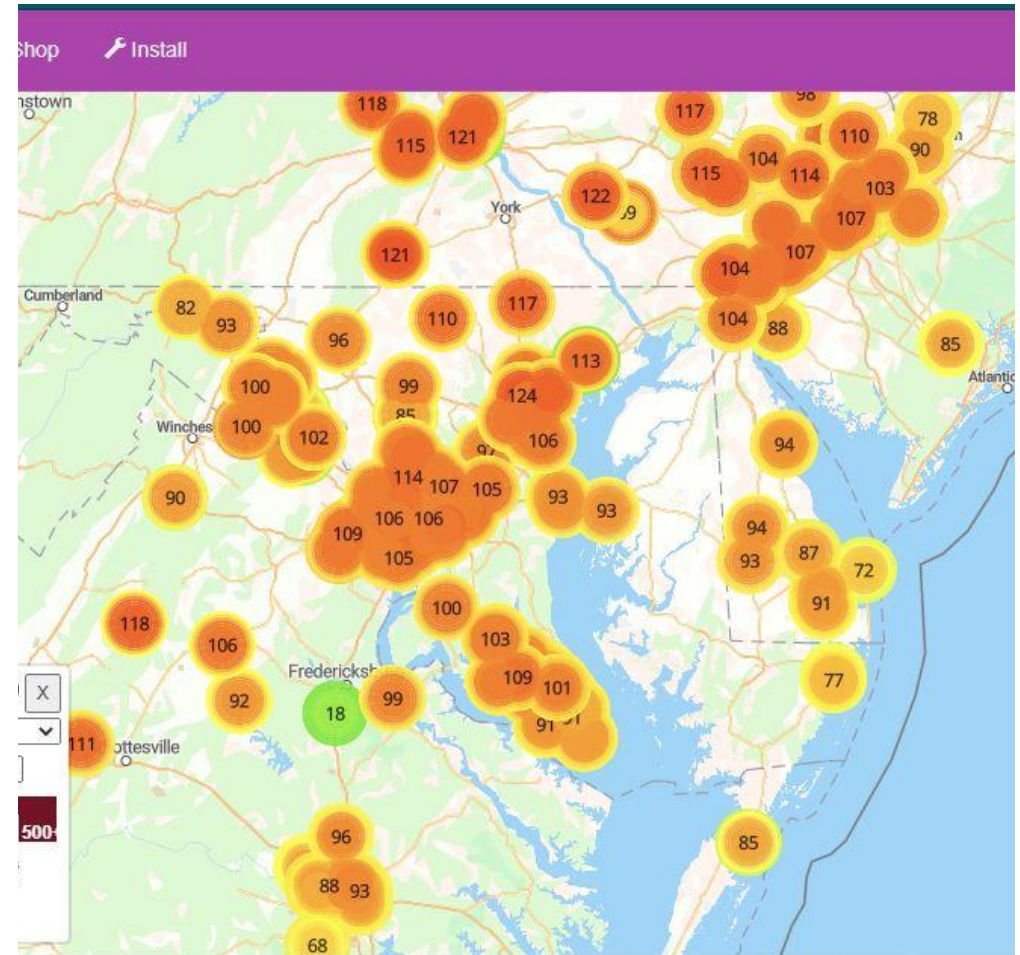
- Air quality affects people daily, but do we think about where those sensors that detect the quality are placed relative to where low-income people live? How about their race/ethnicity?
- Personally, I am a minority, and I can relate to health problems due to air quality not being efficient to those who are not represented.
- Have a passion with helping people who are unrepresented by the local Government and can not have their voices heard.
- As stated in the article “People in Poor Neighborhoods Breathe More Hazardous Particles”, a study in 2012 by Yale University was conducted on large metropolitan cities, on people who are non-white and low-income are more susceptible to hazardous ingredients than affluent people (Katz 2012).

Research Questions

- Hypothesis: What is the race/ethnicity, household wealth classification, and census block groups represented under a PurpleAir quality sensor hub within the city and nearby counties?
1. For every census block group that is displayed, where is the nearest PurpleAir sensor and the distance to it?
 2. Are the census blocks that these hubs are located in have higher density of people nearby and a higher median income?
 3. What is the median income of the census block groups who are further away from hubs?

Methodology

- Acquired data from PurpleAir open-source
- Gathered 20 (at the time) PurpleAir quality sensor hub csv files (filtered for only outside hubs) from July 16, 2021. Merged all the csv's together.
- Concentrated on 2015-2019 data 5-year ACS survey information from US Census Bureau for block groups, due to being the most recent
- Included Median household income, Total population, Race/Ethnicity groups, and Housing unit's totals.
- Calculated mean averages to obtain weighted mean information on Median household incomes and Bipoc (Black, Indigenous, People of color) percent. (Bipoc was based on NHwhite Population)



PurpleAir Quality Sensor Hubs Map of Maryland

Results(Still a work in progress)

- So close to being finished, waiting on last steps from QGIS

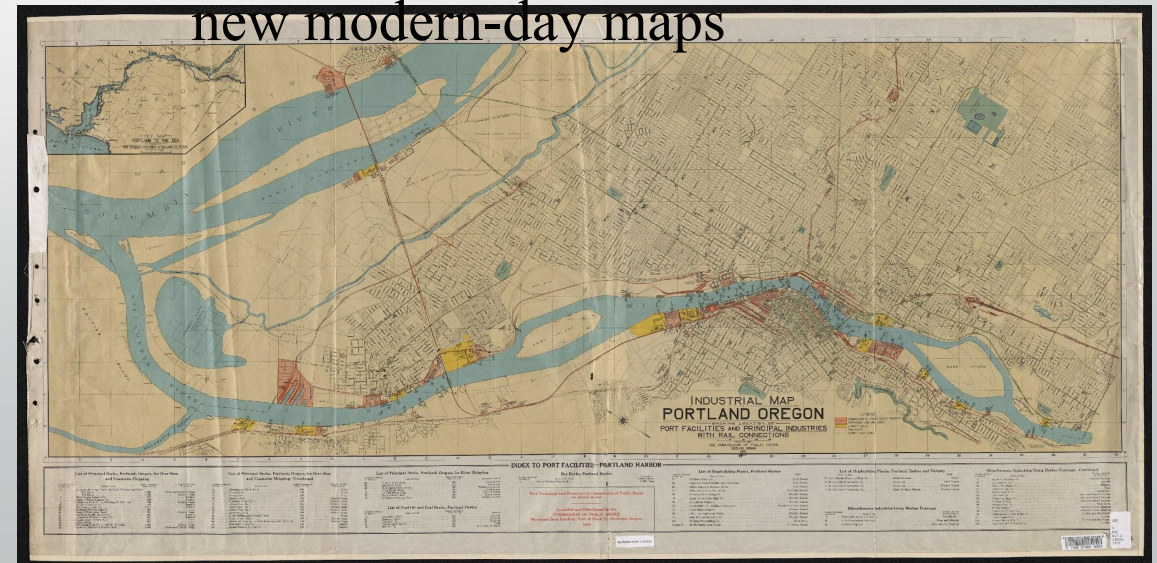
Conclusion/ Society Significance/Future Works

- Conclusion (Still a work in progress)
- Society Significance
 - Beneficial health services to lower income places
 - Better sensor placement or reevaluation the sensors previous range

- Historical Mapping

- City of Portland Oregon, Hazel Nut Grove and Helping the Homeless

- Georeferencing the old maps to new modern-day maps



References

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