Transforming Wastewater Infrastructure in the United States

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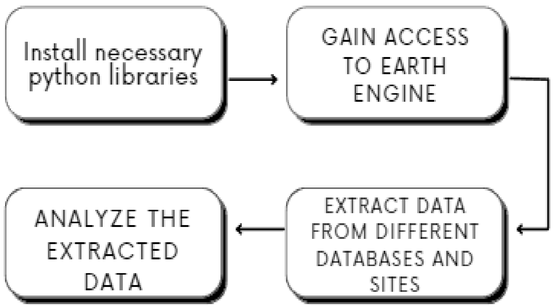
amazon

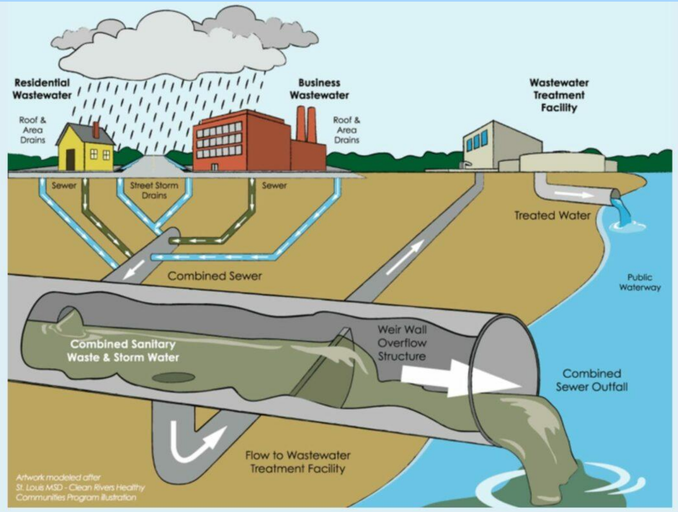
Abstract

Collect information about the current wastewater infrastructure in an area from real estate sites such as Zillow. Make a model that can predict what type of infrastructure system is being used in different areas by using common construction rules such as if a building has a septic system the whole street most likely has a septic system, and the same rule may apply in the case of the sewer system. Extract geographical data such as building footprint, roadmap, soil type, land use, and precipitation data using Python APIs such as EE, OSMNX, geemap, geopandas to create a database of factors that play role in the process of deterioration of the wastewater infrastructure.

Method

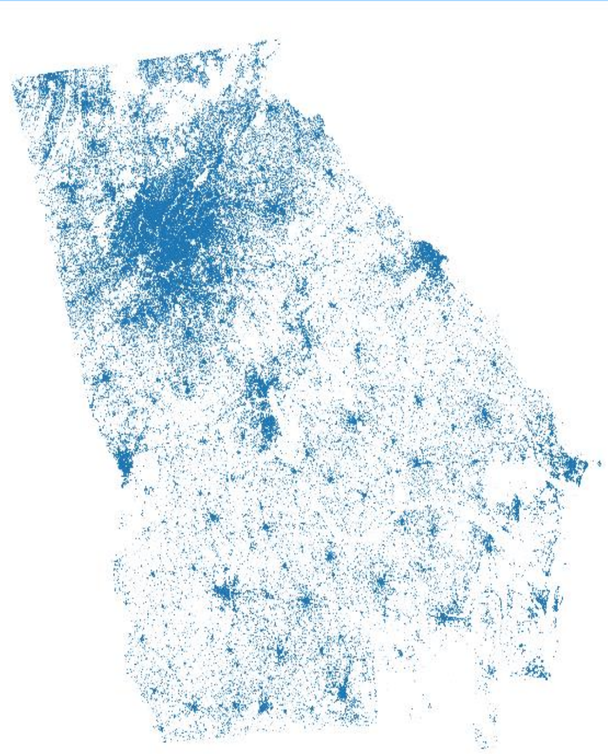


Introduction



The need to address the aging US Water Infrastructure has been articulated for the last 2 decades, with cost estimates ranging from $1 to 2 trillion. However, these estimates are uncertain as the current state of wastewater infrastructure is unknown and by extension, the effects posed to the nation's population and ecological health. Further, without an understanding of the current scale of improvements required, the optimal financial and technical strategies required to improve America's wastewater infrastructure cannot be selected or implemented Goal: To develop a complete census of Wastewater infrastructure in the United States of America which can be used to increase the efficiency of cities in the matter of planning for the repairs and funding for their wastewater infrastructure.

Results



After converting the geojson file that contains data regarding buildings to a shapefile for the state of Georgia, a mapped-out version of the data gives us the figure above where blue represents buildings in the area. To be exact there are 3,981,791 buildings in Georgia as of 2020. This data was used to get the centroid of each building. Data regarding Georgia States' road maps were also collected using OSMNX python API.

Conclusion

- To scale the project to the national level, data must be collected for each state individually.
- Some states have more data than others based on factors such as size and population, so the computation time for the data for each state is different.
- Cloud computing is essential
- This project is still an ongoing study that can make use of the data collected so far. To keep track of any updates, feel free to follow my team and Dr. Upmanu Lall.

Acknowledgements/ my contact

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- Dr. Sara Schwetschenau

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