Toxic waste dumping

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Visualization Path

[Dataset](#)

Focus years - 2003-2023

County / City – heat map

Projection of increasing waste dumping

Dumping by year – timeseries visualization

Industry and chemical by county – hover plot

Carcinogens vs Non-carcinogen– bubble graph

Animations

Drop down box to choose year that populates top 10 companies, and top 10 industries.

Libraries – Matplotlib, Seaborn(pretty visuals), Folium?(interactive/maps), Geopandas?, Plotly?

Language - Python

README:

- **An overview of the project and its purpose**
  - The goal of our project was to highlight facilities and the areas where there are chemicals being released in the environment within Texas and pinpoint so far what year has the most, as well as what areas have the most.
- **Instructions on how to use and interact with the project**
  - To use our dashboard you can click through the tabs which shows you the map thought process with our project, you can also view the presentation to understand more on where we pinpointed. You will want to push the back button to return to the home screen to then click on a new tab.

- **At least one paragraph summarizing efforts for ethical considerations made in the project**
  - According to the EPA website the purpose of the TRI program was to track progress in reducing waste and moving towards safer waste management. The data from the TRI program are from self-reporting and there have been cases when facilities have been noncompliance. The biggest consequence these facilities face are just fines. Are visuals so a increase of toxic release chemicals and this can be due to the increase of facilities over time. These reports could have adverse effects facilities financial performance. On the flip side the data can be used to address potential risks to public health from these releases,
- **References for the data source(s)**
  - https://www.epa.gov/toxics-release-inventory-tri-program/tri-basic-data-files-calendar-years-1987-present
- **References for any code used that is not your own**

Deanna (intro) -

We found our data sets on the Environmental Protection Agency website. For those who don't know the EPA's job is to protect human health and the environment by creating and enforcing regulations based on laws passed by Congress. The EPA has the TRI program (TRI stands for Toxics Release Inventory) and they have records of all facilities in all the US that meet the criteria, since 1987. The TRI program tracks the releases and transfers of toxic chemicals by facilities that manufacture, process or use toxic chemicals. According to the EPA website, what qualifies as a TRI is if a chemical causes cancer or to other chronic human health problems, significant adverse acute human health effects or significant adverse environmental effects. As of today there are 767 chemicals that are considered a TRI in 33 chemical categories. Because of the size of the data our visualizations focus on Texas and only go as far back as 2003.

Ernesto (Cleaning) - The first part of any analyst job is of course to clean the data. We pulled CSV files from the EPA website, These files had a lot more information than we needed, it also had all of the US. We cleaned the CSV files, and also minimized the data to just Texas. We then imported them into a Mongo Database where we then merged them into json files. We did it in 3 year increments due to the file being too large with all files merged together.

Angelica (map 1 & 2) - This map that you will see in the dashboard is a Texas time lapse heatmap years 2009 - 2023, that grows and declines with how much waste the county's produced between these years. The Interactive Heat Map was created by passing in the clean json files then using the python library folium to manipulate the data and produce this interactive timelapse map. This map then manipulates the data so that it becomes more interactive with the years being inside the county's and being able to click on the markers to explore the waste, the amount, as well as the industry and toxic chemicals. The json files were loaded in similarly with a different map layer and features to bindpop each of the county's stats with the year.

Juan (map 3 & 4) - Due to the data we pull from the first map we then focused on 2023 with the next two maps, this allowed us to isolate some data about Texas. These maps were produced by changing the manipulation of the original heat map as well as focusing on one year. We then wanted to see what these companies were and what they were dumping. We then manipulated the type of map so that we could make it clear what areas and companies were dumping the most. We did this by doing the following bubble style map. Which allows you to hover over the spots to see how much waste, chemical, industry and even if the waste is considered a carcinogen.

Kalan (demo & conclusion) - With the story we are telling we were able to first look at Texas and visibly see what year has the most waste, as well as take a deep dive into what exactly was being dumped.

The last two maps allowed us to visibly see what area of Texas has the most amount of dumping as well as take a deeper dive into those specific companies while also putting a visualization of just how much more that specific company was dumping. We discovered the company that dumps the most amount of waste at 42,032,004 lbs of waste in the year of 2023 is a company in Midland with its parent company being Targa Resources Group. However that's a lot, at least we can rest at night knowing that they aren't carcinogenic chemicals.