Evaluation of air quality within different states in the US

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Project Description

Description of data set:

The dataset consists of 1. Air pollutants (O3, CO, SO2, NO2, PM10) in different states (Illinois, California, Florida, North Dacota). of the US: Rows: 463,218 // Cols: 7

A data set shows air pollutant concentrations for 5 criteria i.e. O3, CO, SO2, NO2, and PM10. The variable “pred_weight” shows concentrations of pollutants in $\mu g/m^3$. The title lat and lon represent the latitude and longitude of the specific place where the data were measured and noted. O3 and CO are measured as parts per million (ppm). NO2, and SO2 are measured as parts per billion (ppb).

Info for Decision Making: Threshold for pollutants O3, CO. SO2, NO2, and PM10 concentration thresholds are based on standards set by WHO (World Health Organization) and EPA (Environmental Protection Agency).

- O3: 0.070 ppm exposure for 8 hours.
- CO: 9 ppm (8 hours) and 35 ppm (1 hour). > Not to be exceeded more than once per year
- SO2: 75 ppb (1 hour, 3 years average) and 0.5 ppm (3 hours, year)
- NO2: 100 ppb (1 hour, 3 years average) and 53 ppb (year, annual mean)
- PM10: 150 $\mu g/m^3$ (24 hours, 3 years average)

Dataset: https://www.caces.us/data [Accessed: 09/19/2024] In a CSV file

2. Temperature variation of the above states over years (using NOAA, National Centers for Environmental Information dataset from 1991 to 2020).

- CSV file 1 (Bismarck 2.4 NNW, ND US) Rows: 13 // Cols: 313
- CSV file 2 (Springfield Capital AP, IL US) Rows: 13 // Cols: 413
- CSV file 3 (Tallahassee AP, FL US) Rows: 13 // Cols: 413
- CSV file 4 (Sacramento, CA US) Rows: 13 // Cols: 385

A data set of 4 cities i.e. capital cities of four selected states of the US. The information of capital cities of selected states is given below

Regions in US State Selected city North North Dakota (ND) Bismarck Mid Illinois (IL) Springfield South Florida (FL) Tallahassee West California (CA) Sacramento

The dataset consists of temperature variations in the abovementioned cities from 1991 to 2020. CSV file includes daily max, daily min, mean, standard deviation, cooling degree days, heating degree days, and mean number of days. The data are given in every month from 1991 to 2020.

Dataset: Palecki, Michael; Durre, Imke; Applequist, Scott; Arguez, Anothony; Lawrimore, Jay. 2021: U.S. Climate Normals 2020: U.S. Hourly Climate Normals (1991-2020). [indicate subset used]. NOAA National Centers for Environmental Information. https/doi.org/. Accessed [09/19/2024] In a CSV file

Reference: - https://www.epa.gov/criteria-air-pollutants/naaqs-table - https://www.eea.europa.eu/publications/status-of-air-quality-in-Europe-2022/europes-air-quality-status-2022/world-health-organization-who-air

Proposal: 1. In this research, our team will track the air pollutants in different states of the US. O3, CO, SO2, NO2, and PM10 are the subjects of the investigation. The five states of the US, North Dakota (north), Illinois (mid), Florida (south), and California (west) are the regions for measuring air pollutants.

2. The historical trend (temperature change) of the air pollutants will also be investigated along with the US State data. From 1991 to 2020, the variation of climate (such as mean temperature by months) and air pollutants will be compared to evaluate their correlation.

3. The ultimate goal of this research will be to alert each investigated States of increasing air pollutant and to come up with ideas for mitigating them. Also, the monthly temperature and air pollutants will be compared to notice when the air pollutants are maximized with an understanding of their distribution.

References