

Investigation of Particulate Matter 2.5 and Other Air Pollutants impact on COVID-19 Pandemic will be explained.

Introduction:

As a part of the team project, in this section an Investigation of Particulate Matter 2.5 and Other Air Pollutants impact on COVID-19 Pandemic will be explained.

Project description: World Health Organization reports show that Air pollution is Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. According to the report "Pollutants of major public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulfur dioxide. Outdoor and indoor air pollution cause respiratory and other diseases and is an important source of morbidity and mortality." The study team is interested to look at the link between exposure to fine particulate air pollution M2.5, Nitrogen Dioxide, Sulphur, Carbon Monoxide and temperature and the death from COVID-19 occurred in DC, Maryland and Virginia.

Motivation: The team, concerned with the increasing number of deaths of the target residents due to the Covid – 19, initiated this project to investigate if there is association between the gaseous elements and covid disease.

Goal: The goal is to investigate whether NO₂, CO, SO₂, Temp, PM_{2.5} correlate one another and whether these gaseous elements aggravate the Covid-19 cases in the project target areas.

Method:

To evaluate the Environmental Pollutants PM_{2.5}, CO, NO₂, and O₃ on the Incidence and Mortality of Covid 19 in DMV, the study use historical data obtained from Environmental Protection Agency and National Climate data Center. Data Visualization, Machine Learning, Prediction and Linear Regression model and correlation analysis of PM_{2.5}, CO, NO₂, and O₃ data will be made to determine their impact on the Pandemic.



Data Source and Description

The datasets were collected from the US -Environmental Protection Agency (US-EPA). Initially the dataset collected contained 879531 Columns and 29 Rows.

1.	State Code	10.	Parameter Name	19.	AQI
2.	Address	11.	Sample Duration	20.	Method Code
3.	Longitude	12.	Pollutant Standard	21.	Method Name
4.	Latitude	13.	Date Local	22.	Arithmetic Mean
5.	Parameter Occurrence Code	14.	Units_of_ Measure	23.	1 st Max Value
6.	Datum	15.	Event Type	24.	1 st Max Hour
7.	County Code	16.	Observation Count	25.	Local Site Name
8.	Site Num	17.	Observation Percent	26.	State_ Name
9.	Longitude	18.	Date of Last Change		
27.	County _Name				
28.	City Name				
29.	CBSA Name				

Dimension Reduction:

Data Reduction improves the interpretation of the parameters of the machine learning model by removing irrelevant data. Cognizant of this fact ,since the collected dataset had many attributes some of which were irrelevant to data mining, or some are redundant., the study used attribute Subset Selection Method to reduces the volume of data by eliminating the redundant and irrelevant attribute.

Workable Datasets:

DeathIncrease: Monthly Death Rate of the target due to Covid

Ozone_ Contain: Monthly Ozone Concentration of Ozone

NO2_Contrn: Monthly Ozone Concentration of Nitrogen Oxide

CO_ Concn: Monthly Ozone Concentration of Carbon Monoxide

Temp_ Avg: Monthly Ozone Concentration of Temperature

SO2 _Content: Monthly Ozone Concentration of Sulfur Dioxide

Next Steps



References:

- [Effect of environmental pollutants PM2.5, CO, No2, and O3 on the incidence and mortality of SARS-CoV-2 infection in five regions of the USA](#)
- [\(PDF\) Effect of environmental pollutants PM2.5, CO, No2, and O3 on the incidence and mortality of SARS-CoV-2 infection in five regions of the USA \(researchgate.net\)](#)
- [Evaluating the Contribution of PM2.5 Precursor Gases and Re-entrained Road Emissions to Mobile Source PM2.5 Particulate Matter Emissions \(epa.gov\)](#)
- [Washington Air Quality Index \(AQI\) and Washington, D.C. Air Pollution | AirVisual \(iqair.com\)](#)
- [Effects of SO2 and NOx emission reductions on PM2.5 mass concentrations in the southeastern United States - PubMed \(nih.gov\)](#)
- [Order History | Climate Data Online \(CDO\) | National Climatic Data Center \(NCDC\) \(noaa.gov\)](#)
- [Effect of Environmental Pollutants PM2.5, CO, NO2, and O3 on the Incidence and Mortality of SARS-CoV-2 Infection in Five Regions of the USA](#)

- World Health Organization, [Air pollution \(who.int\)](https://www.who.int/air-pollution)