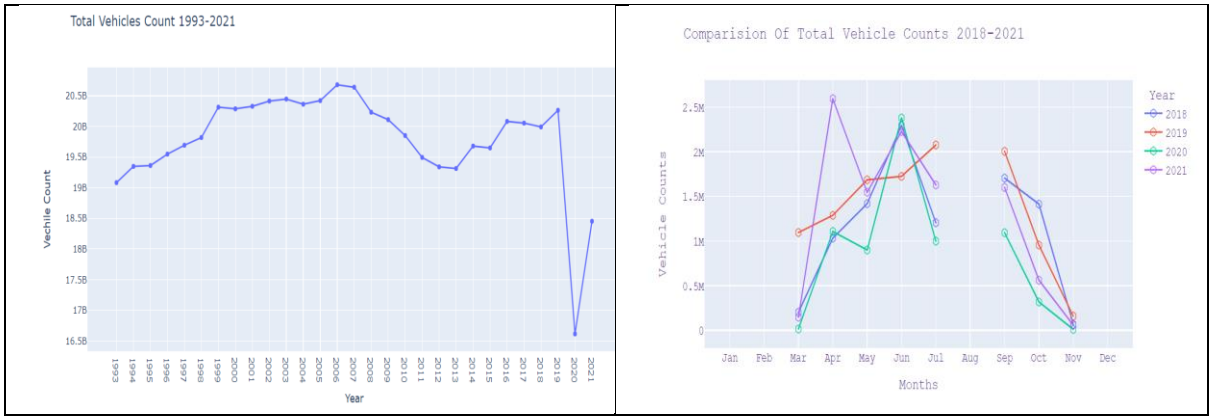
Summary Report

This project concerns the change in concentration of harmful gases release via traffic during the covid-19 period. During the lockdown phases of covid-19, people forced to remain at their homes because of which there are various changes in the environment specially in urban areas. Due to lockdown the traffic stops on the street for the first time at such a large scale and reduced the emission of pollutant gases and hence improved the AQI. NO2 is the main gas released by traffic in urban environment and hence plays an important role in AQI of a region. London has been chosen for this analysis.

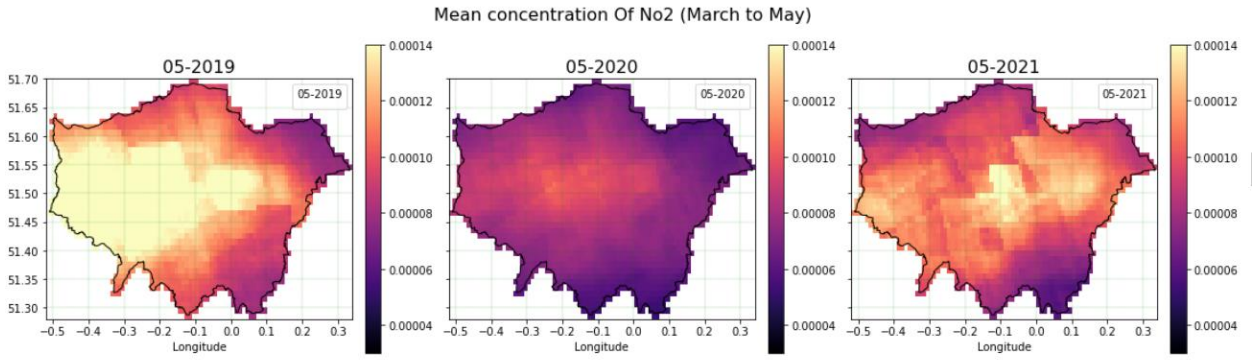
The project will analyse whether there has been any drop in NO2 concentration in covid-19 with respect to traffic.

Key outcomes or takeaways from your solutions:

The traffic has tremendously dropped during 2020 and majorly during lockdown phase (April 2020 to May 2020). But it increased suddenly after the reponing of 1st phase of lockdown as people were rushing back to their homes.



The mean NO2 concentration is decreased in 2020 during specific lockdown months due to which the 2020 mean concentration has also been dropped.



The Satellite data of tropospheric NO2 shows moderate correlation with the ground station data. Three different correlation coefficients have been used to find the relation between the satellite and ground data.

Correlation Method	Correlation	pvalue
Pearson Correlation Cofficient	0.4707544894579632	1.191920765055246e-37
Spearman correlation cofficient	0.37304170662256736	3.4613966737717965e-23
Kendall Cofficient	0.2610338036354244	1851570849598416e-23

The Pearson shows a moderate correlation whereas the other shows low correlation.

The ground station data shows 23% mean decline in NO2 concentration from 2019 to 2020 and 4% mean decline from 2021.

In order to reduce the pollution, the limitation of road traffic could not suffice, but there is a need of a vision aimed at reconsider the polluting effects caused by the vehicle.

How did your solution involve geospatial data

The solution involved the following geospatial data:

Sentinel-5p - Tropospheric vertical column NO_2 data. The data is used to see the spatial variation of NO2 data over a time period of 2019-2020. Both raster and mean statistic value has been used to see the trend with respect to Traffic data.
AURN – AURN are the pollutant monitoring station in London. It measures several pollutants over different locations. The data has daily temporal availability but lags spatially compared to satellite data.
The data is used to validate the NO2 satellite data and see the trend of NO2 variation from ground station data.
Traffic Data – The Traffic statistics data has been extracted from the UK Govt. site. It presents the vehicle count over different major and minor roads in London

Required improvements in terms of data

1. **Incomplete Traffic Data:** The traffic count data collected from UK Govt side has major gap. The data is present from March to July and then September to November.
2. **Sentinel-5p:** The sentinel-5p data has very coarse resolution and can not evaluate everything happening on ground. Better resolution data can be used to get better information or find better correlation analysis.

Required improvements in terms of Methodology

1. **Correlation Between Traffic and Pollutant Data:** A correlation model can be developed between the pollutant and traffic data to see whether they have direct relation to each other or not.
2. **Predictive Model for NO2:** The No2 value can be predicted for 2020 based on 2019 values and then the actual value can be compared with predictive one to see the changes in better way.
3. **Spatio-Temporal Regression Kriging:** The satellite data has spatial advantage whereas ground data has better information and temporal resolution. Both the data can

be used to generate a robust value of pollutant in terms of both Spatial and Temporal Resolution.