

Information for SIH1734 (Smart India Hackathon: Downscaling of Satellite-based Air Quality Maps using AI/ML)

Data source:

1. Satellite derived daily Tropospheric NO₂ from **either** of the following links:

(a) Daily Tropospheric NO₂ from TROPOMI/Sentinel-5p – Swath data

[https://search.earthdata.nasa.gov/search/granules?p=C2089270961-GES_DISC&pg\[0\]\[v\]=f&pg\[0\]\[gsk\]=-start_date&q=tropomi%20no2&tl=1726635700.002!3!!](https://search.earthdata.nasa.gov/search/granules?p=C2089270961-GES_DISC&pg[0][v]=f&pg[0][gsk]=-start_date&q=tropomi%20no2&tl=1726635700.002!3!!)

(b) Daily Tropospheric NO₂ from TROPOMI/Sentinel-5p (using google earth engine) – gridded geotif format

https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S5P_OFFL_L3_NO2#description

(c) Daily Tropospheric NO₂ from OMI/Aura – gridded data

[https://search.earthdata.nasa.gov/search/granules?p=C1266136111-GES_DISC&pg\[0\]\[v\]=f&pg\[0\]\[gsk\]=-start_date&q=omi%20tropospheric%20no2&tl=1726635700.002!3!!](https://search.earthdata.nasa.gov/search/granules?p=C1266136111-GES_DISC&pg[0][v]=f&pg[0][gsk]=-start_date&q=omi%20tropospheric%20no2&tl=1726635700.002!3!!)

(d) Daily Tropospheric NO₂ from OMI/Aura – gridded data

https://measures.gesdisc.eosdis.nasa.gov/data/MINDS/OMI_MINDS_NO2d.1.1/2024/

2. Either of the above data (daily tropospheric NO₂) to be used in conjunction with ground-based NO₂ concentration monitored by CPCB: <https://app.cpcbcr.com/ccr/#/caaqm-dashboard-all/caaqm-landing> (go to Advance Search to download data for different stations)

Machine learning algorithm

Generally, Random Forest, XGBoost and Neural Network (ANN/CNN) are good for downscaling. However, students may explore different AI/ML algorithms and can decide themselves which algorithm to be used.

Methodology

Students may go through the research article on downscaling of satellite-based tropospheric NO₂ (just google it). Innovative, novel and efficient approach for the stated problem is anticipated.

Note:

If you wish, you may explore downscaling of additional air quality parameters (e.g., PM_{2.5}/AOD, CO, etc.).