

# An Artificial Intelligence Approach for Situation-Aware Prediction of Air Quality, based on MODIS and MISR Big Data Time Series

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The continuously deteriorating air quality in major developing nations is a challenge for sustainability of healthy human race. One of the worst recent toxic smog formations was in the National Capital Territory of Delhi (NCT) in India during November-December 2017. Finding the multidimensional causality aspects of this dangerously hazardous situation is an important direction of research before finding any practical recommendations; henceforth any resilient solution. This research presents a prototype model for utilization of heterogeneous Satellite and ground-based sensor data sets comprising Air Quality Index (AQI), Satellite retrievals of aerosol optical depth (AOD) and surface reflectance in various bands, to identify the causality patterns (particularly the effect of kharif crop shoot burning in neighboring states of Delhi (NCT) viz. Punjab, Haryana and Uttar Pradesh). The approach comprises Artificial Intelligence (AI) techniques for logical representation of heterogeneous satellite Big Data and data from *in-situ* ground-based sensor, learning causality relation weights supplemented with inference and prediction capabilities. We have utilized Satellite retrievals of aerosol optical depth (AOD) from MODIS and MISR (Multi-angle Imaging Spectroradiometer) Satellites along with New Delhi Historical data of Air Quality Index (AQI) from AirNow (Environment Protection Agency, USA) and data from Central Pollution Control Board, Government of India. This prototype approach of AI derived process pipeline can be easily replicated for other locations with capabilities such as timely forecast/warning issue and other long-term recommendations.

Keywords: Artificial Intelligence, Air Quality Index (AQI), Situation-Aware, Big Data, Time Series