INDIA INTERNATIONAL SCIENCE FESTIVAL 2023

SCIENCE AND TECHNOLOGY PUBLIC OUTREACH IN AMRIT KAAL

SPACE HACKATHON

H2S HACKTHETILL

Team Name: **Dynamiccoders**

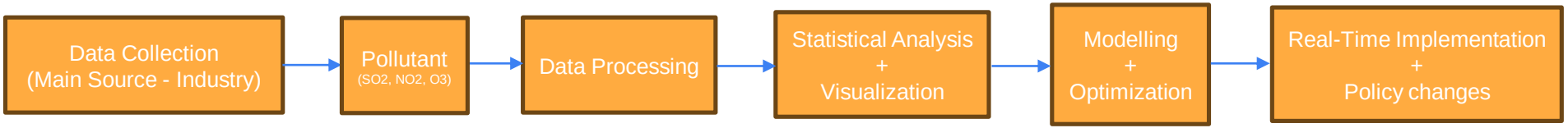
Name of Institute: **Indian Institute of Information Technology, Vadodara**

Problem Statement: **Data dynamics using DL/ML over a time scale - A cluster/trend analysis**

Team Members: **Apoorv Pathak, Manoj Kumar Gautam, Indraneela Doradla**

Brief Idea

- The primary idea is to forecast the changes in the air quality index(AQI) which will help in bringing critical policy reforms specially for the areas where a notable increase in the AQI is observed. Another aim of the analysis is to gain insights about the composition of pollutants in the climate, their emissions sources based on location & time zones.
- Ultimately, we will built a ML/DL model that will help us predict & forecast about the emission of the pollutants in the future. Further, domain experts can help us design relevant policies.



Solution Approach

- Data/cluster analysis begins with the process of the data collection, a mid-sized dataset is taken into consideration to perform analysis that uncover patterns, identify potential insights, & temporal variations.
- Further, a detailed understanding of the data is a necessity. Therefore, exploratory data analysis(EDA) is performed to understand the statistics, distributions, time-series analysis, patterns, trends hidden within the data.
- To perform the trend analysis of a time-series data a nonparametric tests, Spearman's Rho (ρ) test and Mann-Kendall's test is taken into consideration. Correlation analysis, cluster analysis, extreme events analysis, & public health analysis will also be affiliated to this analysis.
- To generalize this approach & develop a machine level intelligence, a forecasting model will also be developed that will help in predicting & forecasting the future impacts of any event.
- Code Repository: https://github.com/ApoorvPathak2003/SIF-Space-Hackathon-2023

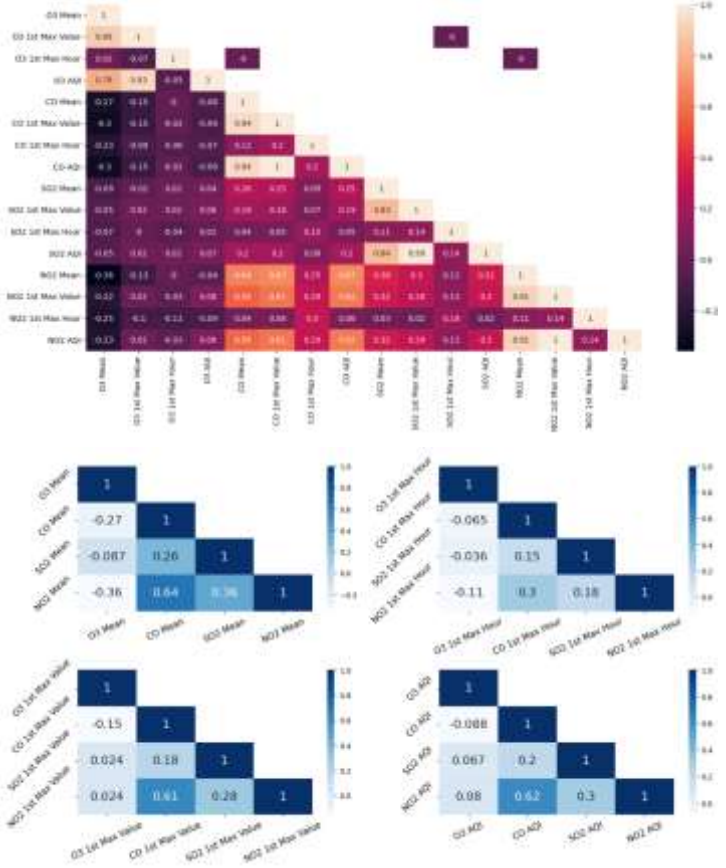
References:

1. https://www.askpython.com/python/examples/spearman-correlation-python
2. https://www.analyticsvidhya.com/blog/2023/07/mann-kendall-trend-test-using-python/
3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1256378/pdf/amjphnation00159-0126.pdf

Expected Outcomes

Expected outcome of this analysis includes the following:

- Identifying the trends of pollutants emission based on the location, & different time zones.
- Monitoring the major pollutants causing pollution & its affect on the nature.
- Acknowledge the pollutants source & its cause.
- Forecast the rate of emission of the pollutants & its hazardous impact, if not controlled..
- Building laws & policies to control the emission of pollutants.
- Communicating the AQI information to the public.
- Implementing warning systems to avoid accidents.



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THANK YOU

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