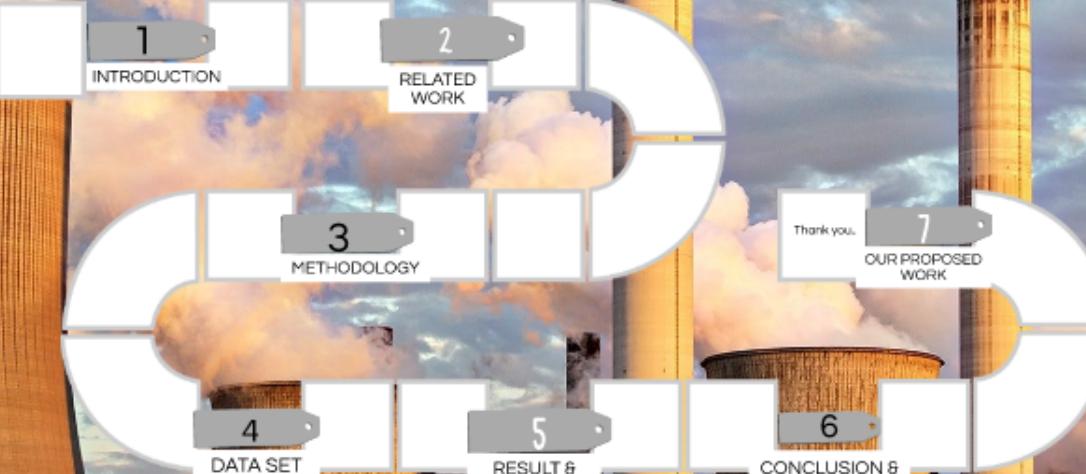


AIR POLLUTION



Collaborators

Analysis of Air Pollutants in Major Cities of Bangladesh and Forecasting Air Quality Index(AQI).

Intro

Chosen paper

Abstract

GROUP MEMBERS

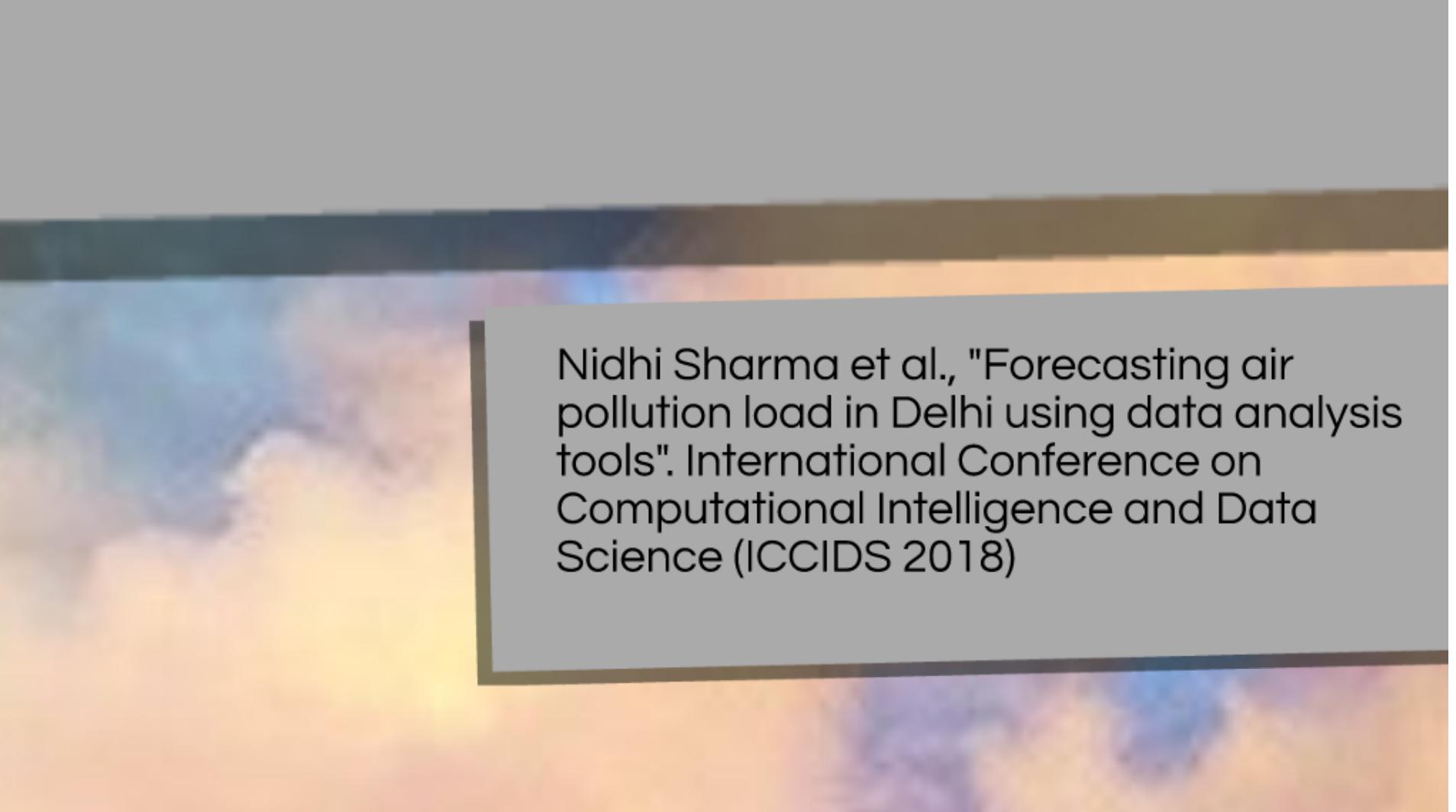
AL-SADMAN CHOWDHURY

ARNOB TANZIM

FARIHA NOOR

MD SHIHAB UDDIN

AKIBA AMRIN



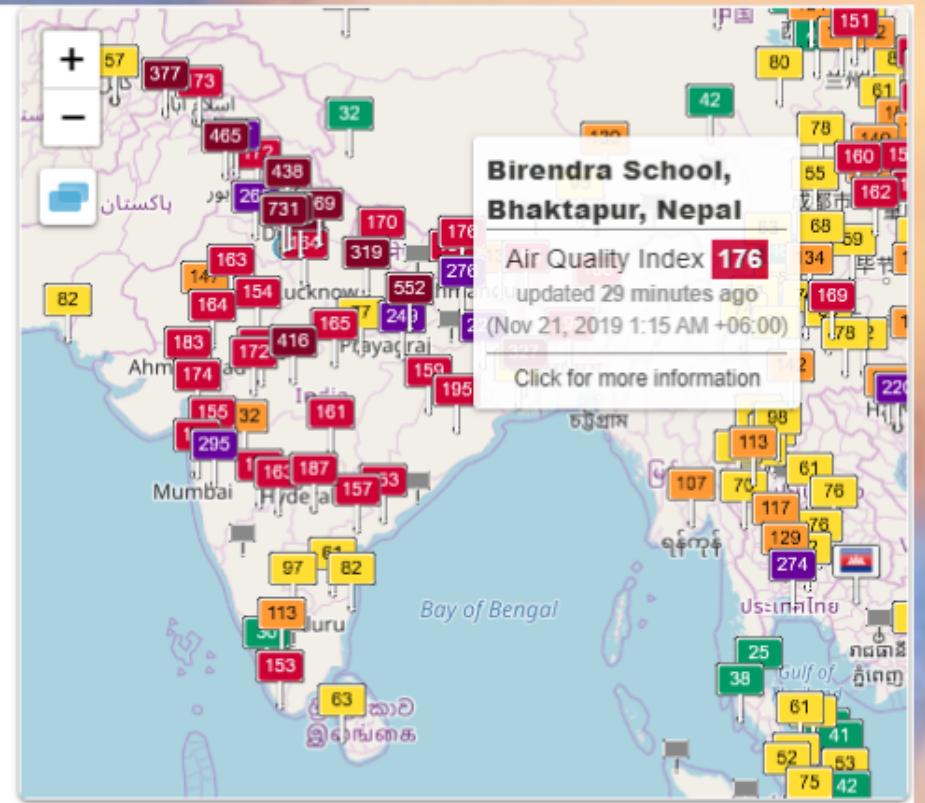
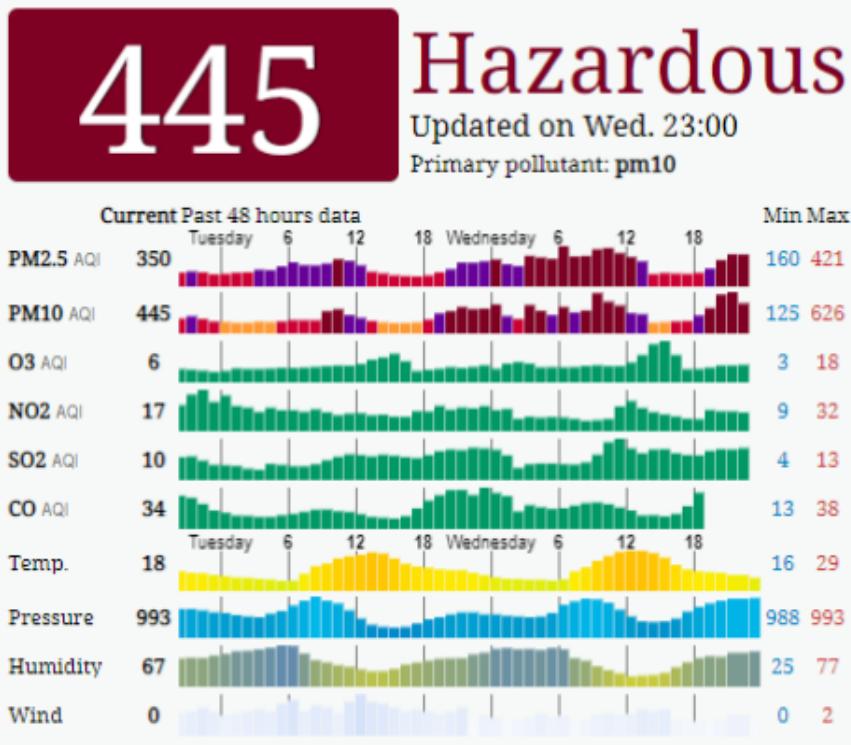
Nidhi Sharma et al., "Forecasting air pollution load in Delhi using data analysis tools". International Conference on Computational Intelligence and Data Science (ICCIDDS 2018)



Introduction

Introduction

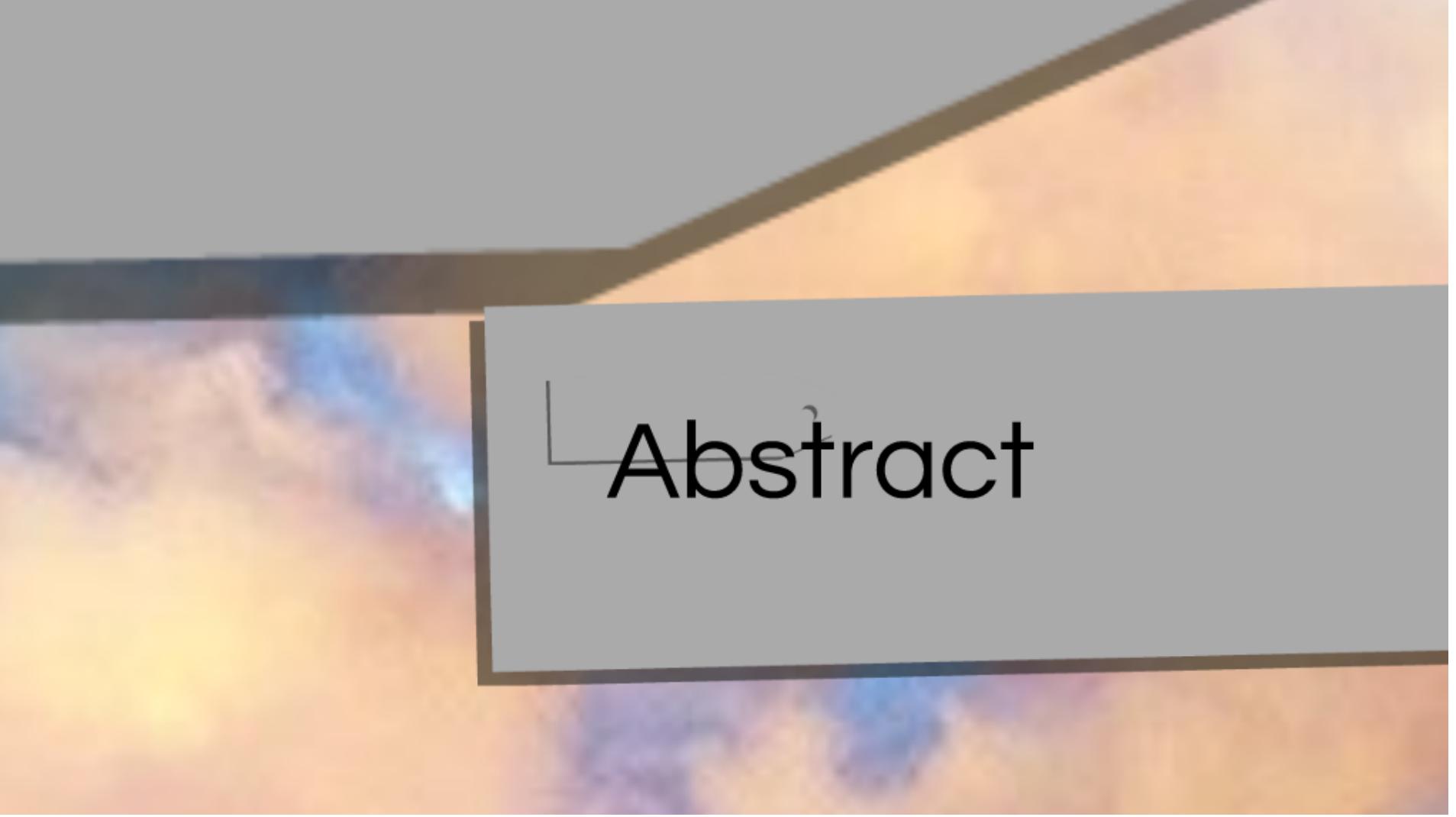
Delhi Institute of Tool Engineering, Wazirpur, Delhi



Picture showing the hazardous condition of air pollution of Delhi. Source: aqicn

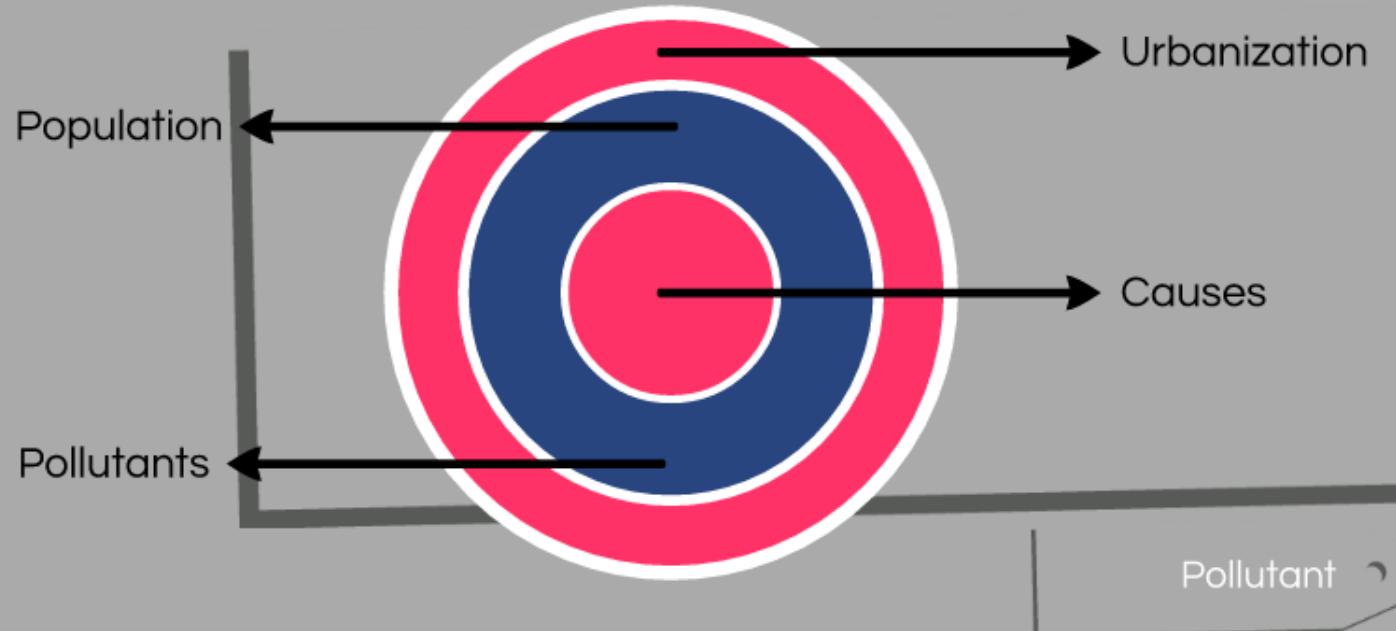


Picture showing the drastic effects of air pollution in Delhi.
Source: The Economic Times

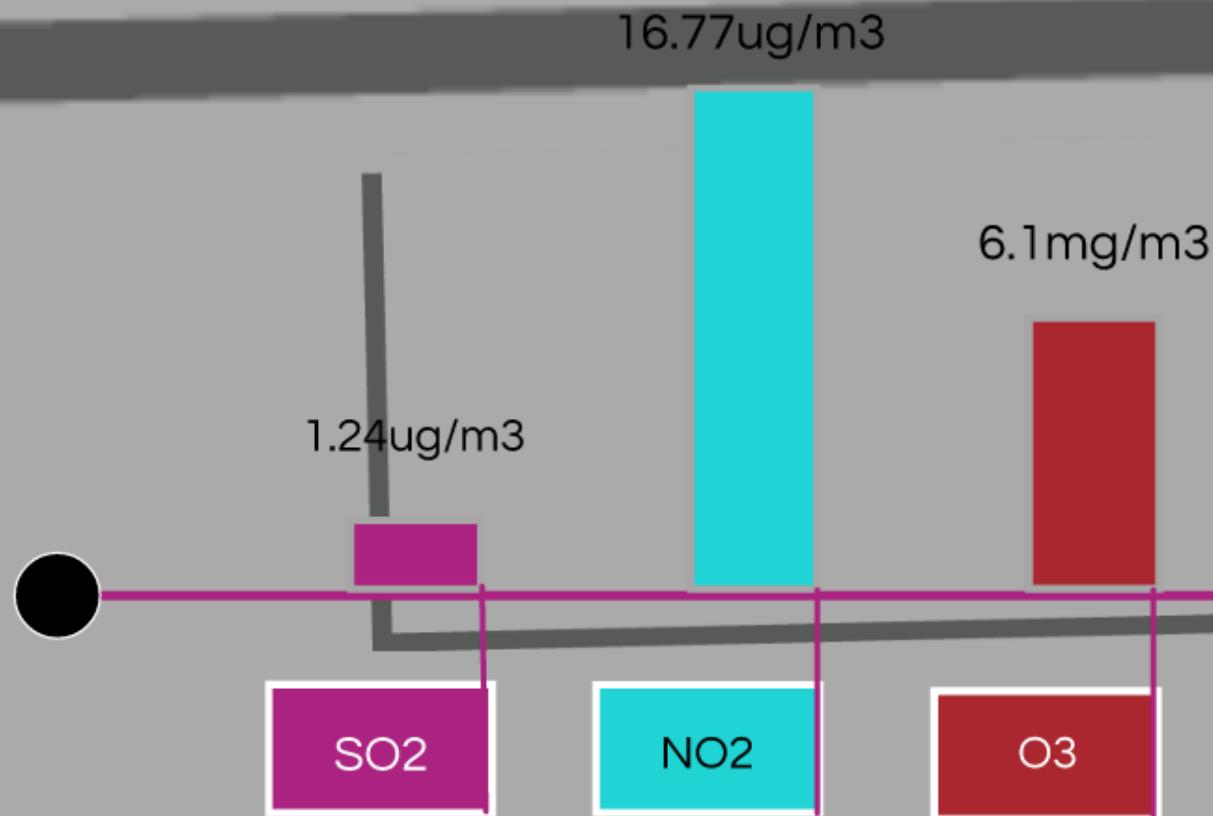


Abstract

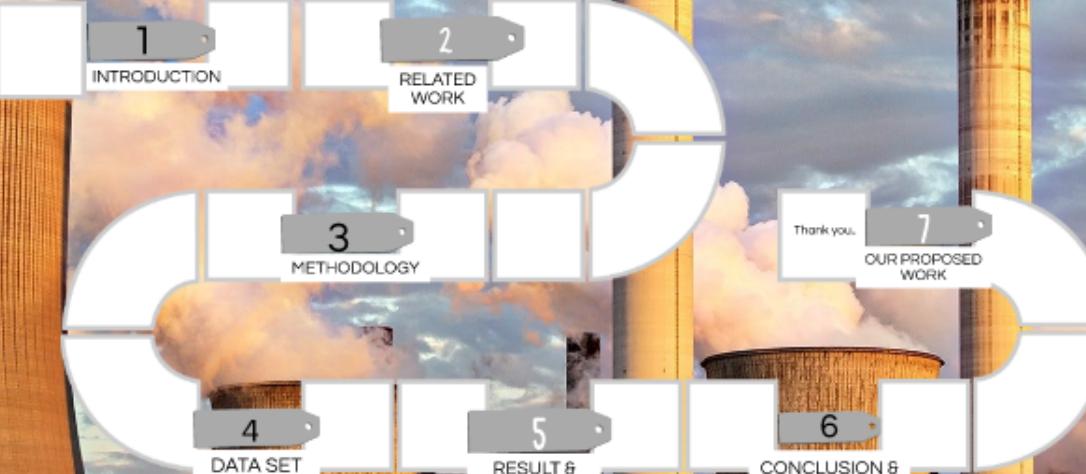
Abstract



Air Pollutants



AIR POLLUTION





Related Works

Lists

Related Works

- "A systematic review of data mining and machine learning for air pollution epidemiology" - by Dr. Jabbar (2017)
- "Air Quality Prediction: Big Data and Machine Learning" - By Dr. Kang (2018)
- "A Machine Learning Approach for Air Quality Prediction: Model Regularization and Optimization" - by Dr. Jhu (2019)
- "Machine learning algorithms in air quality modelling" - by Masih (2019)
- "Machine learning-based rapid response tools for regional air pollution modelling" - by Xiao (2019)

AIR POLLUTION



FLOW CHART

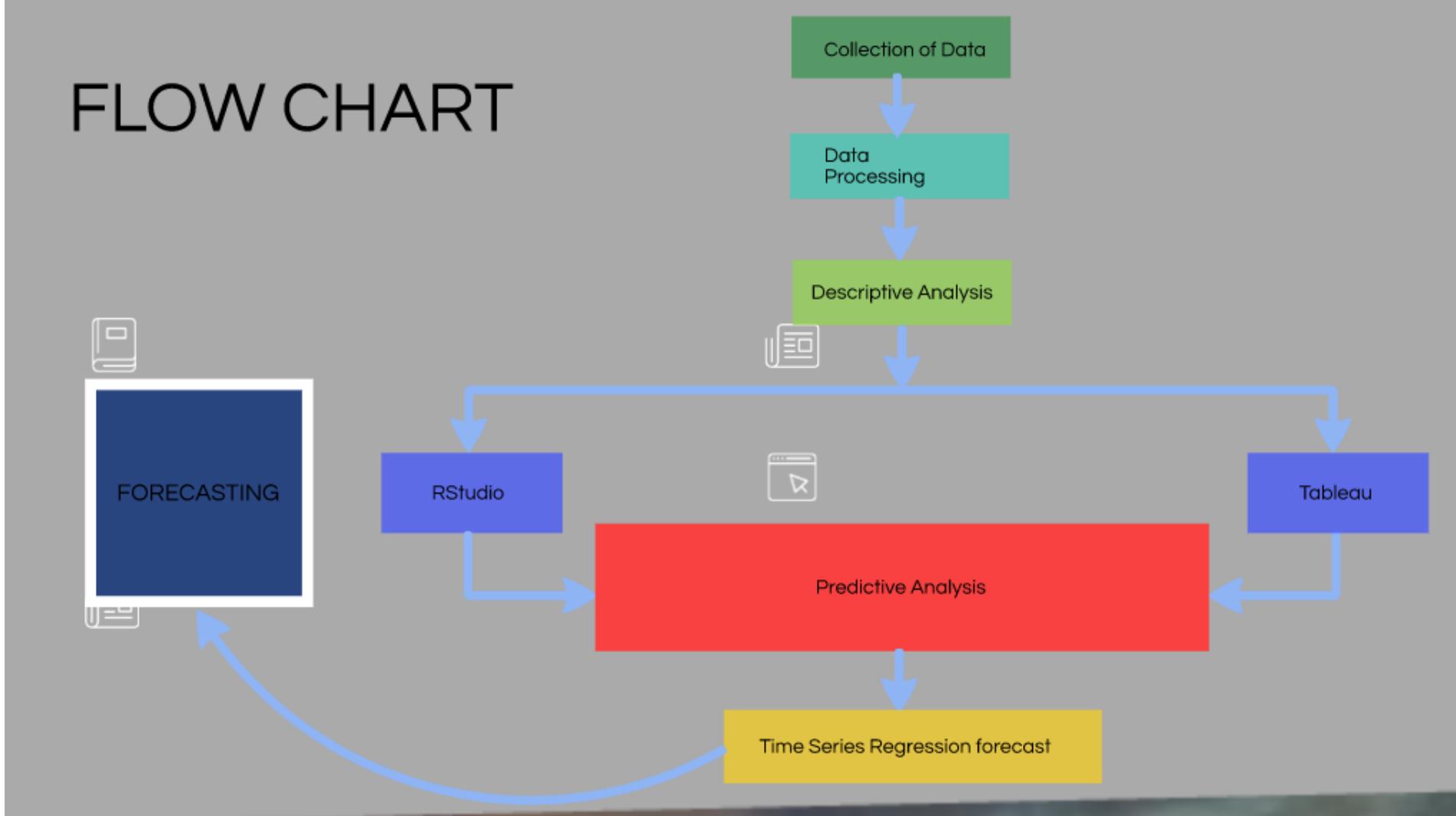
METHODOLOGY



Approach

Methods

FLOW CHART



PROPOSED APPROACH

- Collection of DATA SET.
- Pre Processing of DATA (Removing Redundancy)
- Descriptive Analysis(Rstudio, Tableau)
- Predictive Analysis
- Forecasted DATA

METHODS & TECHNIQUES INVOLVED

DESCRIPTIVE ANALYSIS :

Descriptive analysis has been used in the study to analyze the basic characteristics of data.

PREDICTIVE ANALYSIS :

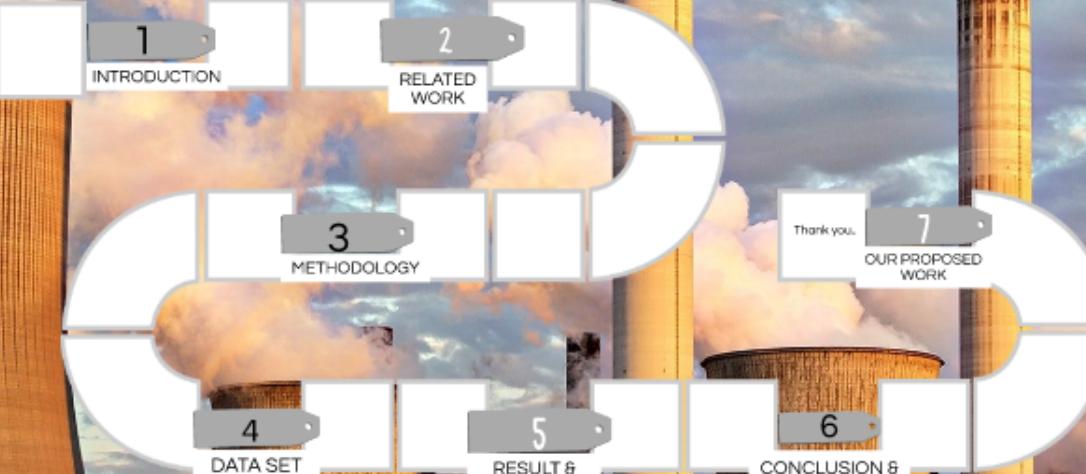
Predictive analytic is the use for statistics and machine learning techniques to predict about the future (unknown data). The goal is to predict the probable future through past experience.

TIME SERIES REGRESSION FORECASTING :

Time series regression forecasting is used for analyzing time series data in order to study the behavior of data with respect to time.



AIR POLLUTION





Our Proposed Work

Resources

Resources

Resources

Our Proposed Work

Analysis of Air Pollutants in Major Cities of Bangladesh and Forecasting Air Quality Index(AQI).

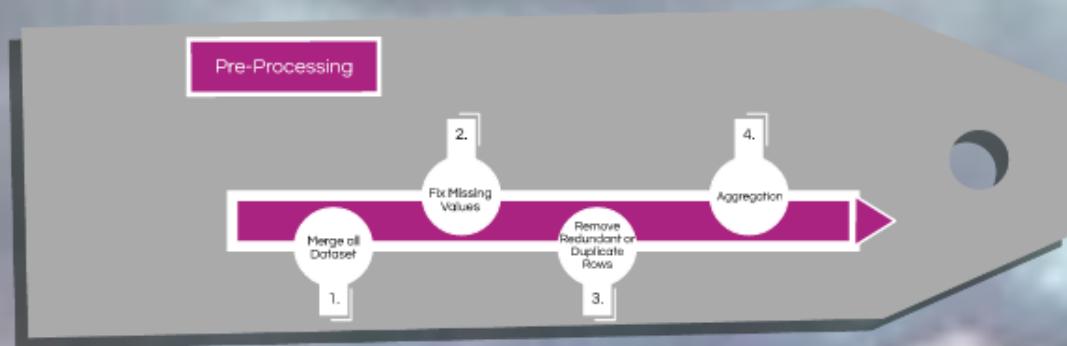
Available Data

- Date, Location, Air Quality Index
- PM2.5, PM10, SO2, NO2, CO, and O3
- Max Temperature, Min Temperature, Rainfall, Wind Speed, Sunshine, Air Pressure, Humidity, Cloud

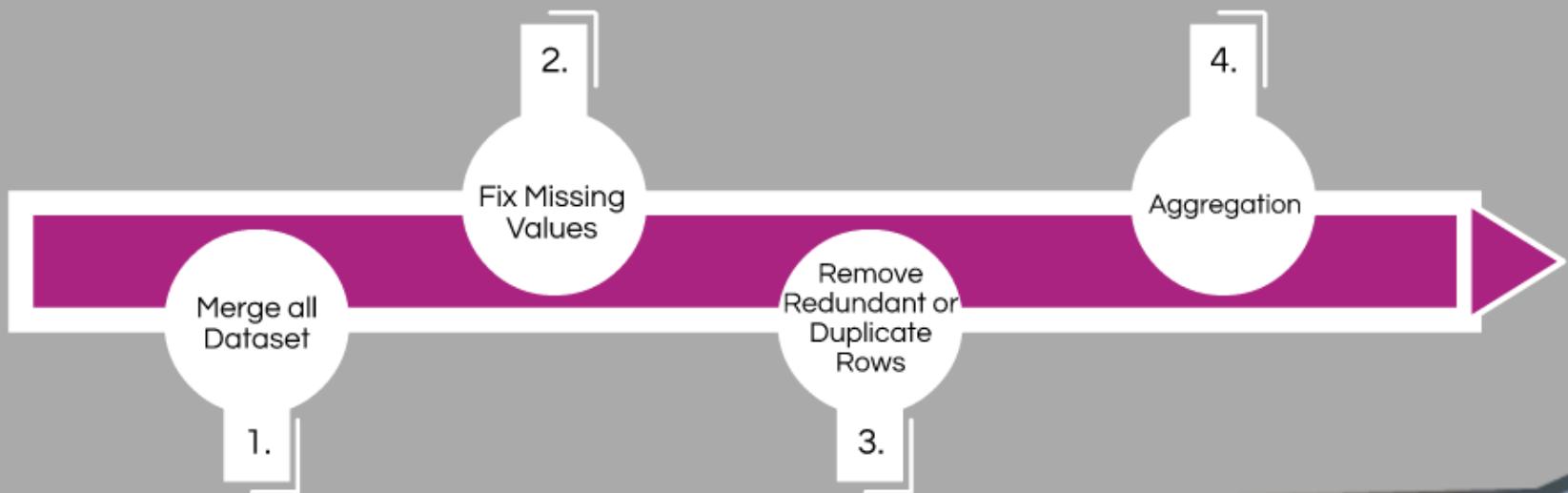
Sources: US Embassy, Department of Environment Bangladesh, and Bangladesh Meteorological Department

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Date	Program	Date (JST)	Year	Month	Day	Hour	Forecast Cond	ACI	ACI Category	Rain Chance	Cloud Unit														
2	Dhaka	PM2.5 - Principal	2019-01-01 1:00	2019	1	1	1	173.1	223	Very Unhealthy	161	UG-MD														
3	Dhaka	PM2.5 - Principal	2019-01-01 2:00	2019	1	1	2	162.6	211	Very Unhealthy	142	UG-MD														
4	Dhaka	PM2.5 - Principal	2019-01-01 3:00	2019	1	1	3	163.8	250	Very Unhealthy	179	UG-MD														
5	Dhaka	PM2.5 - Principal	2019-01-01 4:00	2019	1	1	4	174.9	225	Very Unhealthy	189	UG-MD														
6	Dhaka	PM2.5 - Principal	2019-01-01 5:00	2019	1	1	5	177	259	Very Unhealthy	161	UG-MD														
7	Dhaka	PM2.5 - Principal	2019-01-01 6:00	2019	1	1	6	172.4	223	Very Unhealthy	172	UG-MD														
8	Dhaka	PM2.5 - Principal	2019-01-01 7:00	2019	1	1	7	163.6	241	Very Unhealthy	191	UG-MD														
9	Dhaka	PM2.5 - Principal	2019-01-01 8:00	2019	1	1	8	174.8	241	Very Unhealthy	212	UG-MD														
10	Dhaka	PM2.5 - Principal	2019-01-01 9:00	2019	1	1	9	165.3	255	Very Unhealthy	161	UG-MD														
11	Dhaka	PM2.5 - Principal	2019-01-01 10:00	2019	1	1	10	171.2	201	Very Unhealthy	117	UG-MD														
12	Dhaka	PM2.5 - Principal	2019-01-01 11:00	2019	1	1	11	179.1	188	Unhealthy	88	UG-MD														
13	Dhaka	PM2.5 - Principal	2019-01-01 12:00	2019	1	1	12	88	162	Unhealthy	56	UG-MD														
14	Dhaka	PM2.5 - Principal	2019-01-01 1:00	2019	1	1	13	62	154	Unhealthy	26	UG-MD														
15	Dhaka	PM2.5 - Principal	2019-01-01 2:00	2019	1	1	14	47.9	132	Unhealthy for Sensitive Groups	34	UG-MD														
16	Dhaka	PM2.5 - Principal	2019-01-01 3:00	2019	1	1	15	49.5	114	Unhealthy for Sensitive Groups	34	UG-MD														
17	Dhaka	PM2.5 - Principal	2019-01-01 4:00	2019	1	1	16	36.9	151	Unhealthy for Sensitive Groups	33	UG-MD														
18	Dhaka	PM2.5 - Principal	2019-01-01 5:00	2019	1	1	17	41.6	143	Unhealthy for Sensitive Groups	44	UG-MD														
19	Dhaka	PM2.5 - Principal	2019-01-01 6:00	2019	1	1	18	78.7	162	Unhealthy	198	UG-MD														

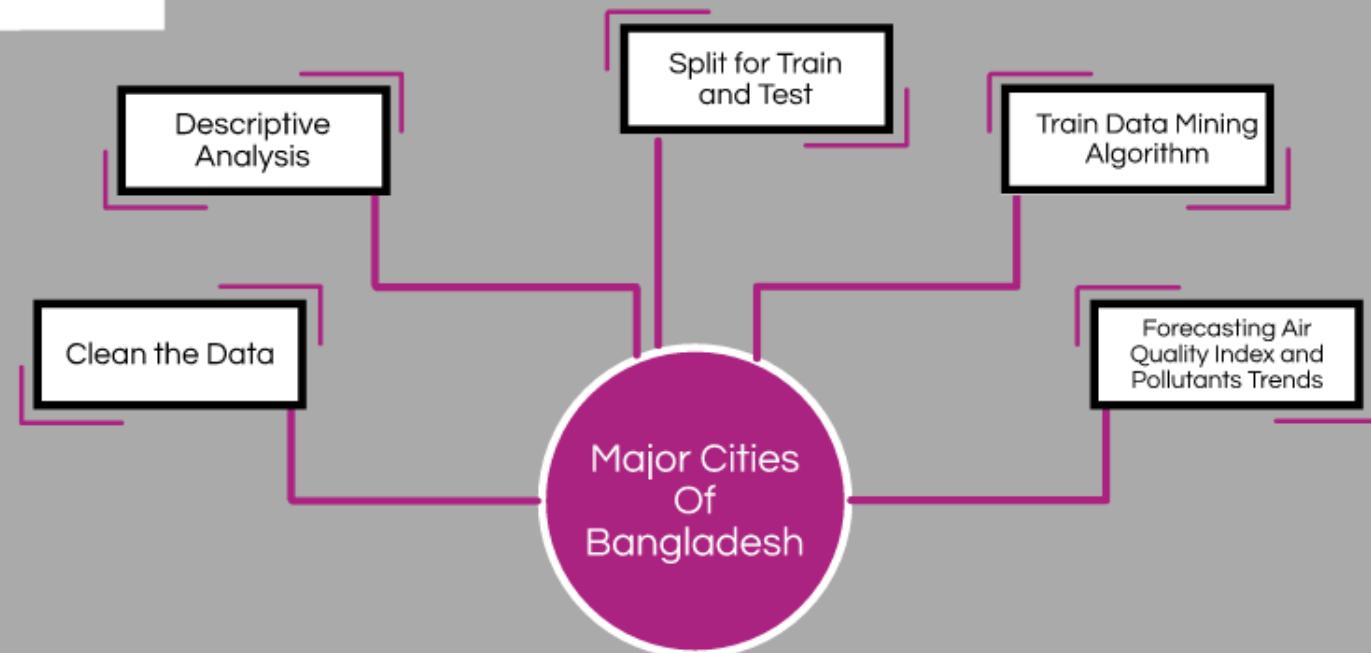
	A	B	C	D	E	F	G	H	I	J	K	L
1	Site	Parameter	Date (LT)	Year	Month	Day	Hour	NowCast Conc.	AQI	AQI Category	Raw Conc.	Conc. Ur
2	Dhaka	PM2.5 - Principal	2019-01-01 1:00	2019	1	1	1	173.1	223	Very Unhealthy	161	UG/M3
3	Dhaka	PM2.5 - Principal	2019-01-01 2:00	2019	1	1	2	160.6	211	Very Unhealthy	148	UG/M3
4	Dhaka	PM2.5 - Principal	2019-01-01 3:00	2019	1	1	3	169.8	220	Very Unhealthy	179	UG/M3
5	Dhaka	PM2.5 - Principal	2019-01-01 4:00	2019	1	1	4	174.9	225	Very Unhealthy	180	UG/M3
6	Dhaka	PM2.5 - Principal	2019-01-01 5:00	2019	1	1	5	172	222	Very Unhealthy	169	UG/M3
7	Dhaka	PM2.5 - Principal	2019-01-01 6:00	2019	1	1	6	172.5	223	Very Unhealthy	173	UG/M3
8	Dhaka	PM2.5 - Principal	2019-01-01 7:00	2019	1	1	7	183.5	234	Very Unhealthy	204	UG/M3
9	Dhaka	PM2.5 - Principal	2019-01-01 8:00	2019	1	1	8	194.6	245	Very Unhealthy	216	UG/M3
10	Dhaka	PM2.5 - Principal	2019-01-01 9:00	2019	1	1	9	189.3	239	Very Unhealthy	181	UG/M3
11	Dhaka	PM2.5 - Principal	2019-01-01 10:00	2019	1	1	10	157.2	208	Very Unhealthy	117	UG/M3
12	Dhaka	PM2.5 - Principal	2019-01-01 11:00	2019	1	1	11	120.1	184	Unhealthy	86	UG/M3
13	Dhaka	PM2.5 - Principal	2019-01-01 12:00	2019	1	1	12	88	168	Unhealthy	56	UG/M3
14	Dhaka	PM2.5 - Principal	2019-01-01 1:00	2019	1	1	13	62	154	Unhealthy	36	UG/M3
15	Dhaka	PM2.5 - Principal	2019-01-01 2:00	2019	1	1	14	47.9	132	Unhealthy for Se	34	UG/M3
16	Dhaka	PM2.5 - Principal	2019-01-01 3:00	2019	1	1	15	40.9	114	Unhealthy for Se	34	UG/M3
17	Dhaka	PM2.5 - Principal	2019-01-01 4:00	2019	1	1	16	36.9	104	Unhealthy for Se	33	UG/M3
18	Dhaka	PM2.5 - Principal	2019-01-01 5:00	2019	1	1	17	51.4	140	Unhealthy for Se	66	UG/M3
19	Dhaka	PM2.5 - Principal	2019-01-01 6:00	2019	1	1	18	78.7	163	Unhealthy	106	UG/M3



Pre-Processing



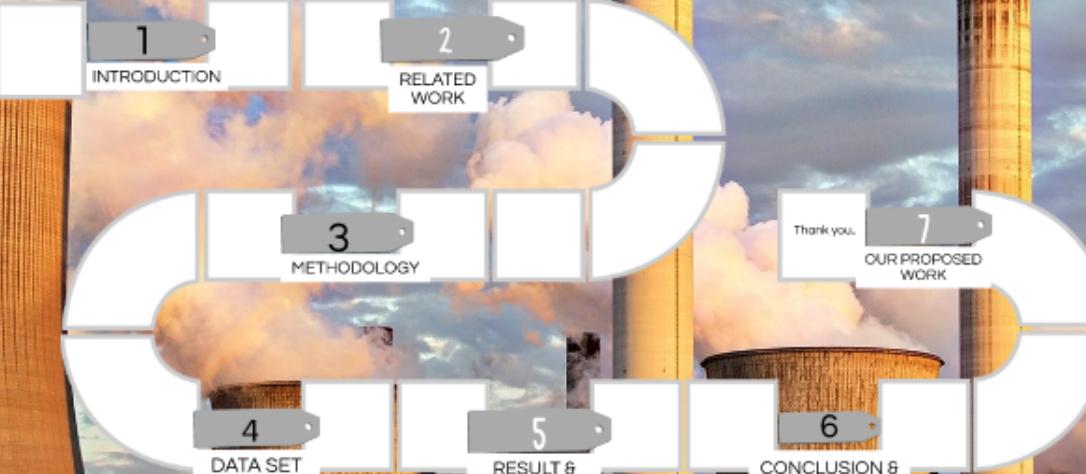
Methodology



Conclusion

Thank You

AIR POLLUTION



DATA SET



SAMPLE DATA

DATA

DATA SET
PROFILE

DATA SET

- Collected from CPBC
- Consists of "TWELVE" Attributes
- Duration of data from 2009-2017

ATTRIBUTES,

ATTRIBUTES

DATE

BENZENE

NO

NO2

TOLUNE

NOX

O3

PM 2.5

PM 10

PXY

SO2

CO

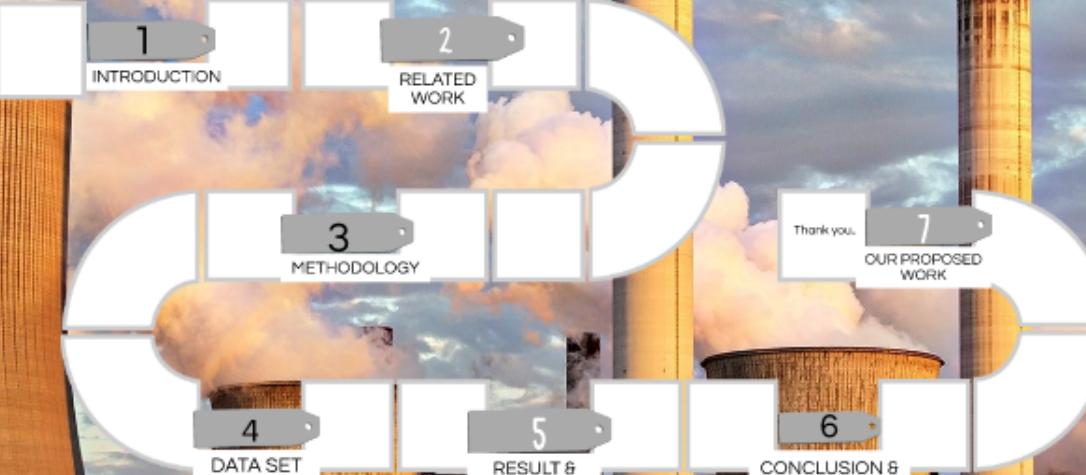
DATA SAMPLE

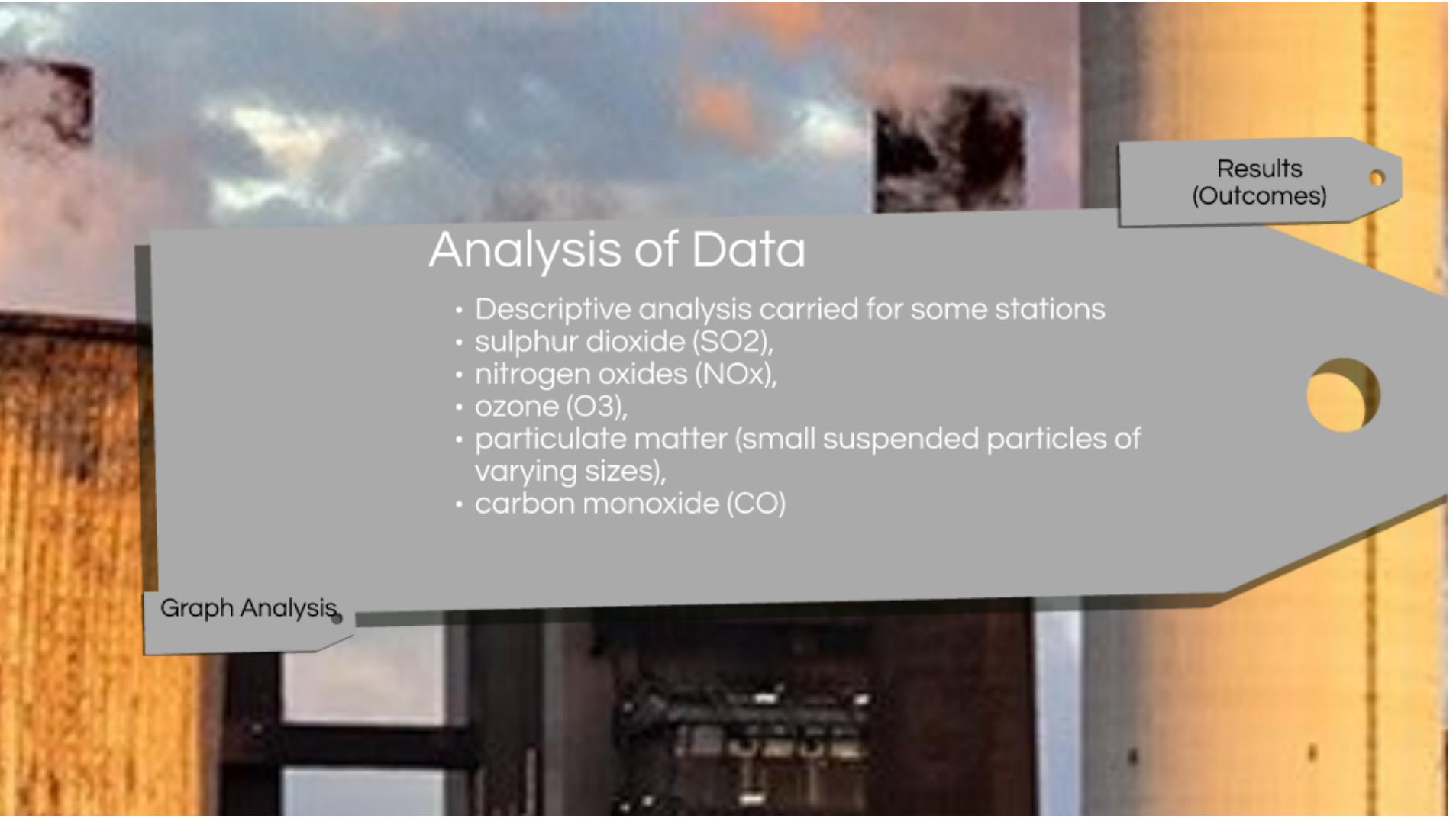
1	Date	benzene(µ NO	NO2	tolune	Nox	O3	pm2.5	pm10	PXY	SO2	CO
2	07/01/20:	3.04	250.71	112.15	7.75	442.3	22.44	469.61	742.25	0.56	32.61
3	08/01/20:	2.28	209.9	95.16	4.03	371.36	12.09	519.68	727.35	0.51	13.9 NA
4	09/01/20:	0.75	151.82	85.5	1.01	283.39	14.22	169.14	476.08	0.39	16.06
5	10/01/20:	1.5	267.57	108.85	1.04	462.4	15.1	280.7	519.8	14.65	18.22
6	11/01/20:	1.87	400.27	125.3	6.28	653.32	39.62	408.91	681.16	18.11	22.41
7	12/01/20:	1.35	168	93.15	6.15	312.42	25.69	289.21	560.1	9.16	26.45
8	13/01/20:	0.81	63.31	81.95	1.44	159.49	15.06	312.28	510.49	10.62	16.66
9	14/01/20:	0.62	98.16	69.33	0.65	195.81	10.74	258.55	475.71	5.61	13.92
10	15/01/20:	0.43	98.76	59.14	0.71	187.52	10.88	183.25	344.5	19.14	13.34
11	16/01/20:	0.34	75.9	60.6	0.48	157.64	13.65	143.24	299.33	30.5	15.44
12	17/01/20:	0.61	81.51	69.2	0.67	172.97	15.16	200.8	386.68	41.13	20.15
13	18/01/20:	1.33	301.02	96.74	1.79	487.27	14.01	339.6	672.07	33.38	16.95
14	19/01/20:	0.75	105.51	67.62	0.97	204.08	9.79	323.85	566.72	15.61	13.01
15	20/01/20:	0.43	89.06	73.91	0.63	187.5	10.61	307.65	531.77	13.92	12.44
16	21/01/20:	0.53	84.65	69.85	0.66	177.81	11.7	235.53	422.96	25.84	13.29
17	22/01/20:	10.93	66.98	73.52	19.58	156.97	13.54	300.89	466.73	56.18	15.53
18	23/01/20:	57.35	123.87	68.47	105.7	230.17	15.71	360.79	544.08	3.81	17.07
19	24/01/20:	39.61	87.29	111.41	59.48	218.47	10.74	388.06	586.09	9.3	24.01
20	25/01/20:	31	58.86	79.39	54.3	151.12	10.81	275.88	510.62	14.29	14.92
21	26/01/20:	31.33	168.42		47.21	317.6	12.58	374.62	569.33	22.81	21.06
22	27/01/20:	35.19	275.8	120.94	109.93	484.38	15.16	338.67	532.39	17.62	18.31
23	28/01/20:	41.98	330.54	124.23	97.87	562.08	10.51	354.83	652.46	7.58	16.24
											4.29

Fig.2. Snapshot of the dataset

- Date Attribute describes the sampling date
- Other Parameters give individual concentrations in the air
- Specific to Shadipur Station

AIR POLLUTION





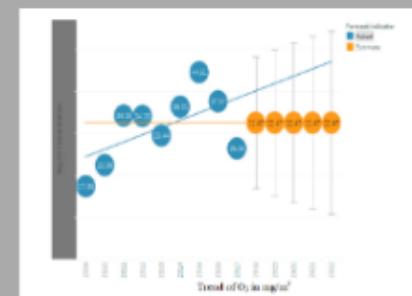
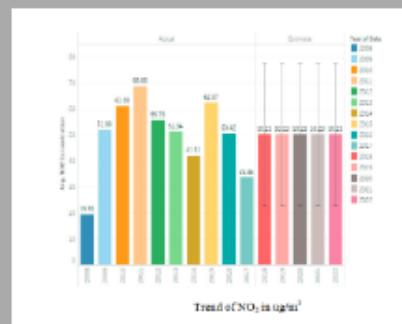
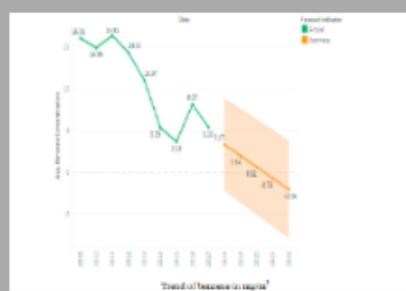
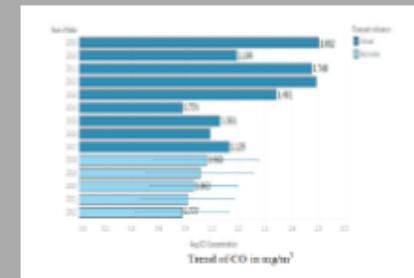
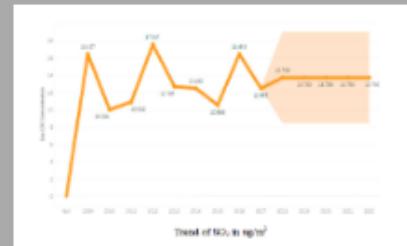
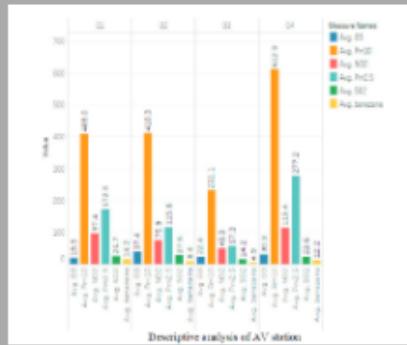
Results
(Outcomes)

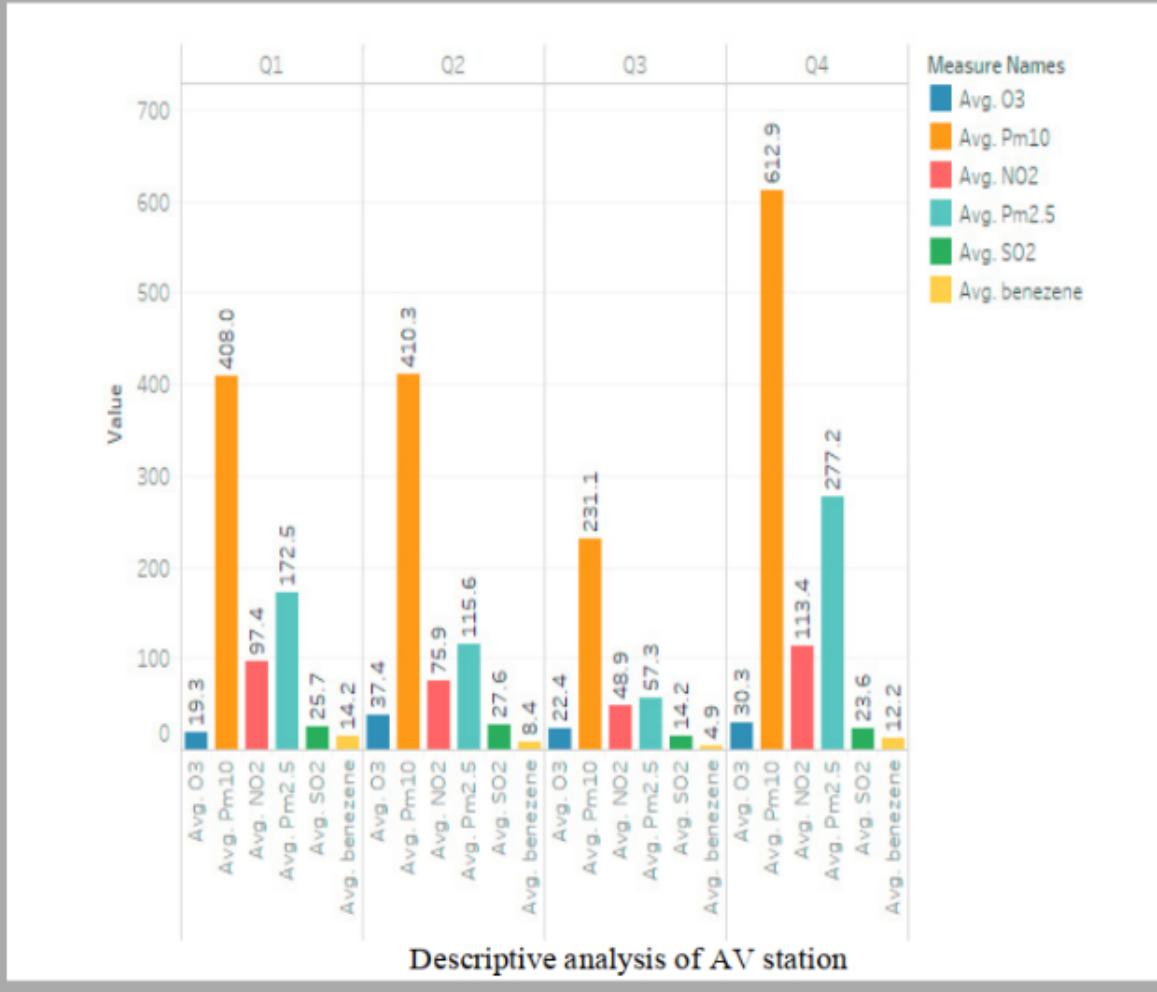
Analysis of Data

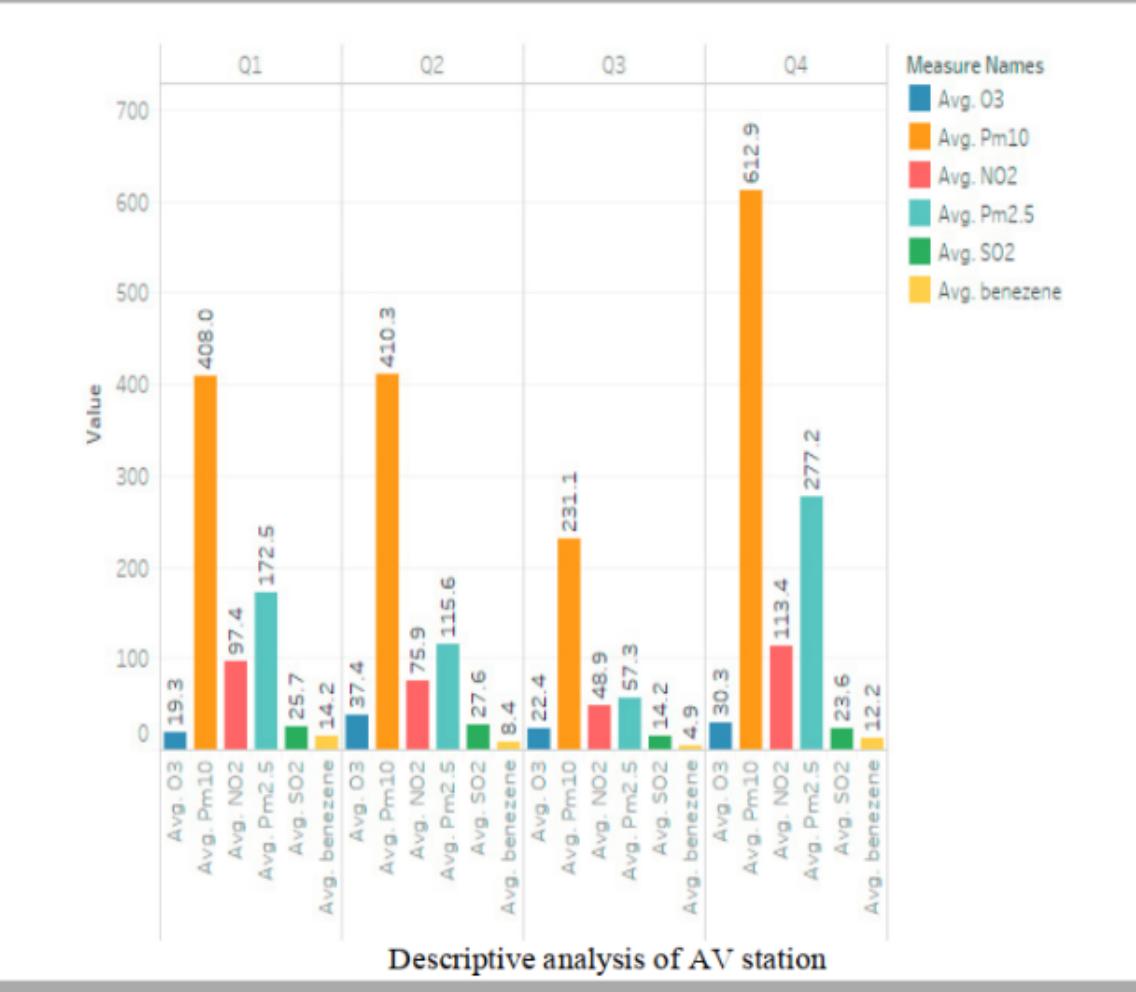
- Descriptive analysis carried for some stations
- sulphur dioxide (SO_2),
- nitrogen oxides (NO_x),
- ozone (O_3),
- particulate matter (small suspended particles of varying sizes),
- carbon monoxide (CO)

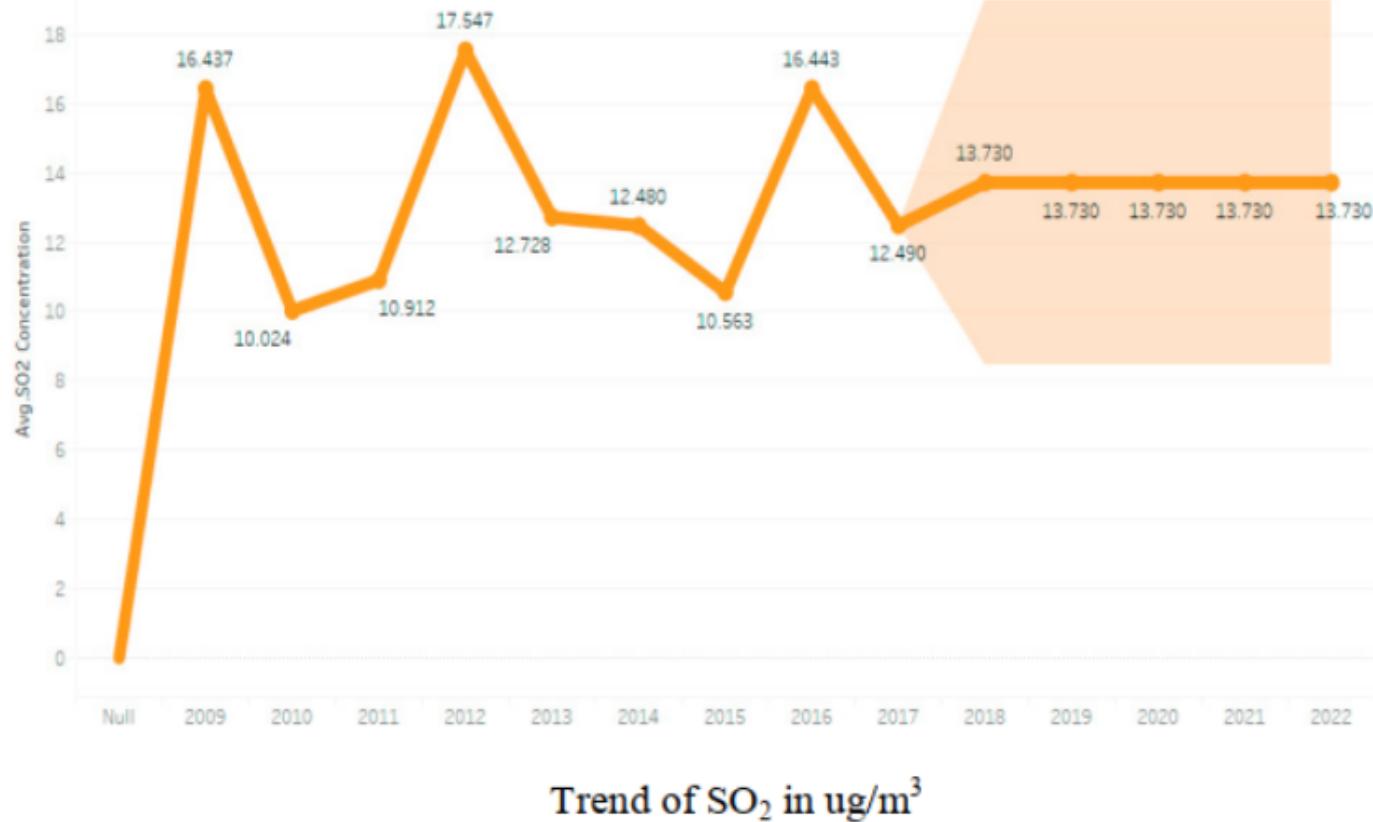
Graph Analysis

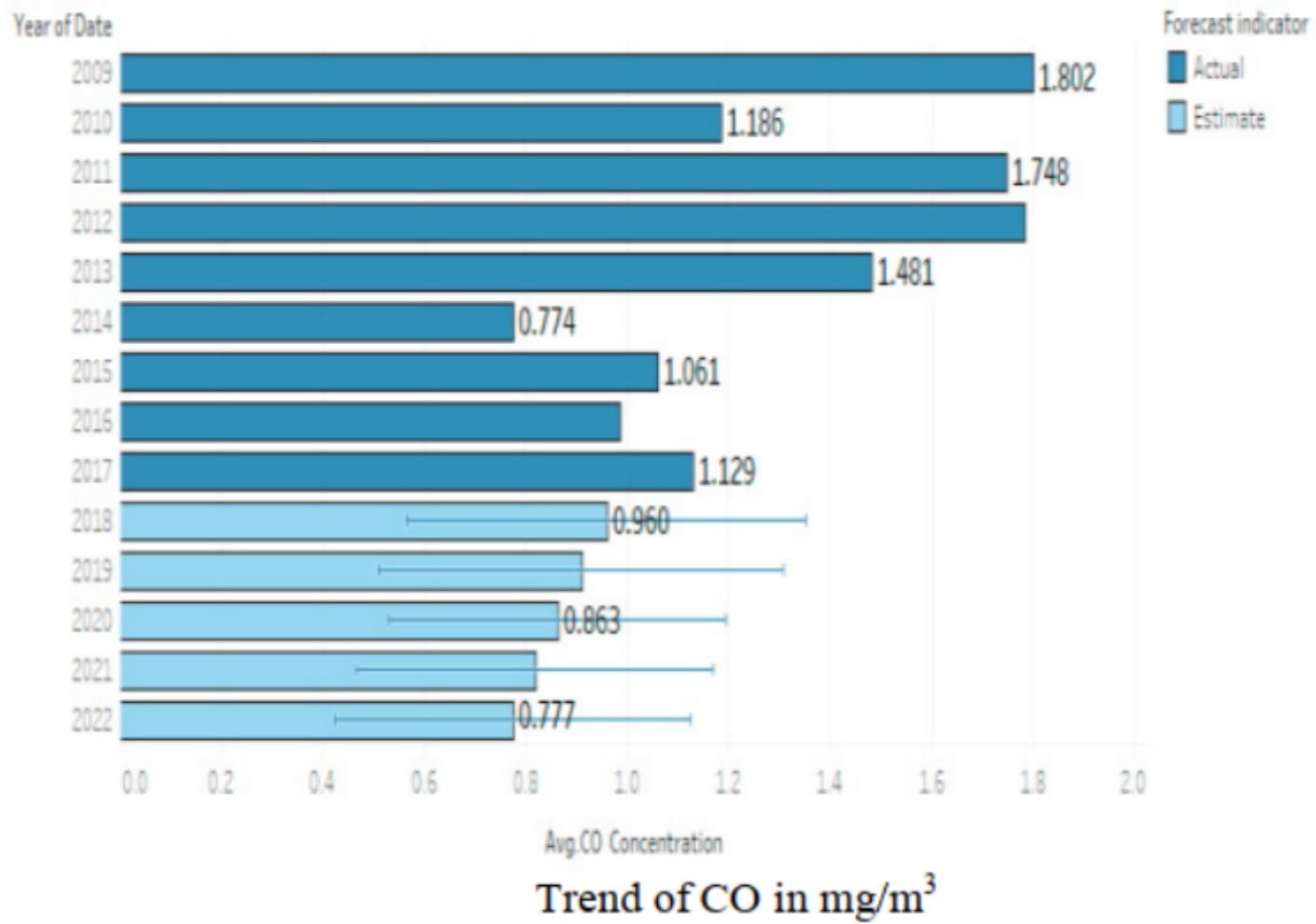
Graphs Showing The Trend of Different Gases That effects the Air

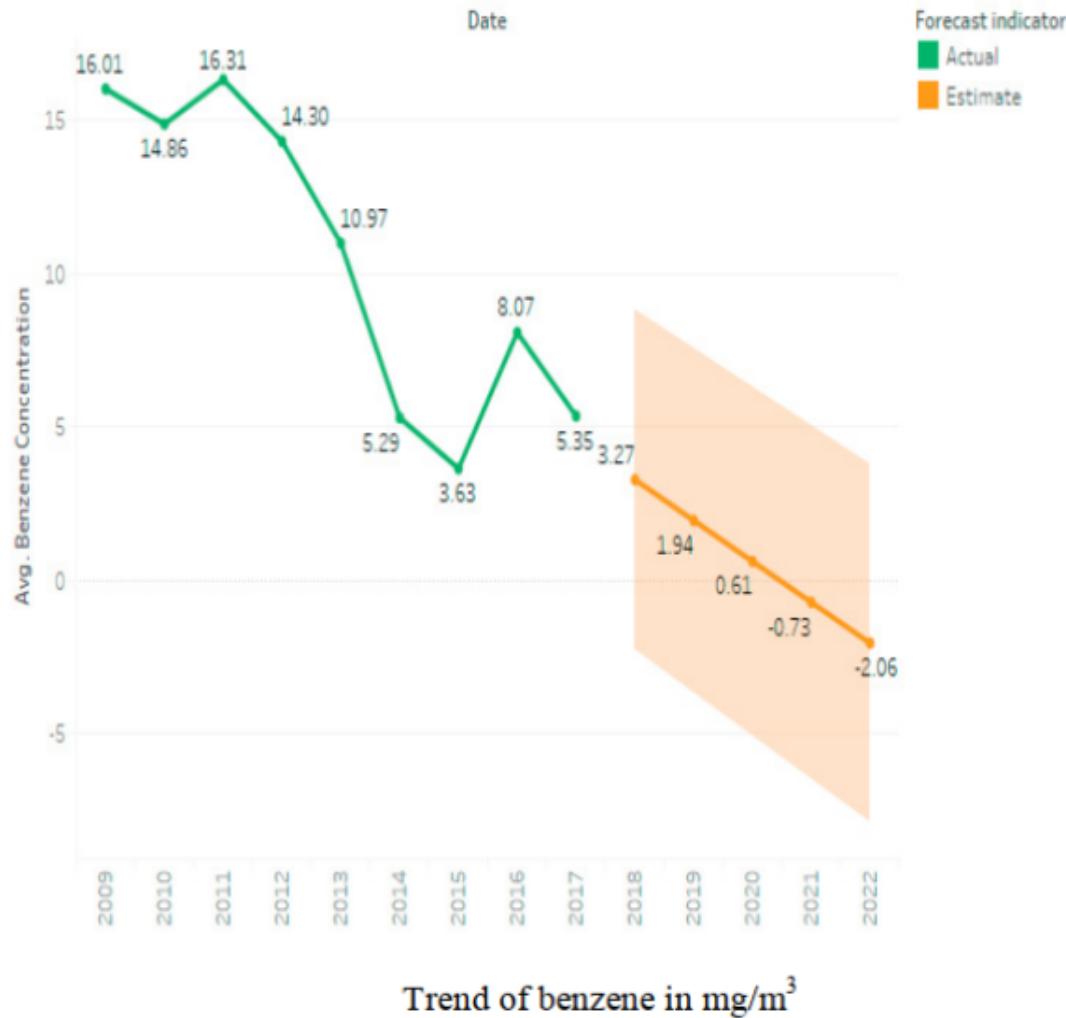


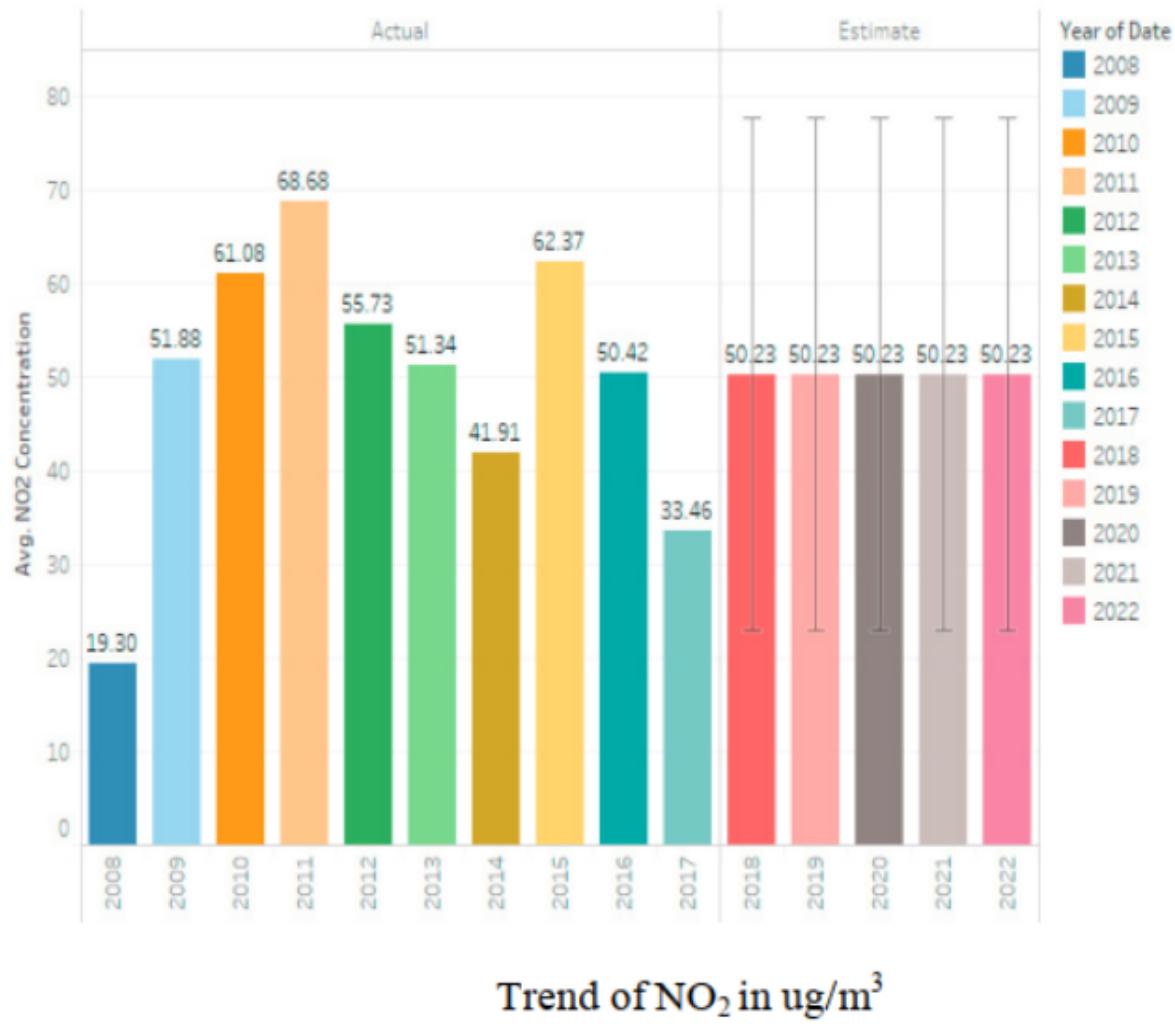


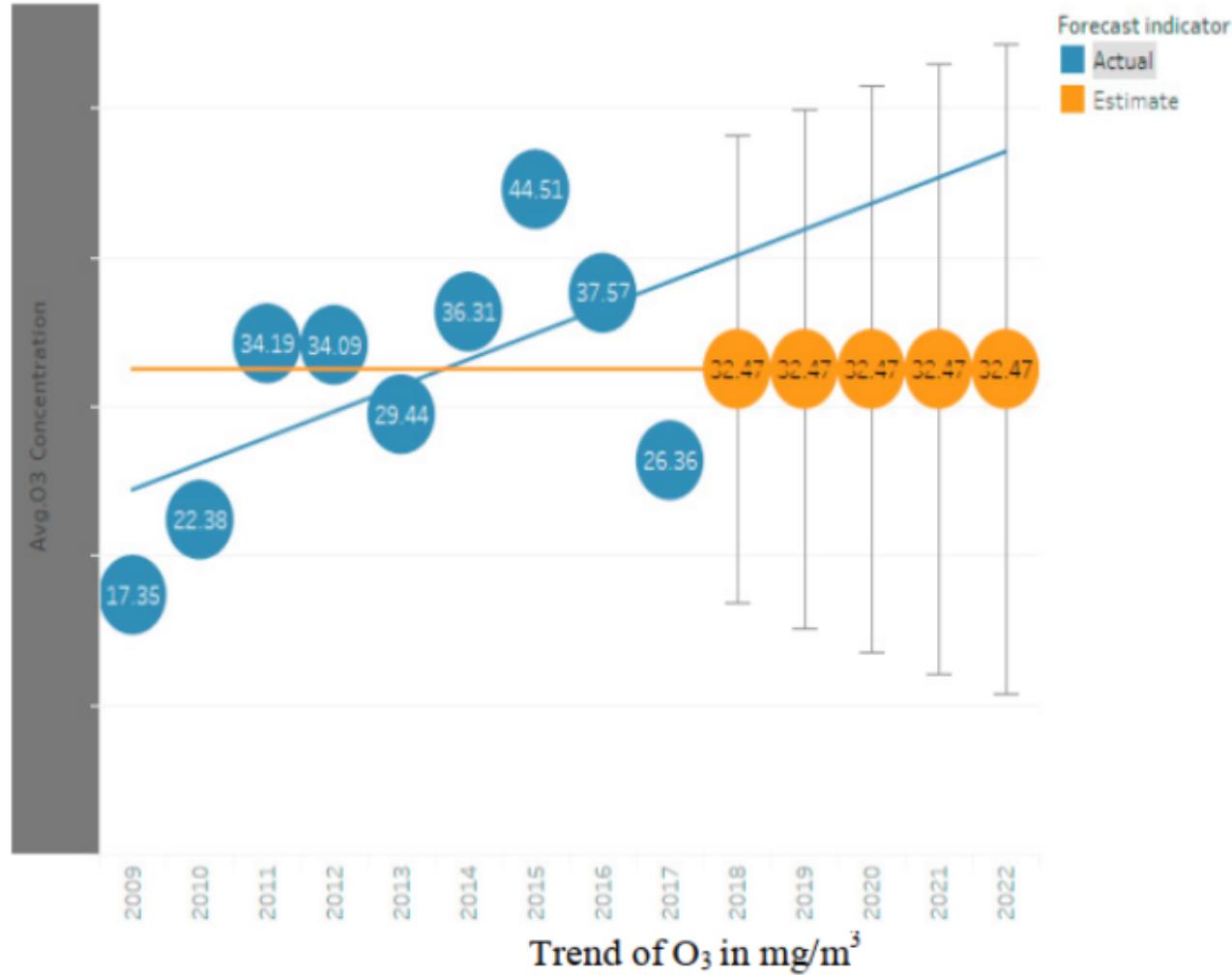








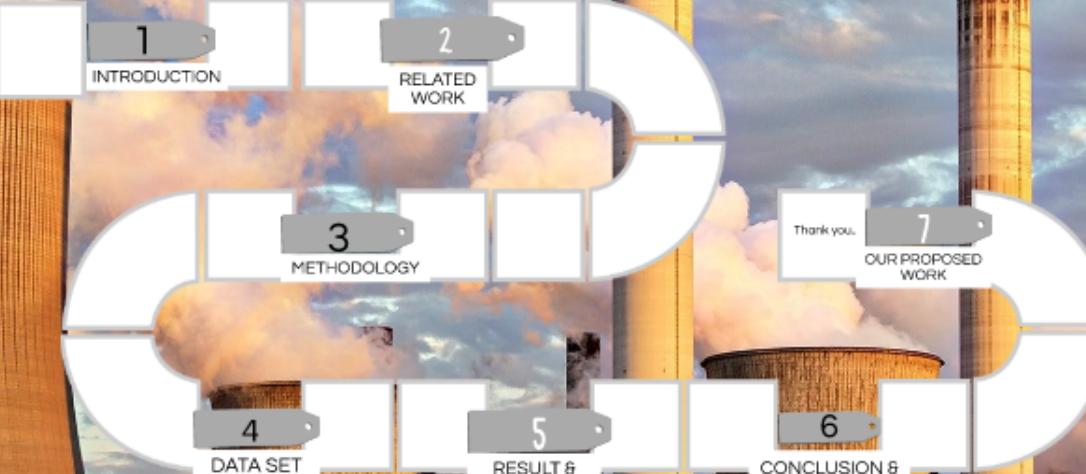




Results and Outcomes

- Pollutants like NOx, PM10, PM 2.5 are likely to drastically increase in future
- SO2 level may increase marginally in future
- O3 levels will increase in initial years
- the amount of CO and Benzene are showing reducing trend
- Health effects: Breathlessness, Chest constriction, Irritation in eyes, Asthma, Allergy
- Delhi's PM2.5 levels are going down day by day

AIR POLLUTION



Conclusion and future scope

- Come to understand the different patterns in various types of pollutants
- The aggravated NOX, particulate matter (PM10 and PM2.5) and ground level O₃ also leads to development of smog pollution
- Trend of NOX in coming years can be attributed to increasing number of vehicles
- Build a forecasting model which is adaptable to dynamic atmospheric variables
- Employing zero waste technology with integrated waste management

AIR POLLUTION

