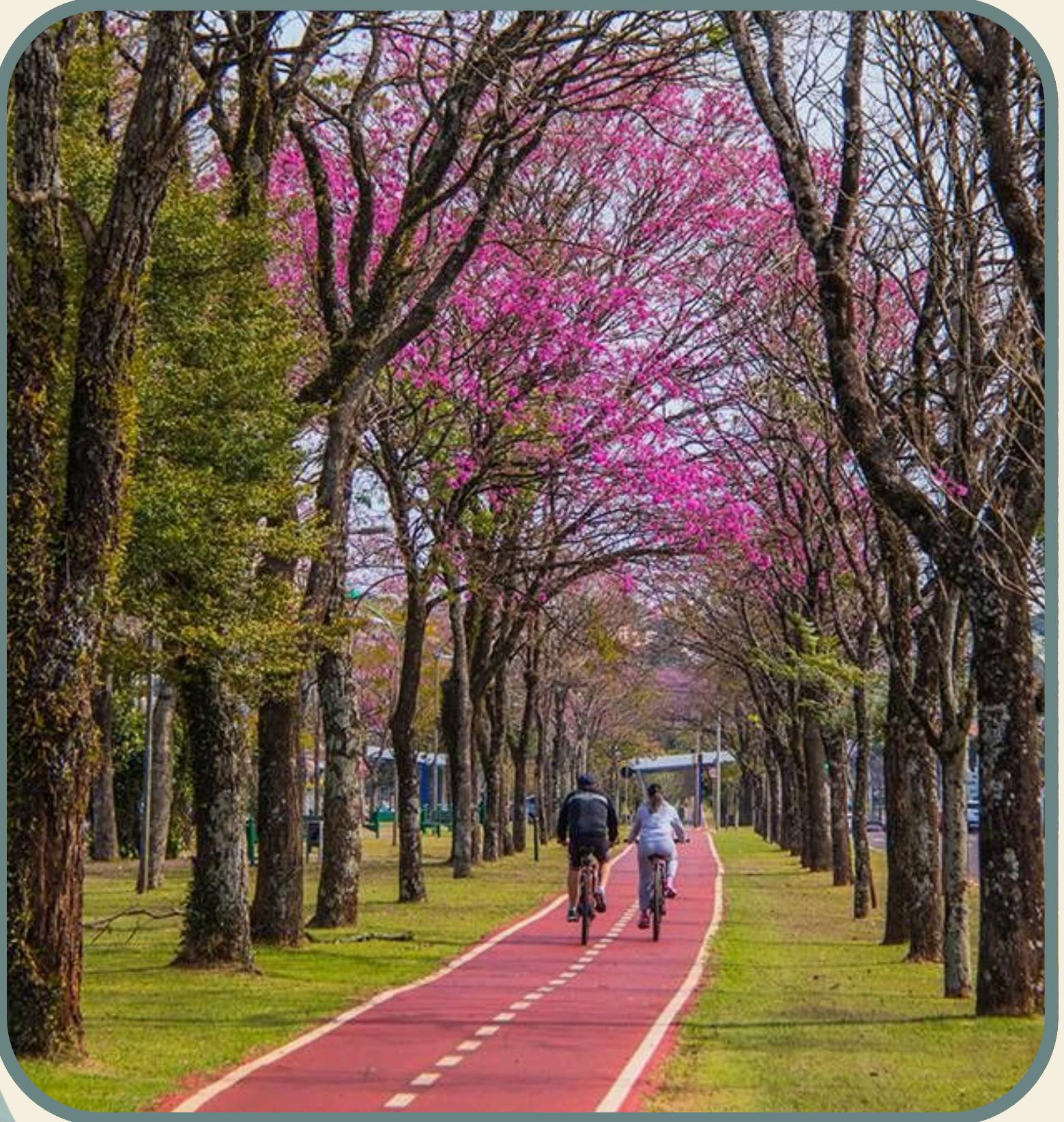


Breathe Easy

AQI Prediction & Routing

Rishita Merchant
Sanskriti Dhar
Sneha Shinde

Problem Statement



Tech Stack

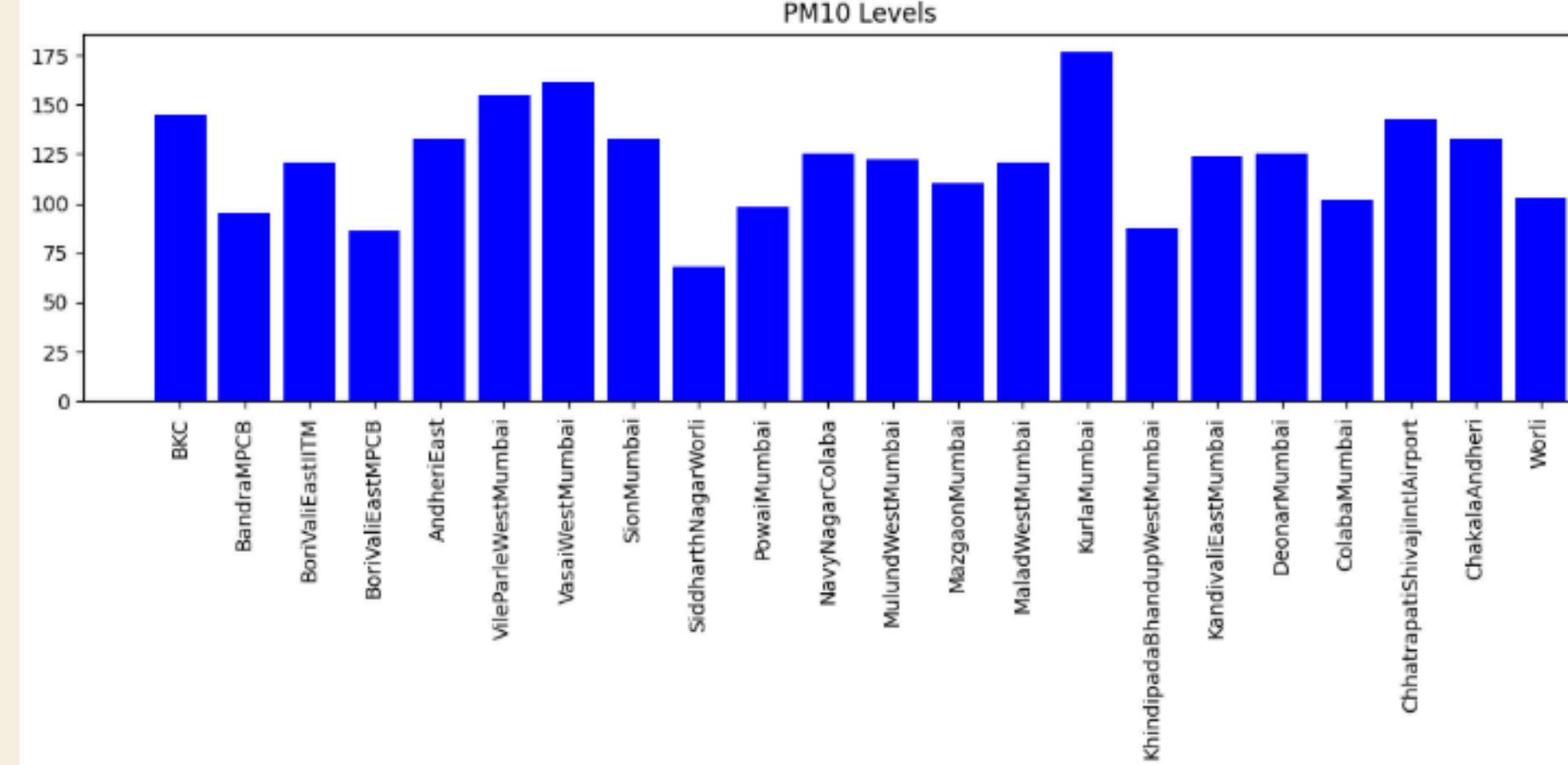
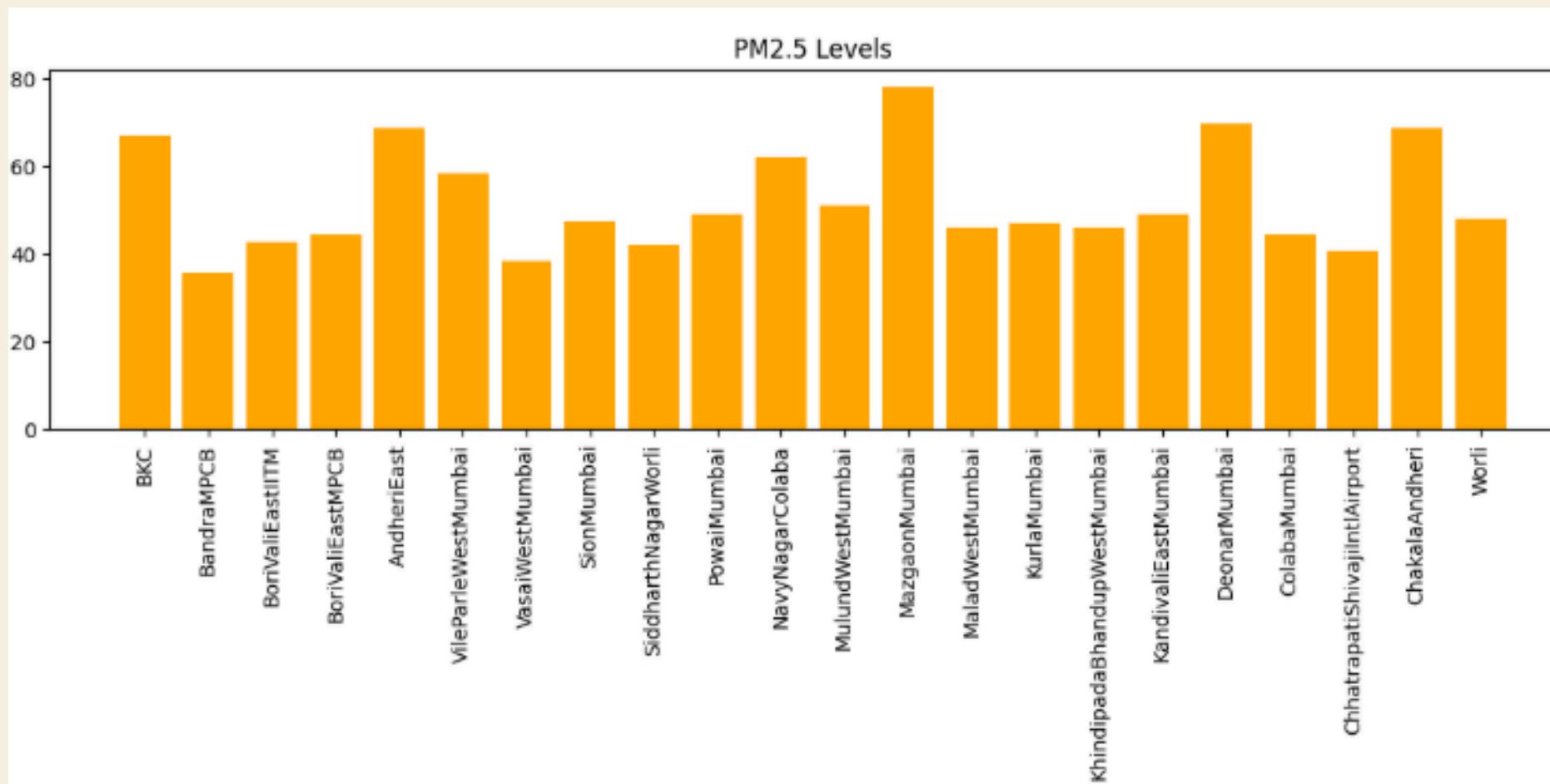
- Python
- Pandas
- Matplotlib
- OpenRoute
- Folium
- OpenAQ
- Numpy
- XGBoost
- Streamlit

Dataset

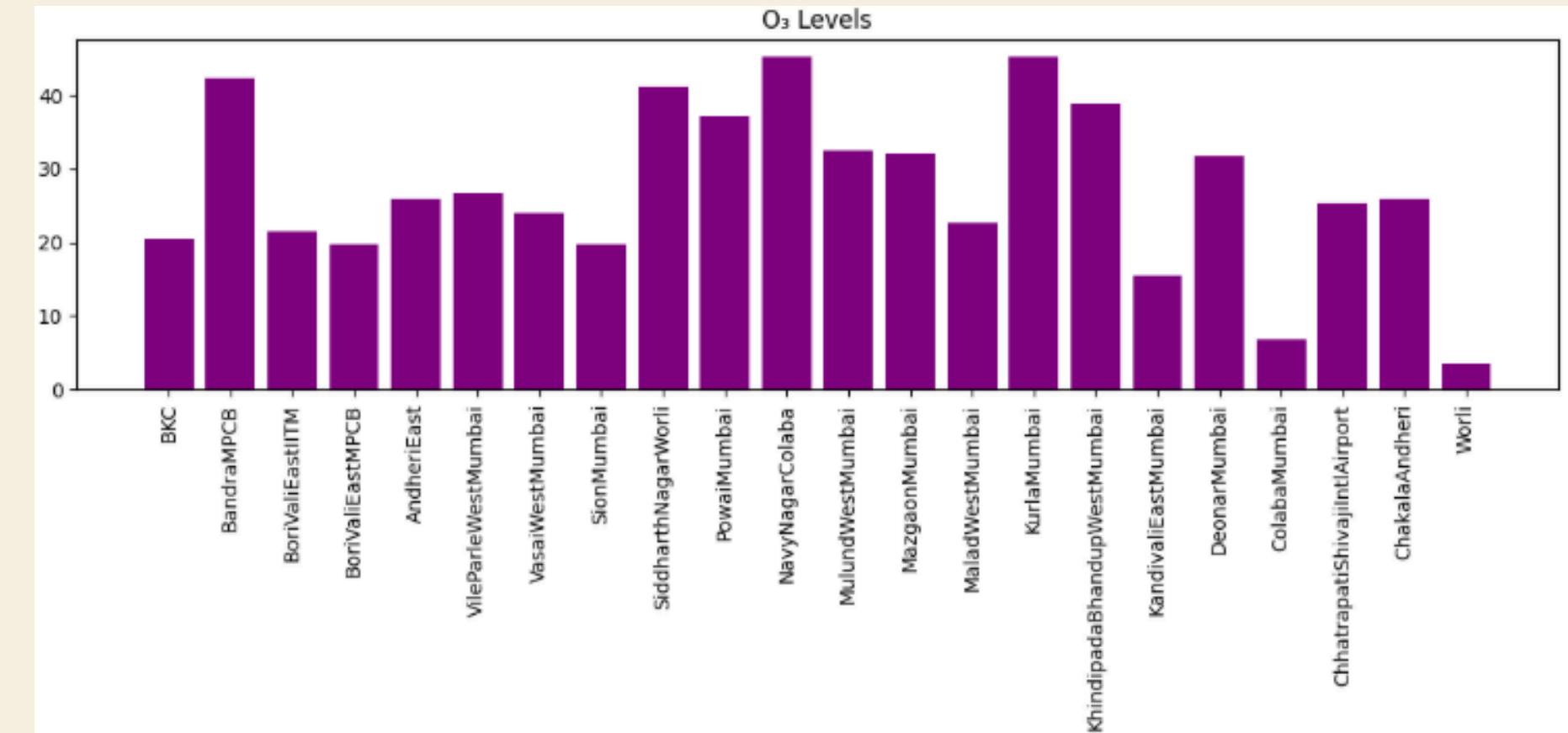
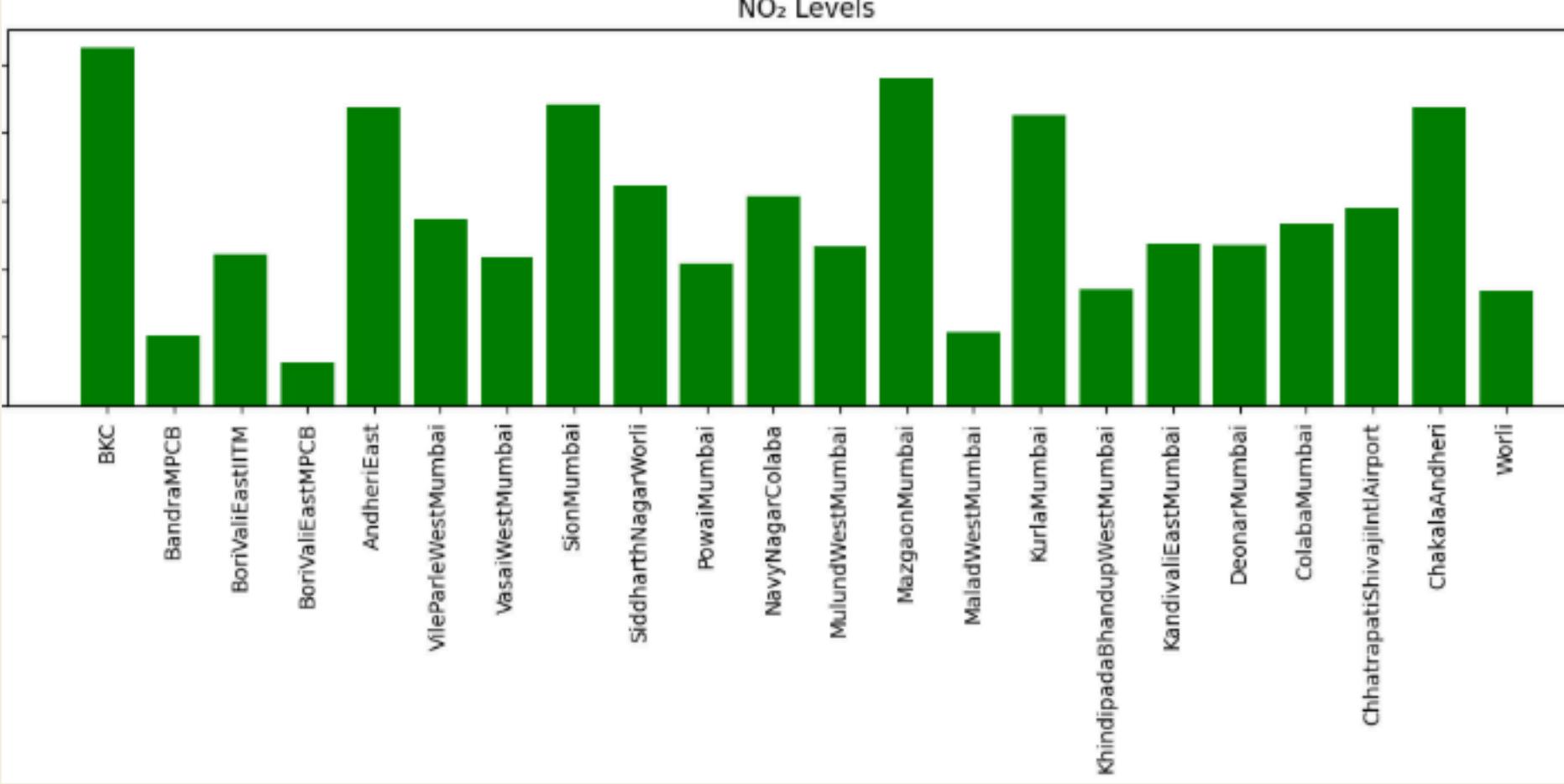
Bandra MPCB

	From Date	To Date	PM2.5	PM10	NO	NO2	NOx	SO2	CO	Ozone	Benzene	Toluene	Temp	RH	WS	WD	SR	BP	VWS	RF	TOT-RF
0	01-01-2021 00:00	01-01-2021 00:15	35.99	54.3	4.88	0.93	5.81	16.15	2.01	10.85	1.65		25.5	81.7	0.1	19.3	15	768.38	0.9	0	0
1	01-01-2021 00:15	01-01-2021 00:30	17.3	60.96	4.84	0.96	5.8	17.11	2.03	10.78	1.53		25.42	82.22	0.09	24.4	15	768.32	0.87	0	0
2	01-01-2021 00:30	01-01-2021 00:45	10.66	57.51	4.87	0.92	5.78	15.24	2.05	10.87	1.61		25	85.1	0.1	53.3	15	768.07	0.9	0	0
3	01-01-2021 00:45	01-01-2021 01:00	5.69	54.66	4.89	0.72	5.62	16.45	2.06	10.6	1.61		25	85.1	0.1	53.3	15	768.07	0.9	0	0
4	01-01-2021 01:00	01-01-2021 01:15	9.84	53.59	4.87	0.93	5.81	15.58	2.07	10.74	1.88		25	85.1	0.1	53.3	15	768.07	0.9	0	0
5	01-01-2021 01:15	01-01-2021 01:30	7.1	51.68	4.88	0.9	5.79	15.63	2.09	10.78	1.79		24.95	85.5	0.06	57.45	15	768.02	0.62	0	0
6	01-01-2021 01:30	01-01-2021 01:45	12.81	45.6	4.86	0.92	5.79	15.61	2.09	10.56	1.71		24.7	87.7	0.1	214.3	15	767.78	0.9	0	0
7	01-01-2021 01:45	01-01-2021 02:00	24.09	35.79	4.83	0.93	5.77	15.98	2.09	10.79	1.49		24.7	87.7	0.1	214.3	15	767.78	0.9	0	0
8	01-01-2021 02:00	01-01-2021 02:15	23.59	41.31	4.86	1.03	5.89	15.78	2.09	10.91	1.69		24.7	87.7	0.1	214.3	15	767.78	0.9	0	0
9	01-01-2021 02:15	01-01-2021 02:30	11.7	54.54	4.9	0.79	5.71	15.6	2.09	10.82	1.87		24.65	87.8	0.06	213.39	15	767.72	0.62	0	0
10	01-01-2021 02:30	01-01-2021 02:45	3.39	65.38	4.85	0.97	5.83	15.94	2.08	10.85	2.01		24.4	88.4	0.1	38.3	15	767.47	0.9	0	0
11	01-01-2021 02:45	01-01-2021 03:00	12.23	60.32	4.84	0.9	5.75	16.09	2.07	10.71	1.85		24.4	88.4	0.1	38.3	15	767.47	0.9	0	0
12	01-01-2021 03:00	01-01-2021 03:15	20.13	56.16	4.88	0.84	5.74	15.85	2.07	10.78	1.76		24.4	88.4	0.1	38.3	15	767.47	0.9	0	0
13	01-01-2021 03:15	01-01-2021 03:30	15.08	38.87	4.84	1.04	5.89	16.17	2.07	10.82	1.88		24.38	88.49	0.09	32.37	15	767.44	0.87	0	0
14	01-01-2021 03:30	01-01-2021 03:45	17.72	27.8	4.8	1.08	5.89	16.01	2.07	10.7	1.99		24.3	89	0.1	358.3	15	767.25	0.9	0	0
15	01-01-2021 03:45	01-01-2021 04:00	15	35.86	4.89	0.93	5.83	15.88	2.07	10.86	1.93		24.3	89	0.1	358.3	15	767.25	0.9	0	0
16	01-01-2021 04:00	01-01-2021 04:15	8.28	56.28	4.88	0.83	5.71	15.95	2.06	10.83	2.06		24.3	89	0.1	358.3	15	767.25	0.9	0	0
17	01-01-2021 04:15	01-01-2021 04:30	1.31	63.59	4.86	0.98	5.84	15.85	2.06	10.75	2.19		24.26	89.15	0.09	5.12	15	767.21	0.86	0	0
18	01-01-2021 04:30	01-01-2021 04:45	9.27	59.4	4.85	0.87	5.74	15.81	2.06	10.85	2.1		24.1	90	0.1	45.3	15	767.03	0.9	0	0
19	01-01-2021 04:45	01-01-2021 05:00	14.66	57.51	4.8	1.05	5.85	15.67	2.07	10.85	2.27		24.1	90	0.1	45.3	15	767.03	0.9	0	0
20	01-01-2021 05:00	01-01-2021 05:15	12.64	56.18	4.86	0.95	5.82	15.9	2.07	10.83	2.12		24.1	90	0.1	45.3	15	767.03	0.9	0	0
21	01-01-2021 05:15	01-01-2021 05:30	6.33	55.33	4.83	0.98	5.81	16.05	2.08	10.89	2.09		24.11	90	0.09	45.92	15	767.07	0.89	0	0
22	01-01-2021 05:30	01-01-2021 05:45	9.76	52.95	4.8	1.07	5.88	16.67	2.09	11.02	2.16		24.2	90	0.1	49.3	15	767.33	0.9	0	0
23	01-01-2021 05:45	01-01-2021 06:00	10.29	50.43	4.84	0.85	5.68	16.28	2.1	10.83	2.44		24.2	90	0.1	49.3	15	767.33	0.9	0	0
24	01-01-2021 06:00	01-01-2021 06:15	9.26	47.93	4.89	0.9	5.8	16.13	2.11	10.82	2.37		24.2	90	0.1	49.3	15	767.33	0.9	0	0
25	01-01-2021 06:15	01-01-2021 06:30	17.56	46.93	4.9	0.85	5.75	16.63	2.12	10.9	2.68		24.13	89.53	0.09	49.14	15	767.4	0.89	0	0
26	01-01-2021 06:30	01-01-2021 06:45	15.94	46.47	4.84	0.93	5.79	16.23	2.13	10.8	2.62		23.8	87	0.1	48.3	15	767.85	0.9	0	0
27	01-01-2021 06:45	01-01-2021 07:00	8.83	44.48	4.83	0.99	5.81	16.27	2.15	10.94	2.39		23.8	87	0.1	48.3	15	767.85	0.9	0	0
28	01-01-2021 07:00	01-01-2021 07:15	35.25	4.88	0.81	5.68	16.01	2.16	10.77	2.18		23.8	87	0.1	48.3	15	767.85	0.9	0	0	
29	01-01-2021 07:15	01-01-2021 07:30	1.27	37.58	4.89	0.88	5.78	16.54	2.18	10.72	2.17		23.94	85.95	0.07	58.56	15.93	767.94	0.71	0	0
30	01-01-2021 07:30	01-01-2021 07:45	0.70	47.70	4.9	0.99	5.74	16.20	2.10	10.69	2.21		24.7	90.2	0.1	162.2	21	769.45	0.0	0	0

Pollutants Breakdown

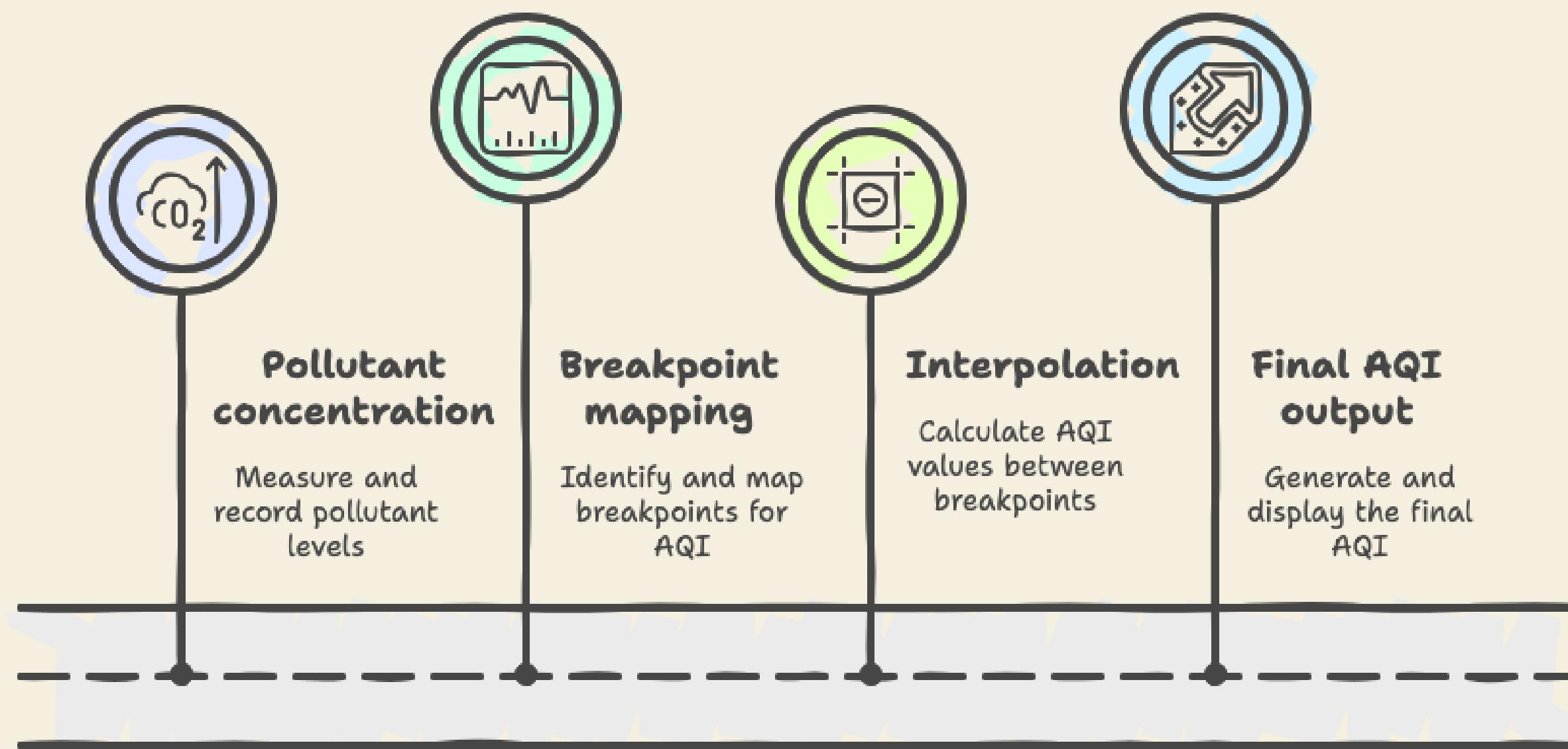


Pollutants Breakdown

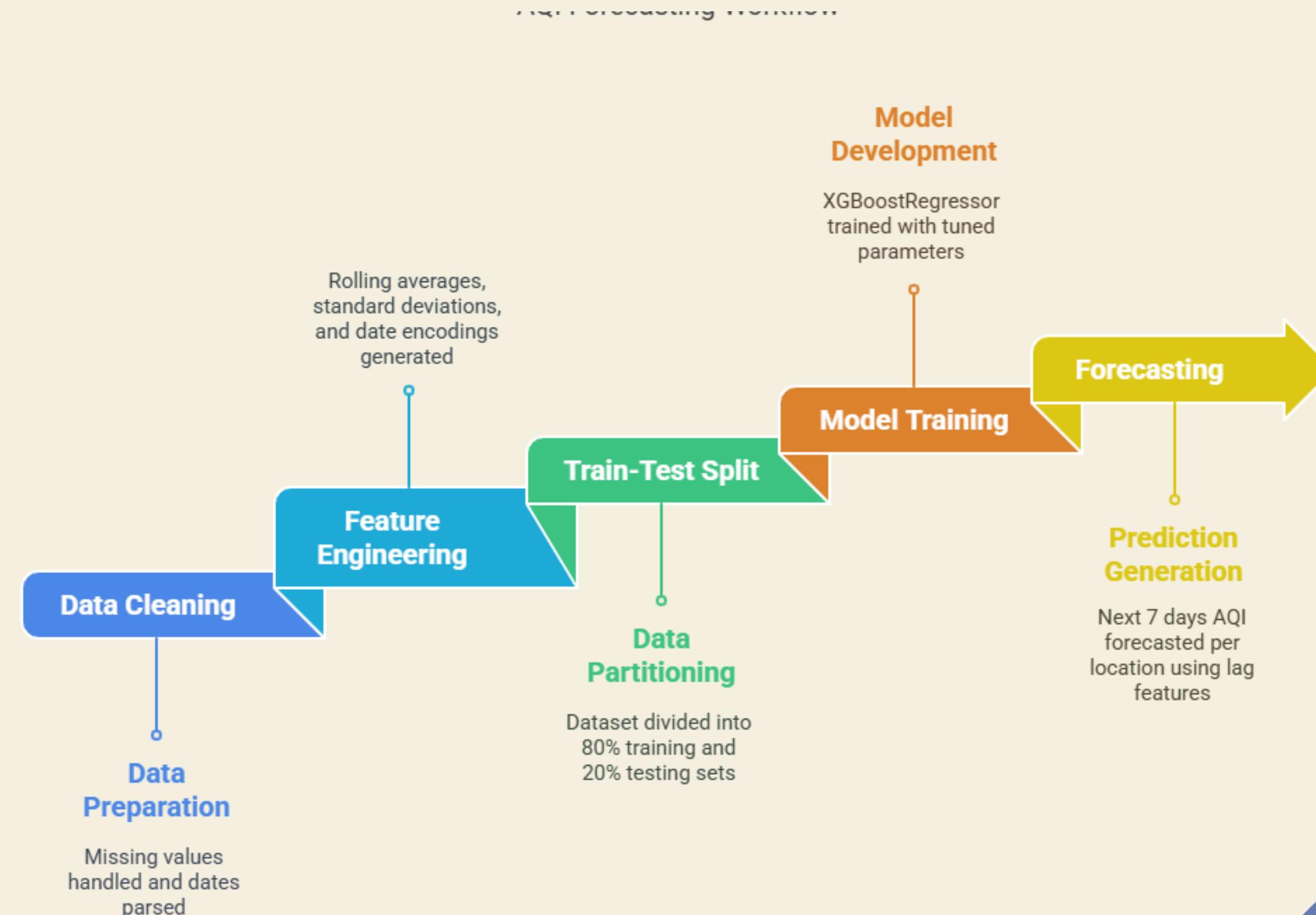


AQI Calculation

Air Quality Index Calculation Process



XGBoost

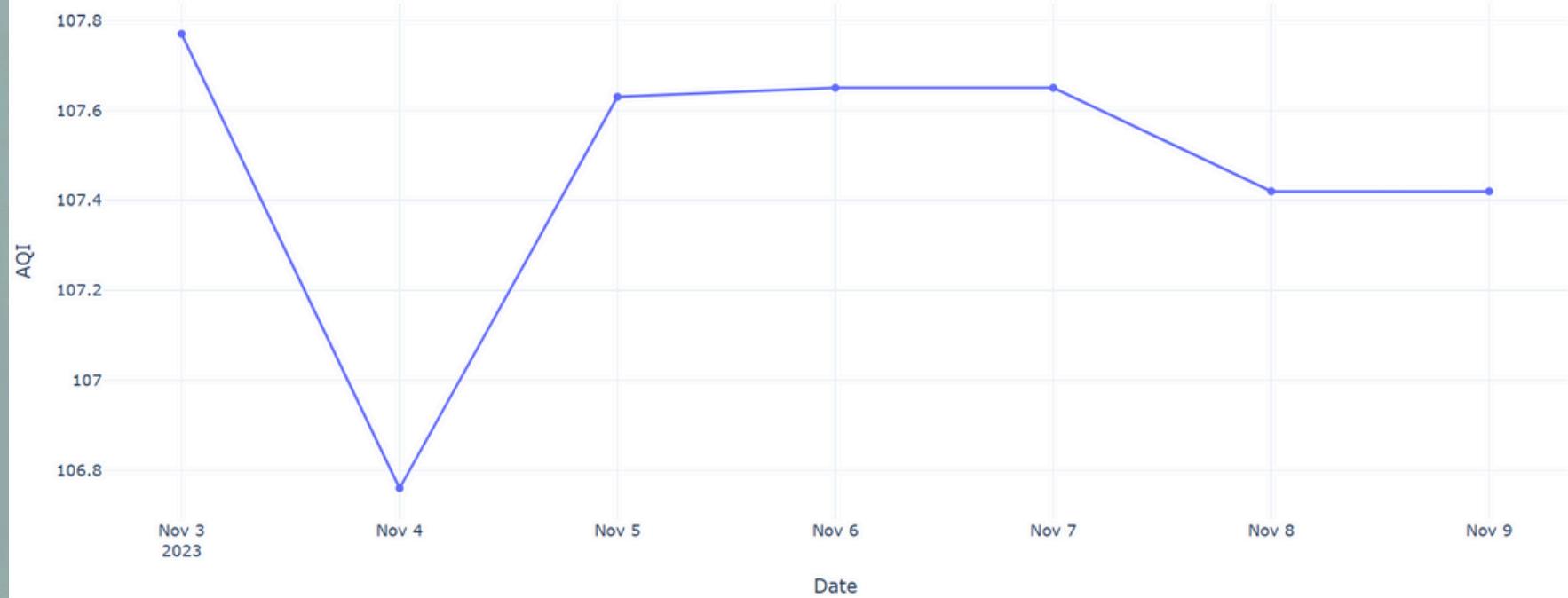


Accuracy of Model

Location	MAE	RMSE	R ²
BKC	12.5851	23.1	0.9482
BandraMPCB	3.3716	8.92	0.9637
BoriValiEastIITM	4.4051	10.45	0.978
BoriValiEastMPCB	3.6721	10.7	0.9739
AndheriEast	7.7617	22.09	0.945
VileParleWestMumbai	8.7239	33.96	0.8477
VasaiWestMumbai	3.5126	6.06	0.9764
SionMumbai	6.8324	16.7	0.972
SiddharthNagarWorli	4.5236	10.5	0.9762
PowaiMumbai	3.6729	8.48	0.9888
NavyNagarColaba	5.017	14.09	0.9818
MulundWestMumbai	3.22	8.62	0.9844
MazgaonMumbai	14.2606	35.63	0.9189
MaladWestMumbai	3.7074	9.5	0.9797
KurlaMumbai	5.5374	18.33	0.9521
KhindipadaBhandupWestMumbai	5.1842	17.5	0.9682
KandivaliEastMumbai	3.1613	9.33	0.9812
DeonarMumbai	4.0476	9.88	0.9916
ColabaMumbai	3.1845	9.4	0.9839
ChhatrapatiShivajiIntlAirport	2.9099	12.38	0.9715
ChakalaAndheri	7.7617	22.09	0.945
Worli	3.0515	8.62	0.9859

Forecast Graphs

7-Day AQI Forecast - ColabaMumbai



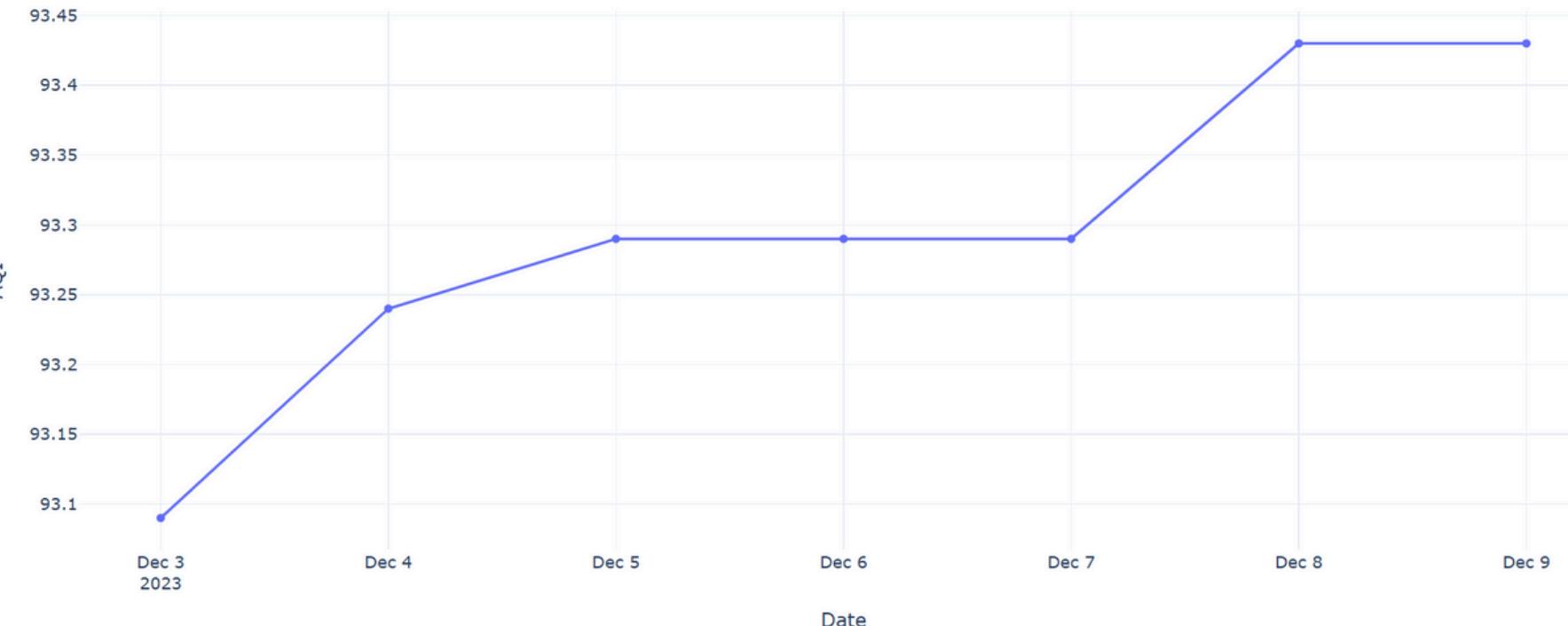
7-Day AQI Forecast - VasaiWestMumbai



7-Day AQI Forecast - MazgaonMumbai

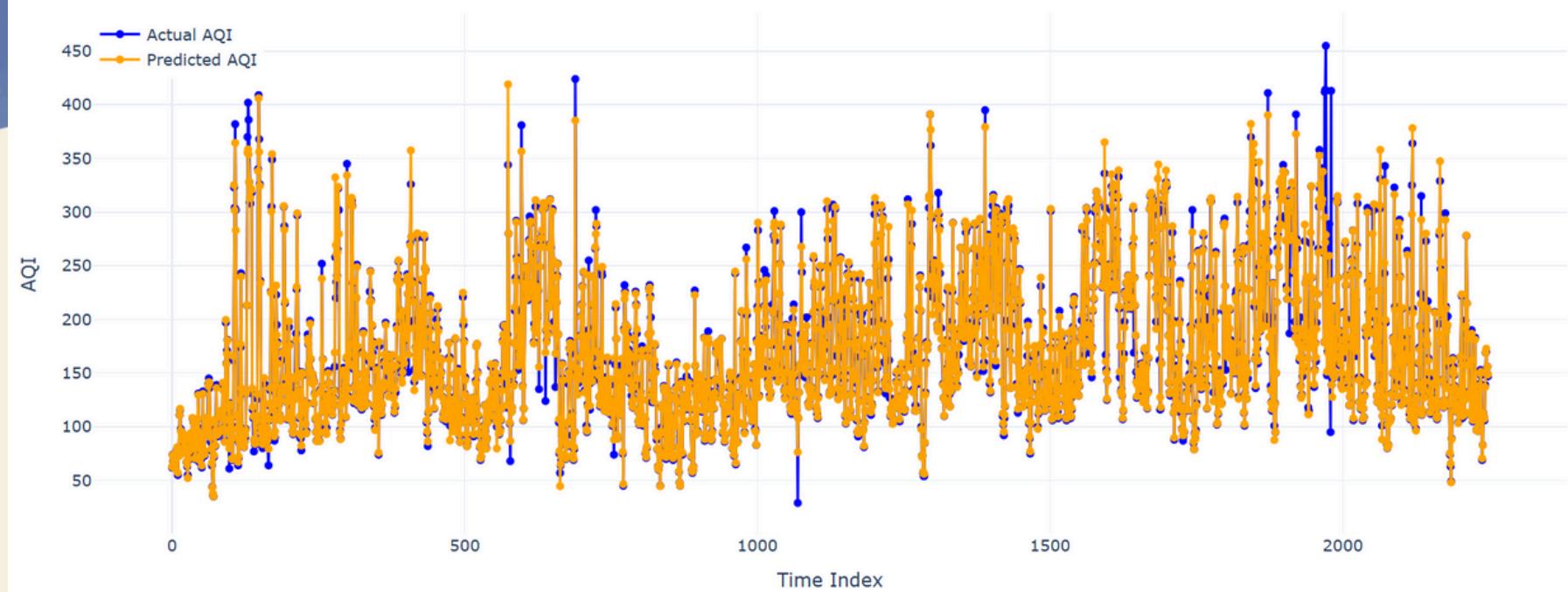


7-Day AQI Forecast - PowaiMumbai

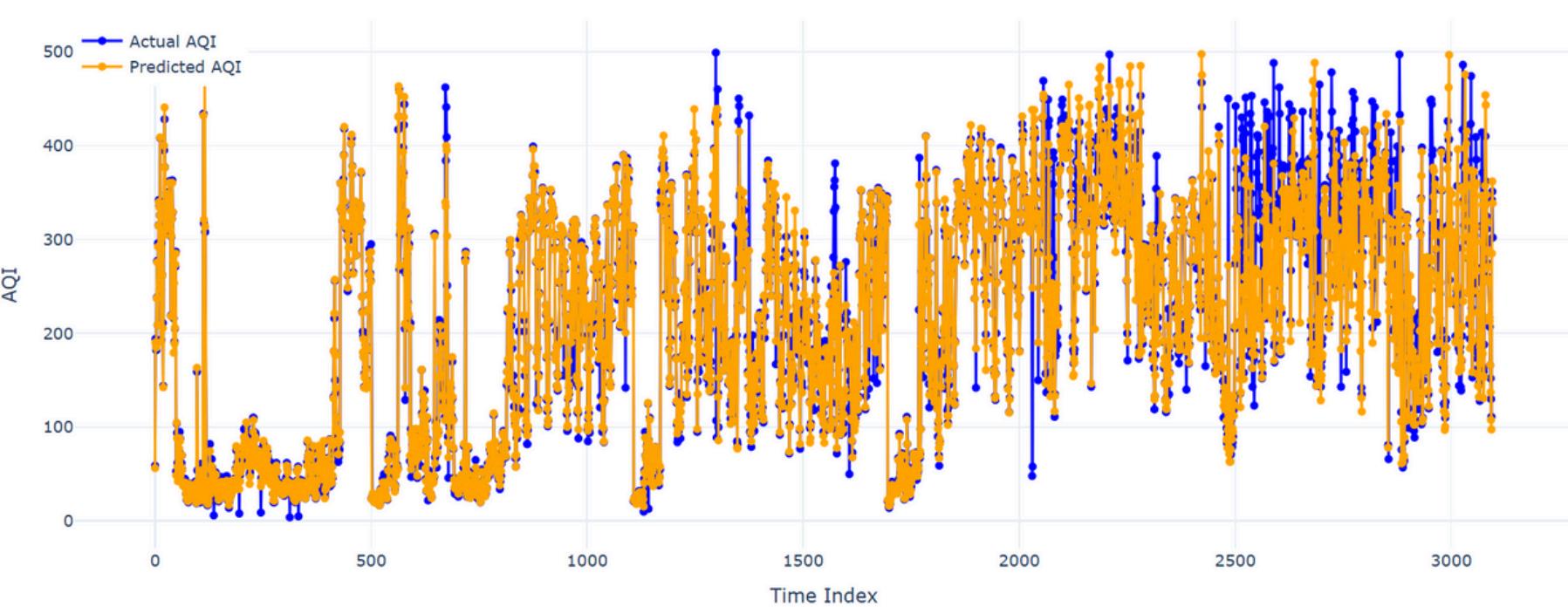


Predicted v/s Actual

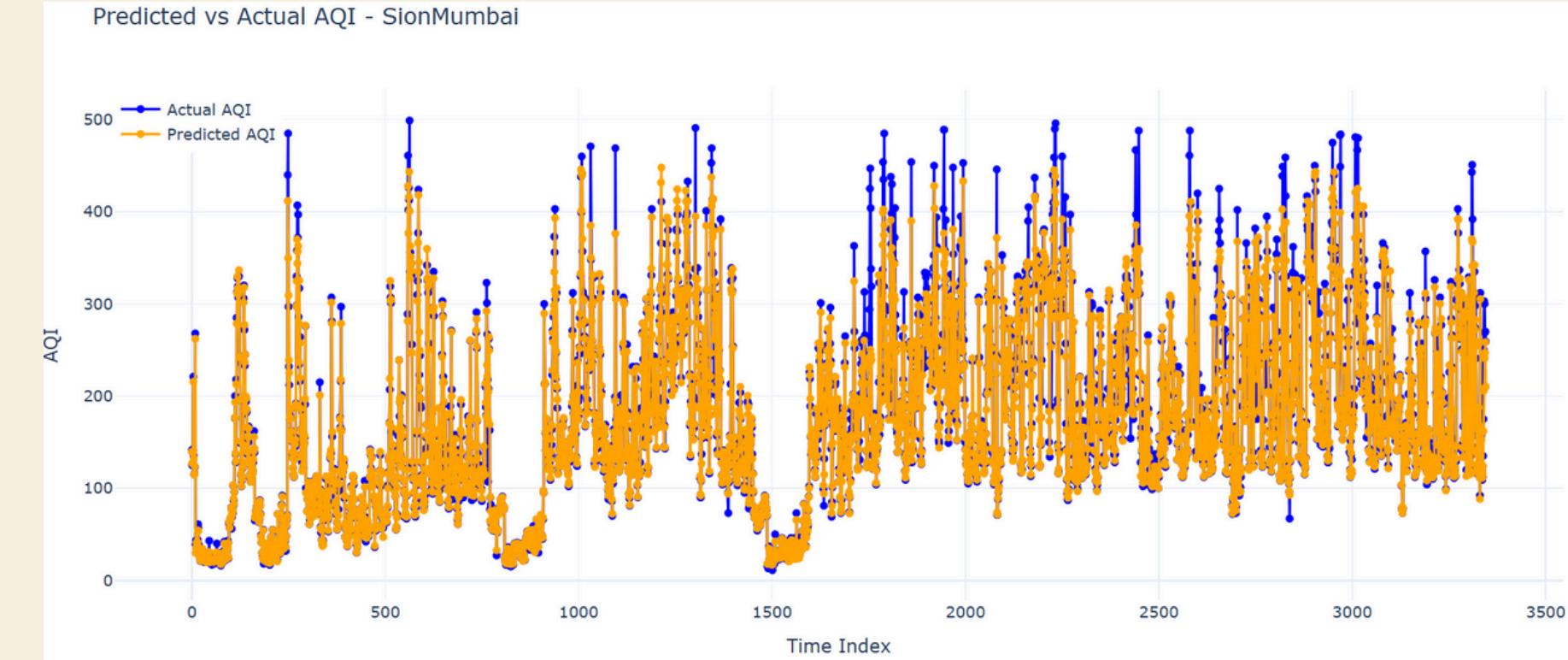
Predicted vs Actual AQI - KandivaliEastMumbai



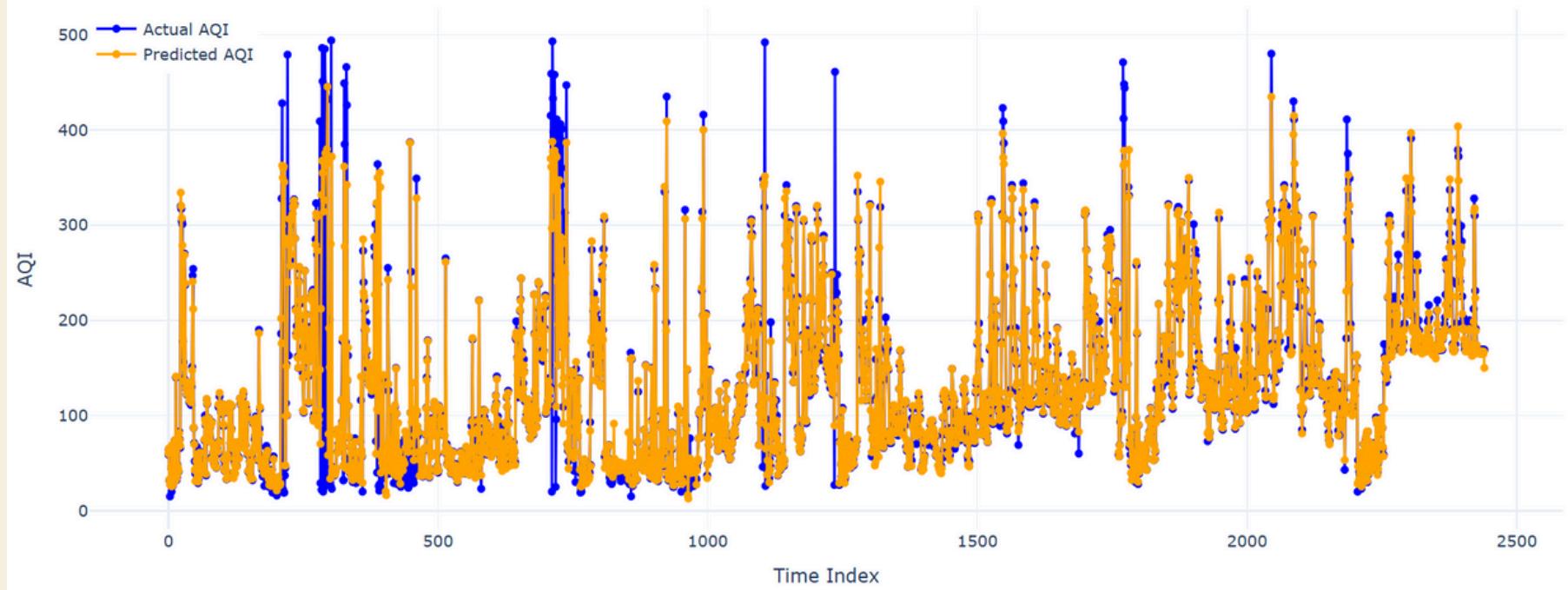
Predicted vs Actual AQI - MazgaonMumbai

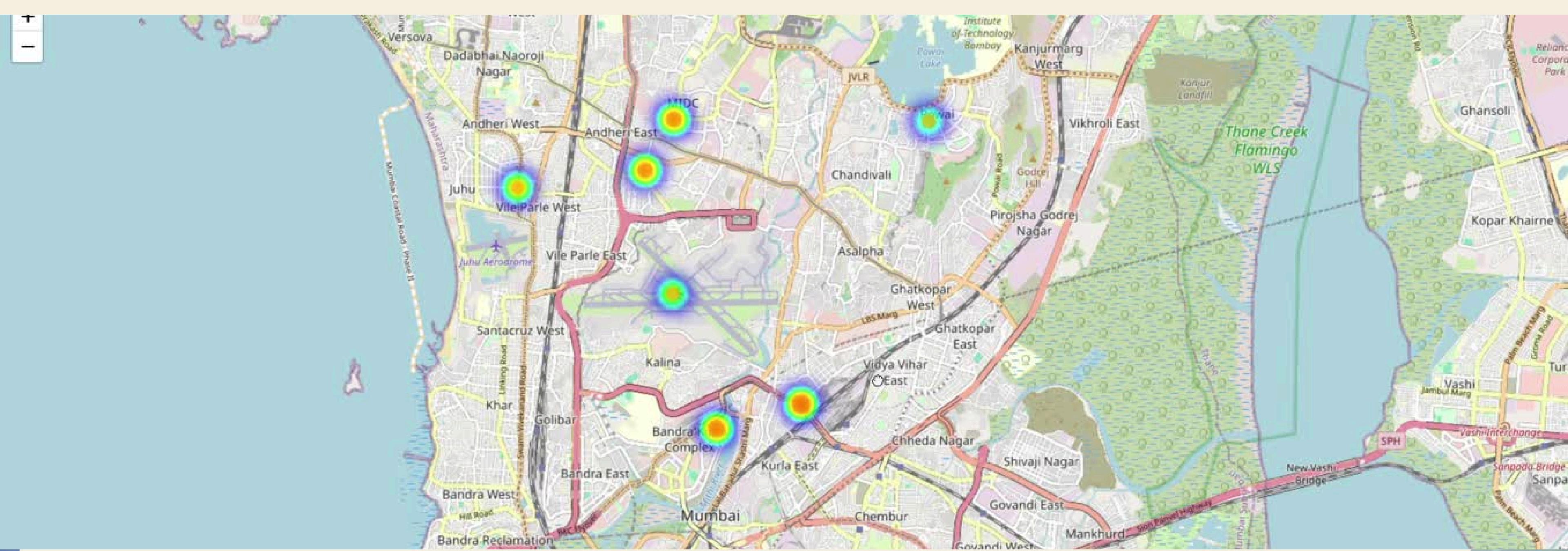


Predicted vs Actual AQI - SionMumbai



Predicted vs Actual AQI - VileParleWestMumbai





Mumbai AQI Heatmap

Heatmap of AQI values across
Mumbai

THANK YOU
Any Questions?