Visualizing Air Pollution Data Caused by Climate Change

Data From Seoul, South Korea

Ting Chen

FURMAN COMPUTER SCIENCE

BACKGROUND

- Air pollution has become a problem worldwide as climate change gets more severe.
- Air Quality → Air Pollution levels
- Visualization of Data → Understanding of air pollution
- Focus on certain pollution regions to mitigate the pollution caused by human actions.

METHOD

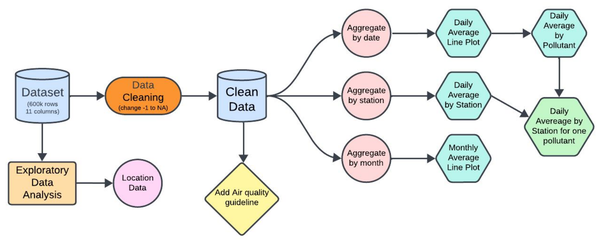

Figure 1: Pipeline for processing data

DATA

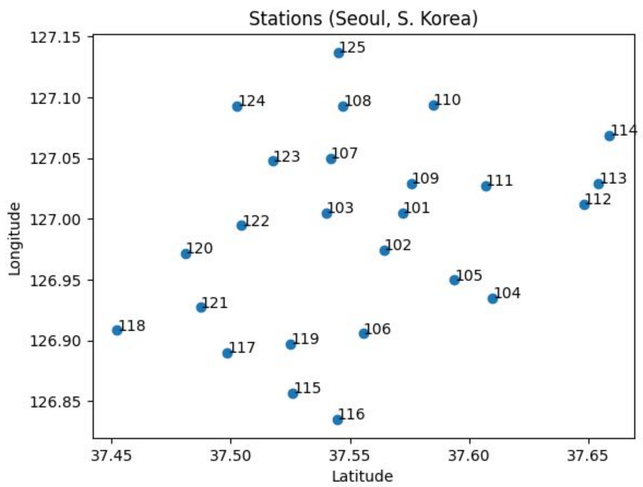

Figure 2: Spatial data of all locations.

- Data from Seoul, South Korea (capital city)
- **600k** rows + **11** columns
- **6** pollutants
- Data recorded from **2017 to 2019**
- **25** stations = borough in NYC

- **In daily average fluctuation in Figure 5:**
- **SO_2**, **NO_2**, and **O_3** follow a similar trend, the **extreme** peak is on *Mar. 6, 2018*.
- Carbon Monoxide (**CO**) has the most fluctuation at the beginning of year.
- **PM10** and **PM2.5** follow a similar trend and shows **more peaks** each year.

DATA ANALYSIS

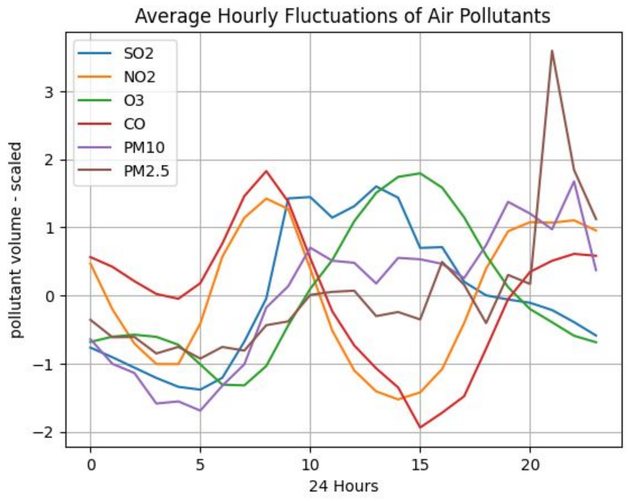

Figure 3: Hourly average fluctuation

- **CO** and **NO_2** follow a similar trend that peaks in the morning
- **SO_2** and **O_3** follow a similar trend that peaks in the afternoon
- **PM10** and **PM2.5** constantly increase and peaks at night

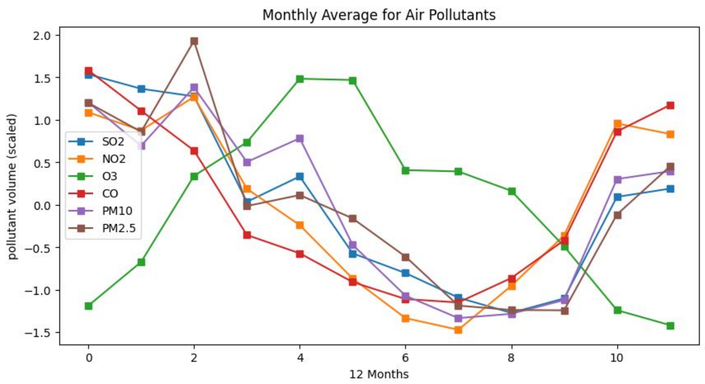

Figure 4: Monthly average across three years

- Monthly average of aggregated data (group by station)
- Standardized air pollutant volume
- **Ozone (O_3)** has an inverse relationship compared to other pollutants
- Pollution gets worse during winter (Dec. to Mar.)

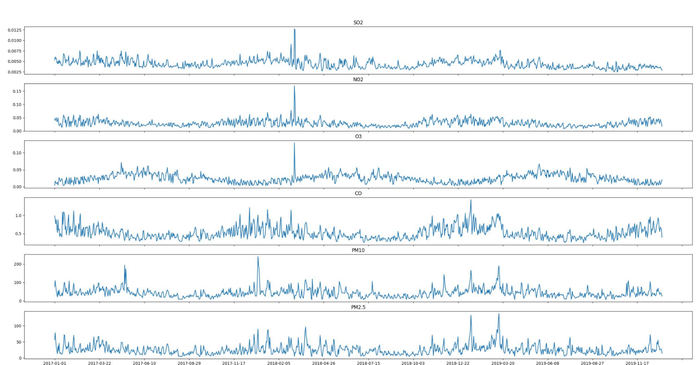

Figure 5: Daily average across three years for each pollutant

RESULTS

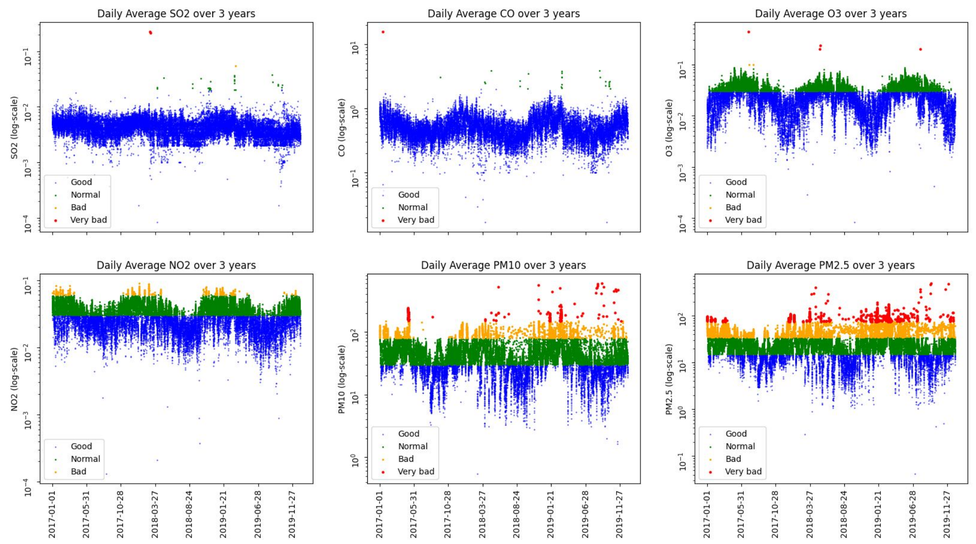

Figure 6: Daily average across three years by each pollutant

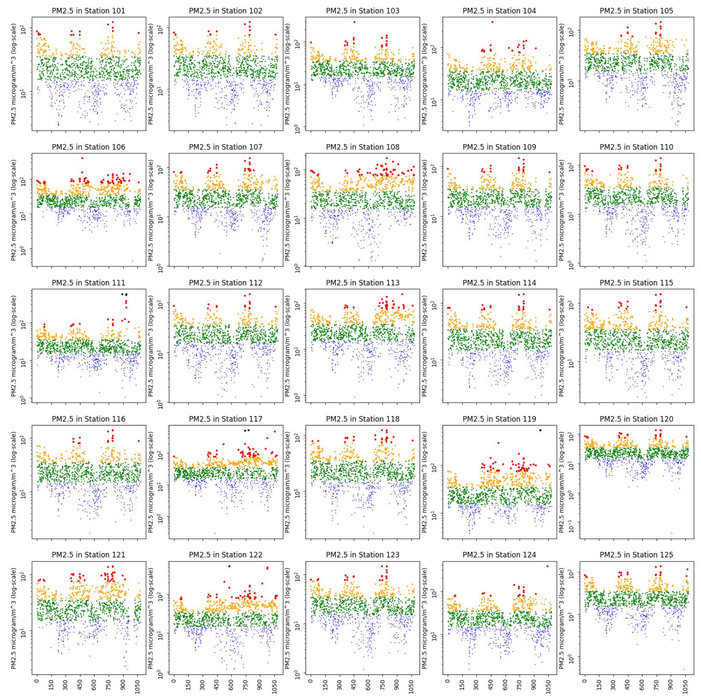

Figure 7: Daily average of PM2.5 by station

- Summary of Results: Figure 6 and 7
- Air pollution is getting **worse** as years go by (especially **PM10** and **PM2.5**)
- Seoul has overall **good** air quality
- Yearly fluctuation for each pollutant exhibit similar trend (e.g. O_3 from Figure 6)
- **Worse** pollution levels in **2019** compared to 2017 (PM2.5 and PM10)
  - More "**Very bad**" – unhealthy
  - *Which station has more severe pollution?* → Figure 7
- **Station 106**, **108**, **111**, **113**, **117**, **119**, and **121** show more "very bad" air pollution level of **PM2.5** in 2019.