Air Pollution in Seoul

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Domain Background

- **Seoul, South Korea is one of the most polluted cities in the world**

- **Shanghai's is major contributor**

Shanghai PM2.5

Seoul PM10

Research Question(s)

-What areas should the South Korean Ministry of Health and Welfare focus on?

- What long-term health effects do they have for people in that area?

-Lastly, what implementations are best to curb the issues of air pollution in specific areas?

Data and Methods

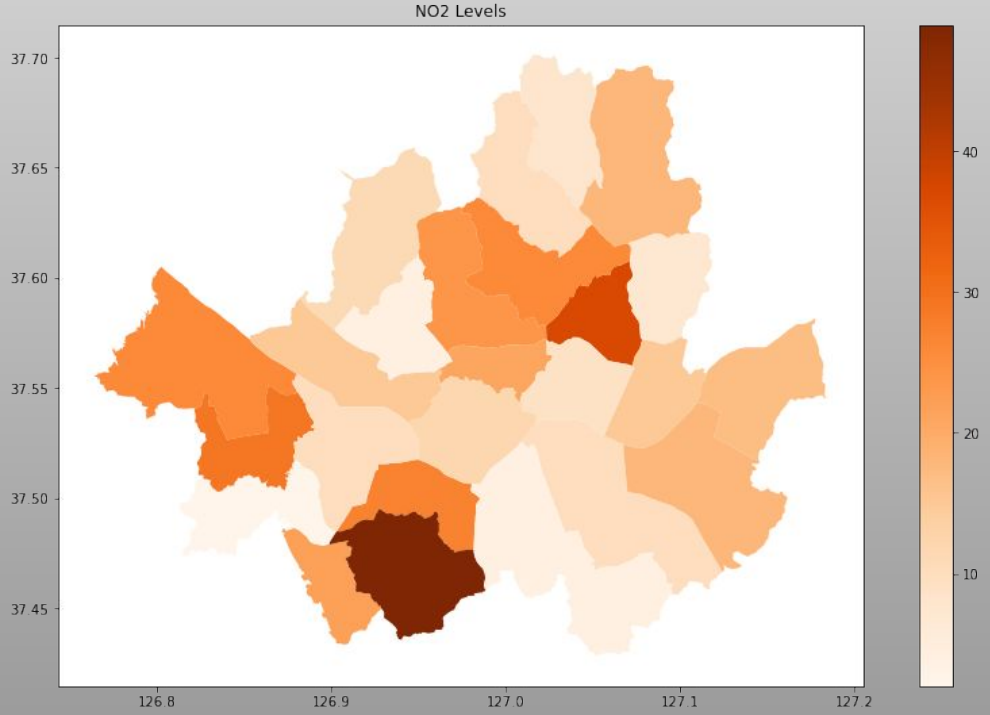
- Seoul Metropolitan Government Open Data Plaza.
  - Year Span from 2017-2019 for every hour of the day
  - Broke down by Day and Station

- Shanghai AQI and Weather
  - Levels of Air quality
  - Looked at PM2.5

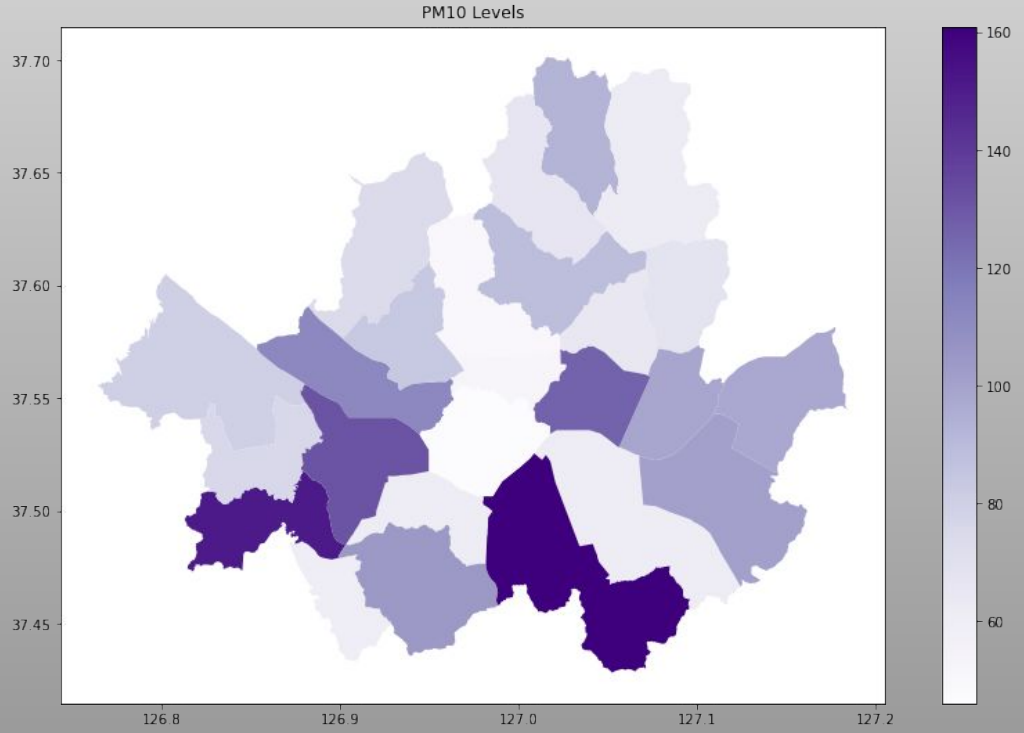
- Time Series Modeling
  - Arima
  - RMSE

Pollutant Name	Measurement	Good	Normal	Bad	Very Bad
Nitrogen Dioxide (NO2)	ppm	0.03	0.06	0.20	2.0
Particulate Matter 10 (PM10)	Mircrogram/m3	30	80	150	600
Particulate Matter 2.5 (PM2.5)	Mircrogram/m3	15	35	75	500

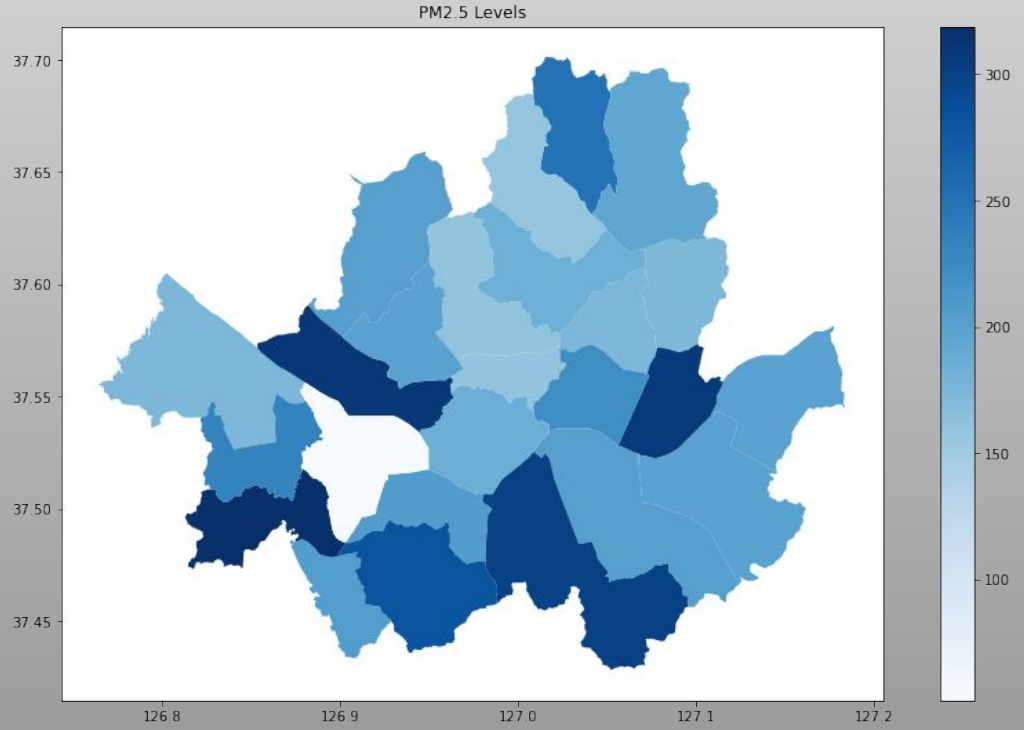
Pinpointing NO2 Level



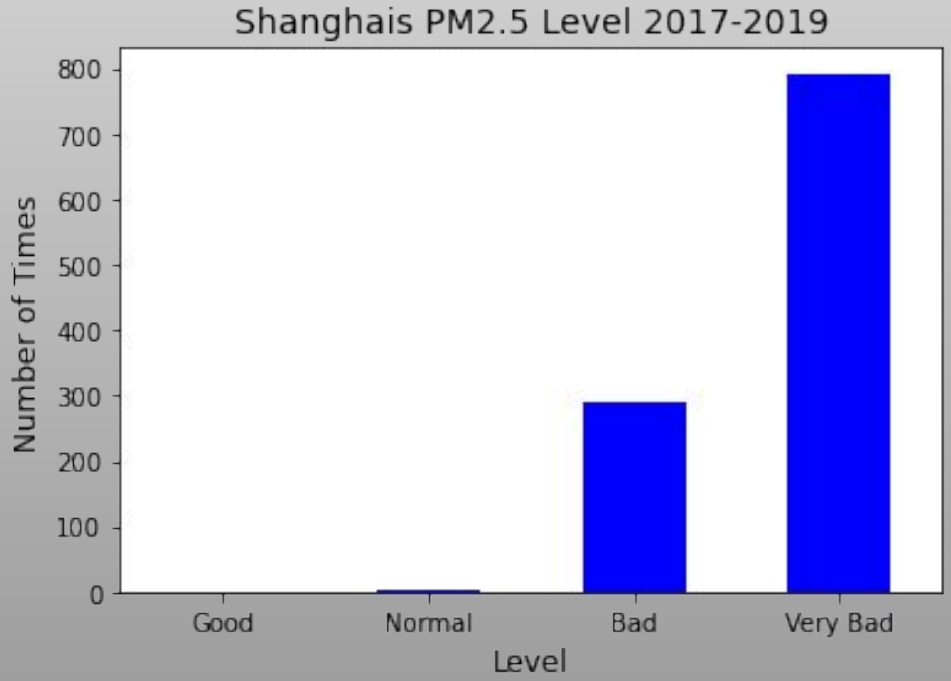
Pinpointing PM10 Level



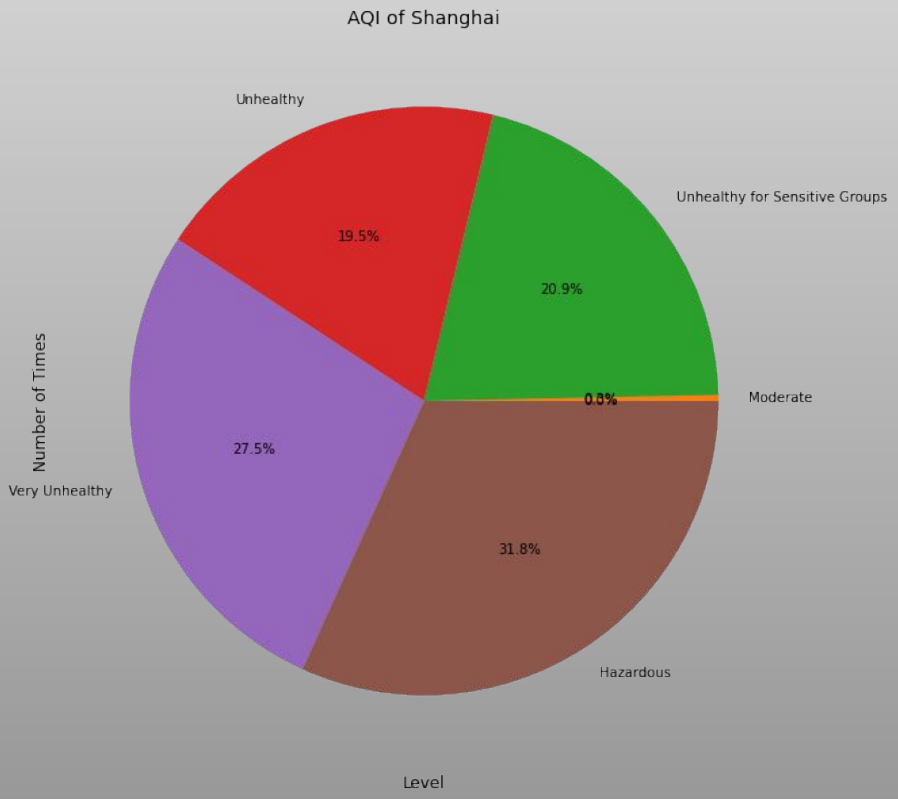
Pinpointing PM2.5 Level



Shanghai PM2.5 Levels



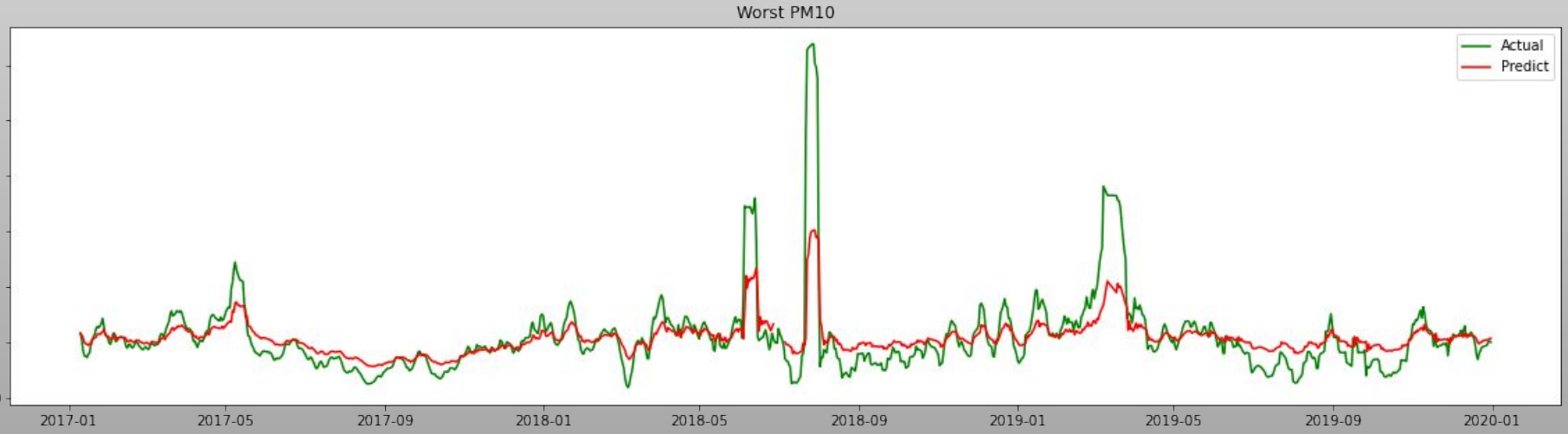
Shanghai PM2.5 Levels



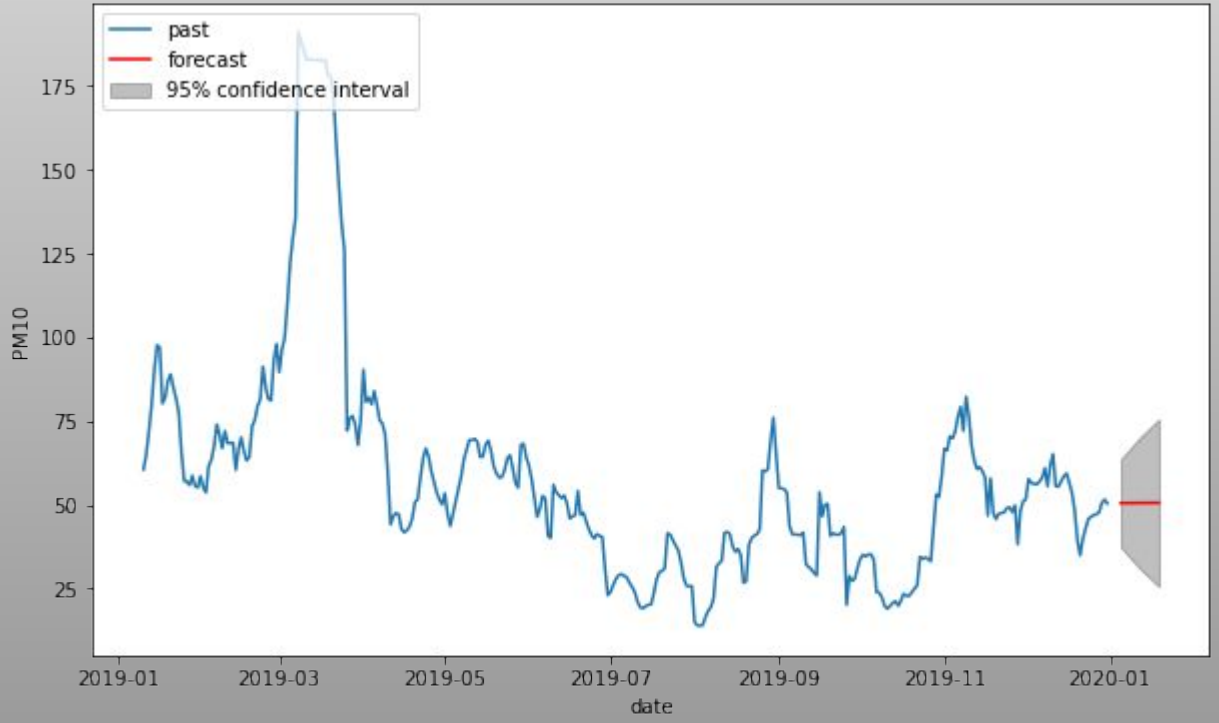
AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

Model Approach



Model Process



Models Results

Pollutant	Avg Train	Avg Test
NO2	.03 ppm	.08 ppm
PM10	26 mm3	51 mm3
PM2.5	13 mm3	27 mm3

Conclusions

- Focus on PM2.5, PM10, NO_2 and areas with high levels
- Air purification in homes
- Put more investment in clean energy

Future Steps

- Collect more earlier data
- Examine other cities in Korea
- Expand to other countries in the area

Thank You!

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Relevant Links

- Impact of the Clean Air Act on Air Pollution and Infant Health: Evidence from South Korea
- Air Pollution in the Republic of Korea
- KORUS-AQ Rapid Science Synthesis Report
- Changes in air pollution levels after COVID-19 outbreak in Korea
- The Effects of Air Pollution on Mortality in South Korea