World Air Quality Ratings

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Who Needs Clean Air?

Anyone who relies on air to breath, but more specifically:

- Policymakers
- Private sectors who's industry relies on use of gasoline, oil, diesel fuel or wood
- Citizens with respiratory issues

This analysis provides awareness to properties that contribute to poor air qualities. These insights can provide guidance when choosing a city for its healthy air qualities. Industries can reduce their reliance on elements that add to reduced air quality. Monitoring our air quality enables us to view other factors of climate instability that can cause cascading environmental issues.

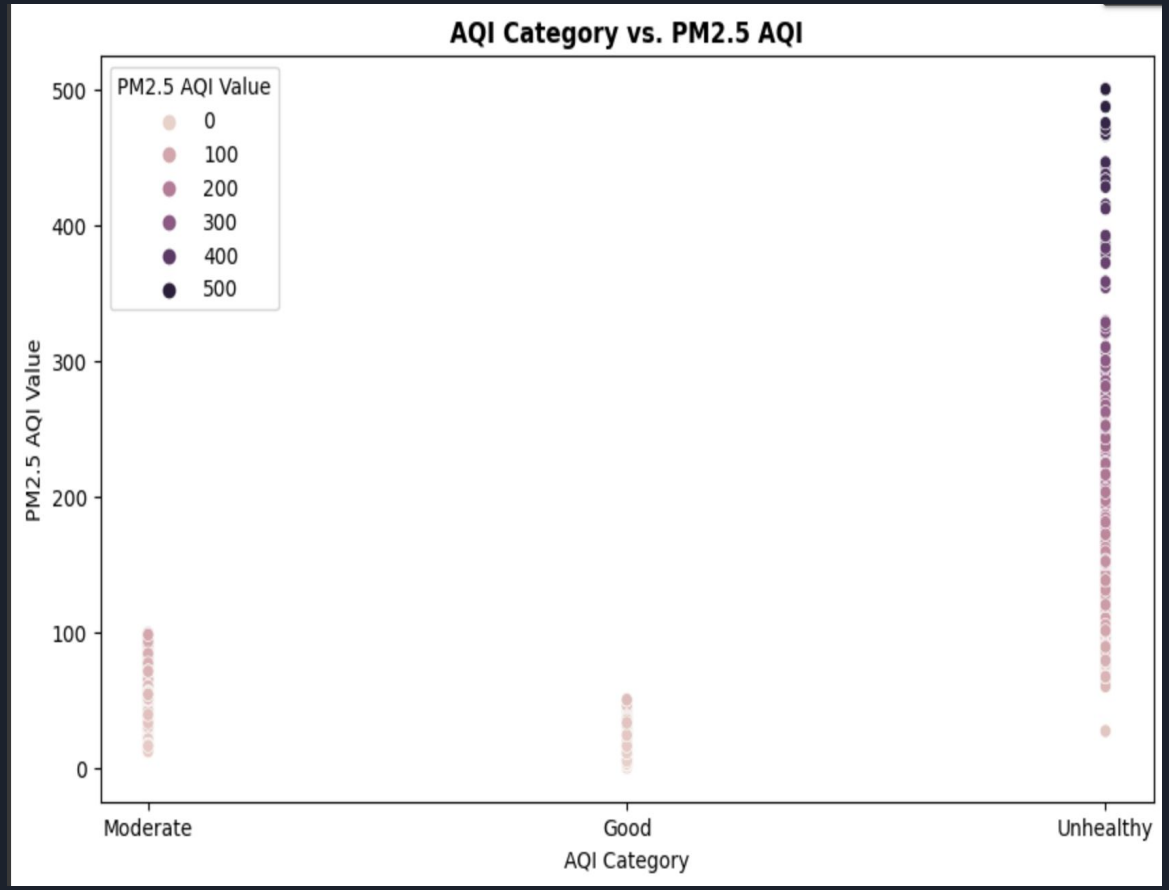
Overview of the Data

The source of this data comes from Kaggle, an open-source website for datasets and insights. This dataset is composed of information collected by the World Health Organization (WHO). The columns in the dataset indicate the key features influencing air qualities within cities around the world. Air quality has been binned into 3 categories, unhealthy, moderate, and good, for easier interpretation of the final results from the machine model.

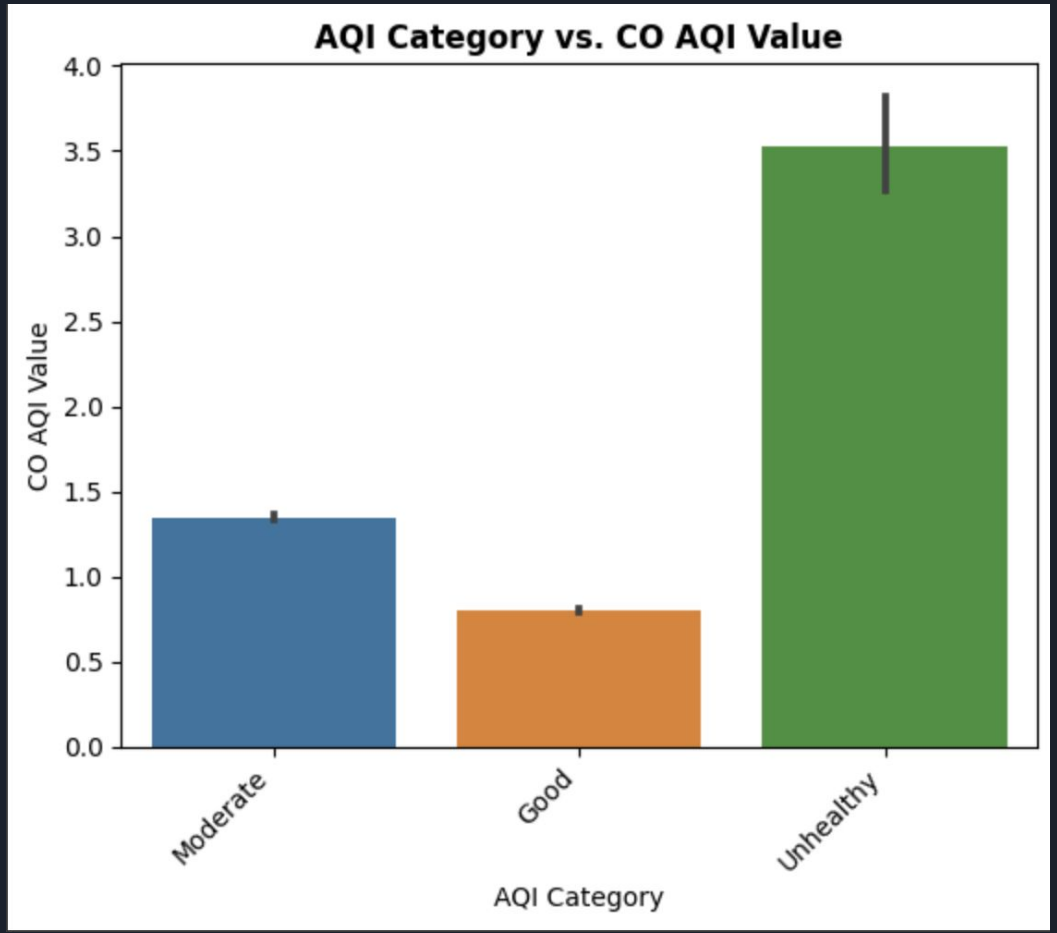
AQI Basics for Ozone and Particle Pollution

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.

- This graph represents the PM2.5 levels present within each air quality category.
- PM2.5 are tiny particles of droplets in the air that are 2.5 microns or less in width.
- Higher PM2.5 levels fall into the unhealthy air quality category.
- Particles come from cars, trucks, buses, factories, construction sites, tilled fields, unpaved roads, stone crushing and burning of wood.



- This chart shows the carbon monoxide (CO) levels present in each air quality.
- Higher CO levels are more likely to fall into the unhealthy air quality category.
- CO comes from the incomplete burning of any material containing carbon, such as gasoline, natural gas, oil, kerosene, propane, charcoal, or wood, produces the poisonous gas.



Strengths and Limitations of this Data:

The machine learning model can explain 93% to 100% of data variance. This means the model has low errors in its predictions on new data.

False Negatives?

The prediction indicated a **unhealthy** air quality but is actually **healthy**. May be financially costly to private sectors who have invested in newer and less pollutive technologies.

False Positives?

The prediction indicated a **healthy** air quality but is actually **unhealthy**. Over long-term this environment could cause respiratory issues but also climate instability.

Final Recommendations

This machine learning model is computation heavy and it's recommended to run a server with significant compute capacity.

CO and PM2.5 are 2 types of pollutants out of many. Air quality is only one aspect of a healthy ecosphere. Other factors such as H_20 quality should be considered for a healthy environment.

Policymakers should work closely with private sectors to reduce air pollution by carbon pricing and establishing other regulation policies.