Predicting Ground Level Ozone Pollution with Weather Data

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The Hypothesis.

Tropospheric ozone pollution, measured in parts per million, can be predicted by weather related metrics.

What is tropospheric ozone pollution

The Data.

Weather Data from Wunderground.com
- L.A. (2005 - 2016)

Air Quality Index (AQI) Data from EPA.org
- L.A. (2005 - 2016)

Features include:

- Humidity
- Temperature
- Wind
- Condition

Target: Tropospheric Ozone Pollution

Feature Design

Minimum Temperature

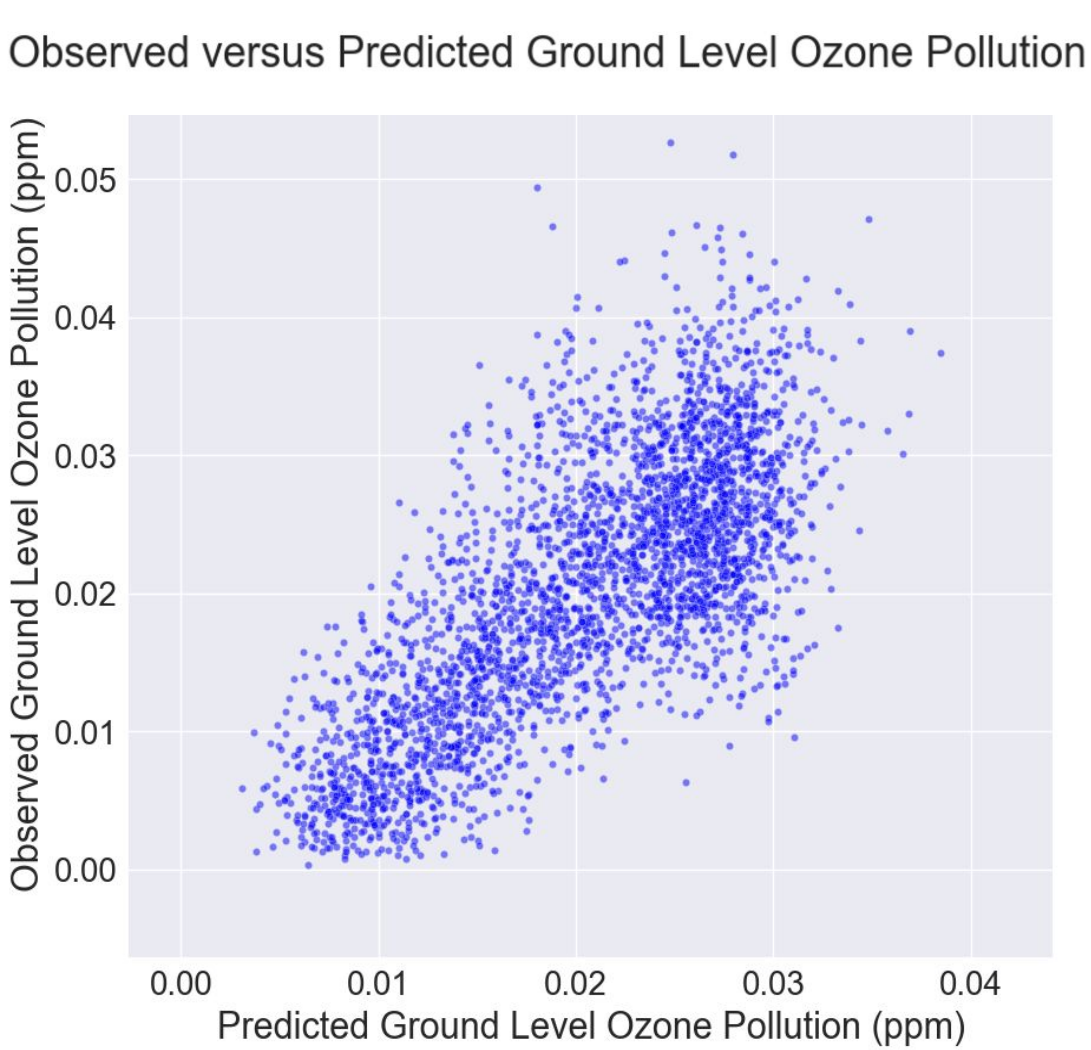
-- Higher min. temp. associated with sunnier days

Max Wind Gust Speed

-- Strongest effect of wind speed data

Overall Condition of Day

-- Quantifying a qualitative measure



Prediction Model -

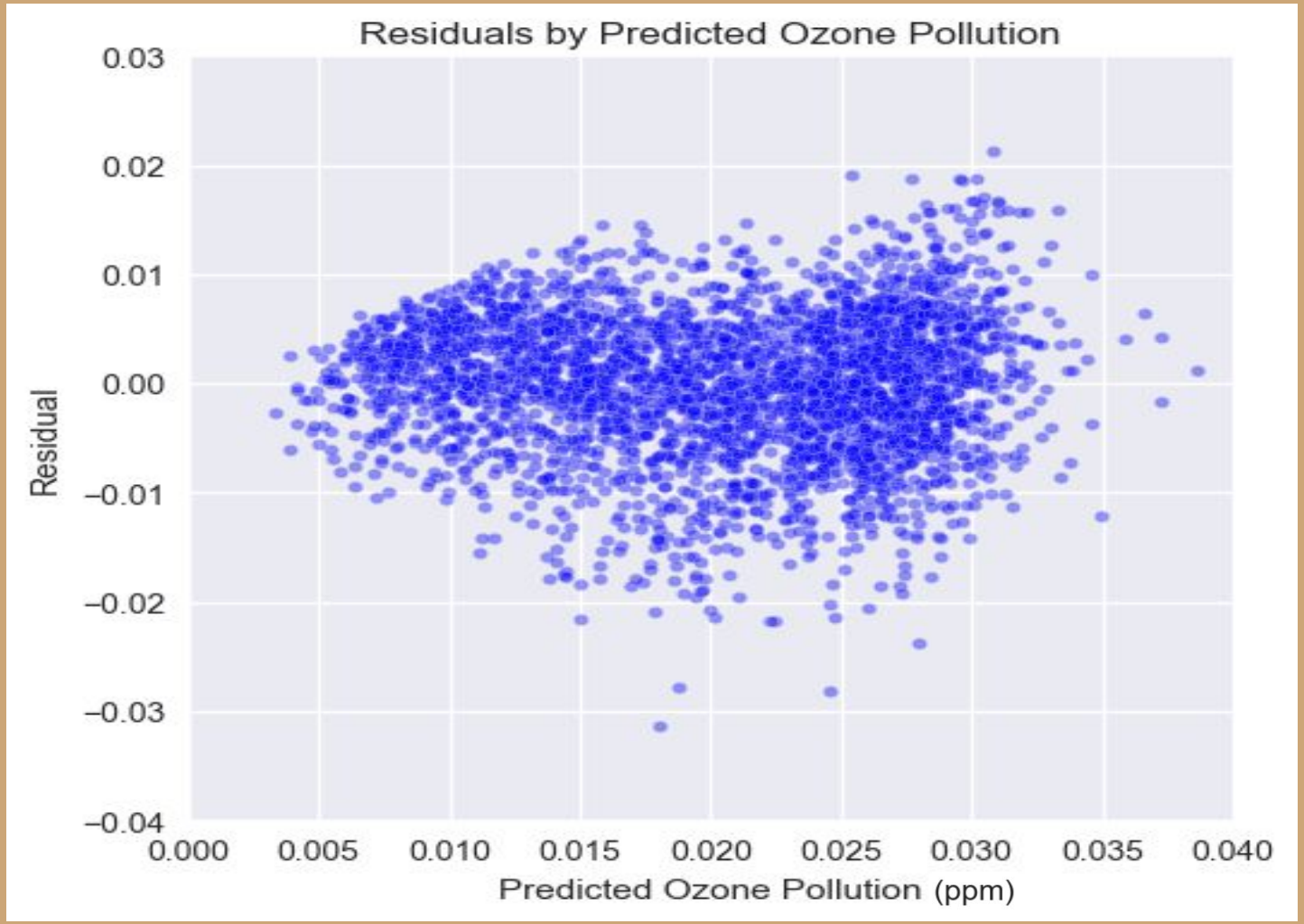
Model Type:
Linear Regression with L2 Regularization

Regularization Parameter:
1e-5

Mean R-Square value from cross validation:
0.5418

Sample Size:
3118 Days

Residuals


Residuals by Predicted Ozone Pollution
Residual
0.03
0.02
0.01
0.00
−0.01
−0.02
−0.03
−0.04
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.035
0.040
Predicted Ozone Pollution (ppm)

The Findings.

The linear regression model accounts for 54% of variation in tropospheric ozone pollution.

Features:

- Average Humidity (+)
- Dew Point (-)
- Max Wind Gust Speed (+)
- Minimum Temperature (+)
- Precipitation (-)
- Sea Level Pressure (-)
- Total Condition of Day (-)
- Length of Day (+)

The Future.

- Incorporate traffic data
- Globalize Model
  - Geographical and Industrial Features

Fin.