

Concentration no2 vs visibility

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Introduction

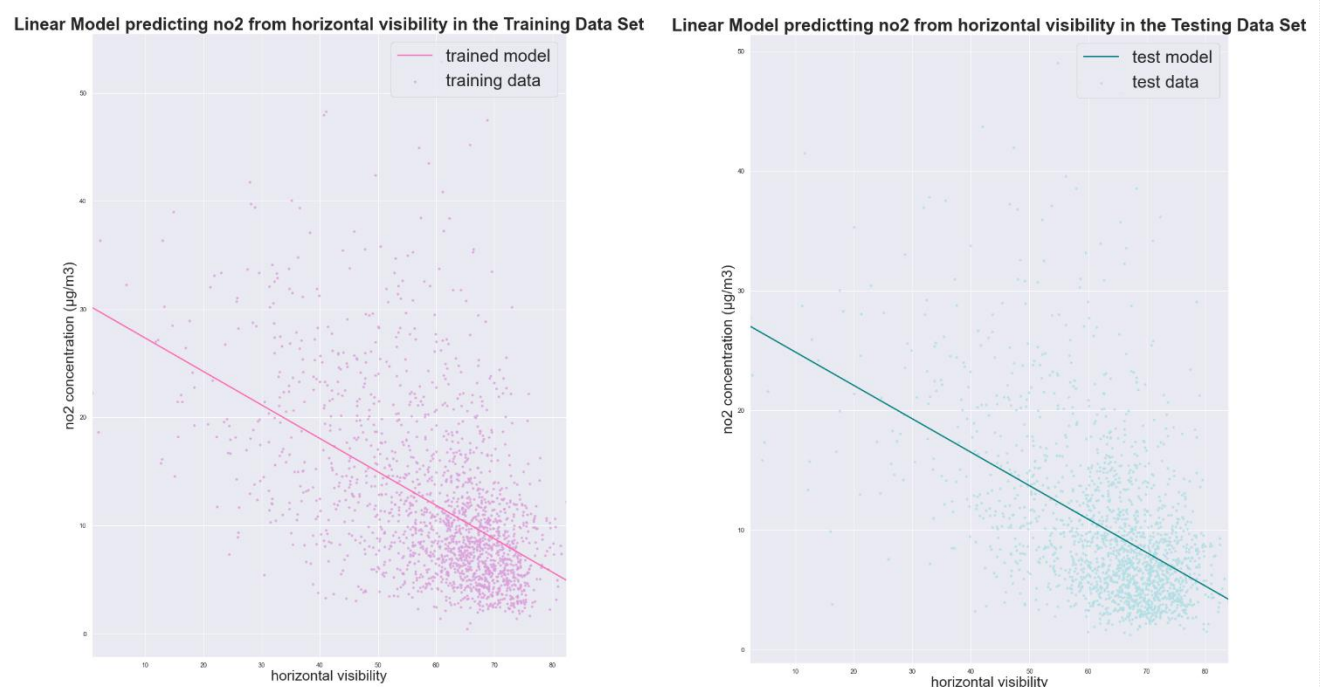
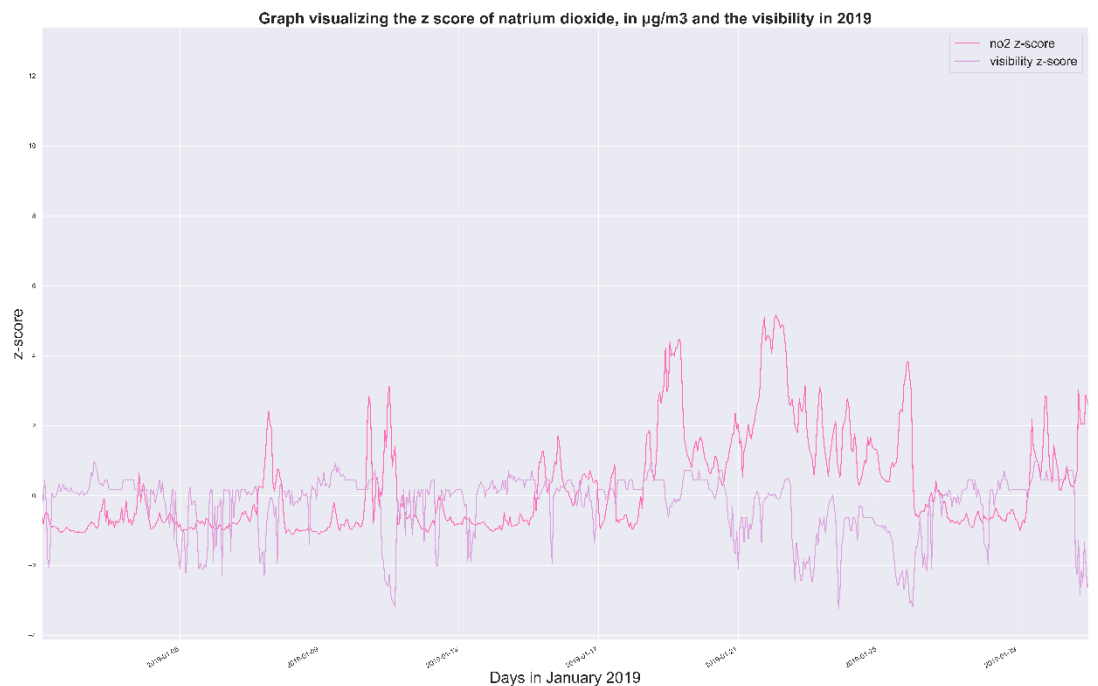
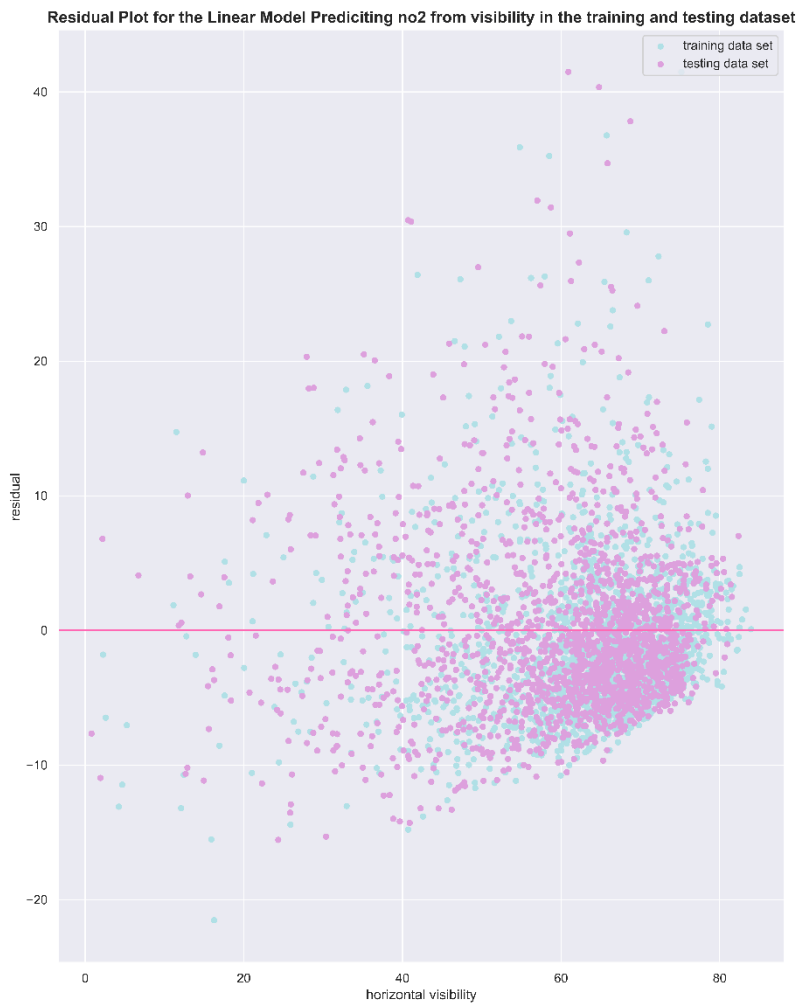
Hypothesis: When there are higher levels of no2 concentration the level of horizontal visibility will be lower, there is a negative correlation.

NO₂ is a gas that is produced by for example burning fossil fuels, and this gas can impact the visibility of the surrounding environment by reacting with other chemicals to form tiny particles that diffusing light (*Nitrogen dioxide*, 2019). This can reduce the horizontal visibility. Because of this, in this poster, we will explore if there is a relation between NO₂ and visibility, and we will find out if this relation is negative as stated in the hypothesis.

Methods

To determine the relation between NO₂ and the visibility, the NO₂ concentration and visibility were measured. A z-score (to show how many standard deviations a particular data point is from the mean of the distribution) line plot was created to show how the variables changed over time, and whether those changes were consistent with what was expected. In this line plot, the y-axis showed the z-scores. The x-axis showed time, for this only one particular month was taken to create a clearer plot. Next to this there were linear models created, and residual plots to find if there was a linear relationship between the two. To verify value accuracy, a training and a testing data were conducted out of the data frame.

Results



Discussion

The correlation in the z-score line plot is not too clear yet as only a part of the data was used and the lines don't always go down as the other one goes up and vice-versa. Looking further into the data with the regression plot and the residual plot helps drawing the conclusion that the correlation is negative. In the residual plot is clear that the variance is small, around the middle line (y-axis [0]) for both the training and the testing data. Both the training and testing data look the same and overlap in some places, this shows good accuracy in the measured data. But other possible (weather) factors were not taken into account, so it's hard to determine a clear relationship. These factors should be taken into account in future analysis.

Conclusion

All the plots confirm the hypothesis: When there are higher levels of no₂ concentration the level of horizontal visibility will be lower, there is a negative correlation. The z-score line plot indicates a negative correlation between the two variables, with one line increasing when the other decreases. The regression plot shows a strong linear relationship between the variables, while the residual plot confirms that the correlation is negative. Moreover, the residual plot shows that this regression model fits the data well, the variance is relatively small, with data points clustered around the middle line (y-axis at 0). This goes for both the training and testing data sets."

Nitrogen dioxide. (2021, September 29). Ministry for the Environment. Retrieved March 10, 2023, from <https://environment.govt.nz/facts-and-science/air/air-pollutants/nitrogen-dioxide-effects-health/#:~:text=Nitrogen%20dioxide%20forms%20when%20nitrogen,especially%20fuel%20used%20in%20cars.>