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**MATH 189Z**

**23 Apr. 2020**

**Final Project Proposal**

**RESEARCH QUESTION:**

**We’ve all seen the headlines. Clearer skies and coronavirus supposedly go hand in hand. We wonder if we can model this perceived decrease in pollution. So, we proceed with our research question: Is expected air quality for the next year higher than models informed with pre COVID 19 data? In other words, will the new air quality numbers generate a prediction with higher air quality for the future?**

**METHODS:**

**For our final project, we propose analyzing and modelling air quality in various counties. We hope to identify trends in quality and projected quality informed by data pre-COVID-19 and post-COVID-19. We suspect that pre-COVID-19 yields projections that predict lower air quality. We intend to use a HMM to model the changes in AQI as HMM’s, as we saw in the stock paper, it can respond to changes more effectively than a method that depends on historical average.**

**SOURCES:**

**The data we plan to use provides historical data of air qualities of counties across the U.S.:** [**aqs.epa.gov/aqsweb/documents/data\_api.html**](https://aqs.epa.gov/aqsweb/documents/data_api.html)

**We will use a HMM to predict future air quality, using this Code for a HMM as inspiration:** [**gist.github.com/dougalsutherland/1329976**](https://gist.github.com/dougalsutherland/1329976)

**This api gives real time AirQuality data:** [**airnowapi.org**](https://www.airnowapi.org/)

**This is no novel idea, as we’ve found a research article using the same methods, (HMM) to Analysis of Multi-Pollutant Exceedances Data:** [**www.researchgate.net/publication/221912145\_A\_Non-Homogeneous\_Hidden\_Markov\_Model\_for\_the\_Analysis\_of\_Multi-Pollutant\_Exceedances\_Data**](https://www.researchgate.net/publication/221912145_A_Non-Homogeneous_Hidden_Markov_Model_for_the_Analysis_of_Multi-Pollutant_Exceedances_Data)**.**