Write-up for Data Analytics Project 1

For this topic we are analyzing the impact of Covid-19 on air quality. Specifically, in what ways has the Covid-19 pandemic impacted air quality, positively or negatively; and if the pandemic had not taken place, what would the expected air quality be for 2020?

We chose this topic as both Covid-19 and the health of the environment are very pressing issues in American, and global, society. We thought that linking these issues to the shift in people working from home would be interesting to see if this caused the pollution in the Twin Cities to drop and thereby improve overall air quality; as measured by the “Air Quality Index” or “AQI.”

In this analysis we will look at past AQI levels for the Twin Cities in order to generate a baseline and predict what the air quality could have expected to be in 2020 had the pandemic not taken place. Then we will examine the measured 2020 AQI and compare it to travel data for both motor vehicles and aircraft to asses if the pandemic caused a change in travel habits, and to what extent those potential changes in habit impacted the measured 2020 AQI.

In this analysis we will be collecting and analyzing raw data from several different sources including the AirNow API, run by the US EPA, traffic volume data API, run by MNDOT, as well as Covid-19 data which is furnished by states and maintained by The Atlantic. Some important measures which we will be reverencing, specifically around AQI, will be Ozone and PM2.5. Ozone refers to the level of Ozone, typically located in the stratosphere, that is measured at ground level. This gas consists of three Oxygen molecules and is pale blue in color, possesses a pungent odor, is chemically unstable, and toxic. Its location in the lower atmosphere is typically the result of ultraviolet light reacting with pollutants from vehicles and factories as they ascend through the atmosphere. PM2.5 is also a standard measure used in calculating the AQI. This measurement refers to the level of particulate matter (PM) in the atmosphere that measure smaller than 2.5 micrometers. These particles are the typical soot and smog that come to mind when discussing air quality and are the result of industrial and vehicle exhaust. However, these particles can also be naturally occurring and can consist of various allergens, bacteria, mold spores, and dusts.

Throughout the course of our analysis we found that the AQI in the Twin Cities was only minorly impacted by both Covid-19 and traffic patterns, both before and during the lockdown. This has led us to believe that the AQI that we experience in the Minneapolis-St. Paul Metro is less contingent upon private habits and more the result of industrial trends. It is noteworthy to mention that overall traffic did see a small decrease during the lockdown, however this decrease appeared to only smooth out the variance observed in the data. While we did see a steady decrease (improvement) of AQI for the data set examined, and during the lockdown, this decrease was only loosely correlated to any changes in individual habits during the same time period, with only a very slight negative correlation being observed. This has led us to speculate that individual consumers only have a minor impact on the air pollution in their region, however more indepth study is necessary to confirm or deny this possible explanation.