Let's go to the Harbourfront, shall we?

An analysis of Canada's Social Distancing during COVID-19

On May 31st, more than two months into nationwide lockdown, my friends and I decided to go to the Harbourfront for a walk. With our face masks on, we were excited to get some fresh air through our stifling N95s. Shockingly, there was a crowd of people by the lake. Most of them were not wearing face masks and they were barely practicing social distancing. We started to wonder why they behaved the way they did and how their behavior connected to the bigger picture in Canada. Thus, this analysis aims to address the question of how active people in Canada are, at practicing social distancing and the driving forces behind their social distancing decisions.

For this analysis, the main dataset comes from Google's Community Mobility data reports. According to Google, the changes in mobility for each day are compared to a baseline value (the median value for the corresponding day of the week during a 5-week period between January 3rd and February 6th, 2020). This dataset on mobility provides us insights into how people respond to potential factors such as weather, policy changes, increases in new cases, etc. We also collected data from Google trends and weather data from the Government of Canada to investigate the probable driving factors of Canada's social distancing.

To get a general sense of people's behavior during COVID-19, we first took a look into the most and least frequent places people visited. Following measures taken in March to stop the spread of COVID-19, people stopped using public transportation and decreased their number of visits to workplaces. They stayed home most of the time with little variation from day to day. However, data showed that people visited parks quite often. There are numerous days where the number of visits to parks surged suddenly. Interestingly, Google trends show a similar pattern in which there is a strong correlation between the number of times people searched for "parks" and the number of times people visited parks.

To better evaluate Canada's social distancing, we created a new metric, *Social Distancing Score*, from Google's community mobility data. After normalizing and combining data to construct the *Social Distancing Score*, we saw the score didn't vary much before March 15th. When Canada announced the closure of the border to international travel and Ontario started its lockdown, the practice of social distancing started to improve as people began recognizing the severity of the situation. However, around April 13th, almost a month into lockdown, people gradually stopped practicing social distancing as COVID-19 put more people out of work and resulted in massive disruption to their lives.

Lastly, we computed the permutation feature importance after fitting a random forests classifier to our data. The mean temperature, new cases, new deaths in Canada are the variables that have the most predictive power. On the other hand, days since the first case, new deaths, and new cases in the world have the least predictive power. To look into the individual effects of the factors, we fitted a multiple linear regression. Mean temperature and new cases in Canada remain significant, while new deaths become less significant. This indicates that as the weather gets warmer and as we enter summer, people want to go out more to bathe in the sun. People are also responsive to the number of new cases and they will act accordingly. Total precipitation is another significant factor. People may decide to stay at home if it is raining outside. In conclusion, Canada's social distancing is responsive to new cases in Canada, temperature, and precipitation. As we are entering summer, it is our job to practice social distancing when going outside for a walk and the government should constantly remind people to take precautions during the pandemic.