COVID-19 DataFest

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Topic

We will investigate bridge traffic statistics from the Niagara Falls Bridge Commission and determine whether and how the COVID-19 pandemic has affected activity at the Lewiston-Queenston, Rainbow, and Whirlpool bridges. The Niagara Falls Bridges are the second-busiest port of entry between US and Canada (behind Kennedy International); thus, these traffic statistics offer a unique opportunity to examine how port crossing has been affected by the COVID-19 pandemic.

Exploratory Data Analysis

We will begin by examining the aggregate data, which combines the traffic statistics from all three bridges – Lewiston-Queenston, Rainbow, and Whirlpool.

```
## # A tibble: 4 x 2
##   Month     total
##   <fct>     <dbl>
## 1 April     20409
## 2 March     121761
## 3 January   198787
## 4 February  199594
```

As we can see from the table above, bridge traffic was similar in January and February, with about 200,000 vehicles crossing in each month. However, when comparing February to March, we notice a large discrepancy in the number of vehicles – roughly 80,000 less vehicles! Furthermore, comparing March to April reveals an even greater discrepancy – almost 100,000 less vehicles! In sum, from January 2020 to April 2020, the number of vehicles crossing the Niagara Falls Bridges drastically decreased (approximately -180,000 vehicles).

Of course, this aligns with our expectations given the lockdown and social distancing guidelines which have been in place in March and April 2020.

## Total Number of Crossing Vehicles
By Month
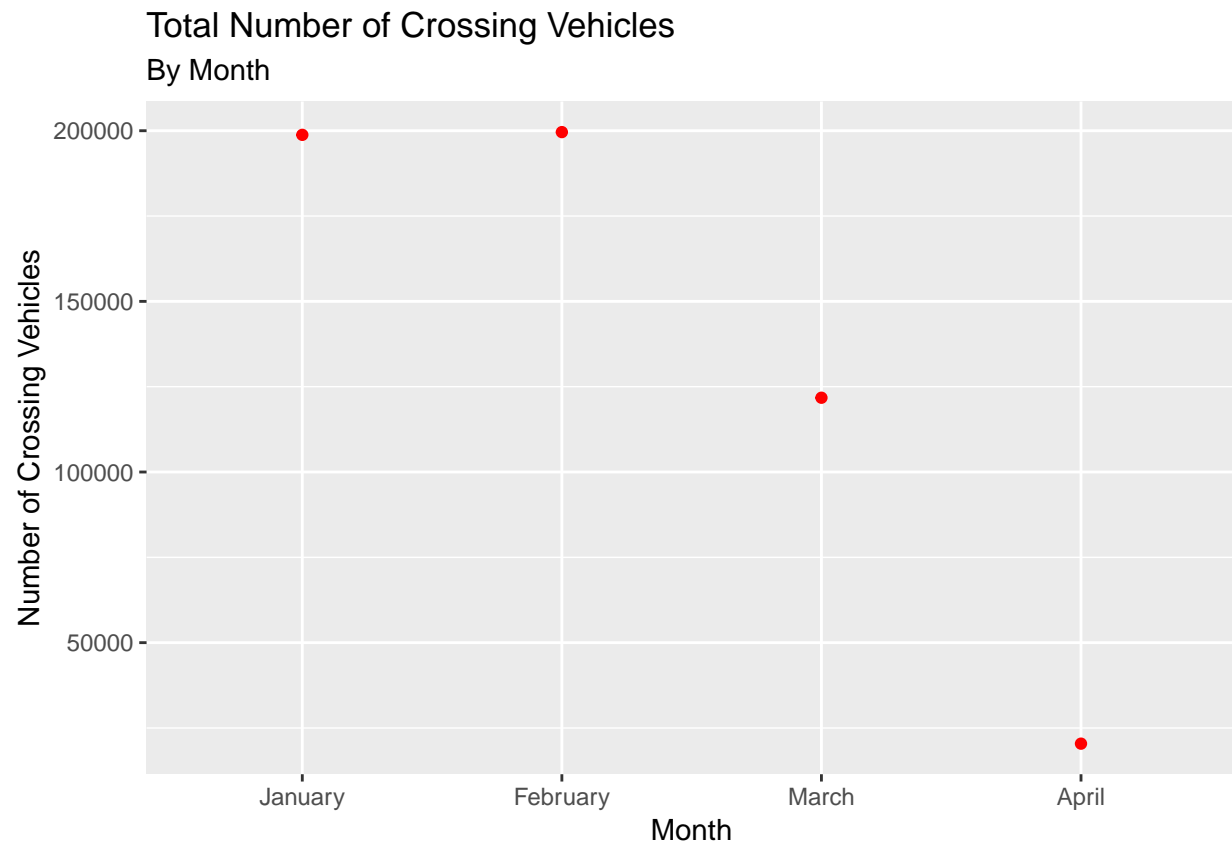
Based on the scatterplot above, there seems to be a nonlinear relationship between month of the year and the number of vehicles crossing the bridges.

```
## # A tibble: 4 x 2
##   Month    totalA
##   <fct>     <dbl>
## 1 April      4359
## 2 March     90570
## 3 January  167326
## 4 February 170191
```
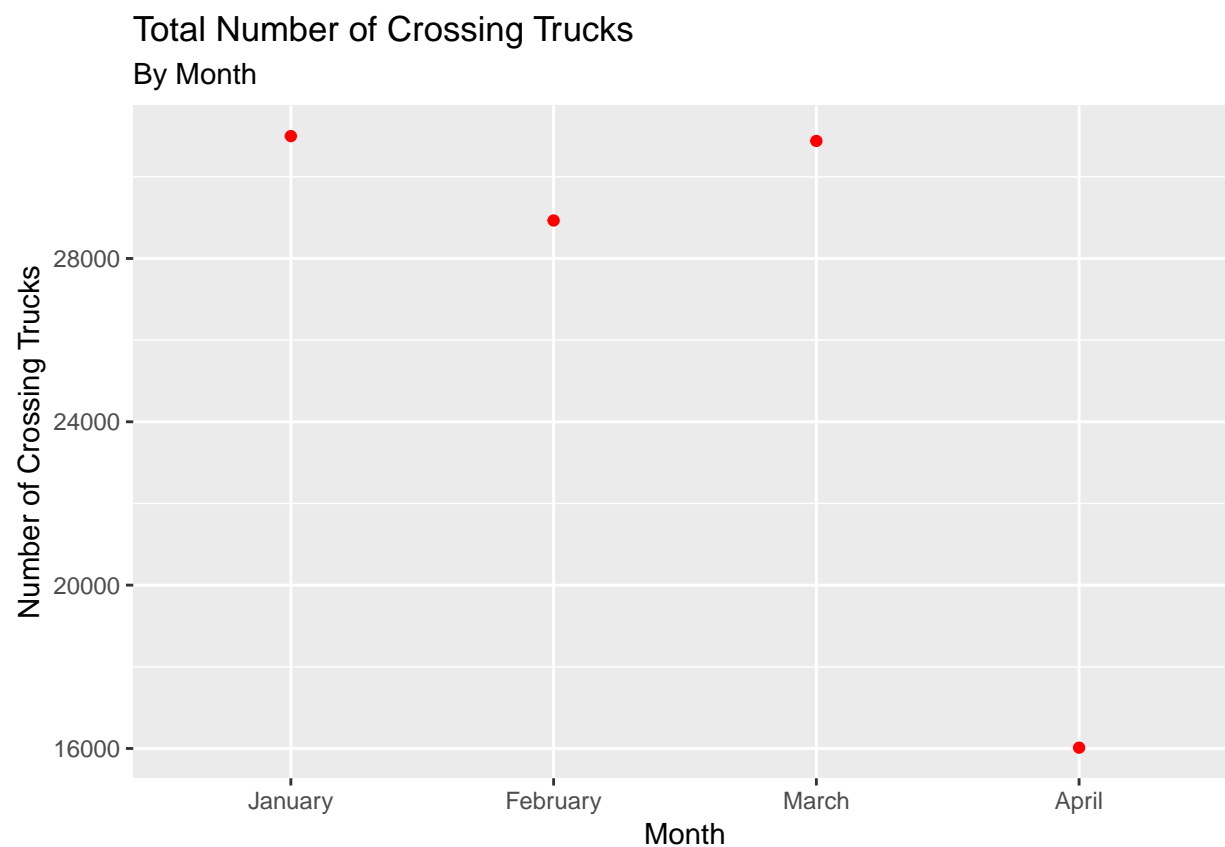
Total Number of Crossing Autos
By Month
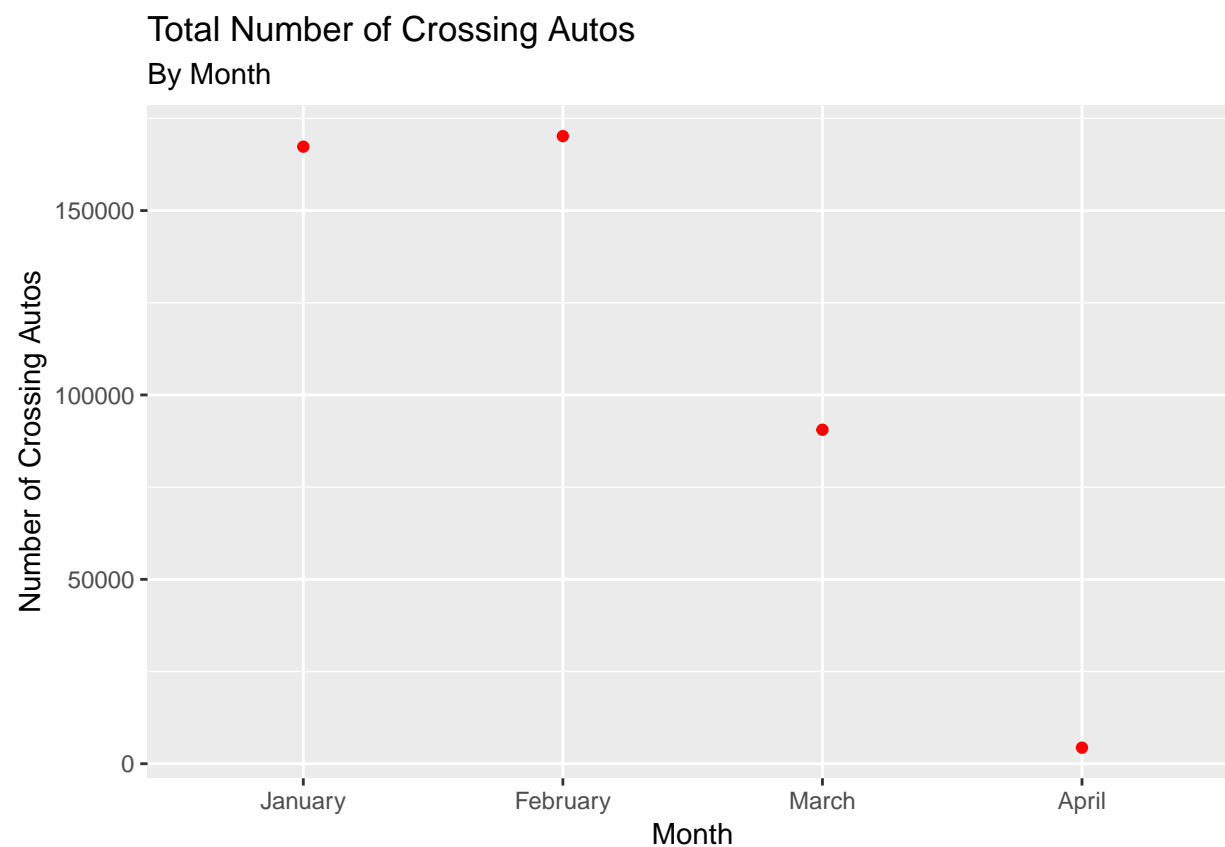

```
## # A tibble: 4 x 2
##    Month    totalB
##    <fct>     <dbl>
## 1 April         2
## 2 March       197
## 3 January     338
## 4 February    364
```
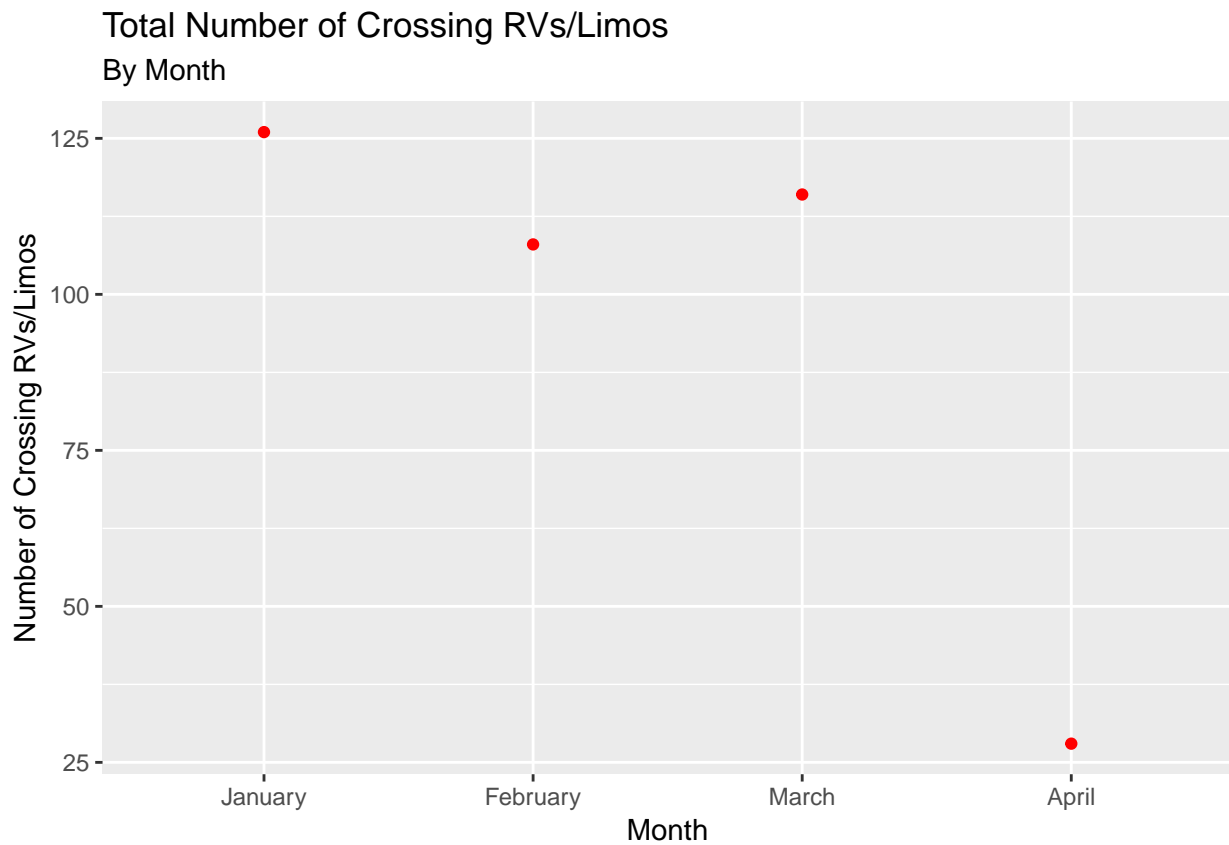
Total Number of Crossing Buses
By Month
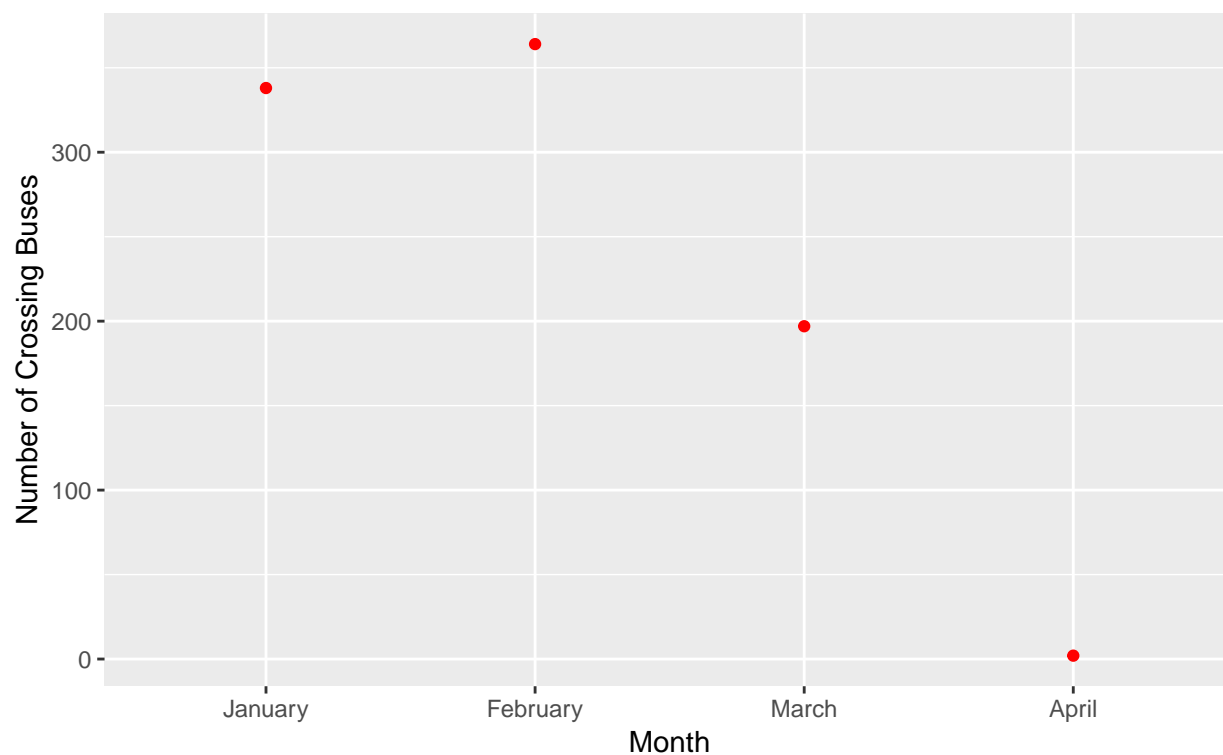

```
## # A tibble: 4 x 2
##   Month    totalT
##   <fct>     <dbl>
## 1 April     16020
## 2 February  28931
## 3 March     30878
## 4 January   30997
```

Total Number of Crossing Trucks
By Month


```
## # A tibble: 4 x 2
##   Month     totalRL
##   <fct>       <dbl>
## 1 April          28
## 2 February      108
## 3 March         116
## 4 January       126
```

Total Number of Crossing RVs/Limos
By Month

Model

Now, we will attempt to fit a multiple linear regression model to explain the variation in the number of vehicles crossing the bridges based on the