

The background image shows a green metal turnstile at a subway station. A yellow sign is hanging from the turnstile, featuring a black circle with a white horizontal bar and the text "NO ENTRY". The sign also says "The Subway is Closed for Cleaning 1 AM to 5 AM". A white hexagon is overlaid on the image, centered near the top of the turnstile.

MTA Turnstile Exploratory Data Analysis

MTA Covid Control

By: Wenting Deng

A teal geometric graphic consisting of a square with a diagonal line from the top-left corner to the bottom-right corner, creating two triangles.

Project Overview

Analysis Background

The NYC Department of Health and Mental Hygiene (NYC DOHMH) is planning to support the city's reopening. And they want to provide some Covid Health kits in some public areas.

Analysis Objective

Analyze the correlations between subway entries and Covid cases, evaluate whether they should target subway stations. If so, which stations.



Analytic Overview

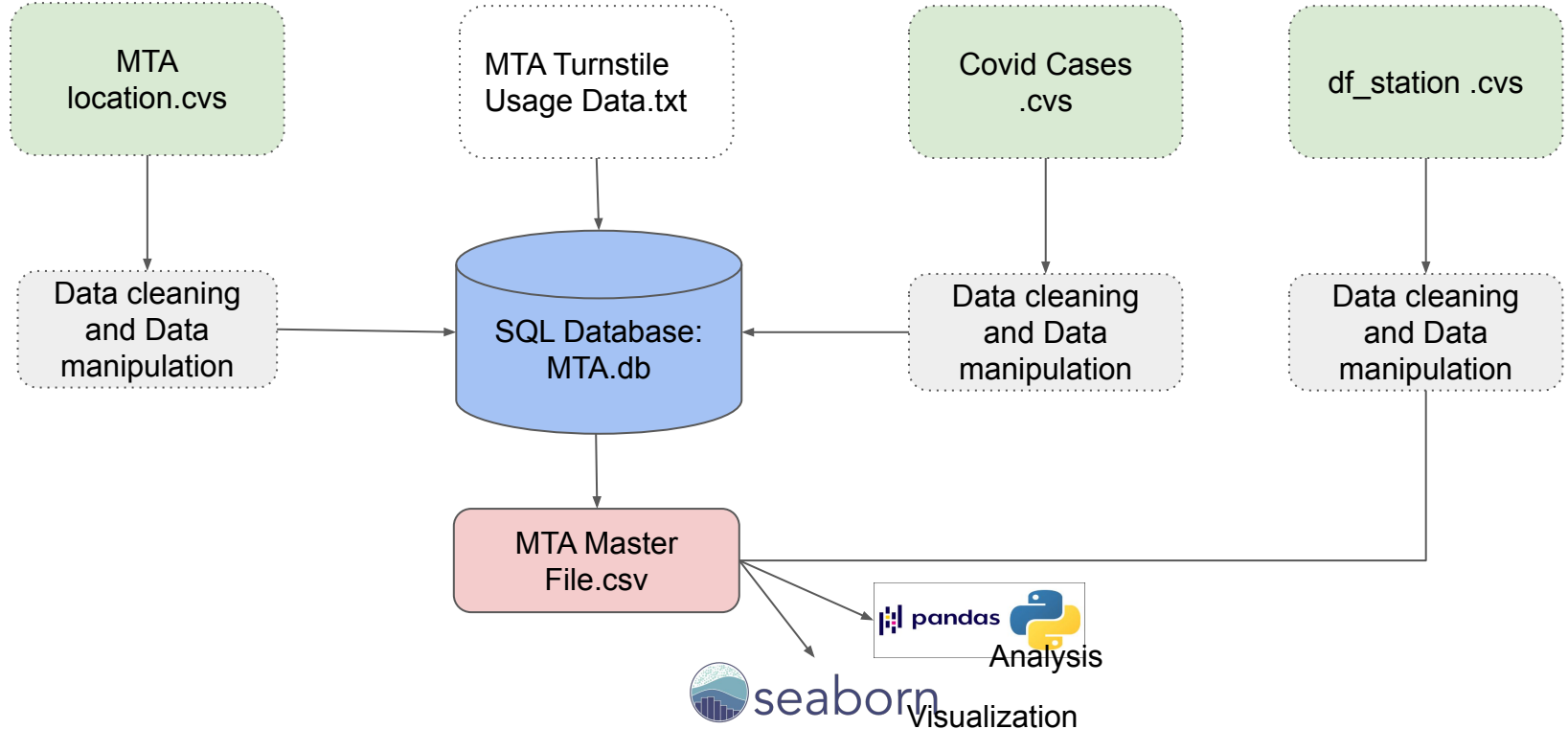
Data Sources

- [MTA Turnstile Usage Data \(Jan 2020 - Oct 2020\)](#)
- [MTA Location Data](#)
- [MTA Remote Complex Mapping](#)
- [Covid Daily Cases Data](#)

Key Metrics:

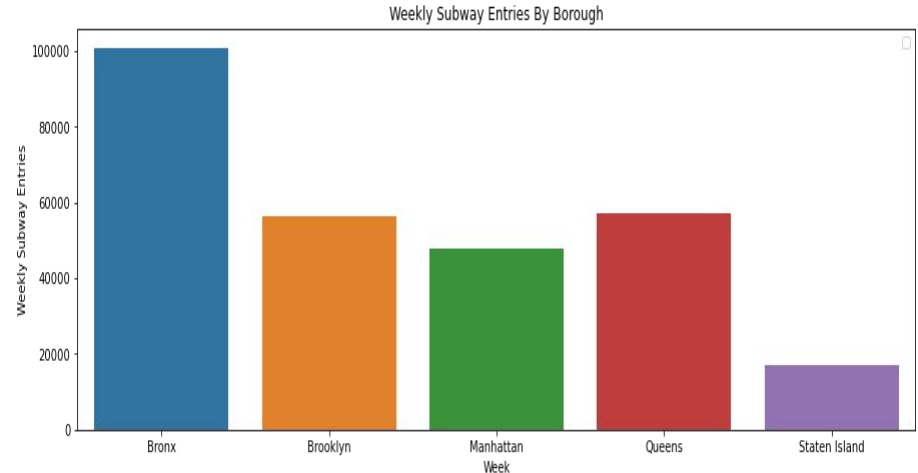
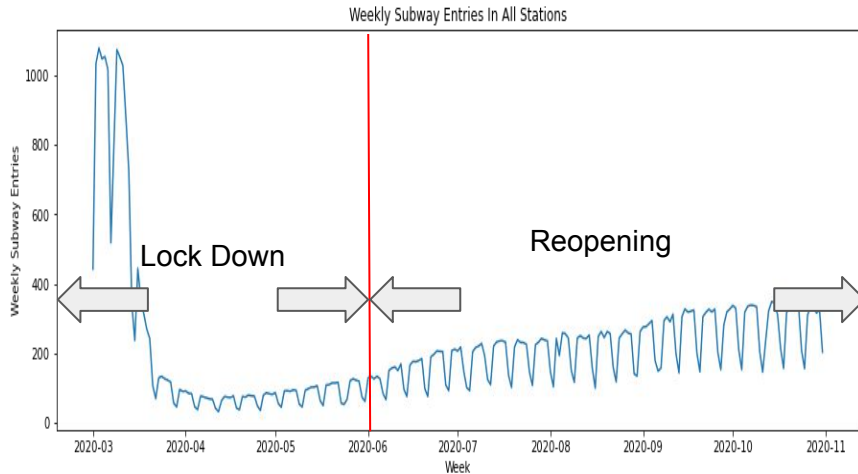
- **Weekly Subway Entries:** Weekly median values of subway turnstile entries
- **Covid Cases:** Weekly median values of COVID cases
- **Station Entries Percent Change:** the weekly entries percentage change from Mar 2020 to Oct 2020

Data Workflow



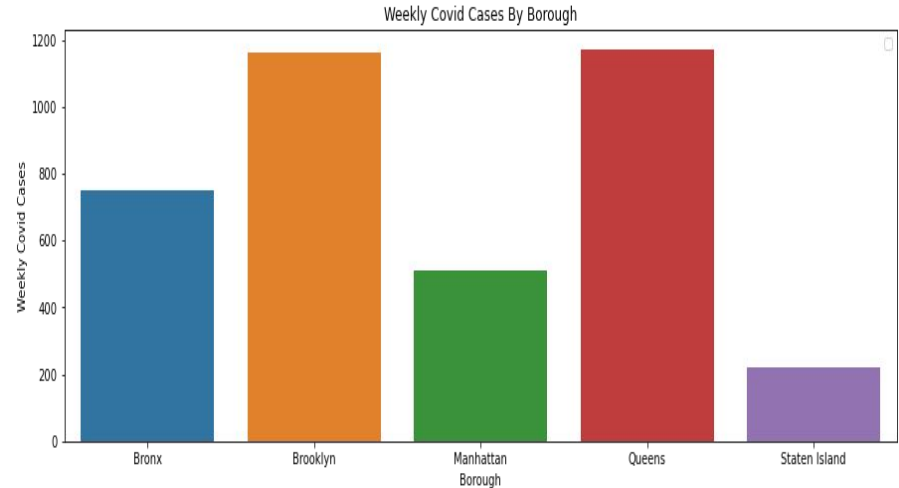
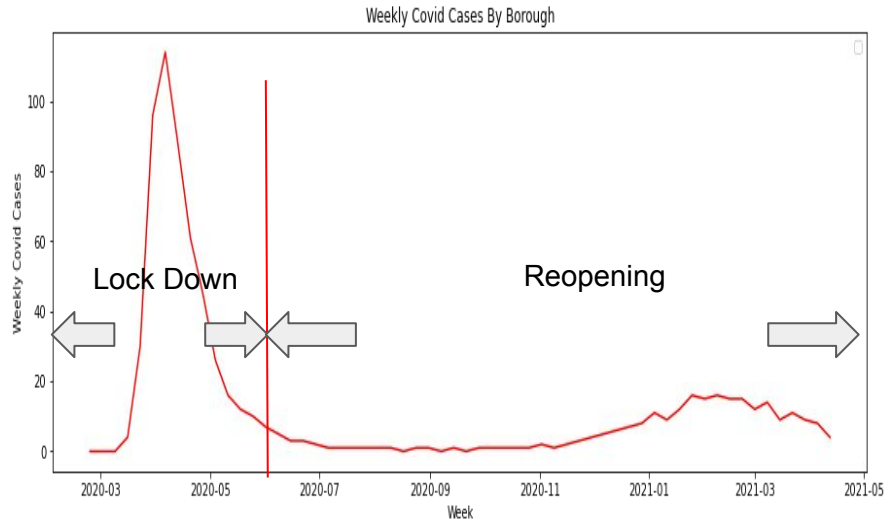
MTA Ridership Trend

- The MTA ridership has dropped drastically since March when the city was locked down
 - Similar patterns are found in each borough (see appendix 1.1)
- Bronx has higher weekly entries volume

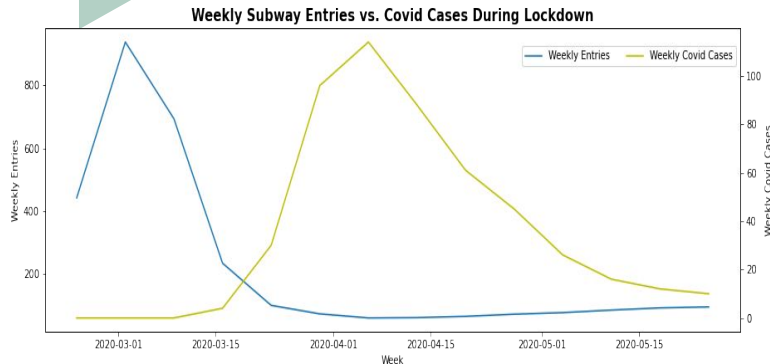


Covid Cases Trend

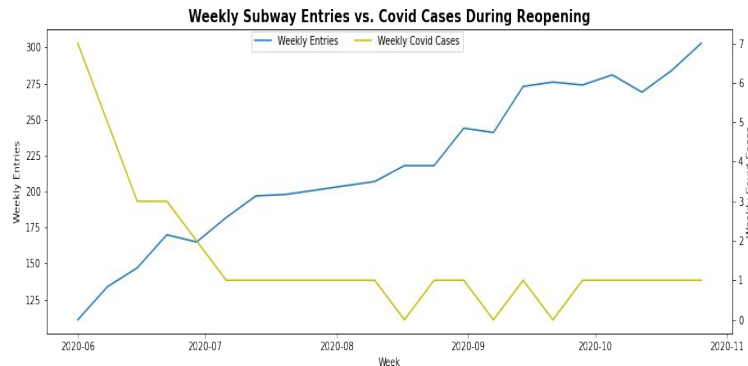
- Similar patterns are found in Covid Cases (see appendix 1.2 for more details)
- More Covid cases are confirmed in Brooklyn and Queens



Weekly Entries vs. Covid Cases



Correlation(lag 4): 0.74



Correlation(lag 1): -0.71

Lockdown Phase

- The weekly entries and Covid cases show a strong POSITIVE correlation with a lag of 4 weeks.

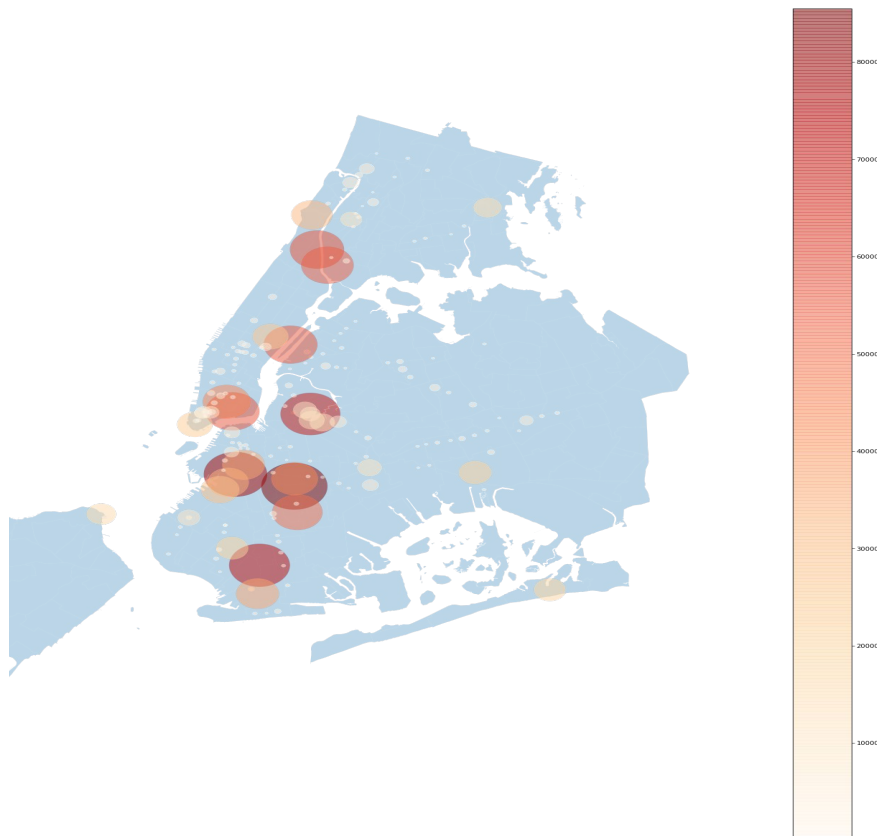
Reopening Phase

- The weekly entries and Covid cases show a strong Negative correlation with a lag of 1 week.

The change of correlations indicates the way people engaging with Covid has changed.

The correlations by borough show similar patterns (see appendix 2)

Find Target Stations By Foot Traffic



- The positive correlation during the lockdown stage indicates the necessity of enforcing COVID protection actions during reopening period.

Target Stations By Borough Details

- By comparing the percentage change of subway entries in each stations against percentage change across stations in corresponding borough, 5 target stations are identified in each borough.

Bronx	Brooklyn	Manhattan	Queens	Staten Island
138/GRAND CONC	STERLING ST	GRAND ST	COURT SQ-23 ST	ST. GEORGE
PELHAM BAY PARK	4AV-9 ST	HARLEM 148 ST	AQUEDUCT RACETR	
MT EDEN AV	AVENUE P	EAST BROADWAY	BEACH 60 ST	
231 ST	BEVERLY RD	ROOSEVELT ISLND	PARSONS BLVD	
182-183 STS	PRESIDENT ST	BOWERY	63 DR-REGO PARK	

A teal-colored geometric graphic consisting of a square with a diagonal line from the top-left corner to the bottom-right corner, creating two triangular sections.

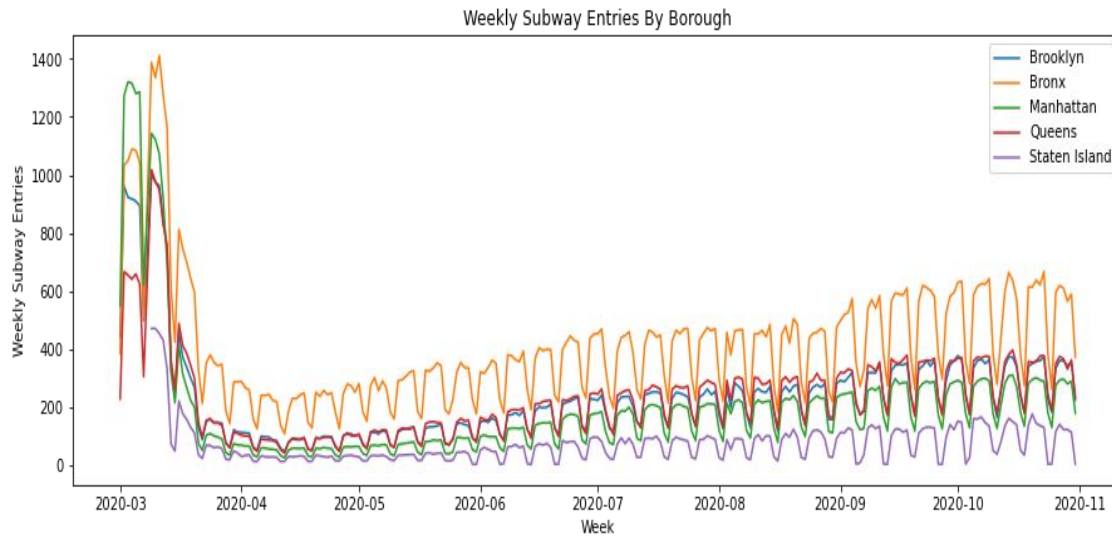
Future Work

- Look for more granular data. Map stations by neighborhoods and if possible pull Covid cases by neighborhoods;
- Forecasting subway foot traffic and Covid cases by applying time series methods, such as ARIMA;

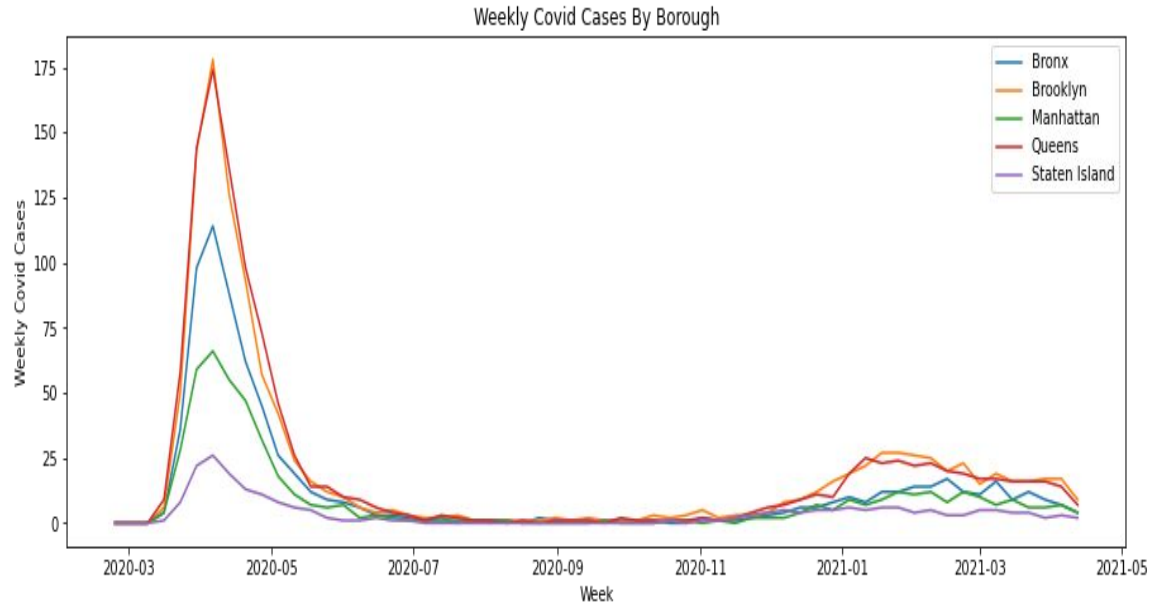


Appendix

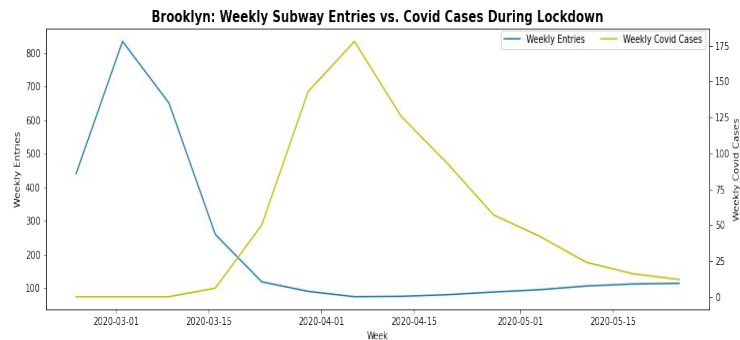
Appendix 1.1: Weekly Entries By Borough



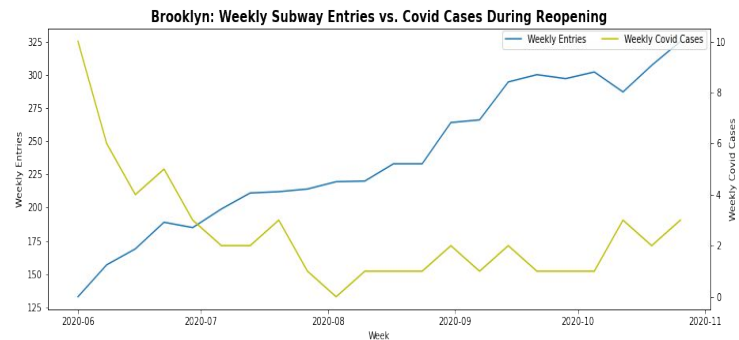
Appendix 1.2: Weekly Covid Cases By Borough



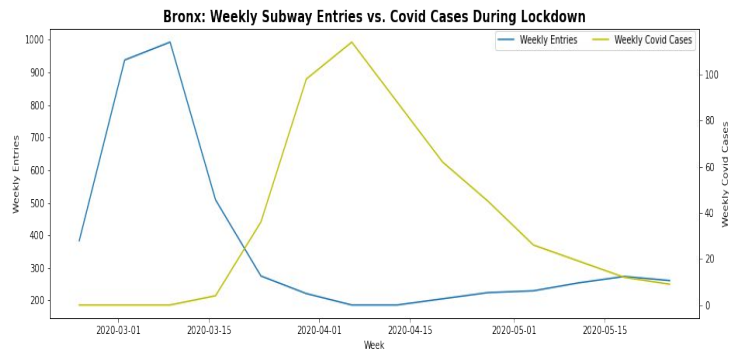
Appendix 2: Weekly Entries vs. Covid Cases By Borough



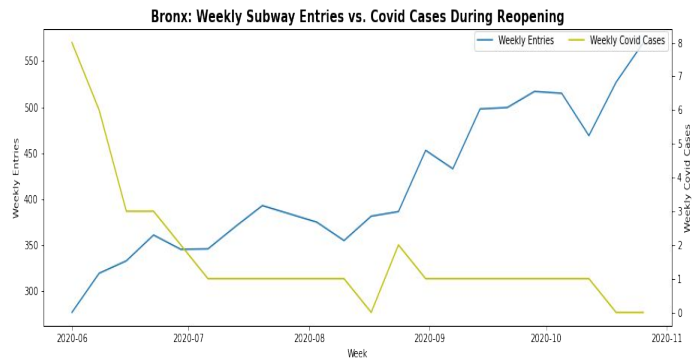
Correlation: 0.78



Correlation: -0.52

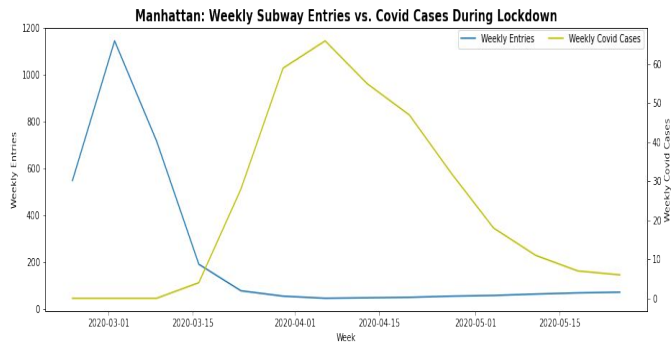


Correlation: 0.89

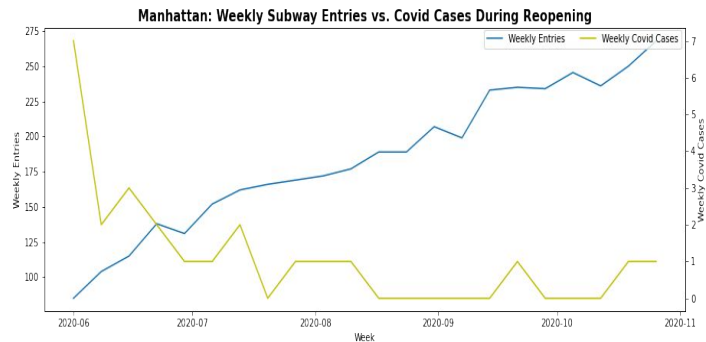


Correlation: -0.60

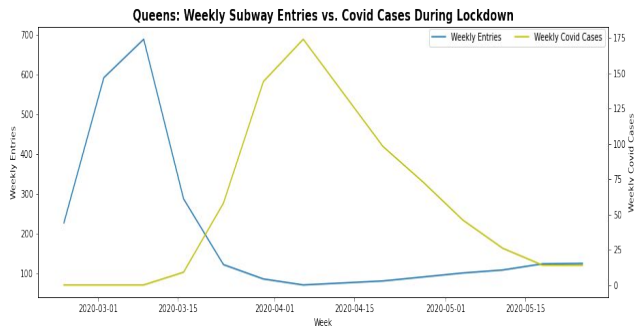
Appendix 2: Weekly Entries vs. Covid Cases By Borough



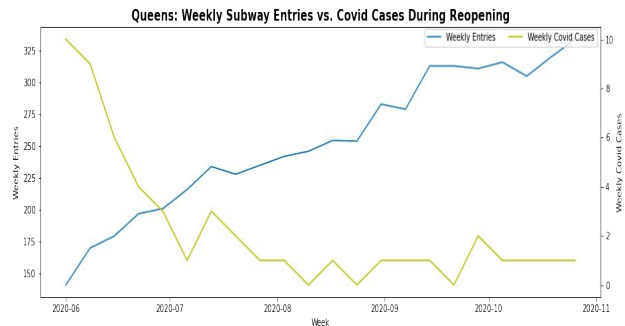
Correlation: 0.66



Correlation: -0.66

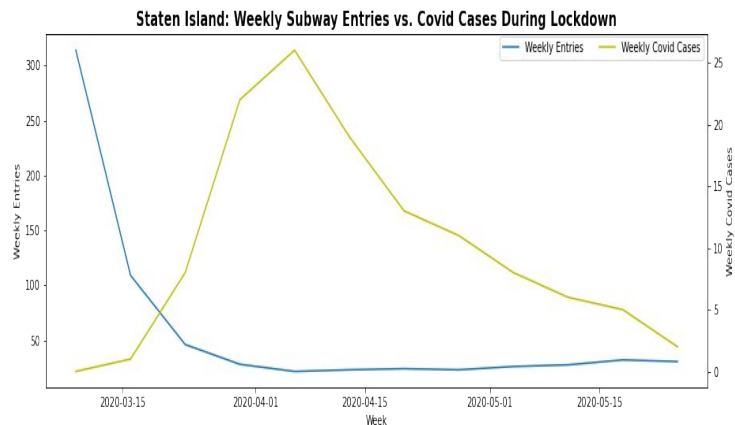


Correlation: 0.86

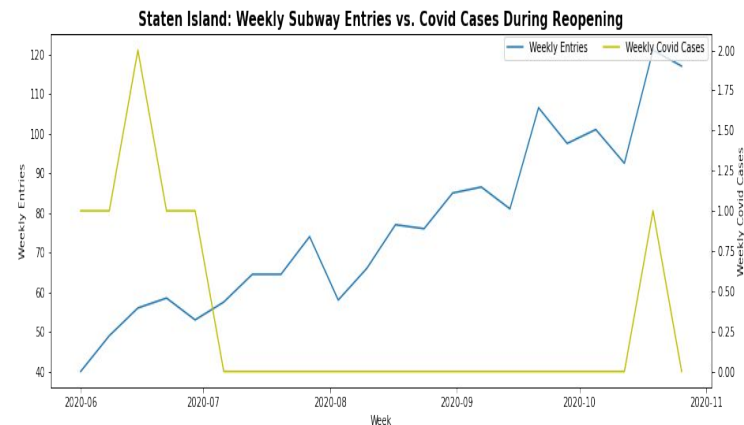


Correlation: -0.72

Appendix 2: Weekly Entries vs. Covid Cases By Borough



Correlation: 0.88



Correlation: -0.43