



How has COVID-19 affected NYC Subway ridership?

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Metis - Spring 2020 - Project 1



Introduction

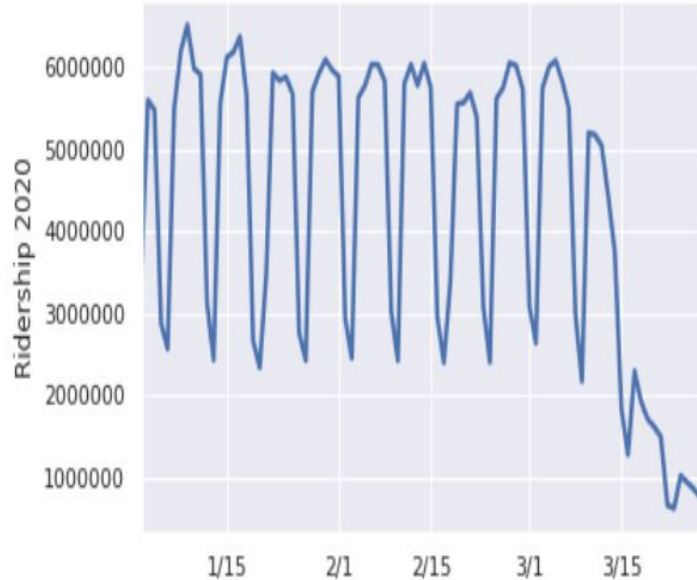
- **Objective:** Investigate how COVID-19 has affected New York City subway ridership
- **Motivation:**
 - Help city government, and public health agencies in particular, determine whether New Yorkers are reducing their travel
 - Inform New Yorkers which subway stations are still heavily trafficked
- **Relevant Data:** Weekly MTA Turnstile data



Methodology

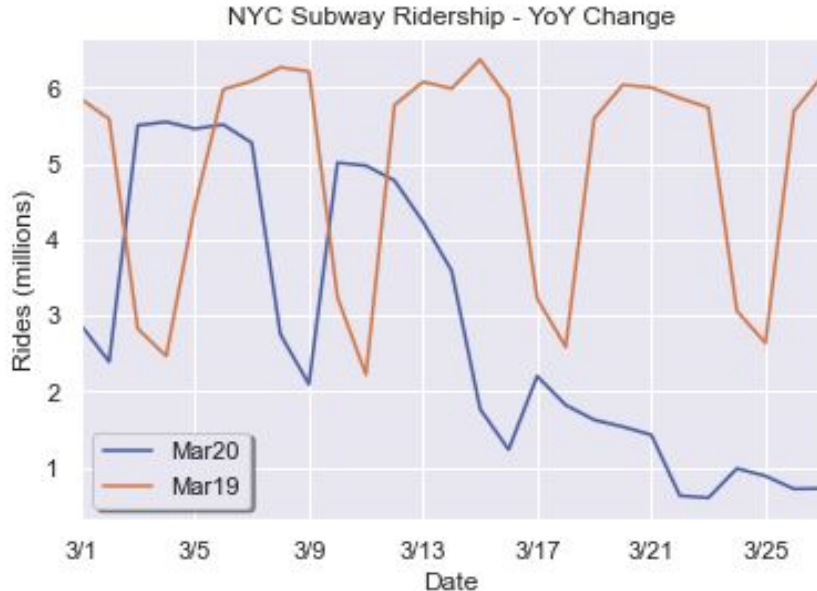
- We compared ridership in March 2020 vs Jan-Feb 2020 as well as March 2019
- Data sources:
 - MTA Turnstile Data
 - NY Open spatial data
 - City of New York - Health
- Tools:
 - Python
 - Data munging
 - Visualization
 - QGIS

Covid impact on Ridership - 2020



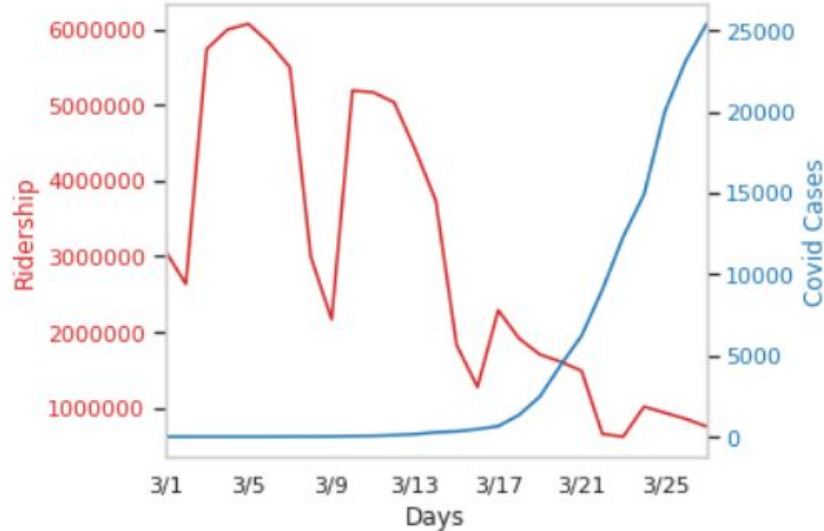
- Weekday/weekend cyclical
- Steep drop in daily ridership beginning in early March

Covid impact on Ridership - March 2020 V 2019



- Year over comparison reduces the noise from seasonality
- Clear downward trend for March 2020
- Weekend drops in ridership attenuated

Covid impact on Ridership - March 2020



3/1 - First NYC confirmed case

3/11 - US announces European travel ban

3/13 - National emergency declared

3/15 - CDC recommends no large gatherings

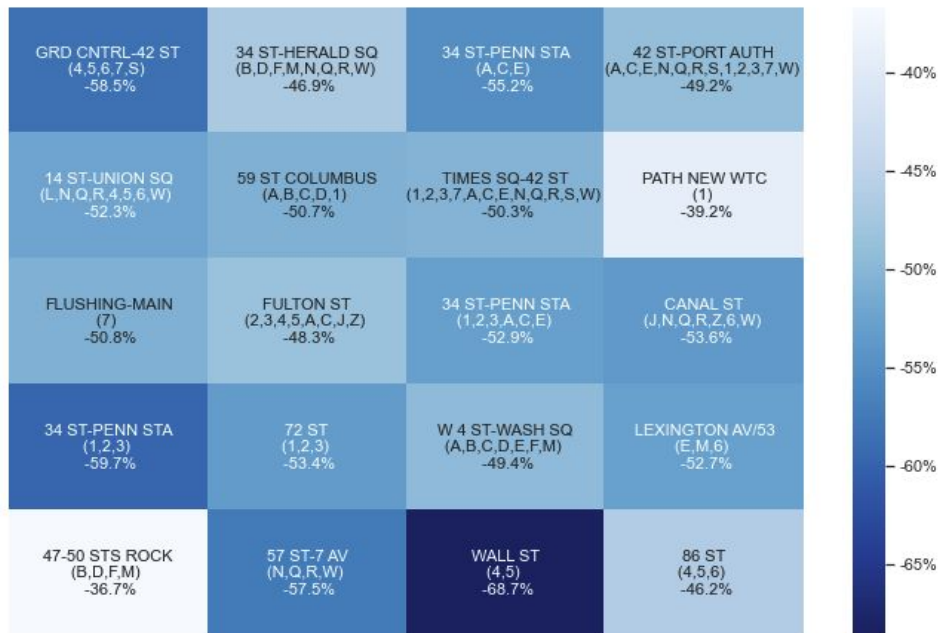
3/22 - NYC orders non-essential workers to stay home

3/23 - Stock market bottoms out (-40%)

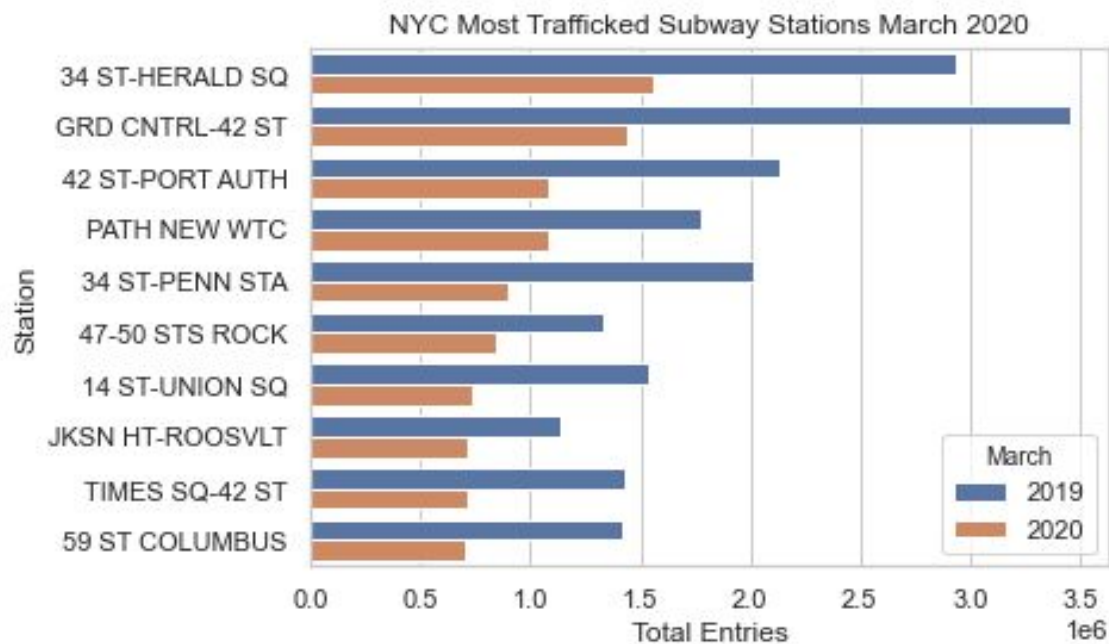
3/28 - CDC travel advisory for NY region



NYC Subway Ridership - March 2020 vs March 2019



- Across the most heavily trafficked stations, ridership has decreased between 35-70%
- The 20 stations with the largest drop in ridership account for 25% of the city-wide decrease



- Change in ridership
- Busy stations



Results Summary

	March 2019	March 2020	Δ
Number of Rides	133.8	76.1	-57.7

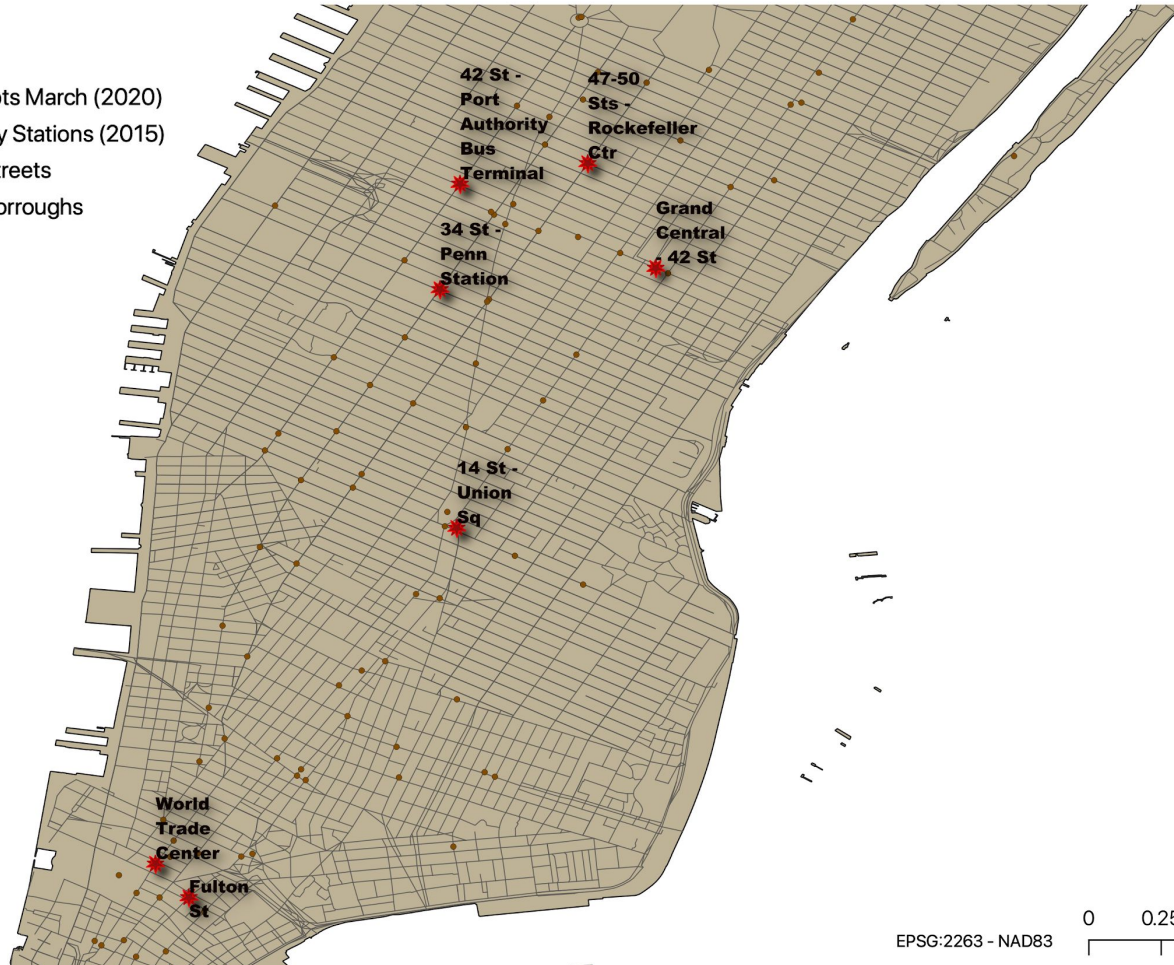
→ Total subway ridership is down **43%** year-over-year

Note: Number of rides in millions

Manhattan Hotspot Subway Stations



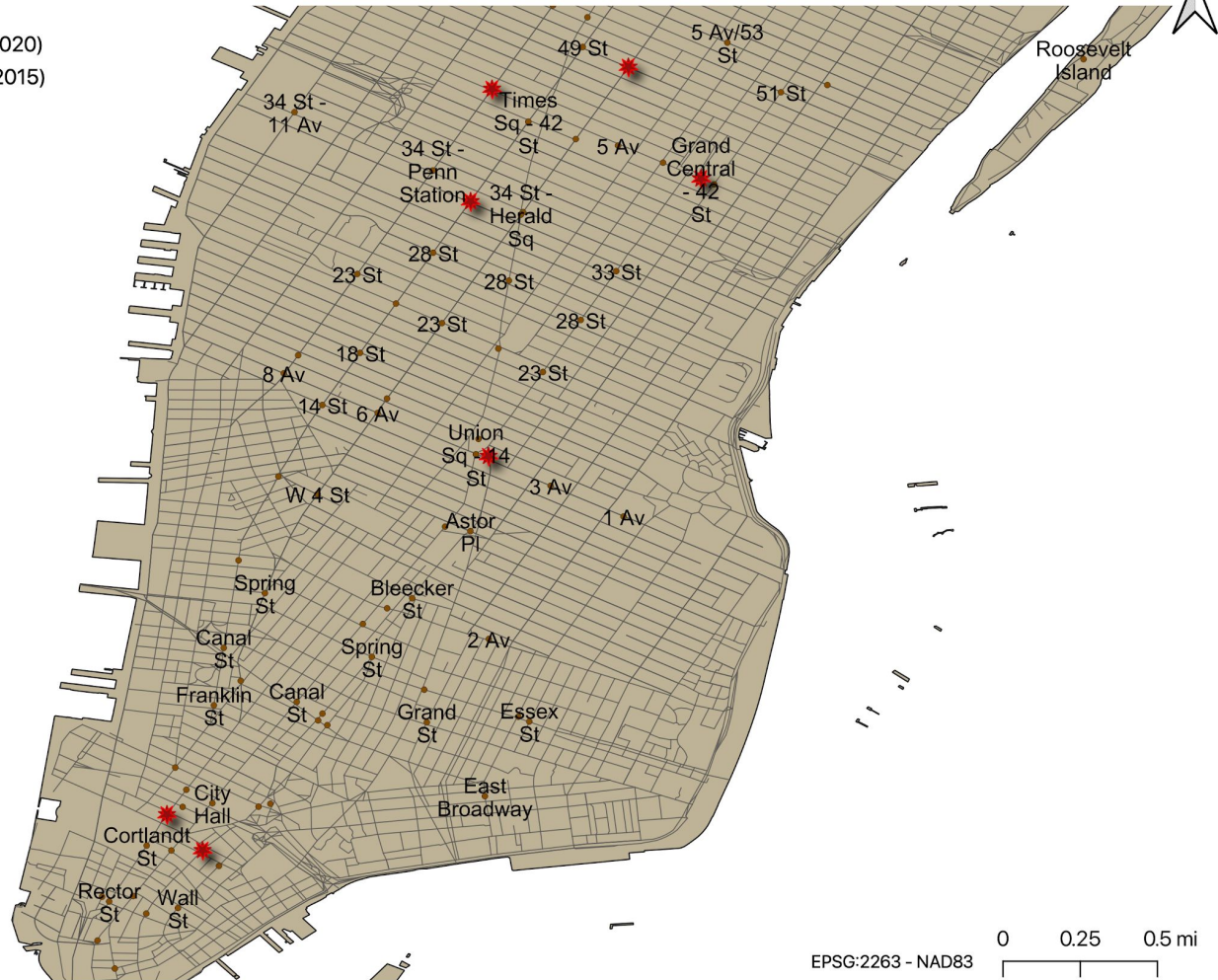
- ★ Hotspots March (2020)
- Subway Stations (2015)
- NYC Streets
- NYC Boroughs



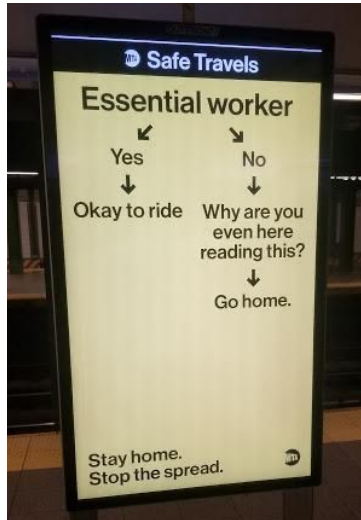
0 0.25 0.5 mi
EPSG:2263 - NAD83

Manhattan Hotspot Subway Stations

- Hotspots March (2020)
- Subway Stations (2015)
- NYC Streets
- NYC Boroughs



Recommendations



- Non-essential workers:
 - Stay home
- Essential workers:
 - Avoid hotspots
 - Consider alternatives
- Employers/organizations:
 - Facilitate WFH and stagger start times
- MTA:
 - Ensure safe transportation for essential workers

Future Work



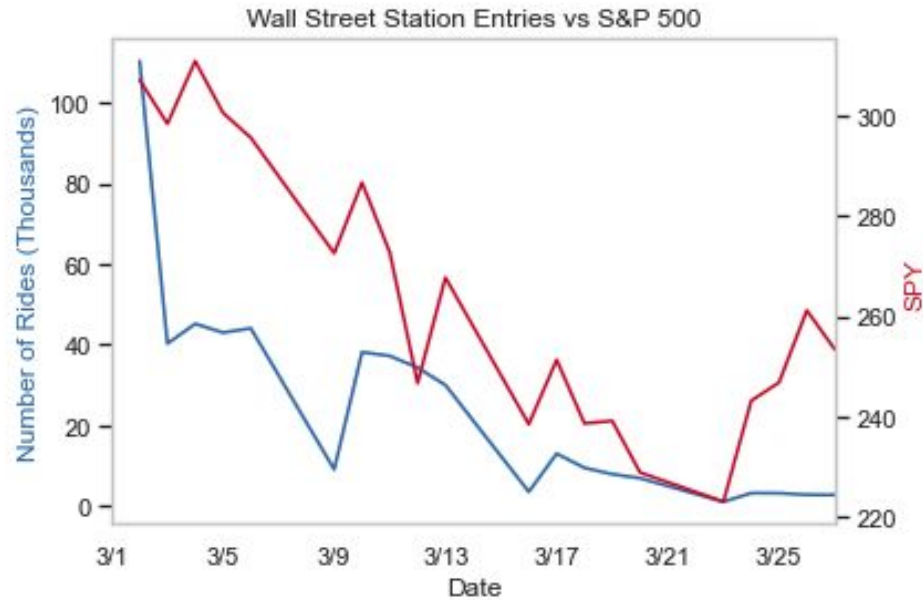
- Reduction in ridership \neq reduction in crowding
- Investigate train capacity to optimize train schedules that facilitate social distancing



Appendix

	STATION	LINENAME	ENTRIES_20	ENTRIES_19	ENTRIES_DIFF	PCT_CHANGE
0	1 AV	L	0	20223	-20223	-100.00%
60	191 ST	1	22287	190550	-168263	-88.30%
42	168 ST	1,A,C	35611	192880	-157269	-81.54%
395	OCEAN PKWY	Q	45714	244700	-198986	-81.32%
383	NEW UTRECHT AV	N,D	22701	111309	-88608	-79.61%
148	8 AV	N	24171	114440	-90269	-78.88%
24	14 ST	A,C,E,L	85754	377704	-291950	-77.30%
208	BERGEN ST	2,3	57522	249541	-192019	-76.95%
362	MARCY AV	J,M,Z	100311	362585	-262274	-72.33%
192	BAY PKWY	N	45575	159092	-113517	-71.35%

Ridership vs. S&P 500



NYC Hospitals and Subway Stations

- NYC Hospitals
- ★ Hotspots March (2020)
- Subway Stations (2015)
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- NYC Boroughs

