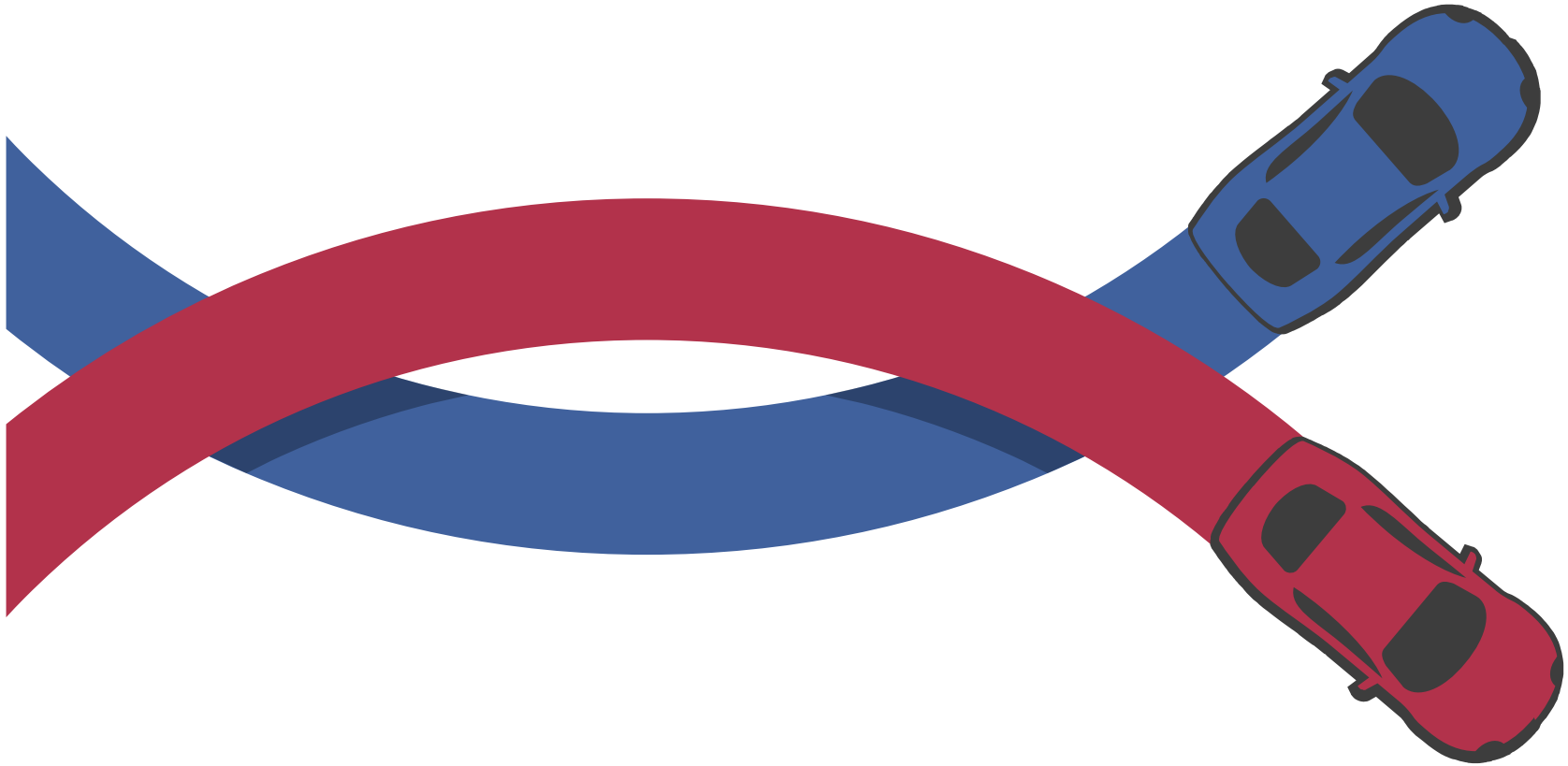
IMPACT OF COVID – 19 ON METROPOLITAN TRANSPORTATION AUTHORITY:

ANALYSIS OF PRE AND POST-COVID DATA

Metropolitan Transportation Authority

HIMANI KAUSHIK
APRIL 2022

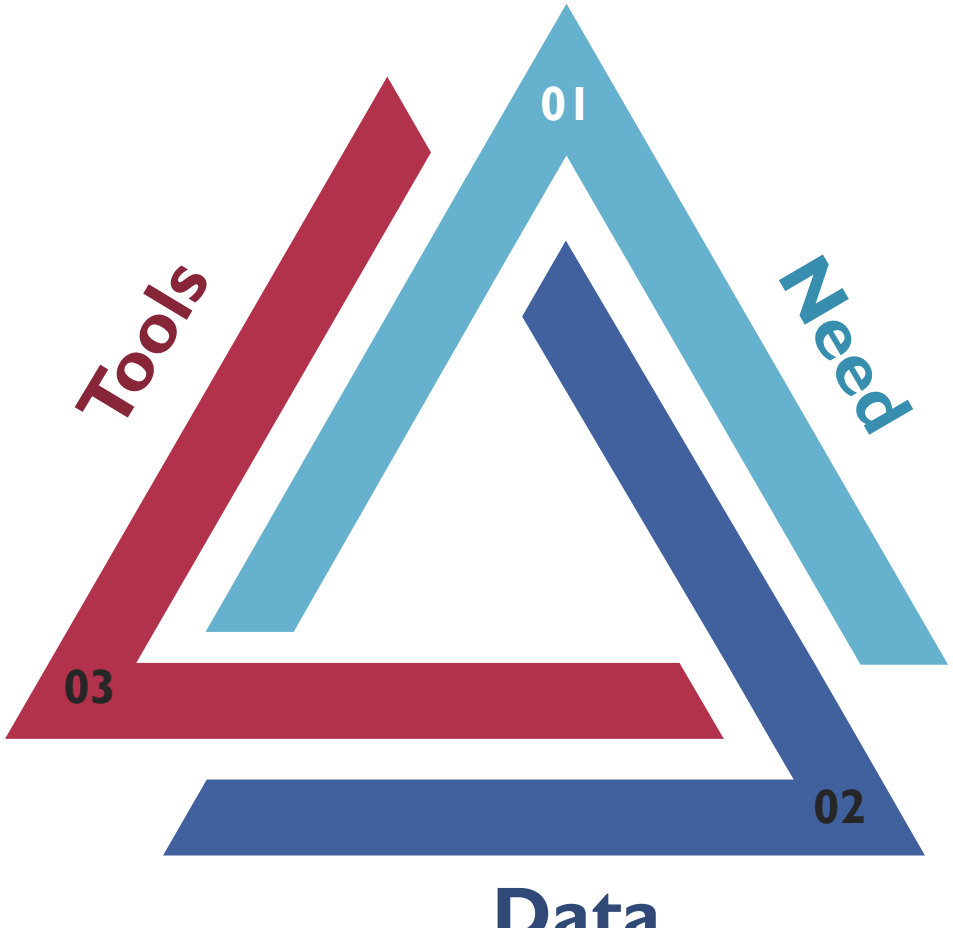
PROJECT GOALS



New York City MTA (The Metropolitan Transportation Authority) needs to determine the impact of COVID-19 and the resultant change in the lifestyles on the daily commute in the city.

This will enable MTA to make informed decisions and optimize the available resources as a result of change in demand, assuming there will be no new variant and the current situation is the new normal.

SCOPE



01 Need

- Analyze and compare the precovid and post covid traffic patterns
- Comprehend the decline in the traffic and understand the impact

02 Data

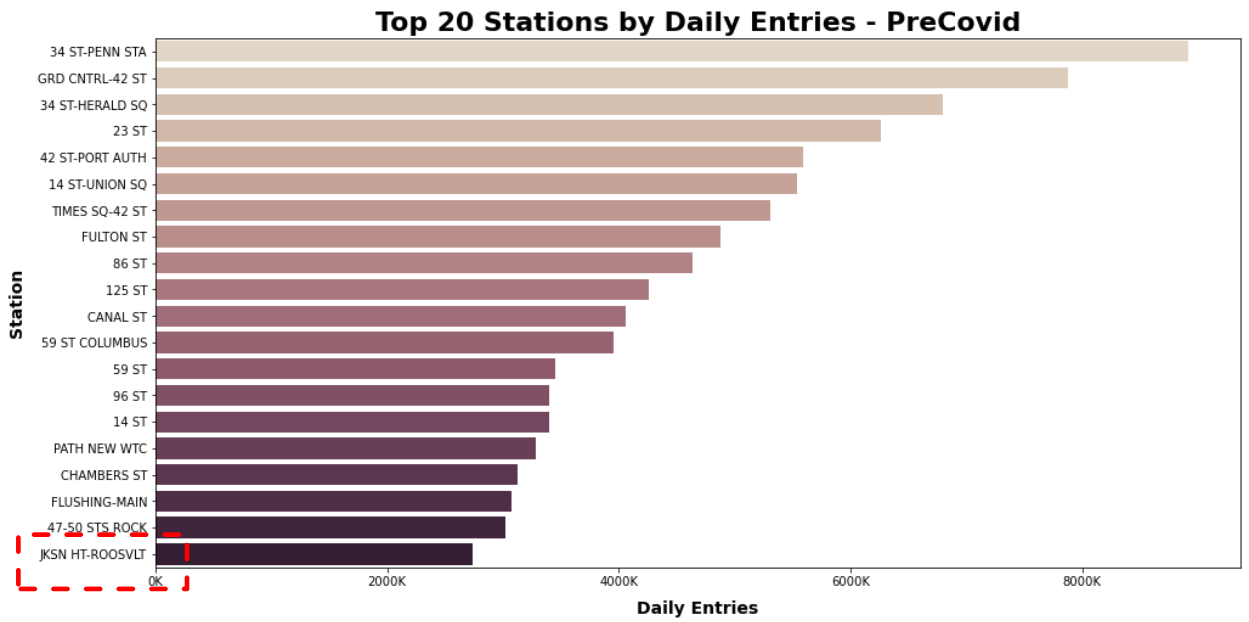
- Turnstile Data :
  - Pre Covid: February – March 2019
  - Post Covid: February – March 2022
- Utilized STATION, DATE, TIME and ENTRIES information from the data.
- Created and merged dataframes by summarizing and aggregating the data points.

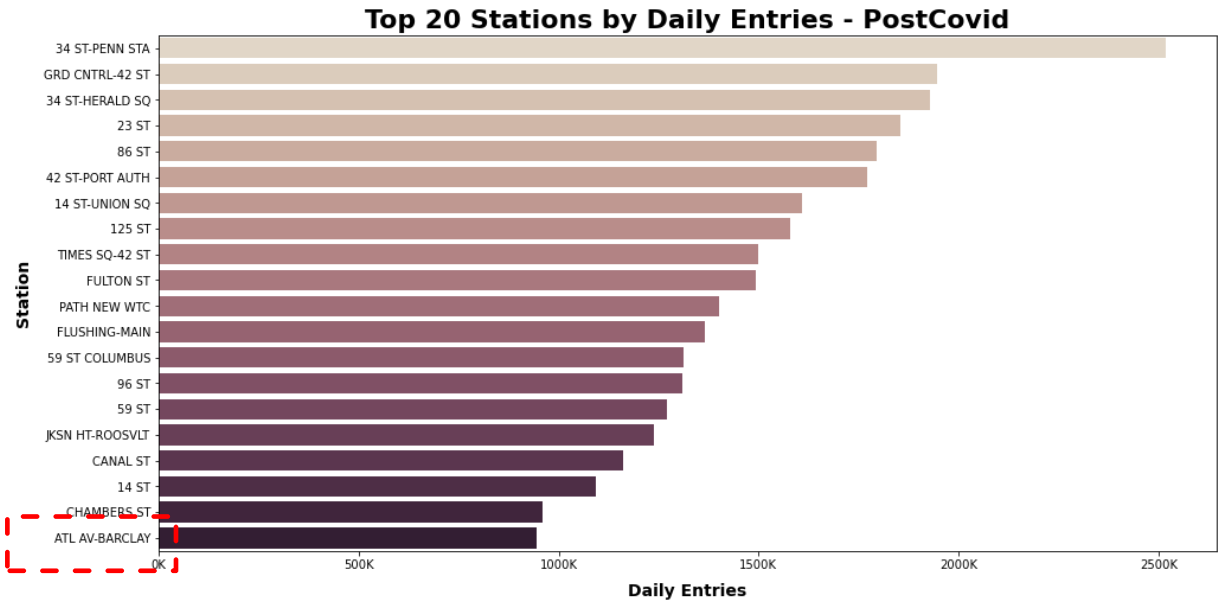
03 Tools

- SQLite and Sqlalchemy: Accessing SQL database in Python
- Pandas and Numpy: Manipulating data
- Matplotlib and Seaborn: Visualizing and plotting data

TOP 20 STATIONS BY DAILY ENTRIES

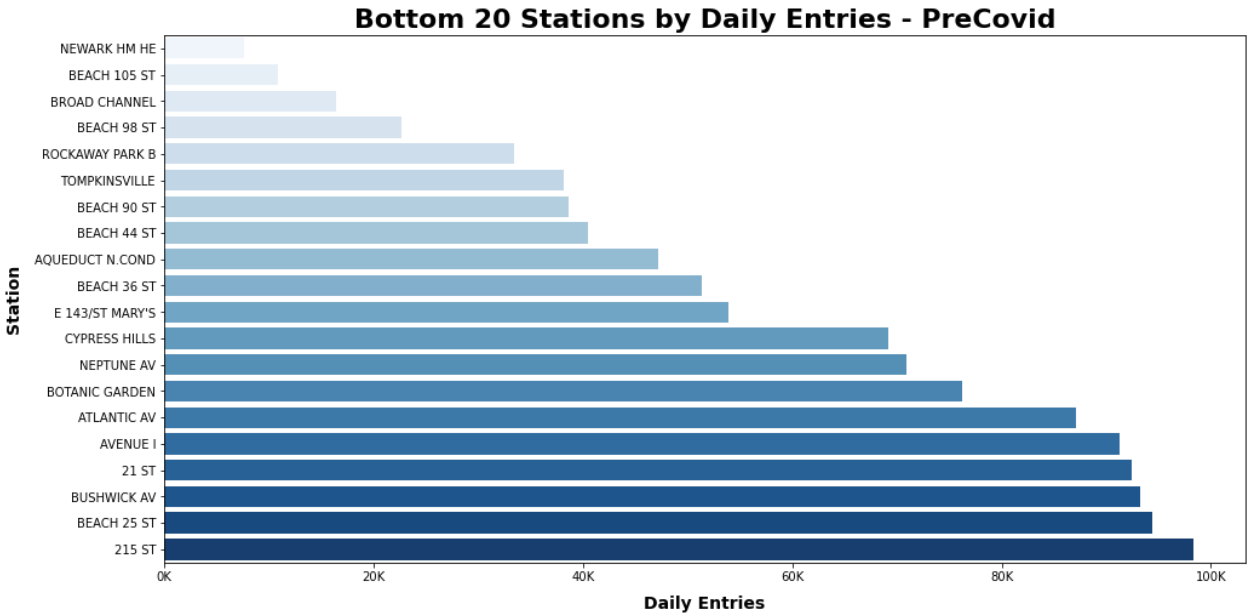
- MTA should continue to focus their resources on these stations
- Identical top four stations by daily entries
- Top 20 stations list has not changed much
  - Post Covid:
    - 47-50th street station is not in top 20 stations list
    - ATL-AV-BARCLAY now features in the top 20 list
  - On an average, the daily volume at each station has decreased by over 66%

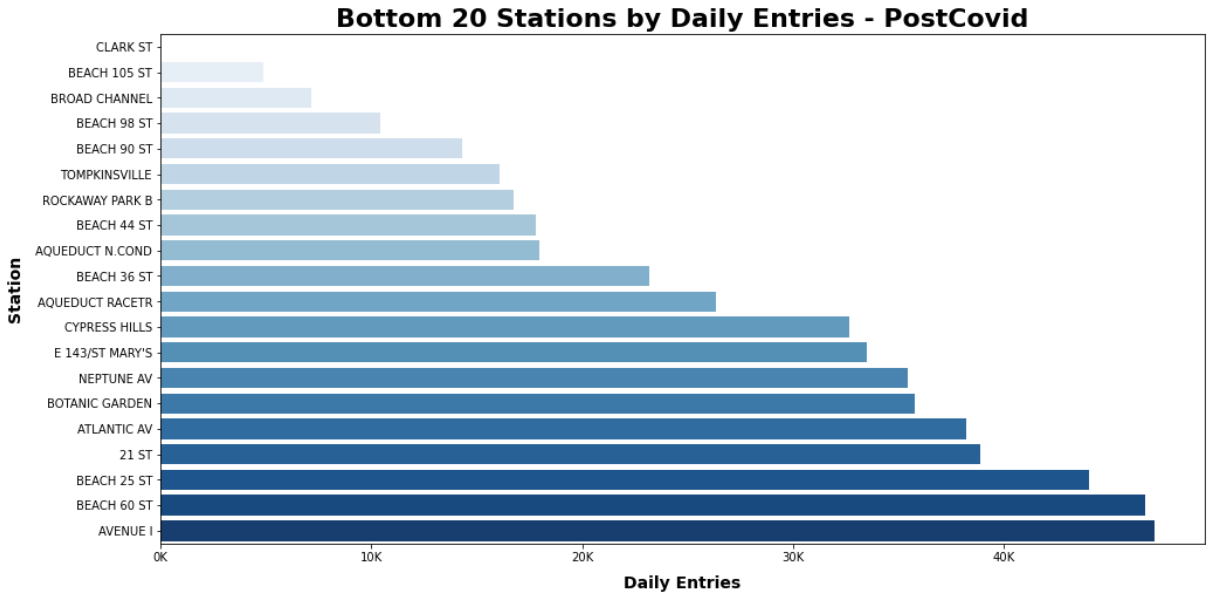




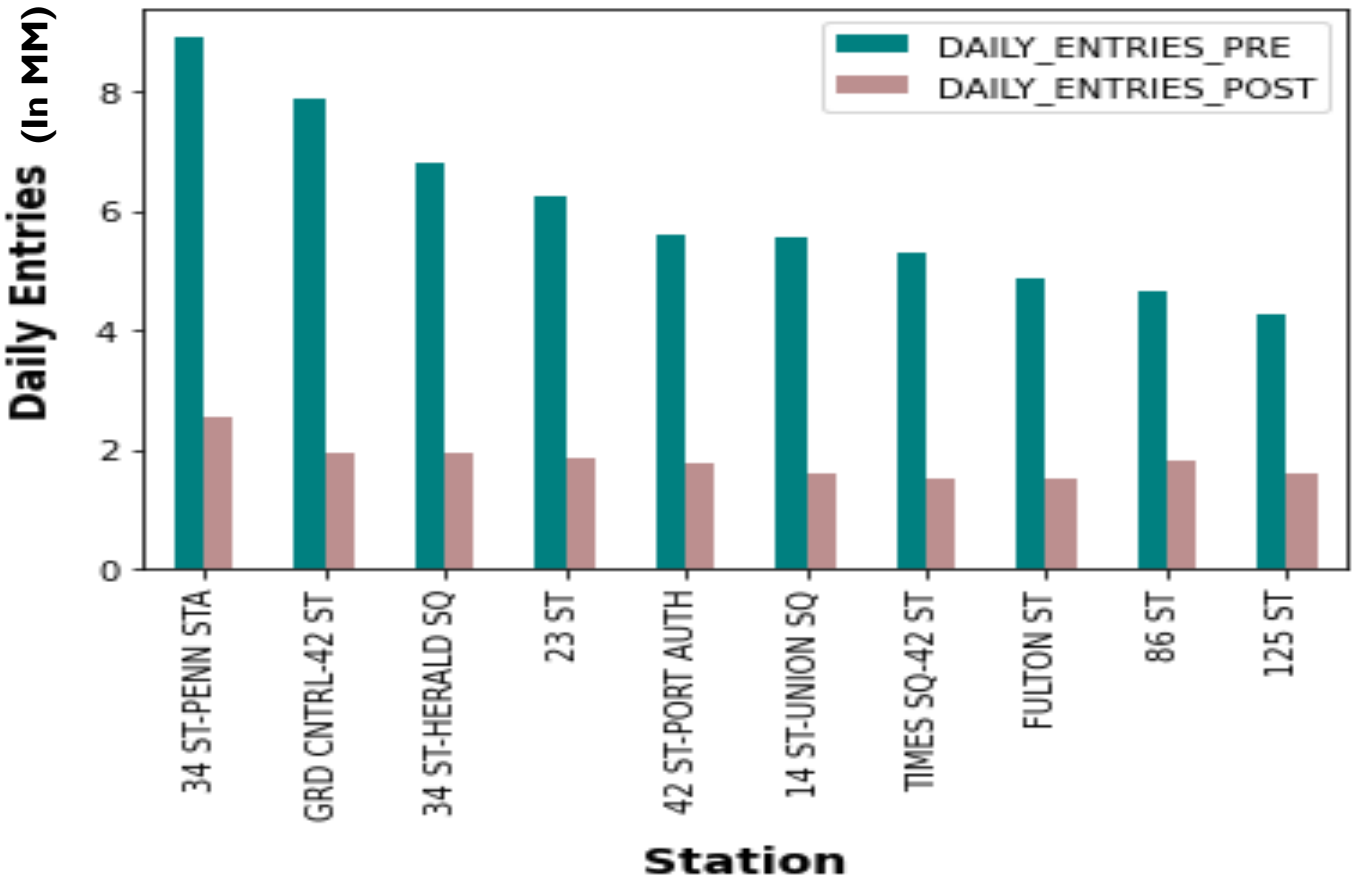
BOTTOM 20 STATIONS BY DAILY ENTRIES

- MTA should investigate further to plan resources for these stations
- Unlike top 20 list, the bottom 20 stations by daily entries list has seen lot of changes:
  - Post Covid:
    - Newark HMHE is no more the least frequented station. That has been replaced by Clark St
    - 215st station is not in bottom 20 list anymore
    - Clark St, Aqueduct Racetr and Beach 60th street are now present in bottom 20 list
  - On an average, the daily volume at each station has decreased by over 50%





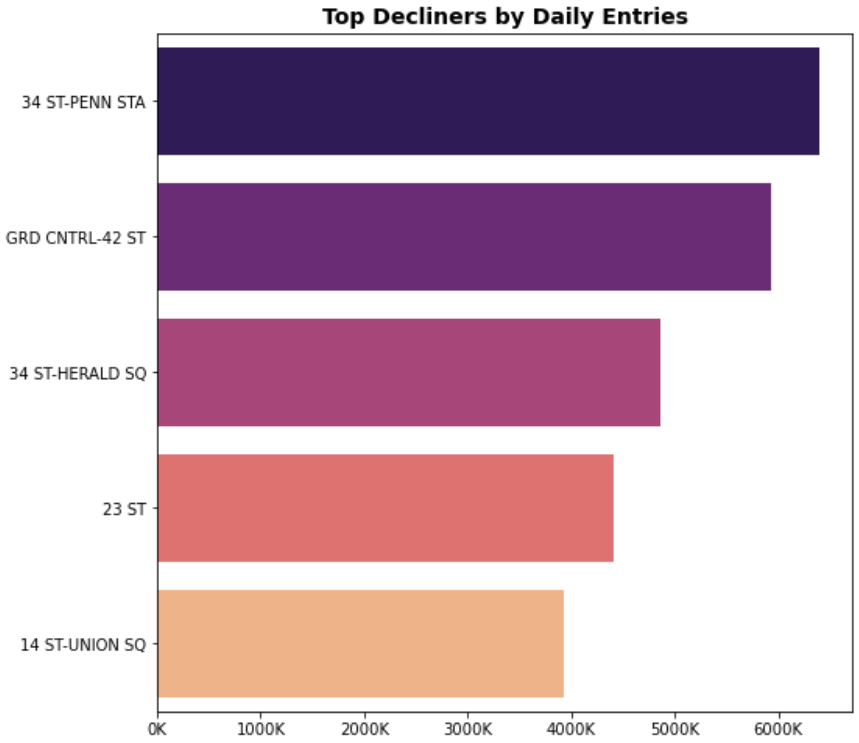
DAILY ENTRIES FOR TOP 10 STATIONS

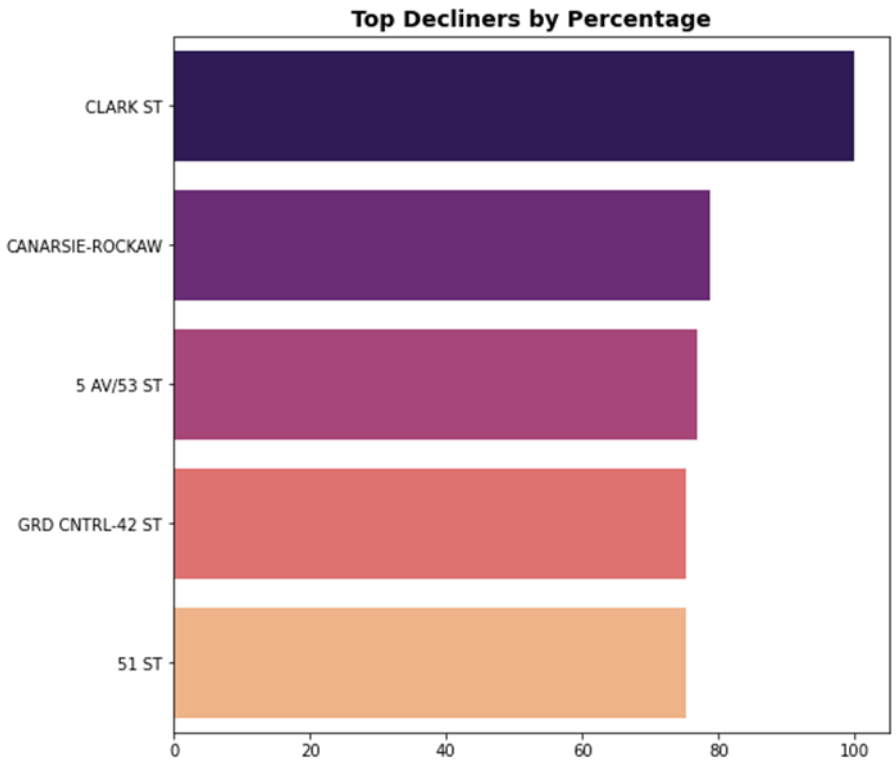


- Overall volume has dropped significantly across each station when compared with pre covid volume
- Volume across top 10 stations is mostly same post covid

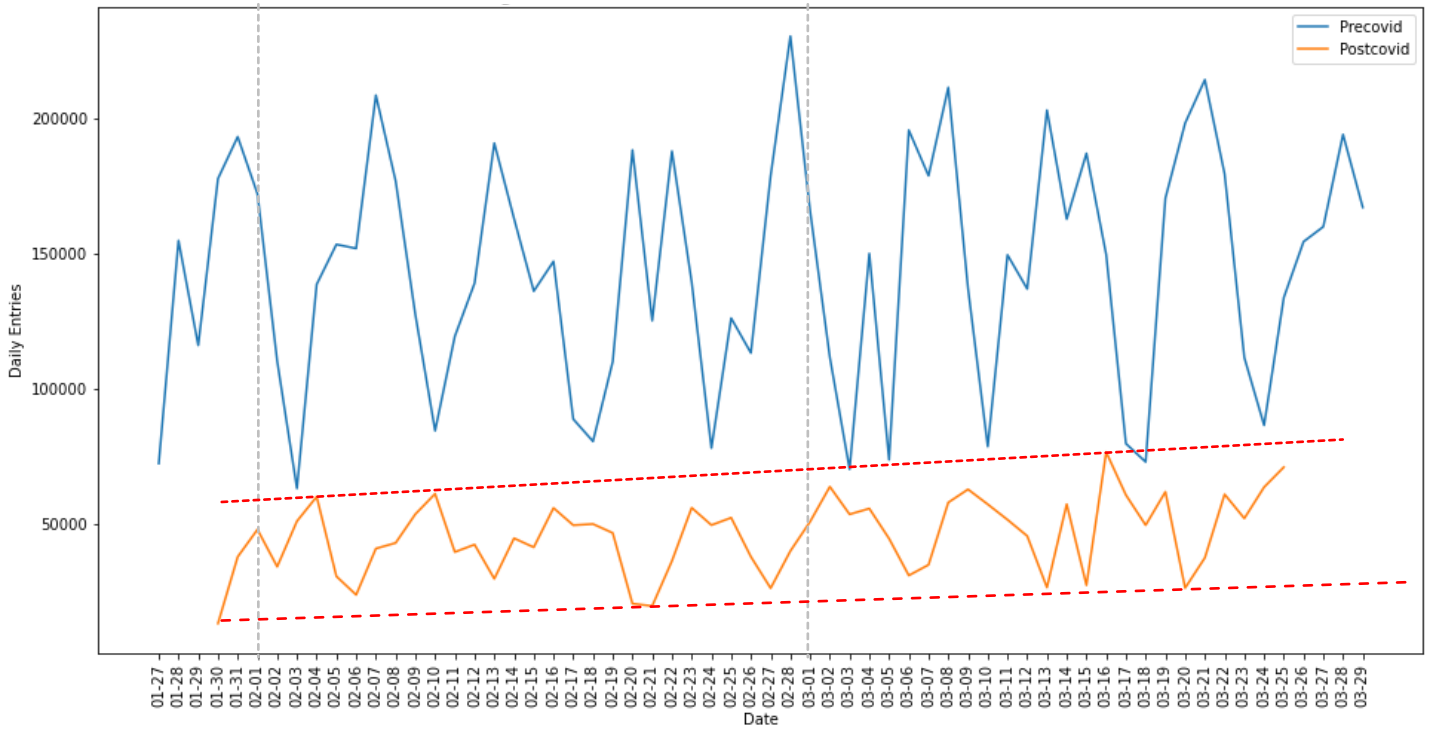
TOP DECLINERS

- 34-ST Penn Station was the biggest decliner in total volume whereas Clark St lost almost all its daily entries
- Grand Central is the only station which had both volume as well as percentage decline



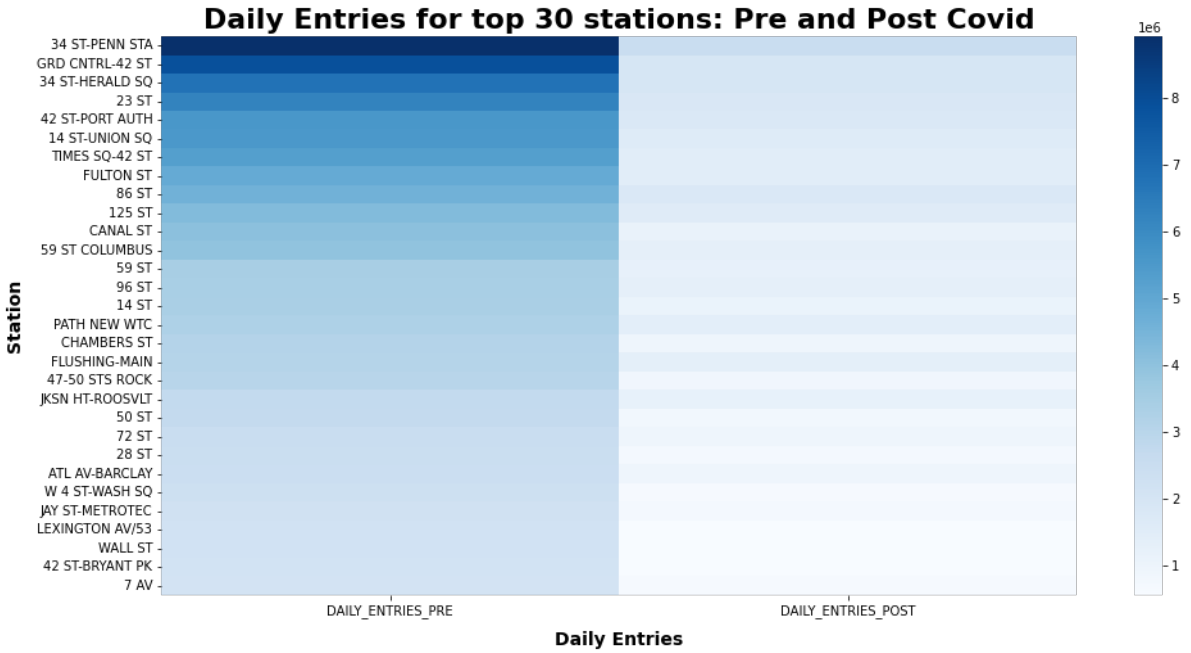


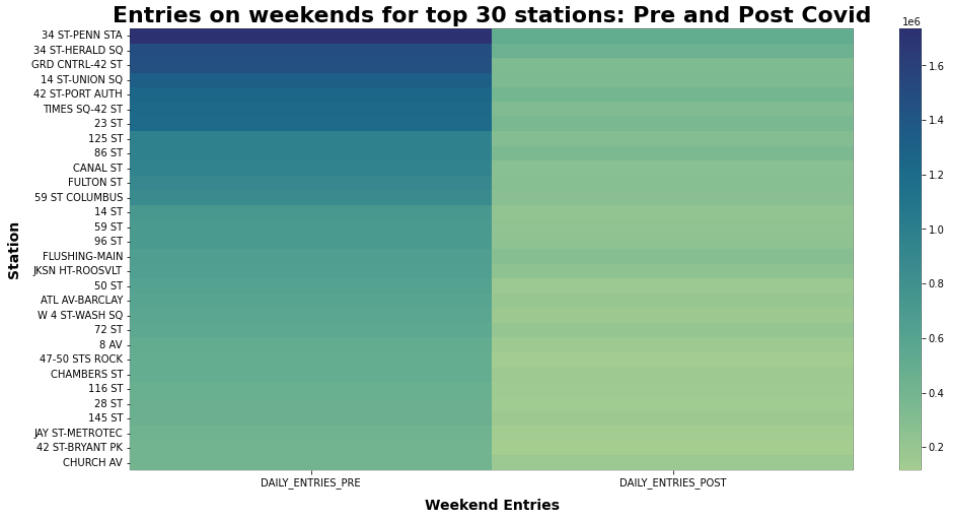
DEEP DIVE: 34-ST PENN STATION

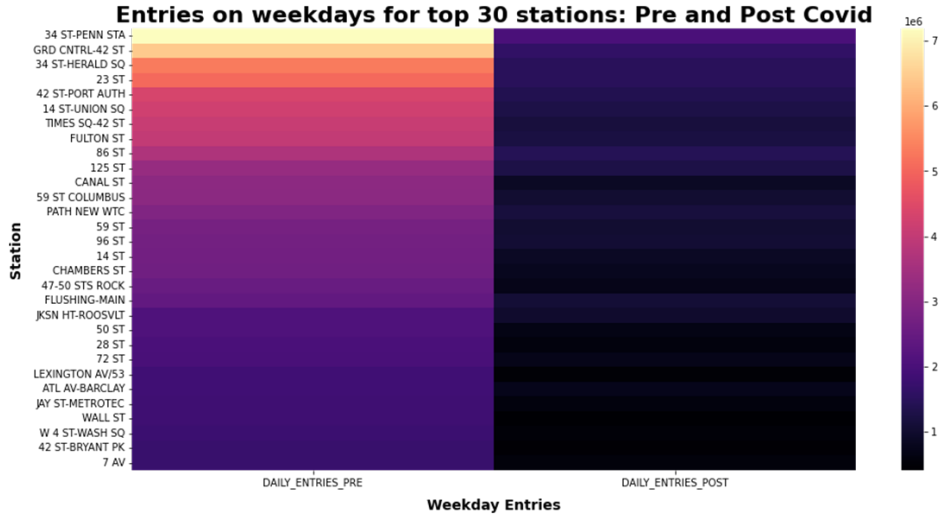


- Daily entries follow a cyclic pattern – High weekday traffic and lowest traffic on weekend
- Both Pre & Post Covid, the peak daily entries are on Wed/Thursday
- Post Covid, both the weekday & weekend entries are on an upward trend, albeit at a slower pace.

MORE COMPARISON







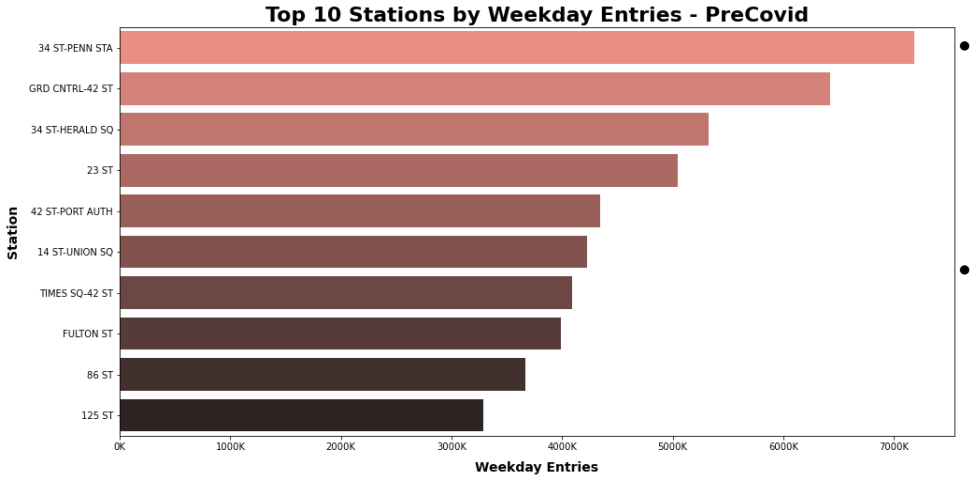
- Similar steep drop in traffic observed across top 30 MTA stations
- Volume drop during weekday was much more than weekend

CONCLUSION

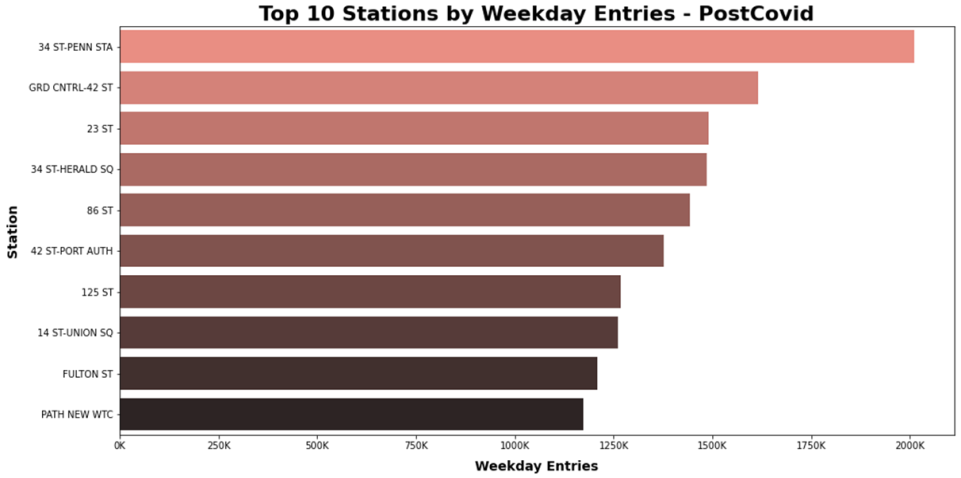
- Significant volume drop across all stations- both on weekday and weekends
  - Multiple non Covid related factors may also contribute to the decline:
    - Remote work possibility
    - Population movement across geographies
    - Job eliminations post Covid
    - MTA route closures and change in frequency
- Optimal resource allocation based on trends and more intensive analysis is need of the hour
  - Resource allocation demand may be higher on specific weekdays due to peak traffic
  - Post Covid traffic on upward swing, albeit at a lower pace
  - MTA should conduct intensive geographical analysis of the traffic to understand the local traffic patterns

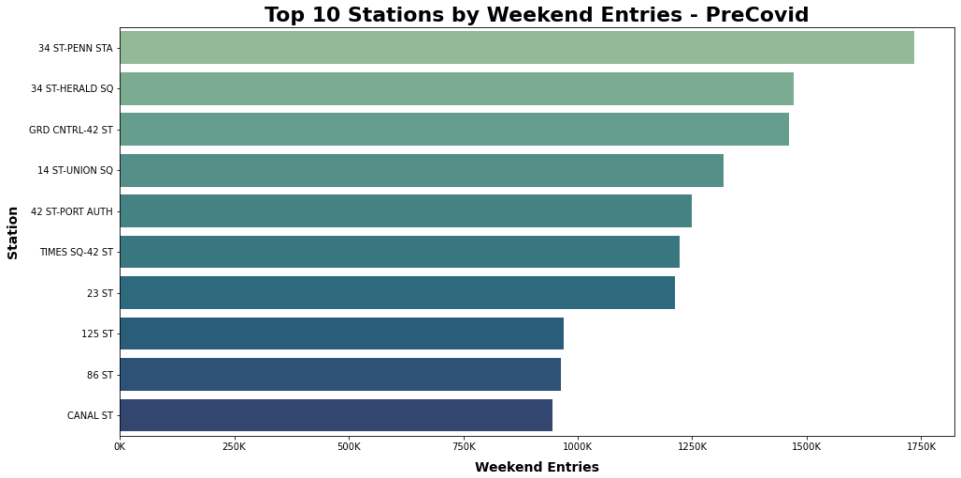
THANK YOU

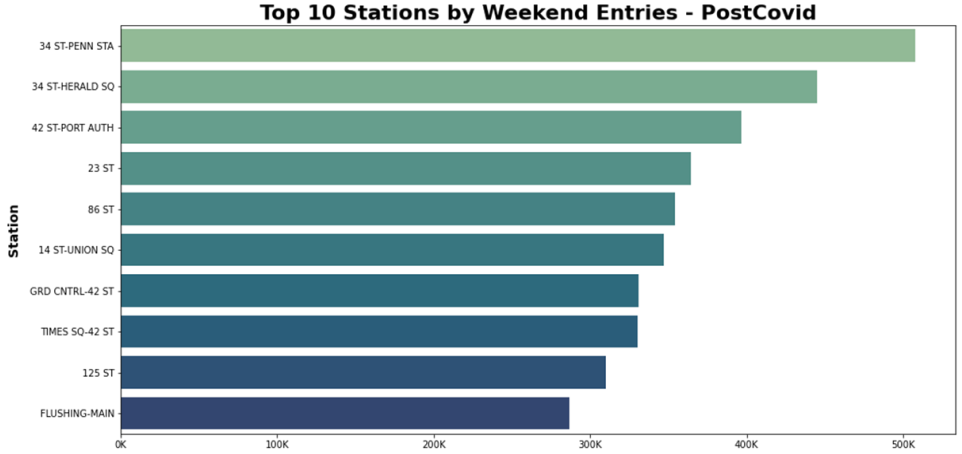
COMPARISON OF WEEKDAY AND WEEKEND ENTRIES



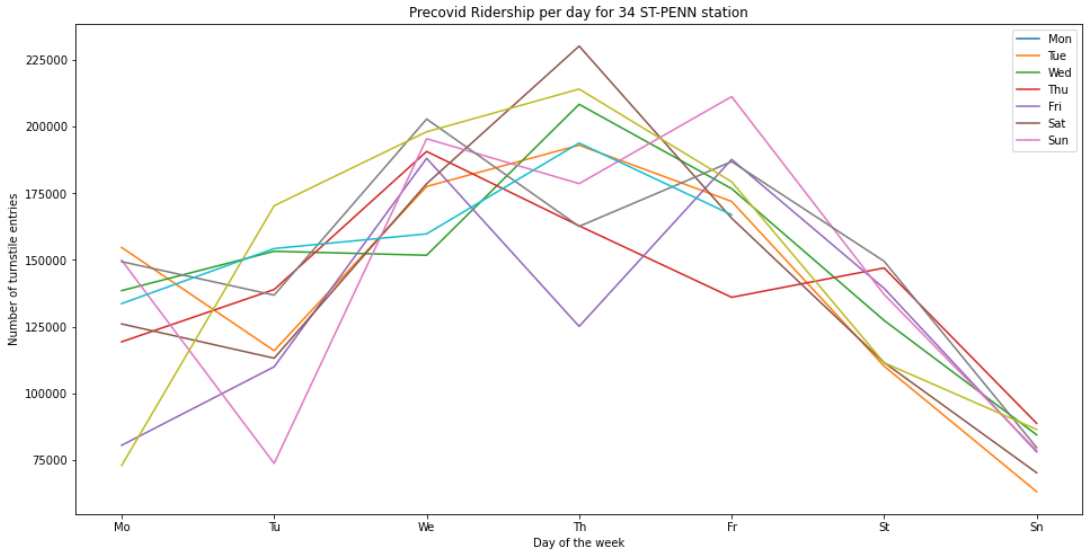
- Weekday traffic fell to 1/3 of its pre covid volume across all top 10 stations
- Similar drop visible across weekend traffic as well
- Pre Covid & post Covid, weekday traffic ratio to its weekend traffic is almost same at ~4-4.5

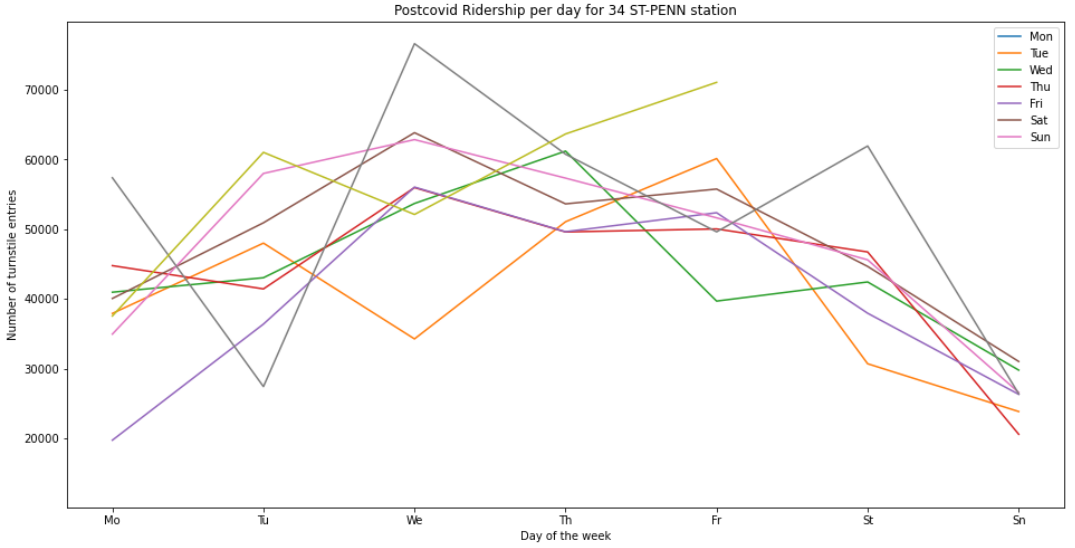






RIDERSHIP COMPARISON: 34 ST PENN STATION





PAIR PLOT FOR PRE AND POST DAILY ENTRIES