

Exploratory Data Analysis – Earth Day



Presentation by: Angus Leung

Introduction

Motivation/Question Asked

How effective is the Earth Day marketing campaigns in New York? An effective campaign would expect that people use increased transit (as they would want to use their car less) in the days around Earth Day. New York City also provided a free Citi Bike usage code for Earth Day. If this is effectively marketed we would see increased usage of Citi Bikes.

Objective and Goals

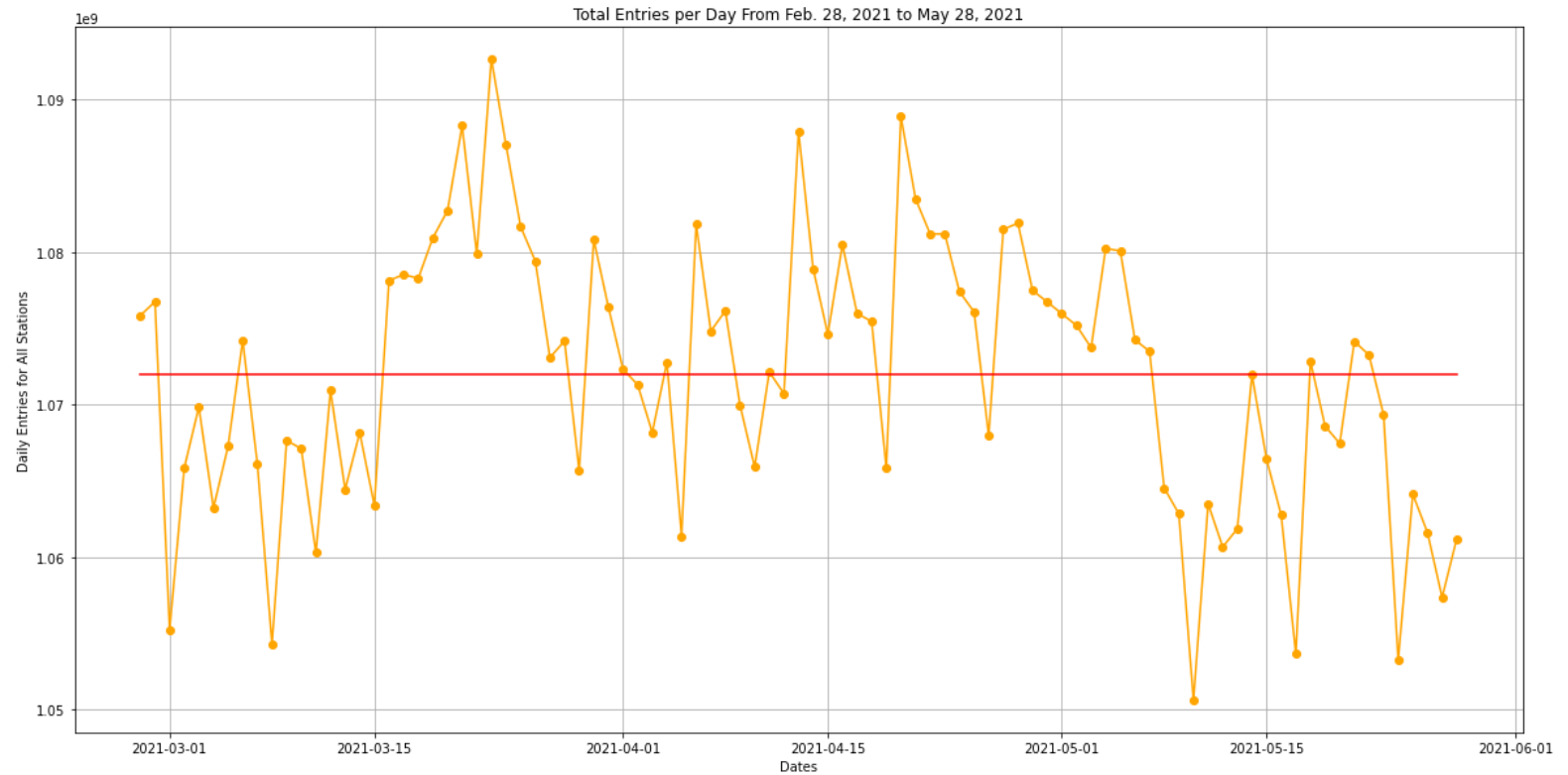
The analysis will provide visual data that shows the usage of the transit system and Citi Bikes to see how effective Earth Day marketing has been.

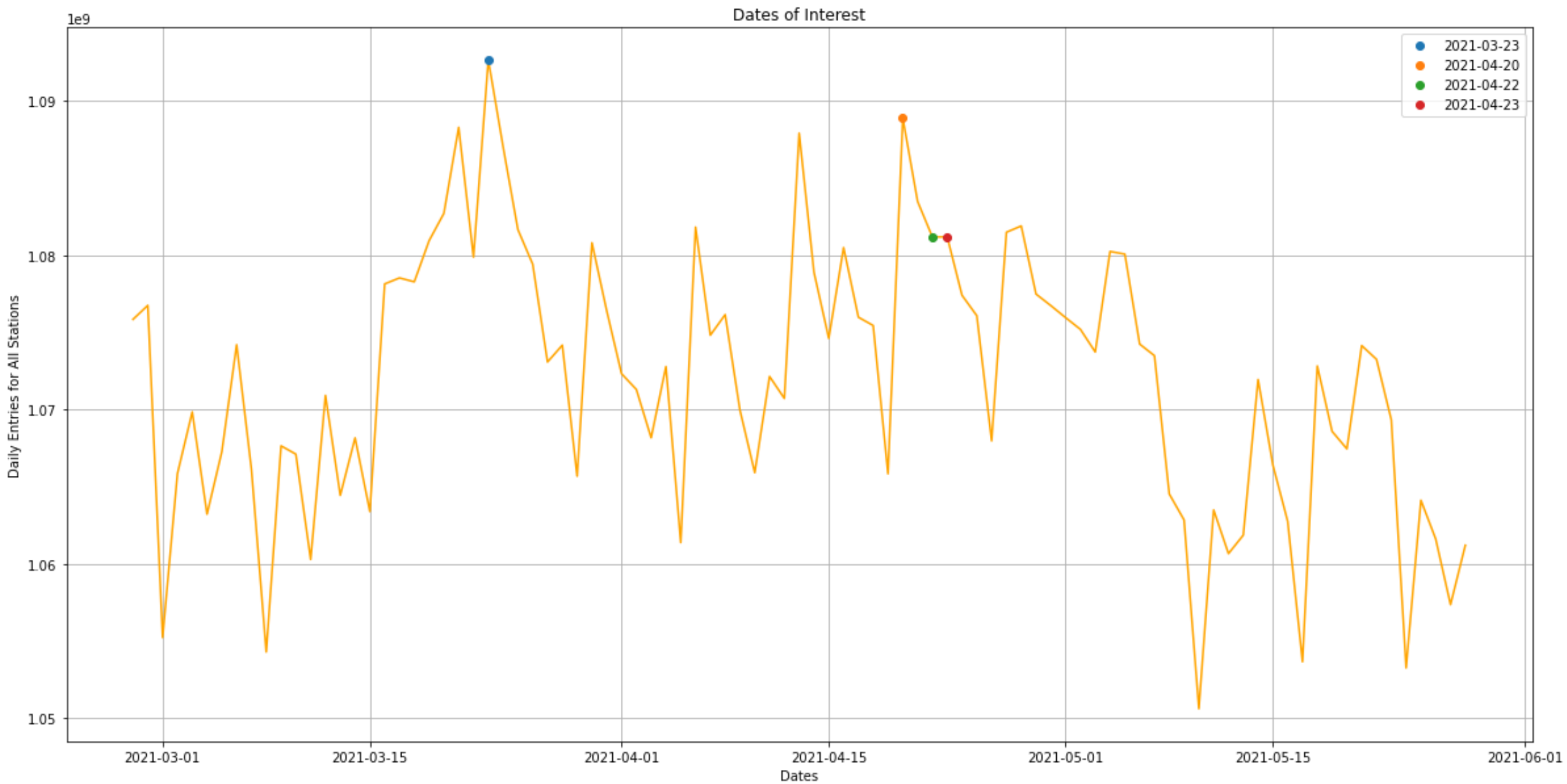
Methodology

- MTA turnstile data is provided by the [MTA](#)
 - Data from March 2021, April 2021, and May 2021 are cleaned
 - SQL – initial queries to get an idea of the data
 - Python - Cleaning
 - A daily count of entries for each turnstile is aggregated for each station
 - Matplotlib
- Citi Bike ride data is provided from [Citi Bike](#)
 - Data from March 2021, April 2021, and May 2021 are cleaned
 - SQL – initial queries to get an idea of the data
 - Python - Cleaning
 - Number of rides per day are drawn based on each line of ride data
 - Matplotlib

Results - MTA

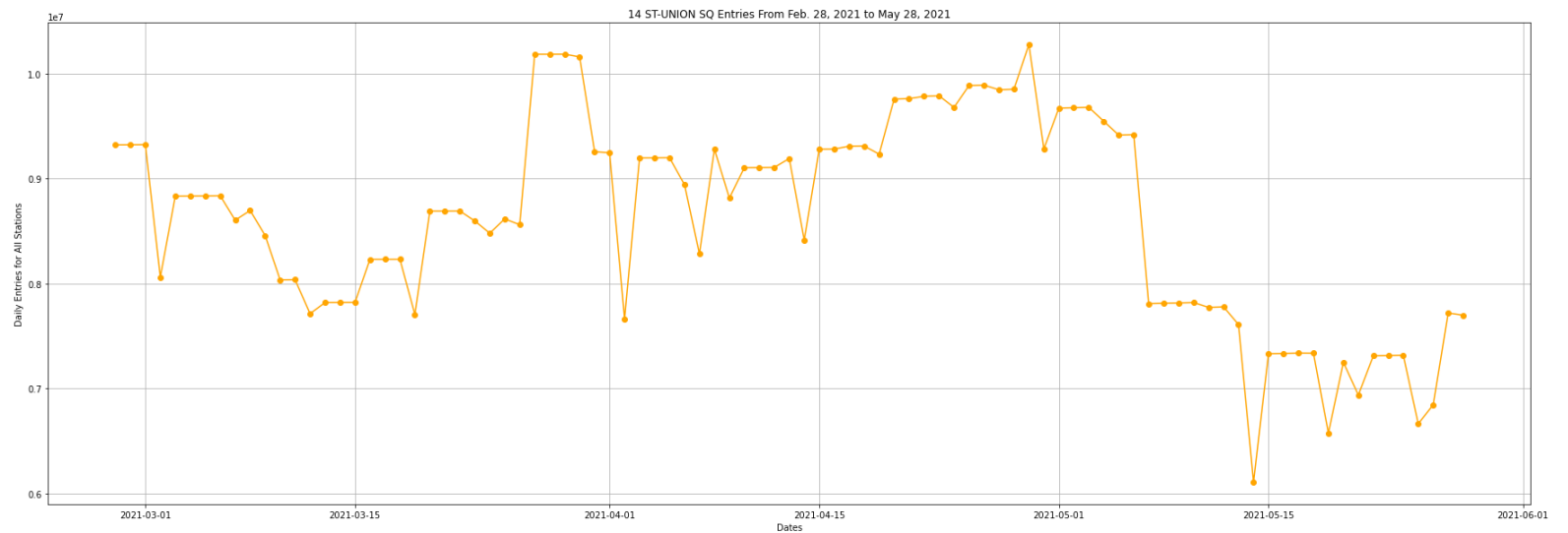
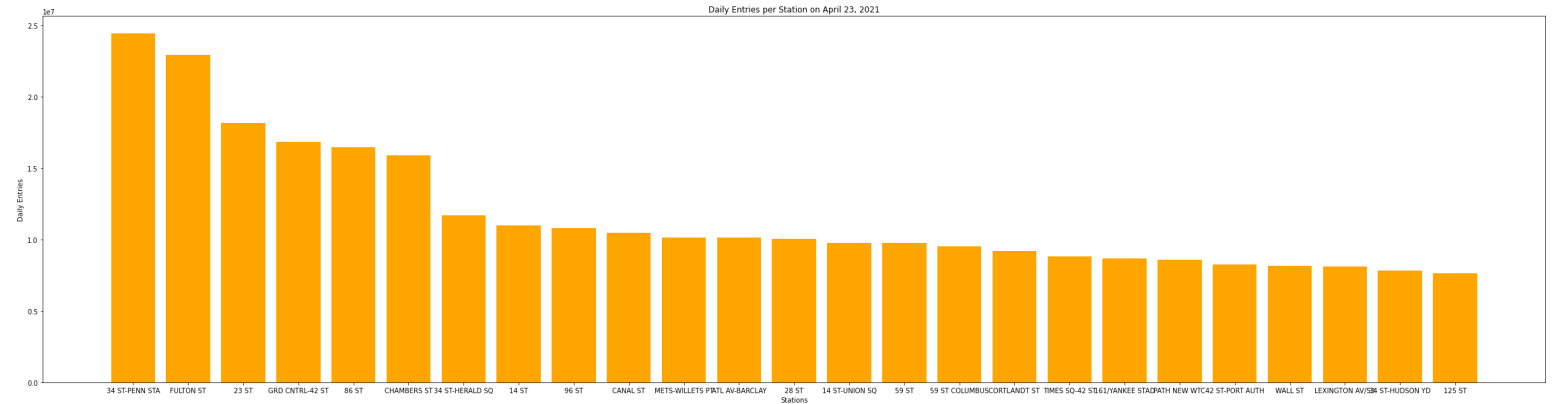
- The conclusion that I've arrived at is that there is no significant increase in MTA usage as it relates to Earth Day.
- April 22 and April 23 see a slightly higher than average number (1072021411) of entries



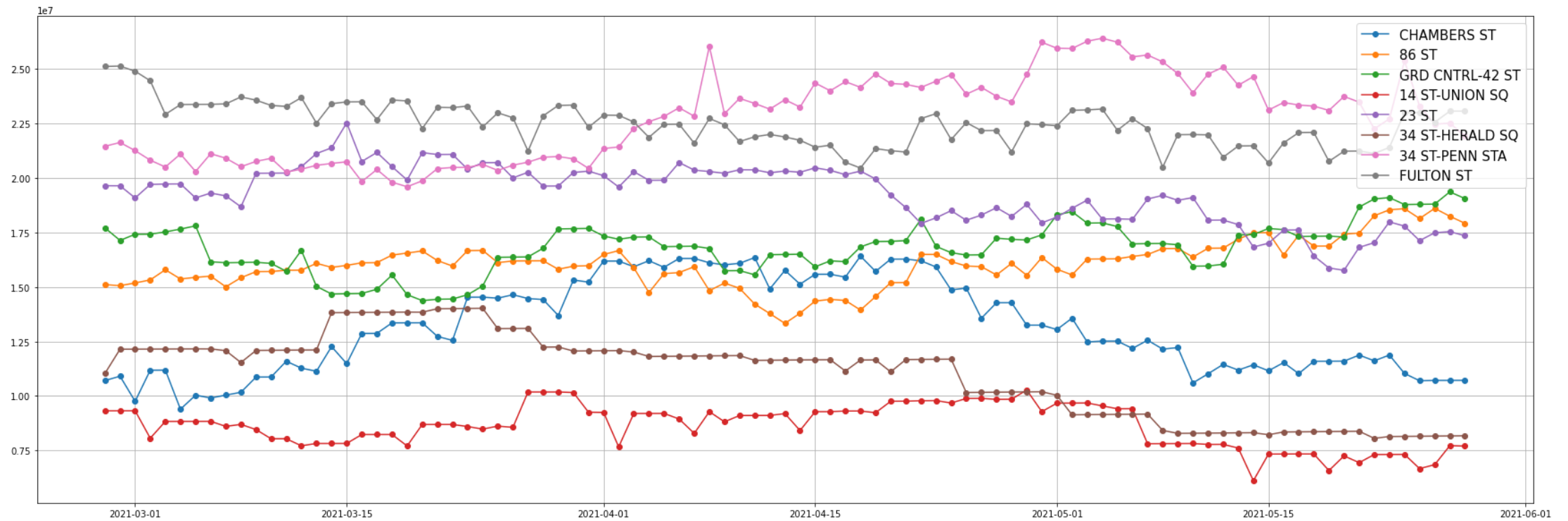


Results - MTA

- A breakdown of the 25 most used stations on April 23 shows the majority of traffic is towards downtown New York with some possibly going to Earth Day activities
- Looking at usages over 3 months to Union Square (where Earth Day activities take place) we see a slight increase leading up to Earth Day but no spike on Earth Day.

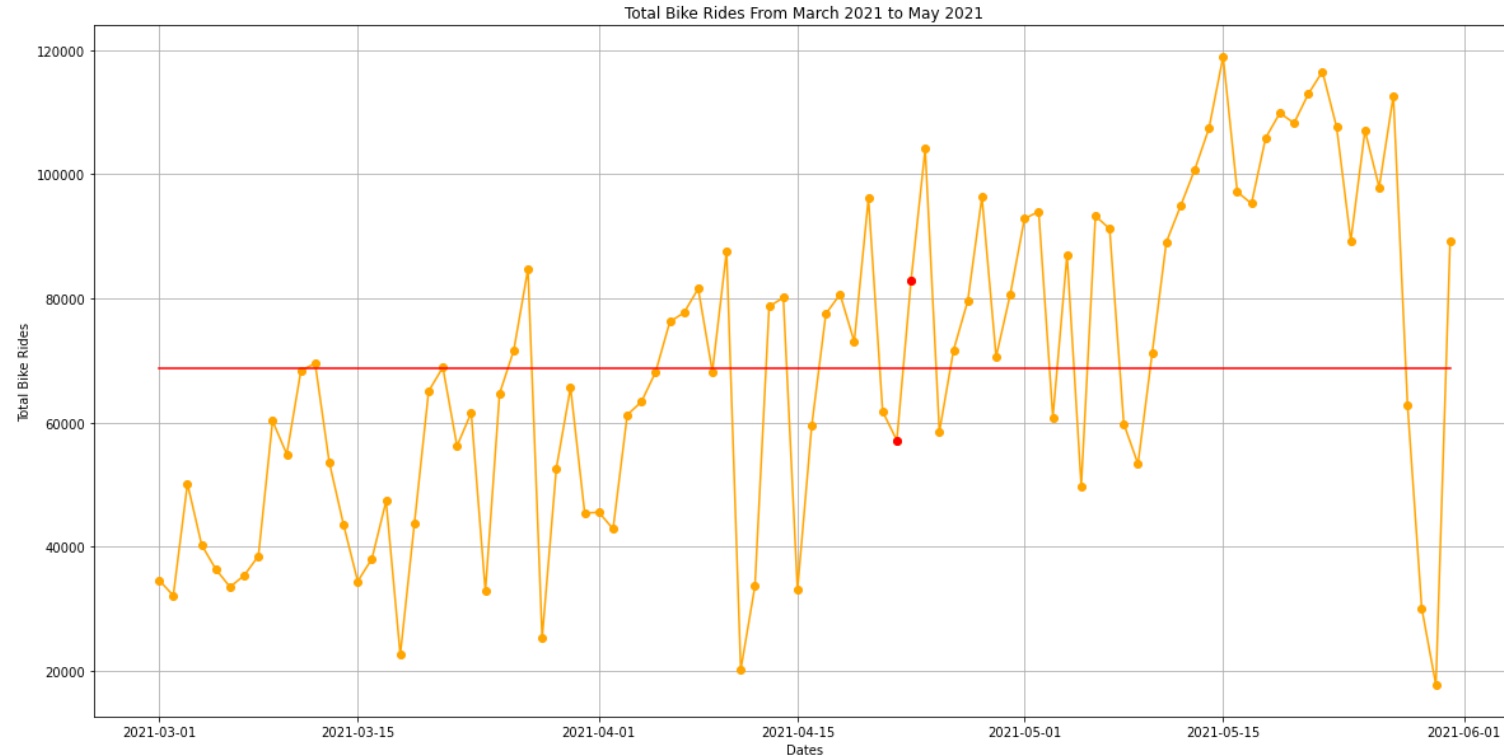


Comparison of Union Square Station Usage



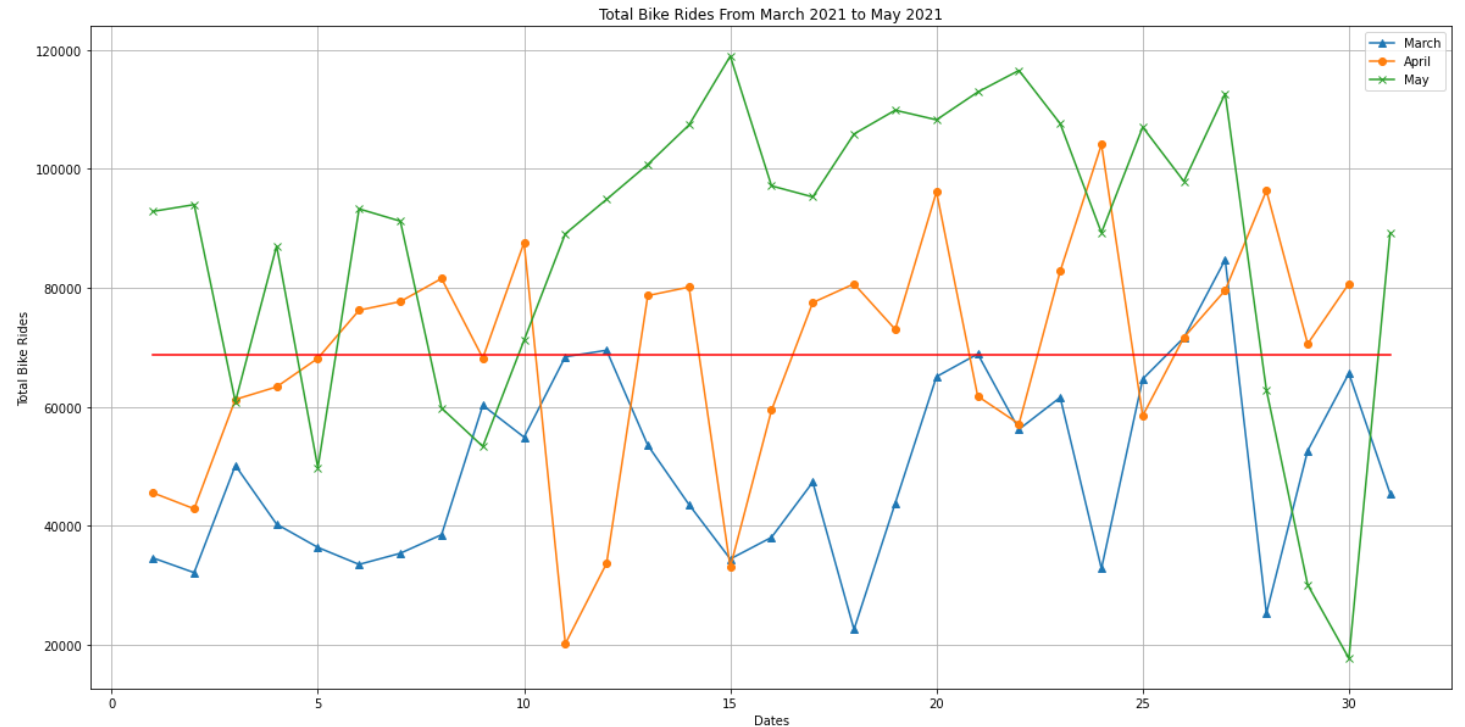
Results – Citi Bike

- Visualizing the Citi Bike usage shows that there does seem to be an increased usage of the Citi Bike program on April 23, 2021, however, it's unclear if this increased usage is due to Earth Day.
- Looking at usages over 3 months we see a gradual increase of usage as the months progress and subsequently the weather gets better.



Citi Bike Usage

- Plotting the three months in the dataset on top of each other illustrates increased usage over the months



Conclusions

- Recommendations:
 - Increased marketing of Earth Day activities
 - Improved infrastructure to encourage people to want to use available transit systems
- Interesting insights:
 - There seems to be higher usage of the MTA around other events regardless of whether it is a weekend or weekday (4/20)

Appendix

Average Daily Entries/Month

```
daily_agg.groupby(daily_agg.DATE_TIME.dt.month)['DAILY_ENTRIES'].mean()
```

```
DATE_TIME
2    1.076300e+09
3    1.072767e+09
4    1.075684e+09
5    1.066966e+09
Name: DAILY_ENTRIES, dtype: float64
```

Descriptive Statistics of Daily Entries

```
daily_agg['DAILY_ENTRIES'].describe()
```

```
count    9.100000e+01
mean     1.072021e+09
std      8.671214e+06
min      1.050629e+09
25%      1.065885e+09
50%      1.073085e+09
75%      1.078210e+09
max      1.092659e+09
Name: DAILY_ENTRIES, dtype: float64
```

Descriptive Statistics of Citi Bike Usage

rides_total	
count	92.000000
mean	68727.478261
std	25785.428887
min	17684.000000
25%	49140.250000
50%	68290.500000
75%	89257.000000
max	118947.000000

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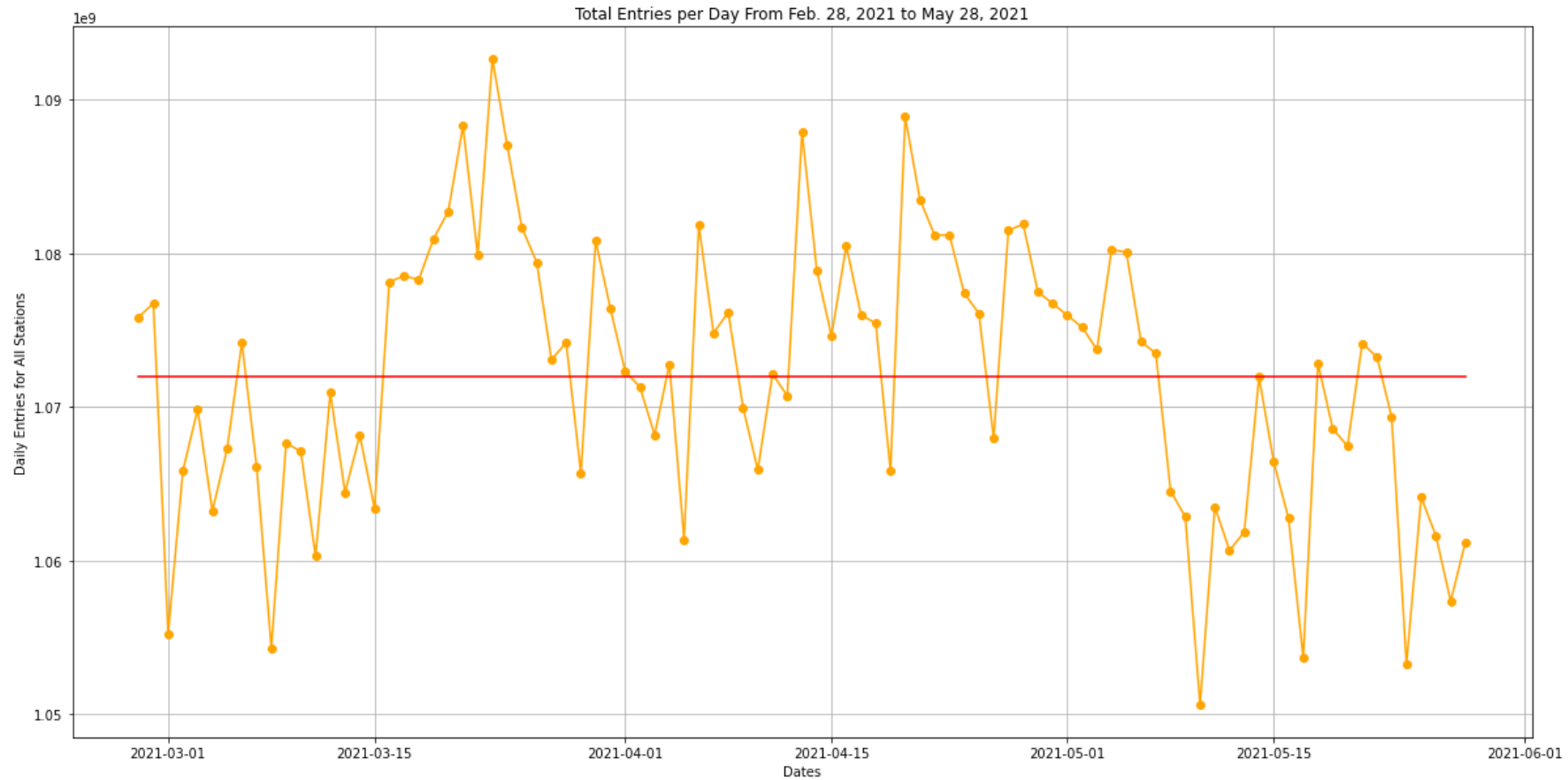
- Earth Day Events: <https://www.nycgo.com/events/earth-day-events/>

With events on Earth Day (Friday, April 22) and throughout the week, New York City celebrates sustainability and ways to live in harmony with the planet. Below we've listed some of the events where you can honor our planet; Union Square is the usual primary host of Earth Day events, but there are happenings both big and small across the City.

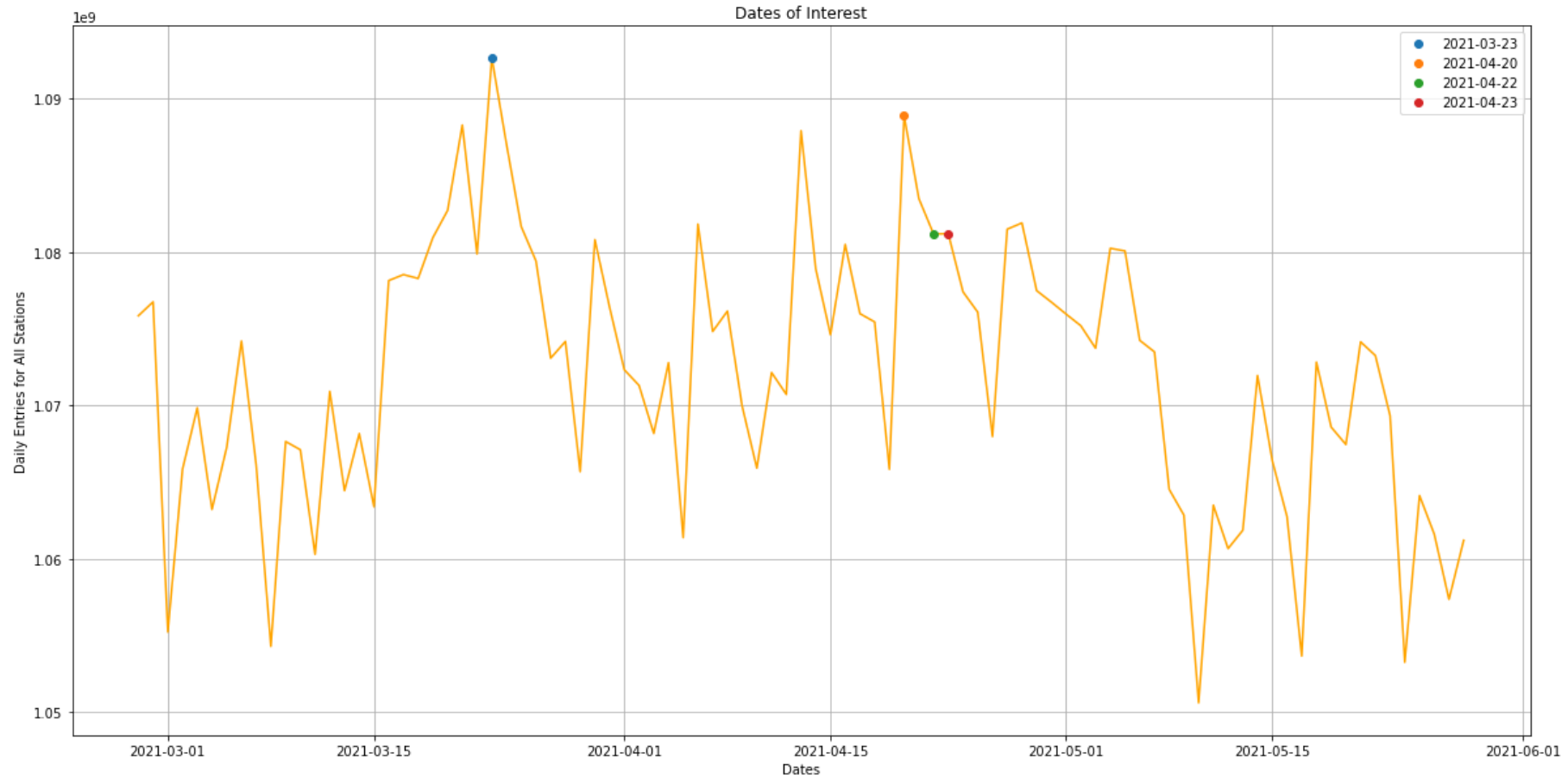
- April 21: Earth Day Initiative's return to in-person Earth Day activities takes place in Union Square Park. Come to talk to science-forward and environmentally conscious exhibitors, meet fellow activists, watch performances and hear speakers in this daylong event.
- April 22: Queens County Farm Museum holds Bee-a-Pollinator Service Day—a time to volunteer, play a few games and hear from the farm's beekeeper.
- April 23: Bring the family to Rockefeller Park, in Battery Park City, for a zero-waste art project and traditional Japanese drumming.
- April 24: Volunteer to restore woodlands and salt marsh habitats at Urban Farm on Randall's Island ; you can also just bring the kids to explore the garden there.

- Earth Day free Citi Bike usage [news](#)

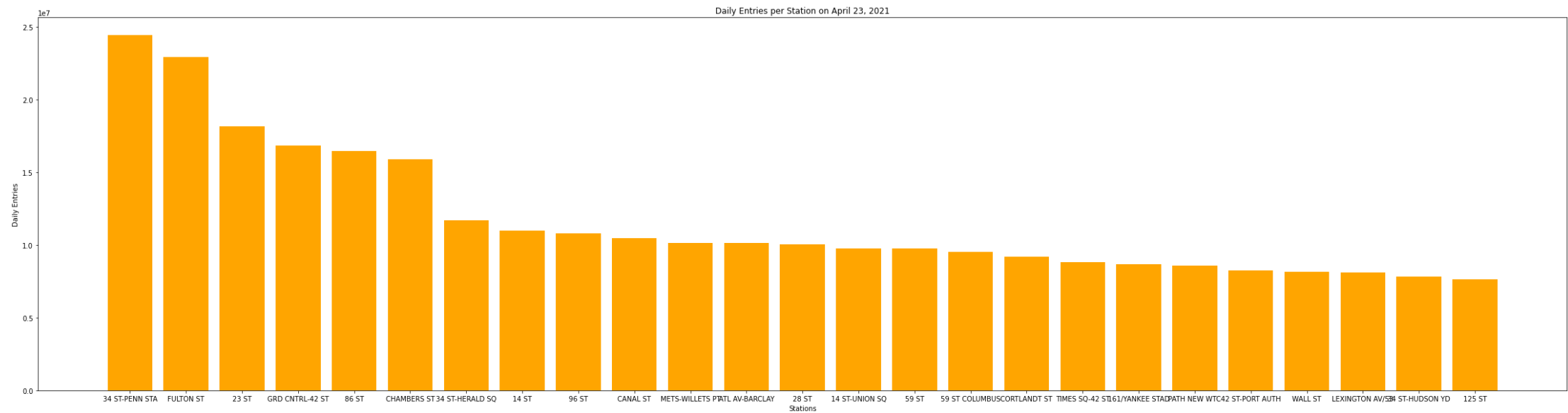
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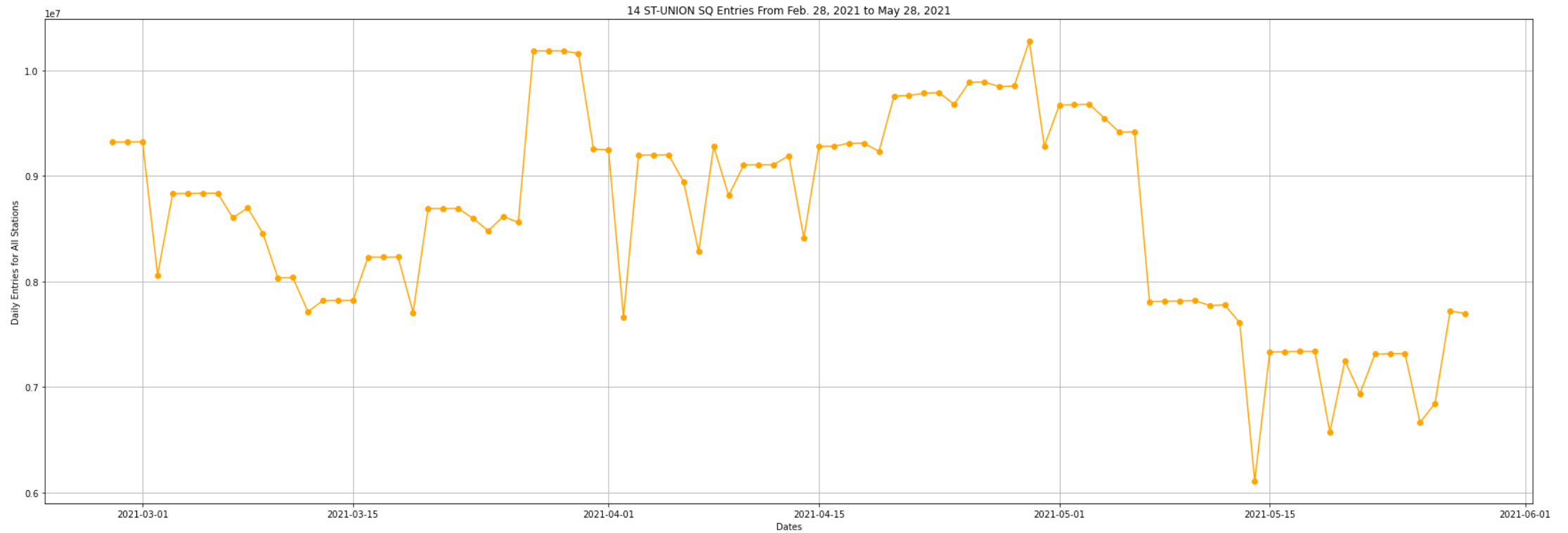
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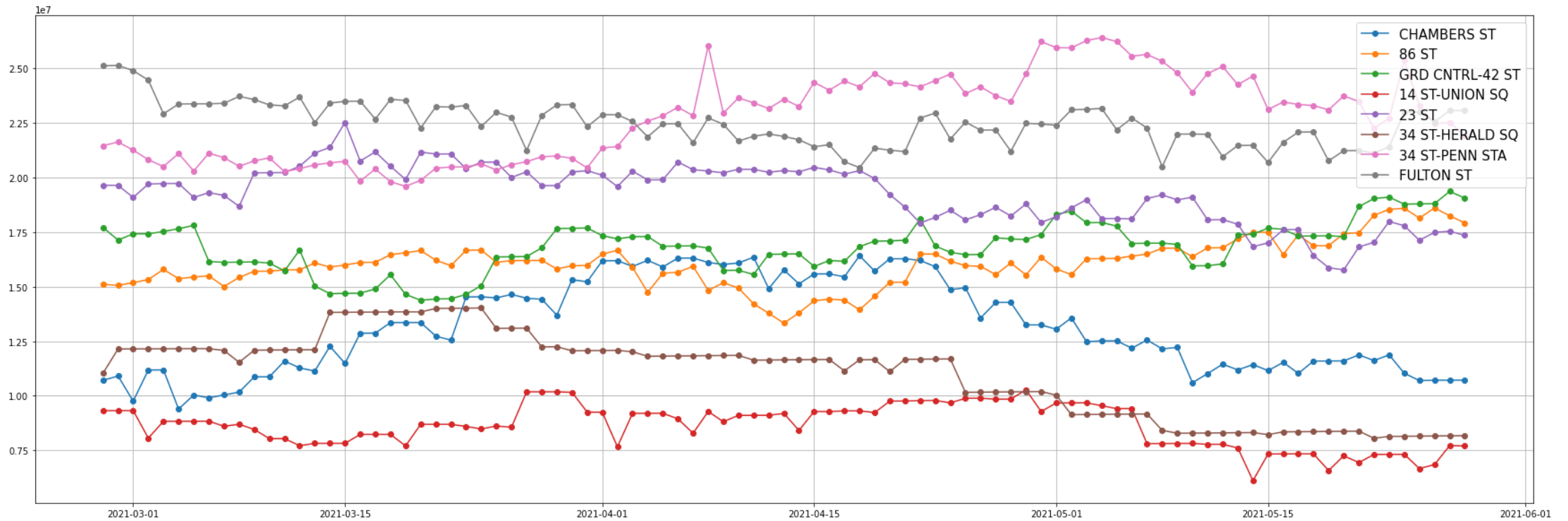
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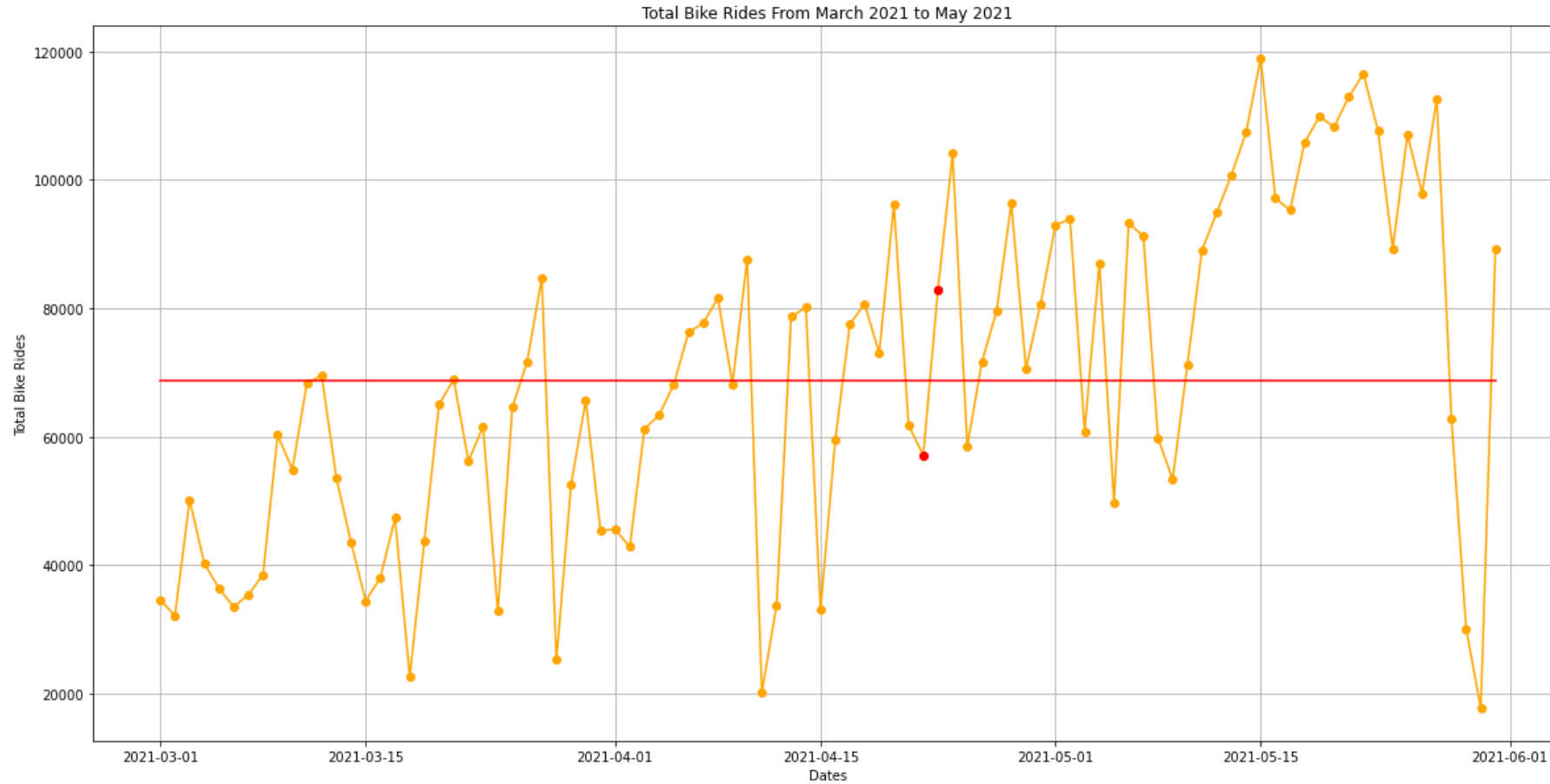
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