Abstract

In this short project, we want to see how COVID-19 affect crime rate in SF area. The goal is to give law enforcement department an outline of how pandemic affect public safety and the situation may change in the future.

We want to compare the pre-pandamic period with the last one and half year. We will be dig into several aspect such as total crime rate and sub categories such as types of crime and area of crime.

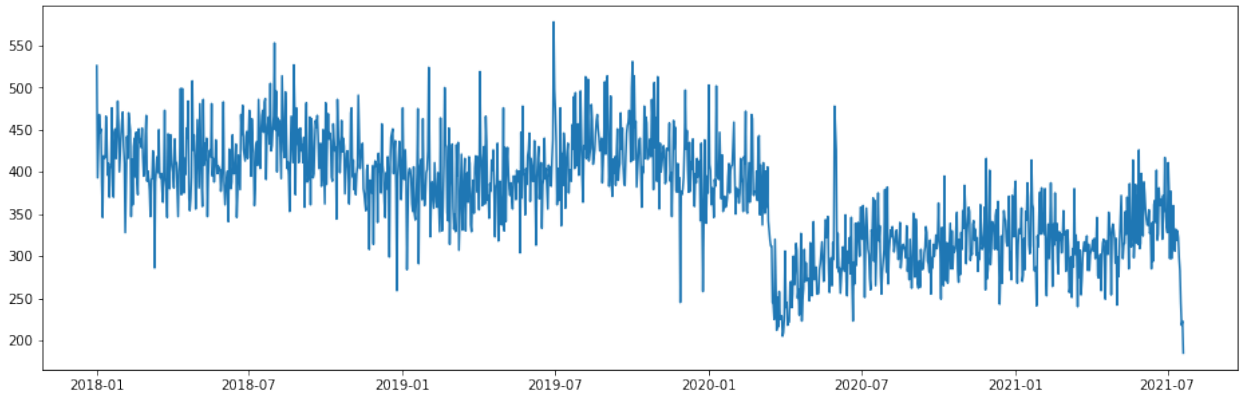
Dataset

Source: https://data.sfgov.org/Public-Safety/Police-Department-Incident-Reports-2018-to-Present/wg3w-h783

We use SF police department record of criminal incident report as dataset. The dataset ranged from early 2018 to July 20.

Outline

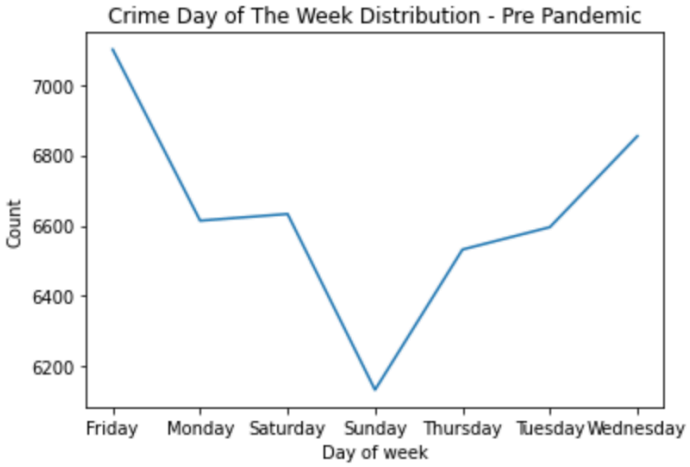
Unnecessary columns are removed along with records that has missing value. We then inspect data type and convert to form we want to use such as time stamp to DataFrame in Pandas.

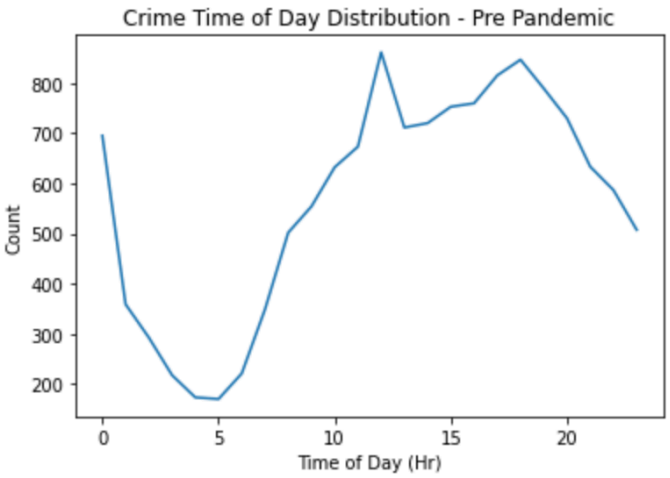


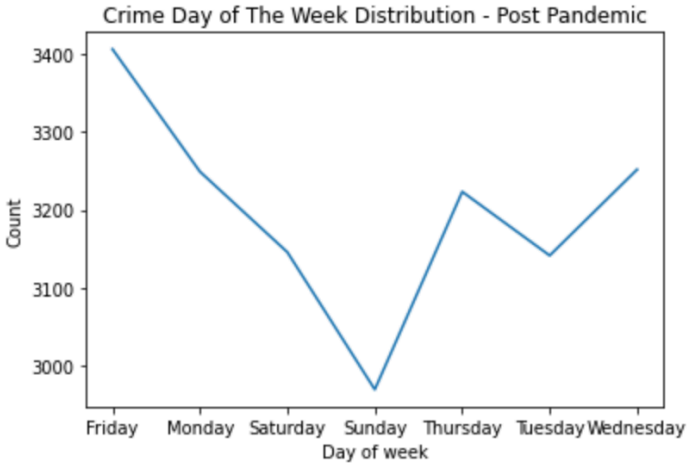
A count of daily criminal incident is plotted as above. We can see a sudden drop of daily cases in March 2020.

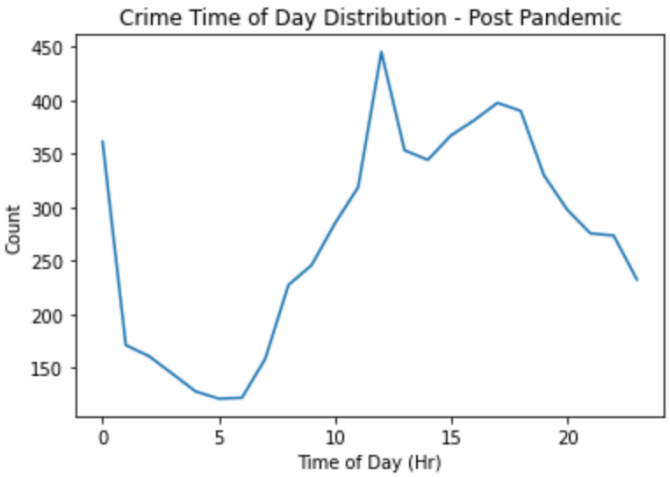
The dataset is segmented into two equal length parts, pre and post pandemic using 03/04/2020 as mark(the first cases diagnosed in the area). We calculate the mean and variance of two period(Assume two period are stationary time series:

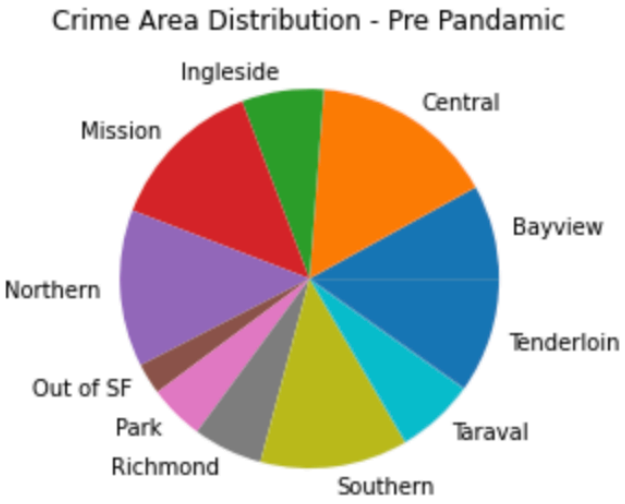
	Mean	Variance
Pre Pandemic	409.8	1875
Post Pandemic	310	1714

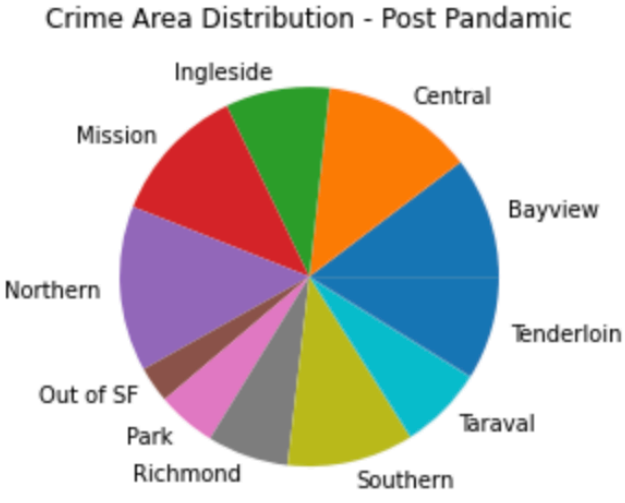

Crime Day of The Week Distribution - Pre Pandemic
Count
7000
6800
6600
6400
6200
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
Day of week


Crime Time of Day Distribution - Pre Pandemic
Count
800
700
600
500
400
300
200
0
5
10
15
20
Time of Day (Hr)


Crime Day of The Week Distribution - Post Pandemic
Count
3400
3300
3200
3100
3000
Friday
Monday
Saturday
Sunday
Thursday
Tuesday
Wednesday
Day of week


Crime Time of Day Distribution - Post Pandemic
Count
450
400
350
300
250
200
150
0
5
10
15
20
Time of Day (Hr)


Crime Area Distribution - Pre Pandamic
Ingleside
Central
Mission
Bayview
Northern
Tenderloin
Out of SF
Park
Taraval
Richmond
Southern


Crime Area Distribution - Post Pandamic
Ingleside
Central
Mission
Bayview
Northern
Tenderloin
Out of SF
Park
Taraval
Richmond
Southern

We want to see the time of day or day of week distribution has changed between two period.

TO DO:

Statistic Significance should be evaluate by calculating p-value between two period.
We expect to see the pandemic causes the total crime incident to decrease due to reduced activity but not affect the location or time of the day/week distribution.

However, the criminal incident are expecting to climb back to pre-pandemic so putting more effort in law enforcement might be necessary to ensure safe community.