

Chicago Crime Data Analysis

MIDS -INFO- S18 Python Fundamental

Project 2: Data Analysis

Angshuman Paul, Anu Sankar, Yue Hu, Kuangwei Huang



The Datasets...

1. City of Chicago Crime Data

- a. <https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2>
- b. Sliced to Jan 1, 2015 to Dec 31, 2017
- c. 17 Columns, 798 748 Rows
- d. date, primary_type, location_description, arrest, domestic, district, ward, community_area, fbi_code

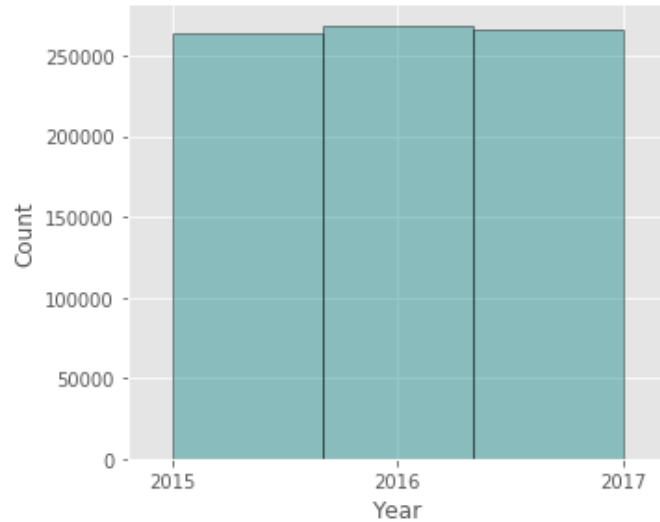
1. Weather Data

- a. <https://github.com/fivethirtyeight/data/tree/master/us-weather-history>
- b. From Jan 1, 2015 to Dec 31, 2017
- c. 13 Columns, 1 096 Rows
- d. date, actual_mean_temp, actual_min_temp, actual_max_temp, actual_precipitation

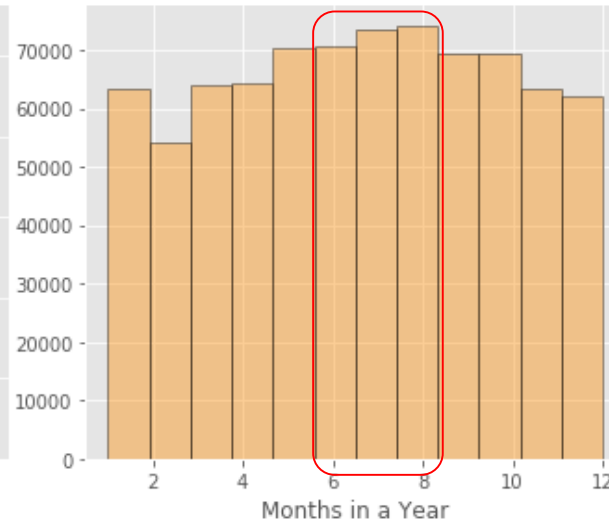


Trends in Crime Over Time

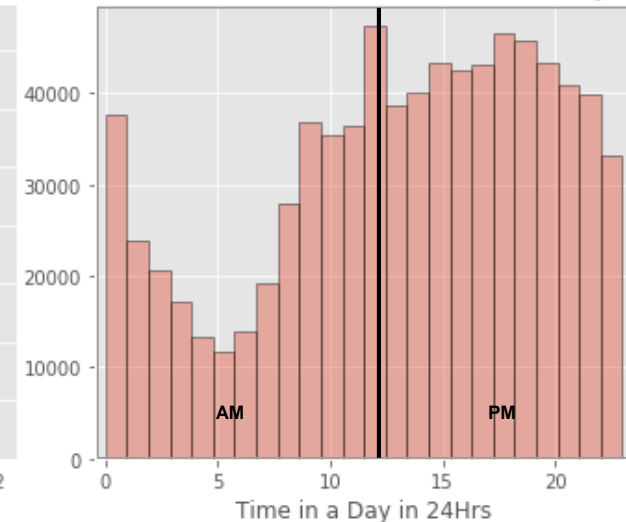
Distribtuion of Crime, Years



Distribution of Crime, Months in a Year

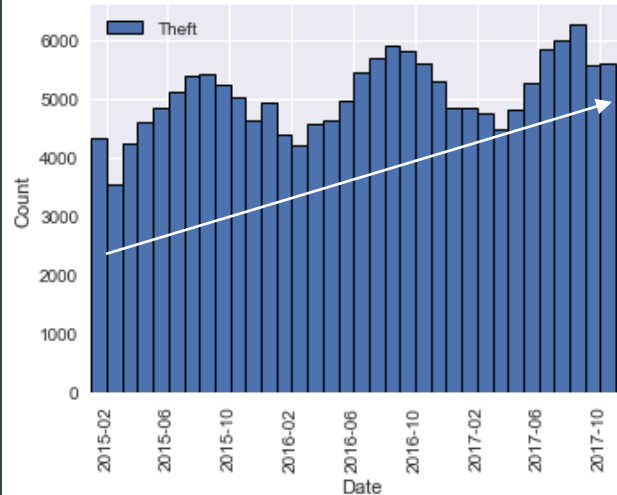


Distribution of Crime, Hours in a Day

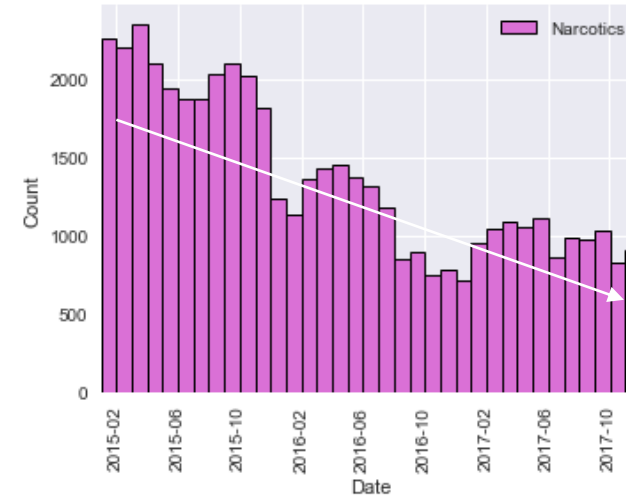


1. Relatively constant y-o-y, mean of 266 249 crimes.
2. Summer months from June through August.
3. 10am - 10pm, with unusual spikes at 12 midnight and 12 noon.
4. ↑ Theft, ↓ Narcotics.

Increasing Theft Crimes through 2015-2017

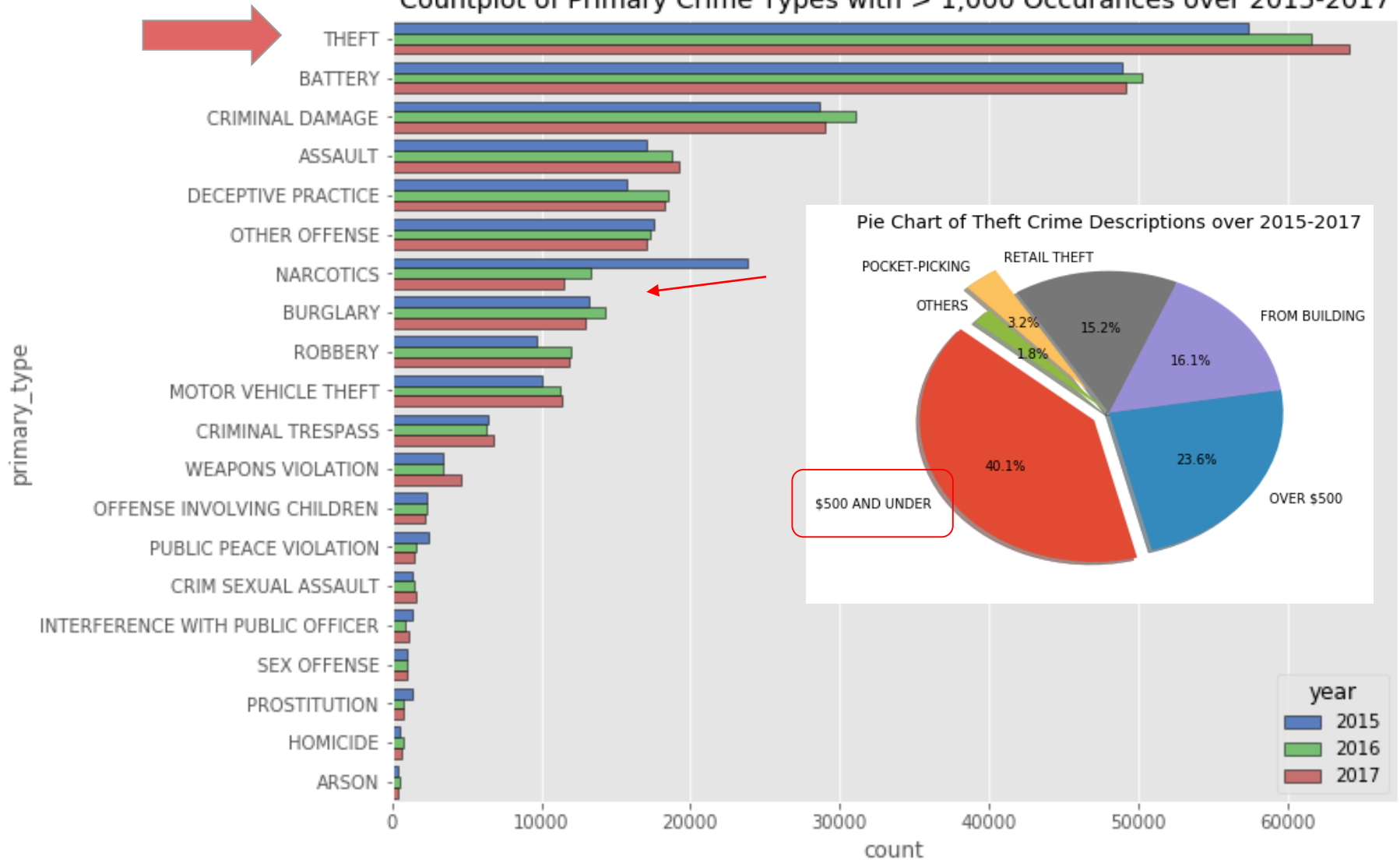


Decreasing Narcotics Crimes through 2015-2017

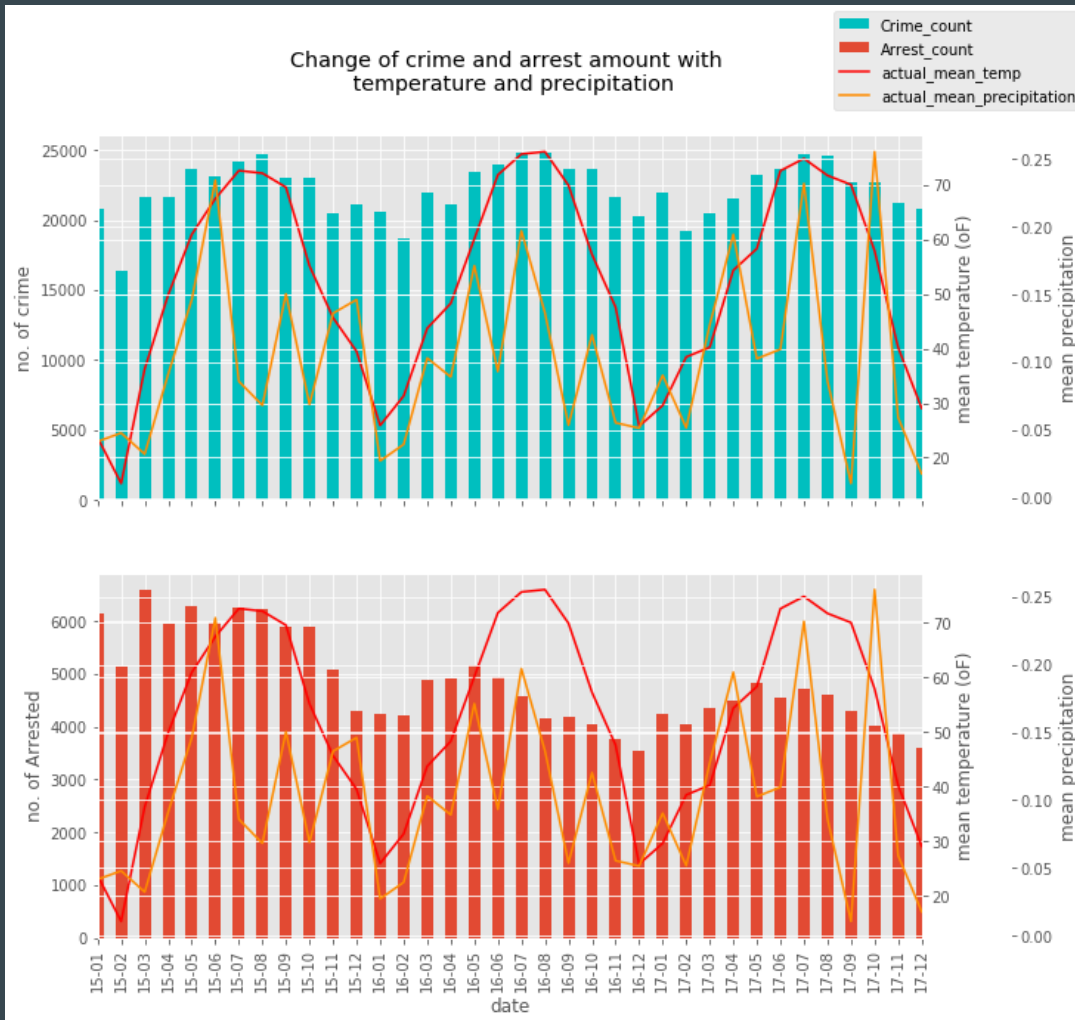


Theft is the most frequently committed crime

Countplot of Primary Crime Types with > 1,000 Occurances over 2015-2017

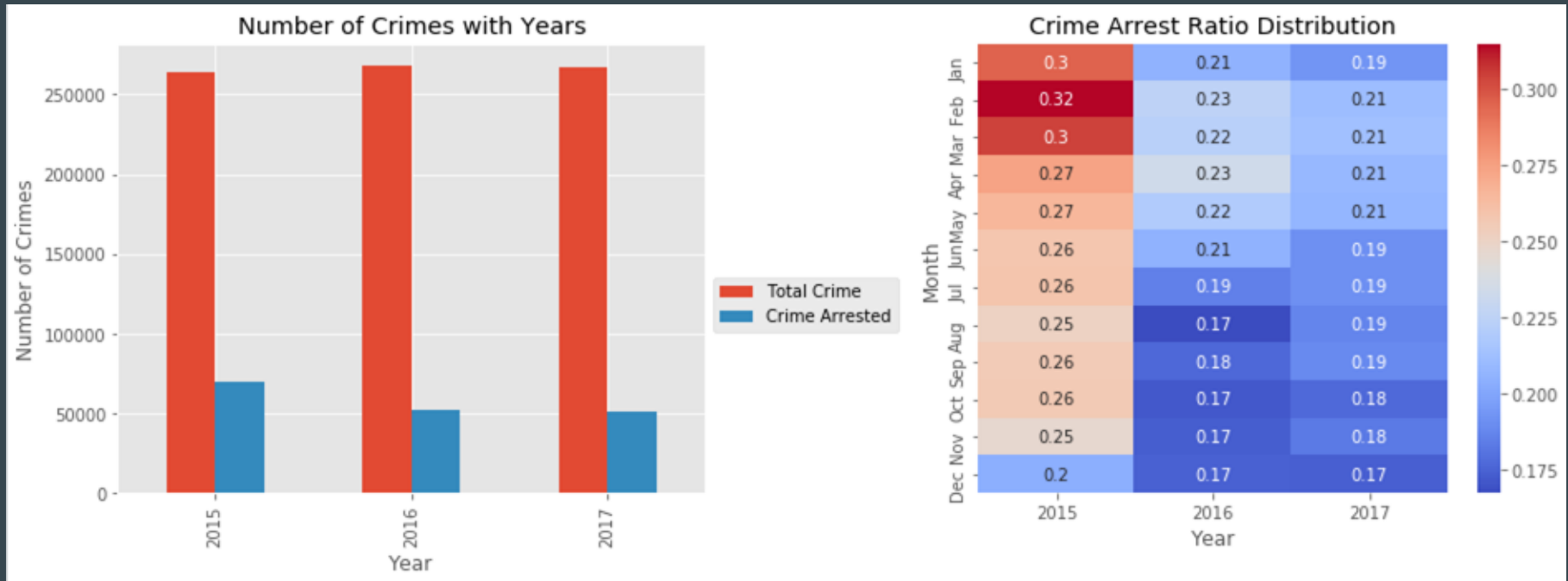


Impact of Weather on Crime



- Study crimes rate with Weather:
 1. Total Crimes
 2. Crimes of which arrests were made
- Crime occurrence are closely related to mean temperature.
- The high temperature may cause high crime occurrence in Summer.

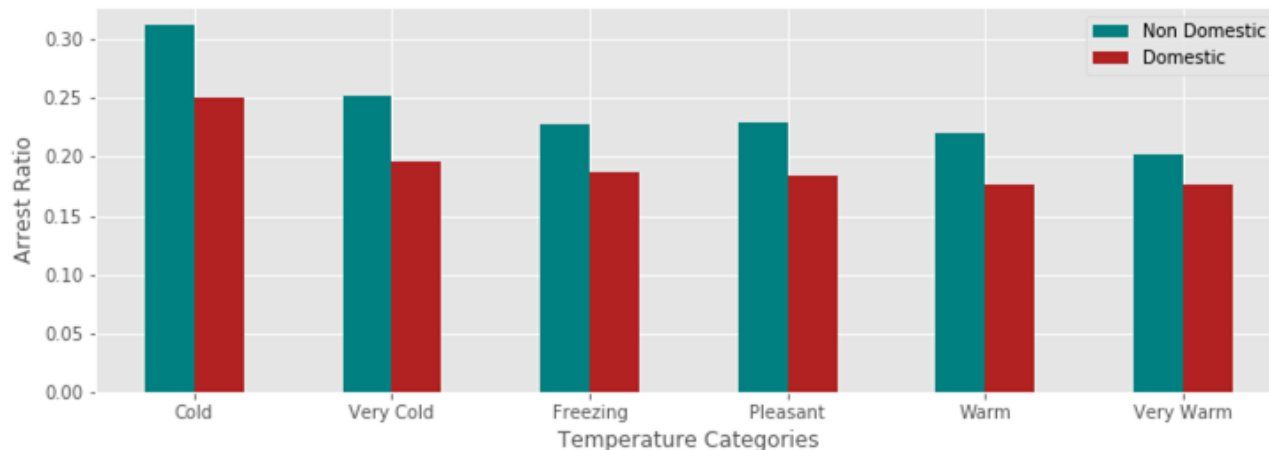
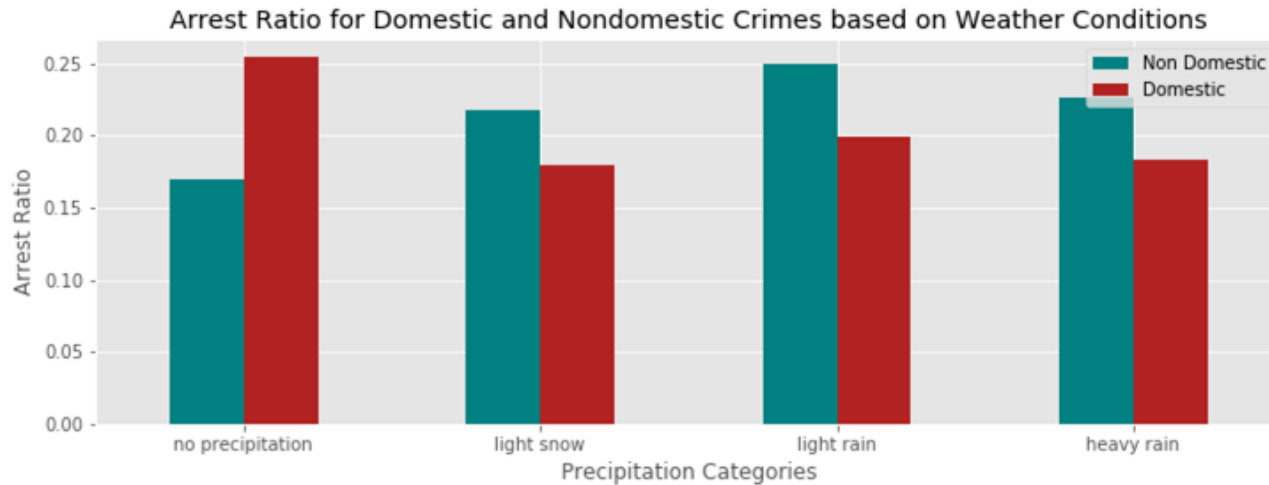
High Incidence with Low Arrest Ratio



Arrest Ratio = no. of crimes of which criminals are arrested / no. of total crimes

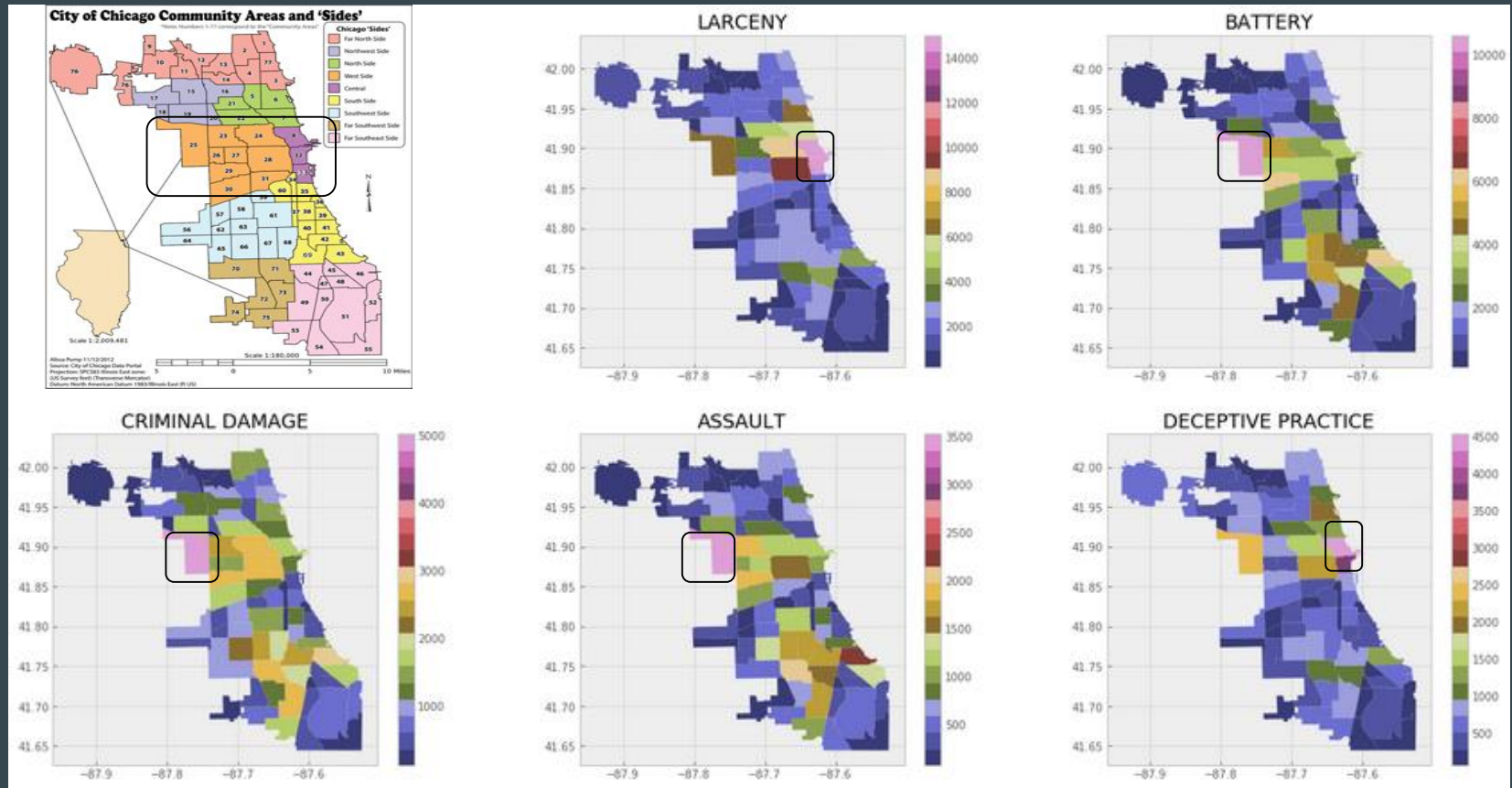
- Even occurrence of crimes keep similar from 2015 to 2017, the number of crimes of which criminals are arrested is continuously decreasing
- Arrest ratio is continuously decreasing from 2015 to 2017
- More patrols and better police performance are needed

Impact of Weather on Arrest Ratio (AR)



- Days with No Precipitation
 - Highest AR of domestic crimes
 - Lowest AR of non-domestic crimes
- Crimes with Same Trend of AR vs. Temperature categories

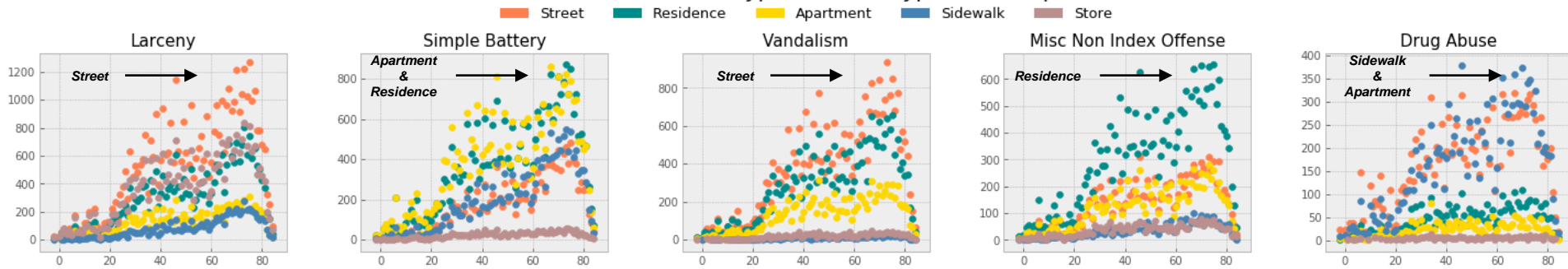
Geographical Distribution of Crimes



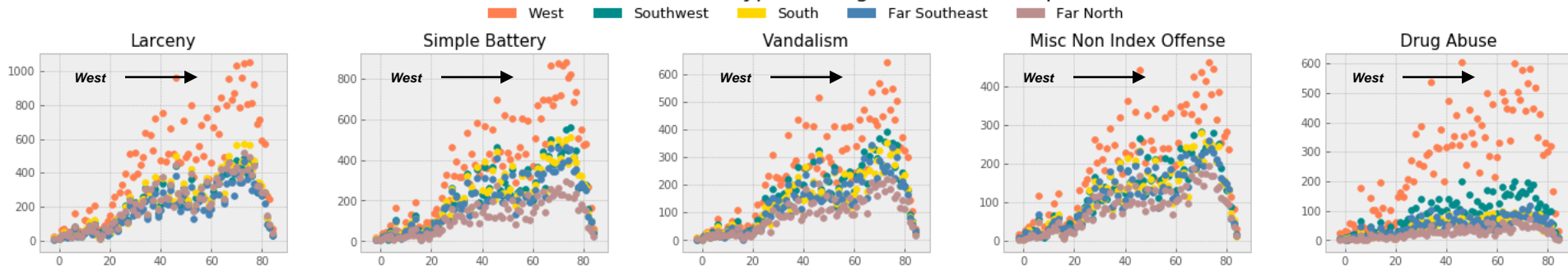
1. Majority of top 5 crimes in Central and West side communities
2. Most of Larceny crimes in all Central communities
3. Battery, Criminal Damage and Assault in community area 25 of West side
4. Deceptive Practice mostly in community area 8 of the central side

Crime Type across 'Sides', Locations, Temperature

Correlations between crime type, location type and temperature

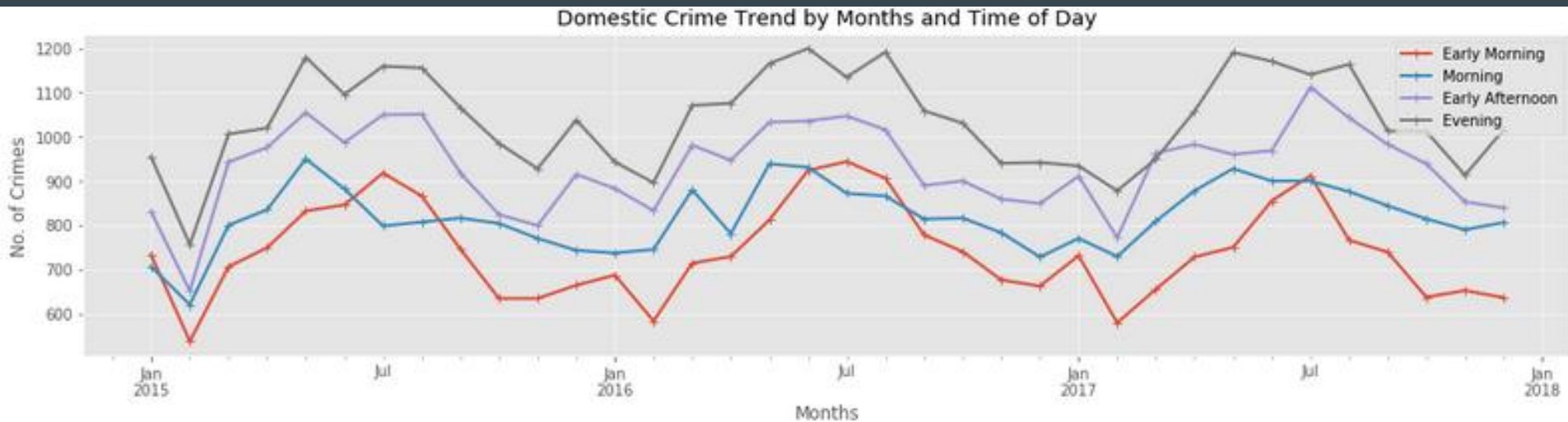
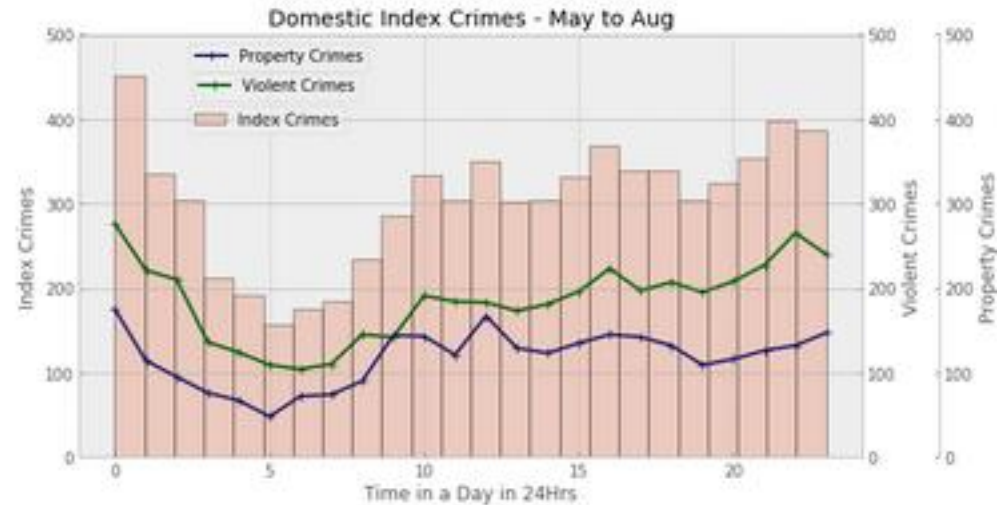
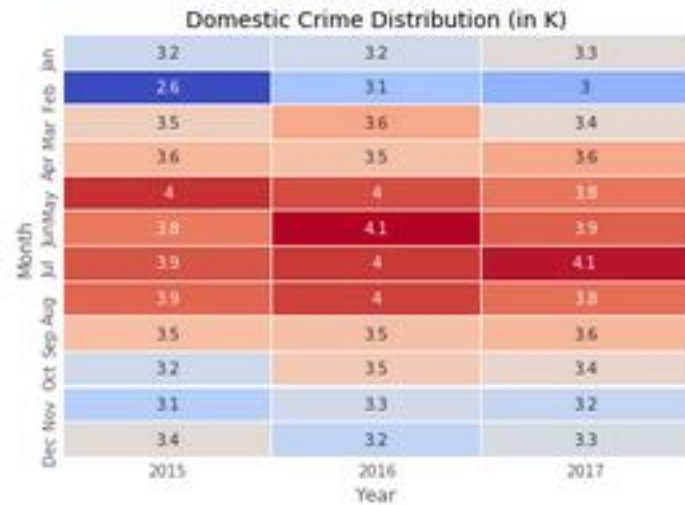


Correlations between crime type, chicago sides and temperature



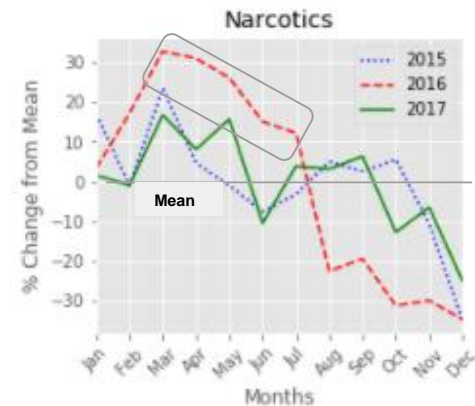
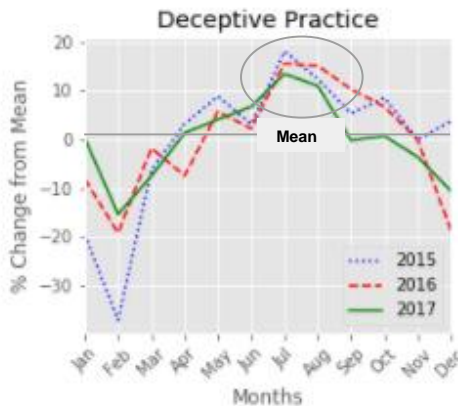
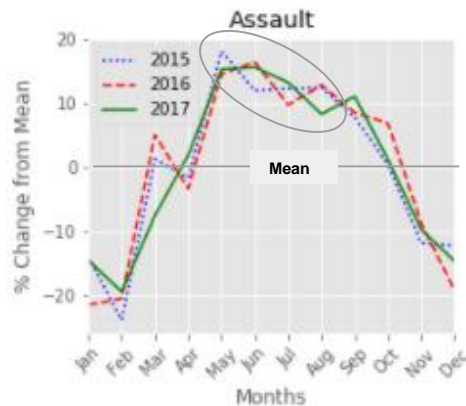
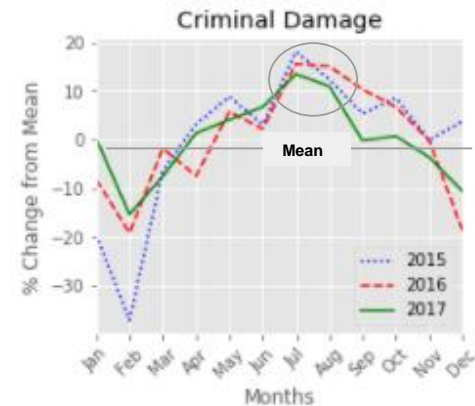
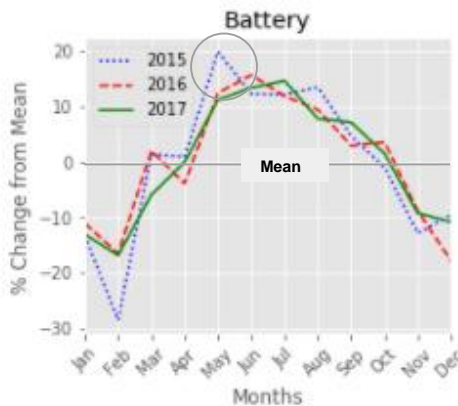
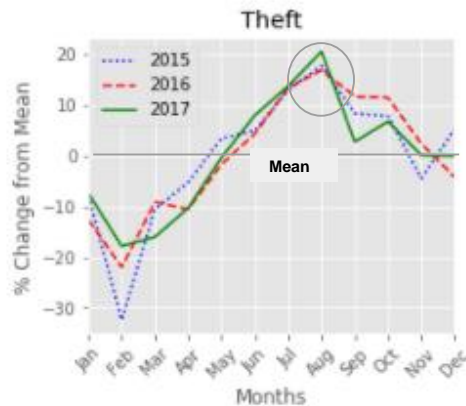
1. Peak at temperatures between 60 and 80 degrees irrespective of type and location.
2. Streets seem to be most prone to crimes while stores are the least prone.
3. West side has the most crime regardless of crime type.

Domestic Crimes - Serious crimes on the rise !



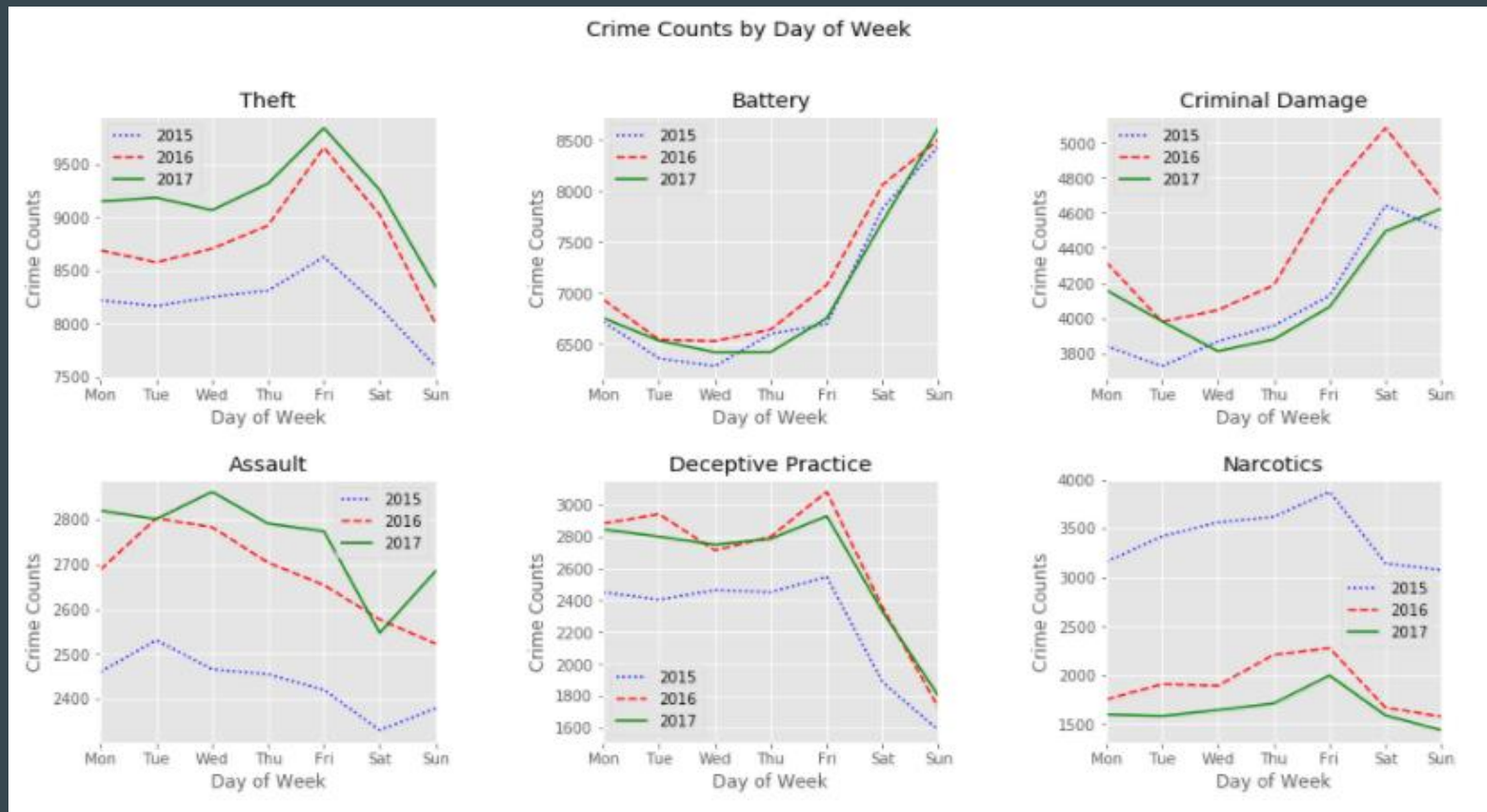
Variation from the Mean

Percentage Variation of Crime Types from Respective Monthly Average by Year



1. Theft does not increase during Holiday season.
2. Narcotics is at its lowest during holiday season but spikes again in March / beginning of Spring
3. Police focus on specific crimes should shift with seasons

Which Day of Week is more crime ridden?



1. Different crimes peak on different days of the week. Friday is the most crime ridden day of the week.
2. Police can be on high alert for specific crimes on certain days of the week:
 - Tue, Wed : Assault; Fri : Theft, Deceptive Practice, Narcotics;
 - Sat : Criminal Damage; Sun : Battery

Conclusions

1. Theft is most prevalent crime in Chicago, and most of it is petty theft.
2. Narcotics crimes are decreasing but they still peak in March / beginning of Spring every year.
3. The West Side has the most amount of crime.
4. Keep off the Streets.
5. Crime is highest in the Summer.
6. Friday is the most crime ridden day of the week.
7. Police vigilance should increase
 - a. In Summer
 - b. On Fridays throughout the year.
8. Domestic crimes peak between 12 midnight and 1am - Number of serious crimes are increasing.
9. For firearms related crimes, stay away from streets: S Dr Martin Luther King Jr Dr. and S Ashland Ave ; as well as districts: Harrison and Englewood.

So, Stay Safe!



Thank You!

City of Chicago Community Area Map

