

LA Crime

Team Members

- Eoin Doherty
- James Maxwell
- Ryan Murphy
- Ryan Shuman

Questions We Sought to Answer

- What types of crimes are committed the most?
- When are most crimes committed?
- What areas of LA city have the most crime?
 - Has the crime rate in those areas improved since 2010?
- Is there a correlation between weather and crime in LA? Unemployment rate and crime?
 - If so, how much of an effect do unemployment and weather have on crime rate?

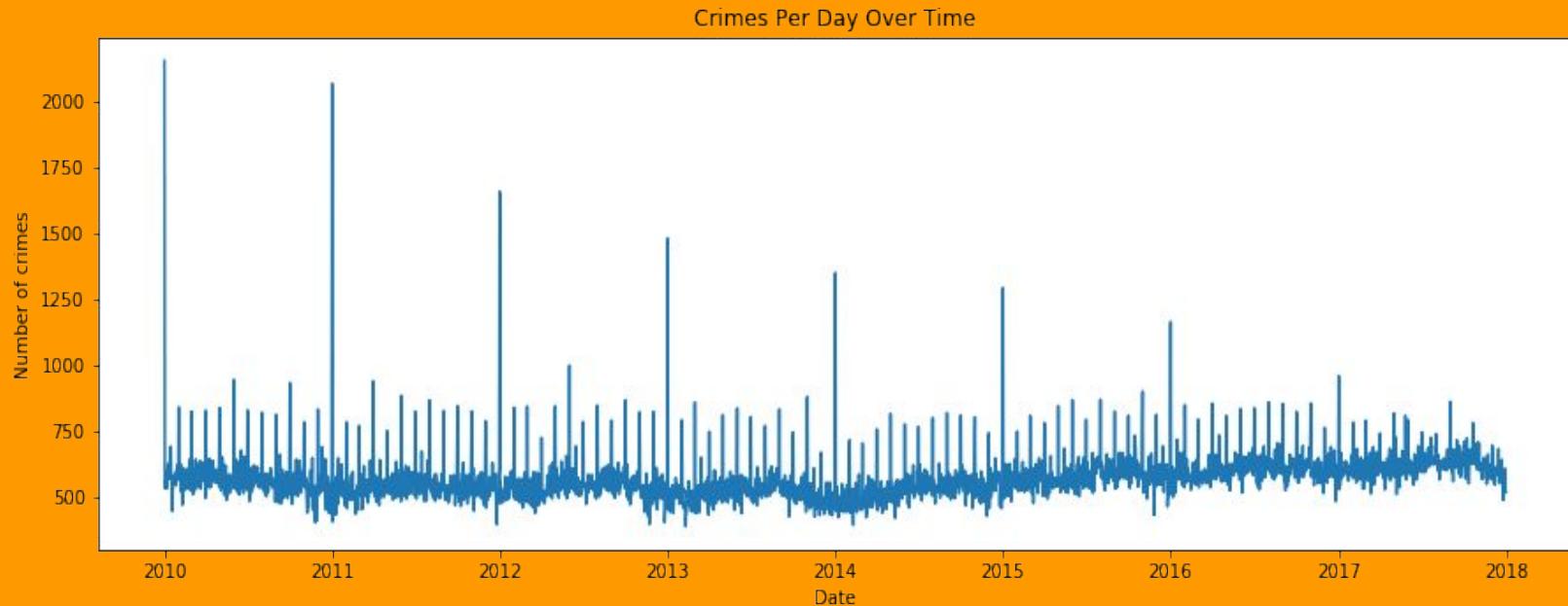
Tools Used

- MySQL
 - For data cleaning and consolidation
- Jupyter Notebooks
 - For analysis
- Python Libraries:
 - Numpy
 - Pandas
 - Scipy
 - Sklearn
 - Mlxtend
 - Matplotlib
 - dbscan

Data Preparation Work

- Dropped unemployment data from prior to 2010 (Crime data starts in 2010)
- Dropped redundant and unnecessary columns
- Created reference csv's to keep track of codes and to make sense of our analysis
- Filled in empty data with placeholders
- Consolidated data from unemployment dataset, weather dataset, and crime dataset

When Are The Most Crimes Committed?



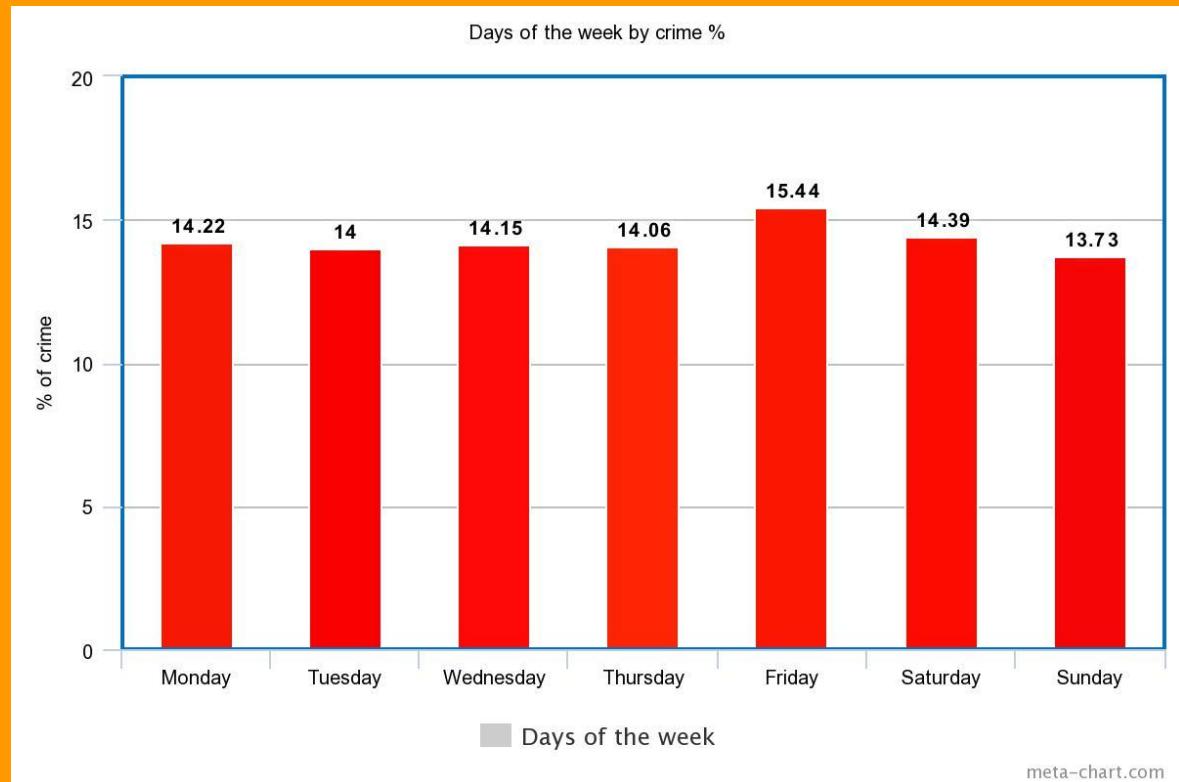
Spikes are 1st of the month, and large spikes are 1st of the year. We believe these are commonly the dates they use when the actual date is unknown. There is also a slight increase in crime from 2014 to 2018.

When Are The Most Crimes Committed?

Time of Day	% of Crimes
Day	54.856631
Night	45.143369

- As you can see there is a fairly even split between crime and time of day.
- Fridays seem to be the most crime ridden days, while sundays are the safest.
- The type of crimes stays the same

Average Crimes Per Day: 568.41



Time taken to report crimes

- Mean: 16.1921506275
- Median: 0.0833333333333 (Massive Skew)
- As we expected more serious crimes got reported quicker than less serious crimes

Shortest time to be reported by crime:

Rank	Crime
1	BATTERY - SIMPLE ASSAULT
2	BURGLARY FROM VEHICLE
3	VEHICLE - STOLEN
4	BURGLARY
5	THEFT PLAIN - PETTY (\$950 & UNDER)

Longest time to be reported by crime:

Rank	Crime
1	THEFT OF IDENTITY
2	THEFT-GRAND
3	THEFT PLAIN - PETTY
4	DOCUMENT FORGERY / STOLEN FELONY
5	BURGLARY

What Areas of LA City Have the Most Crime?

- Top 5 most violent areas.

- 77th Street
- Southwest LA
- N Hollywood
- Pacific
- Southeast

Area	% of Total Crimes
77th Street	6.967615
Southwest	6.452347
N Hollywood	5.439272
Pacific	5.286643
Southeast	5.265449

- Most occur on the streets or in houses.

Location	% of Total Crimes
STREET	22.273922
SINGLE FAMILY DWELLING	20.633349
MULTI-UNIT DWELLING (APARTMENT, DUPLEX, ETC)	12.869291
PARKING LOT	7.117053
SIDEWALK	4.992341

What crimes are committed the most?

- Some crimes have multiple crime codes.
 - We used apriori pruning with a minimum support of 0.0003 to find frequent itemsets of crime codes.
- Most frequent 1-itemsets
 - Ambiguous
 - These crime codes can apply to a variety of incidents which is why they are so common.
- Most frequent 2-itemsets
 - A little more specific
 - Child Abuse
 - Brandishing a weapon / Threats
 - Bike Stolen
 - Identity theft and forgery

Crime
BATTERY - SIMPLE ASSAULT
VEHICLE - STOLEN
BURGLARY FROM VEHICLE
BURGLARY
THEFT PLAIN - PETTY (\$950 & UN

Crime 1	Crime 2
CRM AGNST CHLD (13 OR UNDER)	BATTERY WITH SEXUAL CONTACT
BRANDISH WEAPON	CRIMINAL THREATS - NO WEAPON D
THEFT PLAIN - PETTY (\$950 & UN	BIKE - STOLEN
THEFT OF IDENTITY	DOCUMENT FORGERY / STOLEN FELONY

Miscellaneous Statistics

- Victim Stats

Sex	% of Victims
M	46.603255
F	42.544633
Not Reported	10.852112

- Weapon Stats

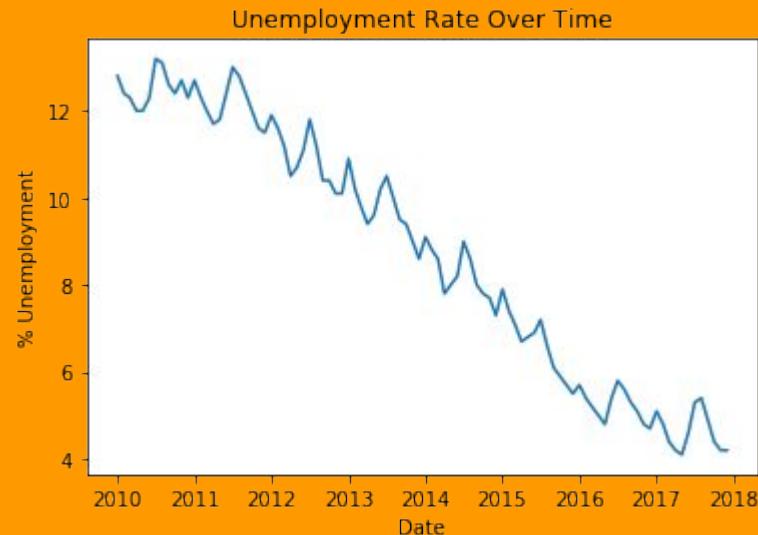
Weapon	% of Total Crimes
STRONG-ARM (BODILY FORCE)	20.148848
VERBAL THREAT	2.750222
UNKNOWN/OTHER WEAPON	2.584226
HAND GUN	1.595957
SEMI-AUTOMATIC PISTOL	0.630869

Descent	% of Victims
Hispanic	34.641071
White	24.644707
Black	16.044107
X (Unknown)	11.955079
Other	9.658110

What Factors Affect Crime Rate?

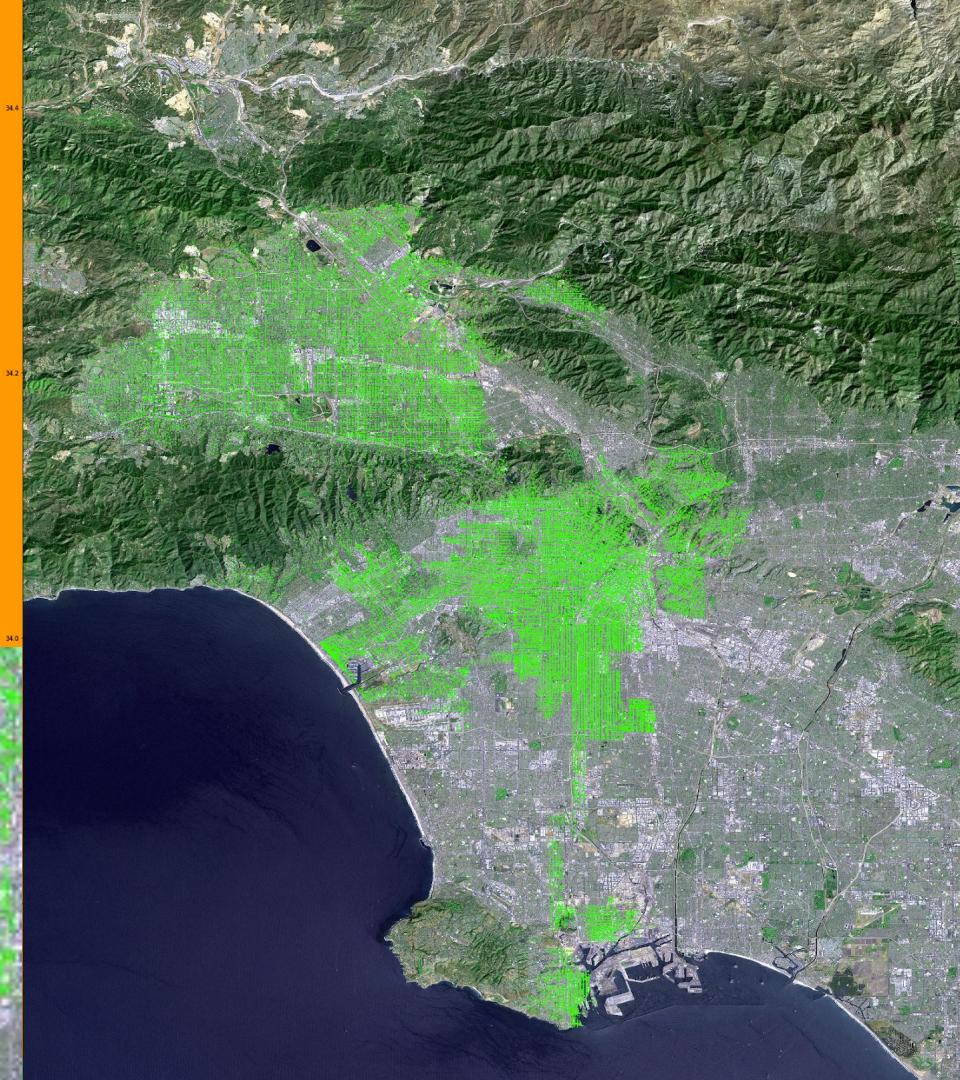
- Weather
 - Many weather features had no effect
 - Humidity
 - Heat and Heat Index
 - Discretizing this dimension did not help.
 - Precipitation
 - Precipitation had a significant effect on crime rate when days were grouped as rainy or not rainy.
- Unemployment rate
 - We found a correlation of -0.528 between unemployment rate and weather.
 - Counter to what we expected, total monthly crime increased when unemployment rate decreased.

Rain	Average Number of Crimes (Daily)
No	540.1561829878484
Yes	349.3621495327103



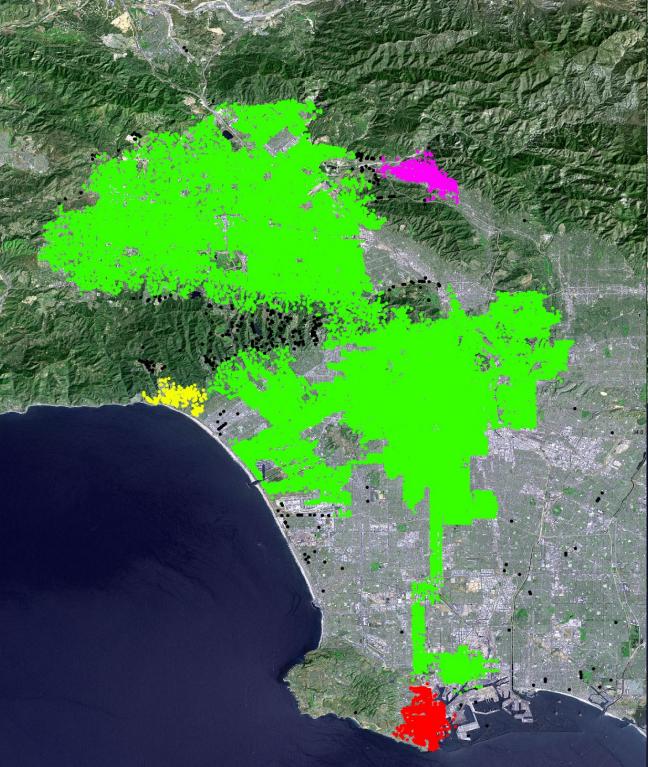
Clustering Analysis

- DBSCAN
- The goal is to search for possible connections between locations and factors that may affect crime
- difficulties :
 - Dataset too big
 - Some data was difficult to deal with

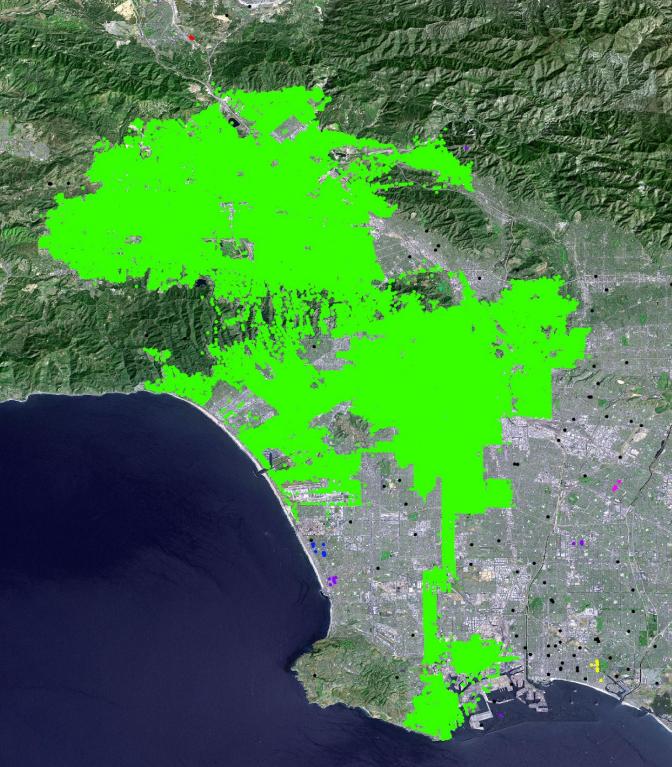


No correlation between location, precipitation and employment rates

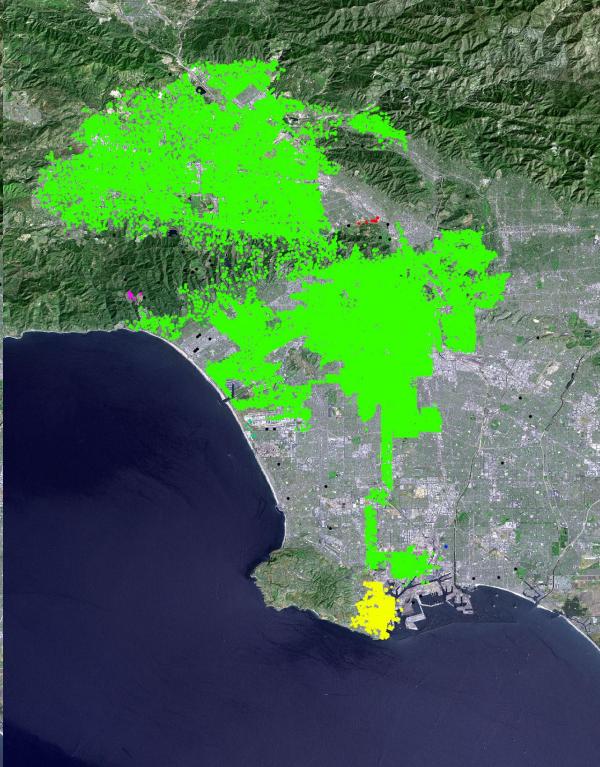
Low employment



Days without rain

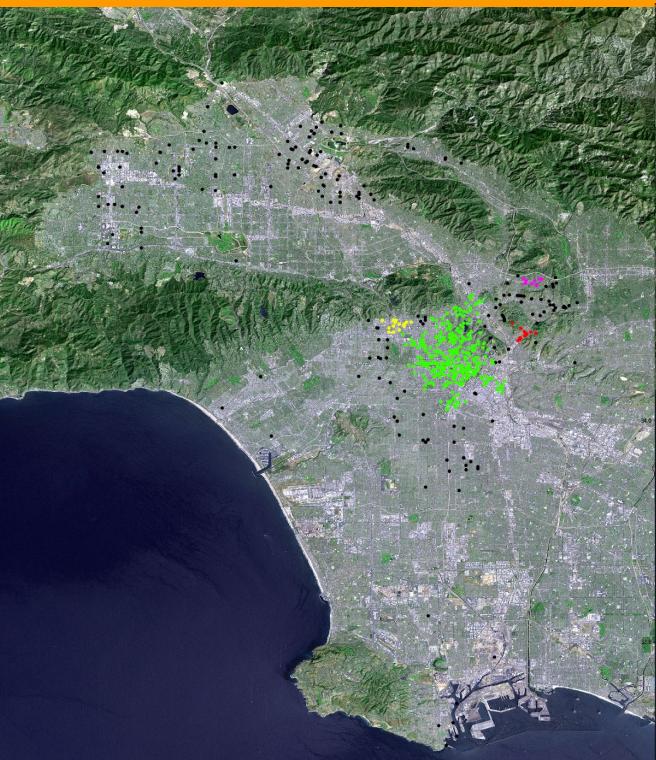


Days with rain

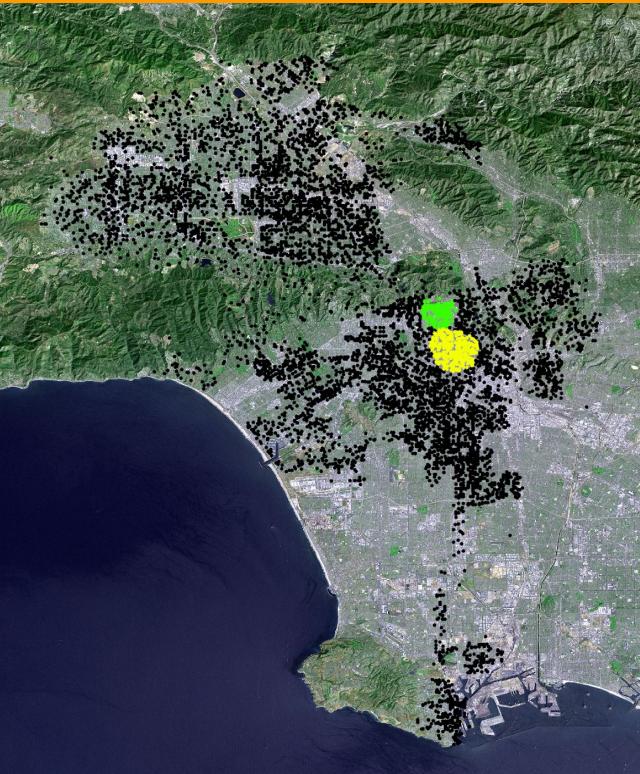


Other Interesting Clusters

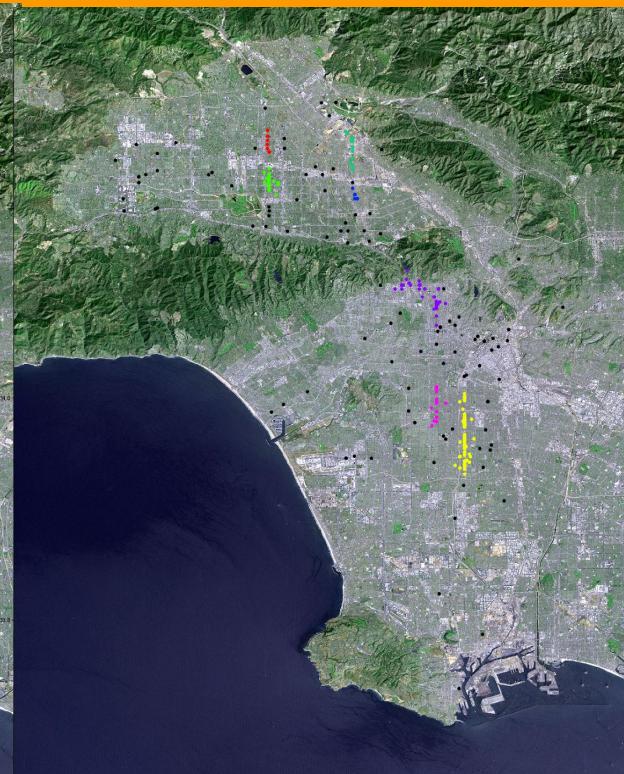
Bike theft



Identity theft



Pimping



Applications Of Knowledge

- Less Police needed on Sundays more on Fridays
- Police can use this data to plan patrol routes.
 - More Police needed on 77th st and Southwest
- Less police are needed on rainy days.
- It takes a while for victims to report some crimes like identity theft
 - This is likely because those victims do not recognize those crimes have happened or do not know how/do not want to report them.
 - The city of LA can educate its citizens about spotting these and reporting crimes.