Correlations of crime and land use in Chicago

Crime is a complex phenomena, with a lot of factors. There are economic, cultural, judicial, seasonal factors. Certainly there are other factors that have been overlooked.

Could the venues in a city have an impact in crime?

How it is possible to know?

Use techniques of data science to try to take into account other factors.

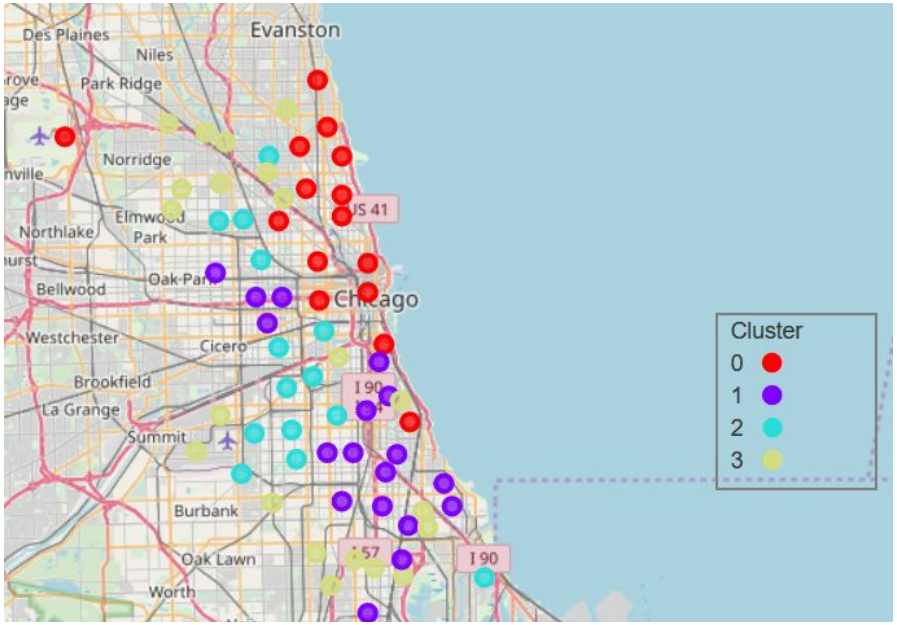
In this project I took into account the socioeconomic status of an area. I only study and compare similar areas. The venues will change from one place to another, but there are similar types of venues. Only the type of venue is considered.

Data

The city of Chicago provides data of the socioeconomic indicators of the 77 areas of the city. It also provides information about the crimes in each area.

The venues in each area are obtained using the Foursquare api, which is a location platform.

Socioeconomic Clusters



Cluster	PERCENT OF HOUSING CROWDED	PERCENT HOUSEHOLDS BELOW POVERTY	PERCENT AGED 16+ UNEMPLOYED	PERCENT AGED 25+ WITHOUT HIGH SCHOOL DIPLOMA	PERCENT AGED UNDER 18 OR OVER 64	HARDSHIP_INDEX	PERCENT PER_CAPITA_INCOME
0	2.686667	15.680000	7.240000	8.620000	23.213333	13.666667	1.858548
1	4.705263	35.163158	24.042105	21.278947	40.926316	74.263158	0.595431
2	10.657143	22.935714	15.042857	39.100000	37.385714	74.928571	0.584286
3	3.322727	13.440909	13.277273	15.681818	37.795455	35.227273	1.028572

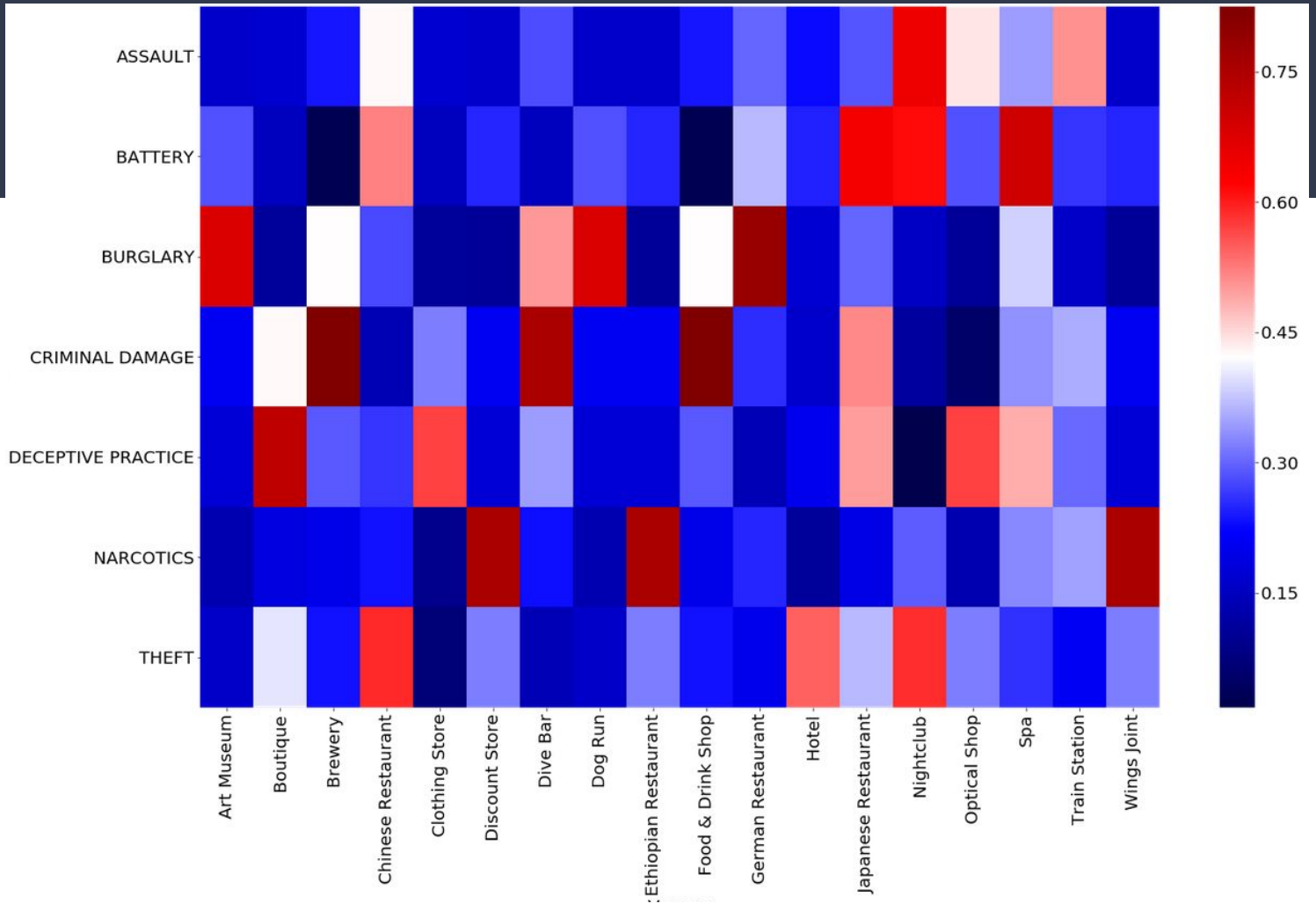
Correlations

They are a measure of how closely related are two variables. There are various correlations measures. I use the Pearson correlation function.

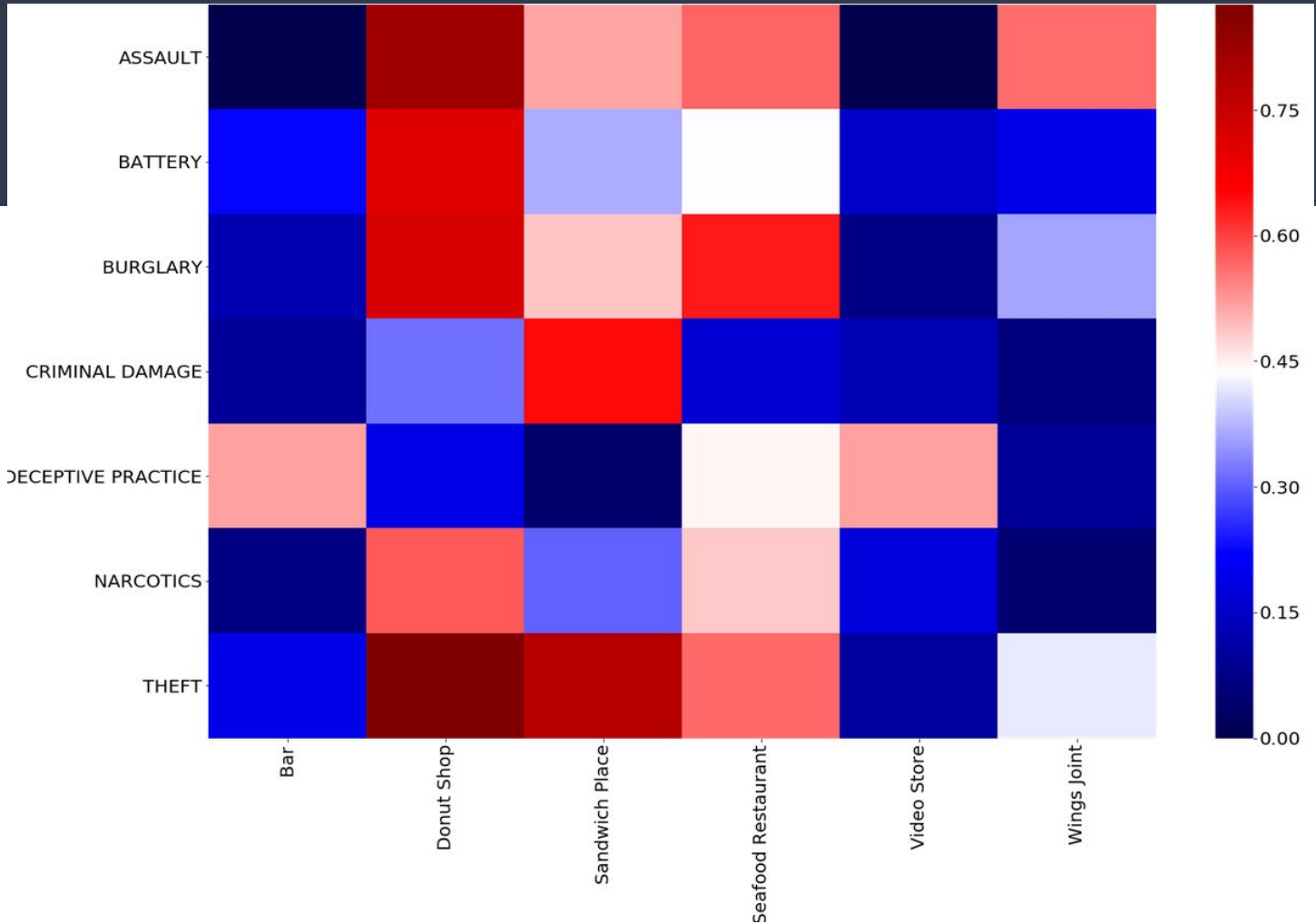
$$\rho(X,Y) = \frac{Cov(X,Y)}{\sigma_x \sigma_Y}$$

Cov(*,*) is the covariance
σ_x is the standard deviation of x

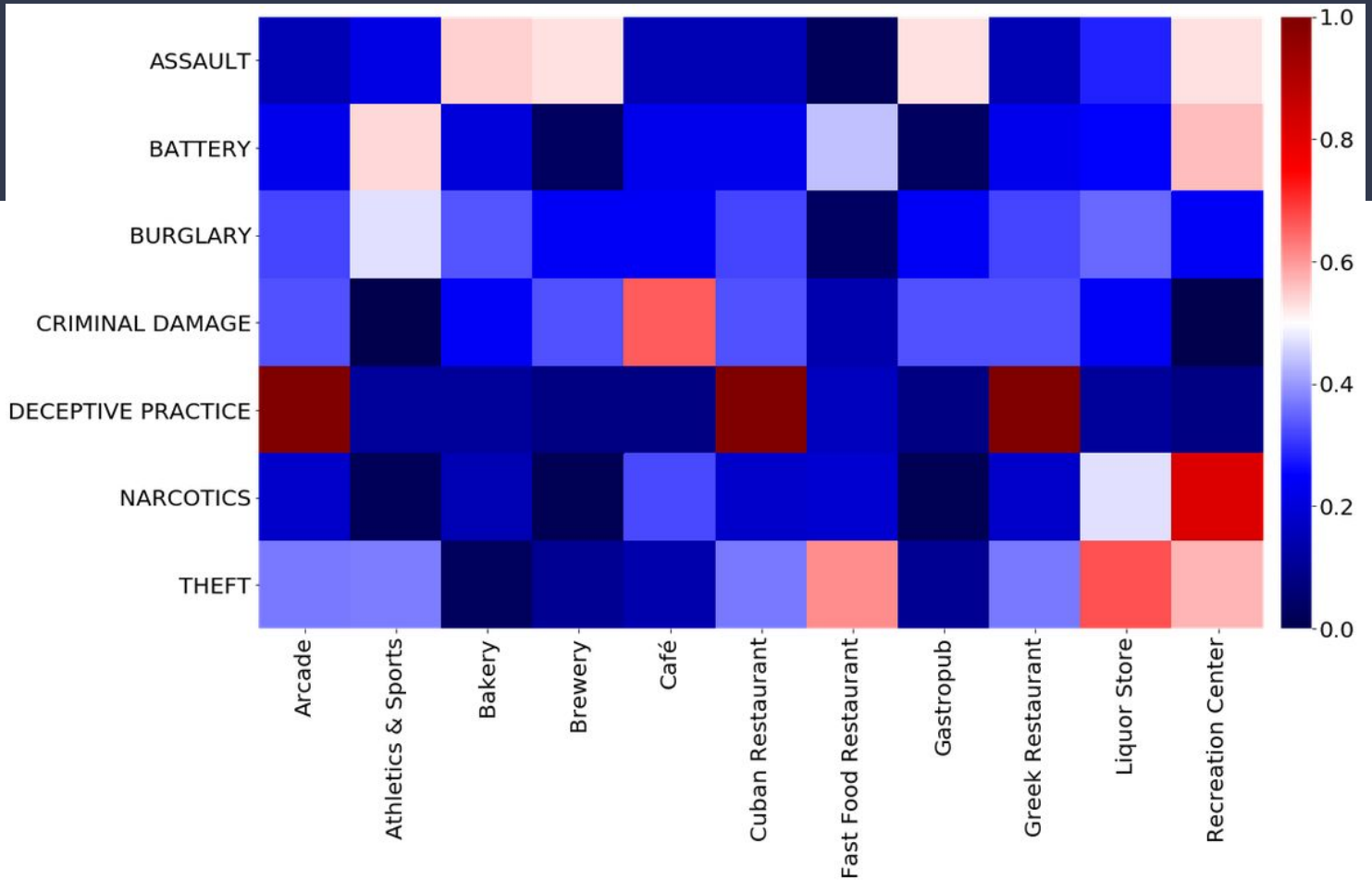
Cluster 0


ASSAULT
BATTERY
BURGLARY
CRIMINAL DAMAGE
DECEPTIVE PRACTICE
NARCOTICS
THEFT
Art Museum
Boutique
Brewery
Chinese Restaurant
Clothing Store
Discount Store
Dive Bar
Dog Run
Ethiopian Restaurant
Food & Drink Shop
German Restaurant
Hotel
Japanese Restaurant
Nightclub
Optical Shop
Spa
Train Station
Wings Joint
0.75
0.60
0.45
0.30
0.15

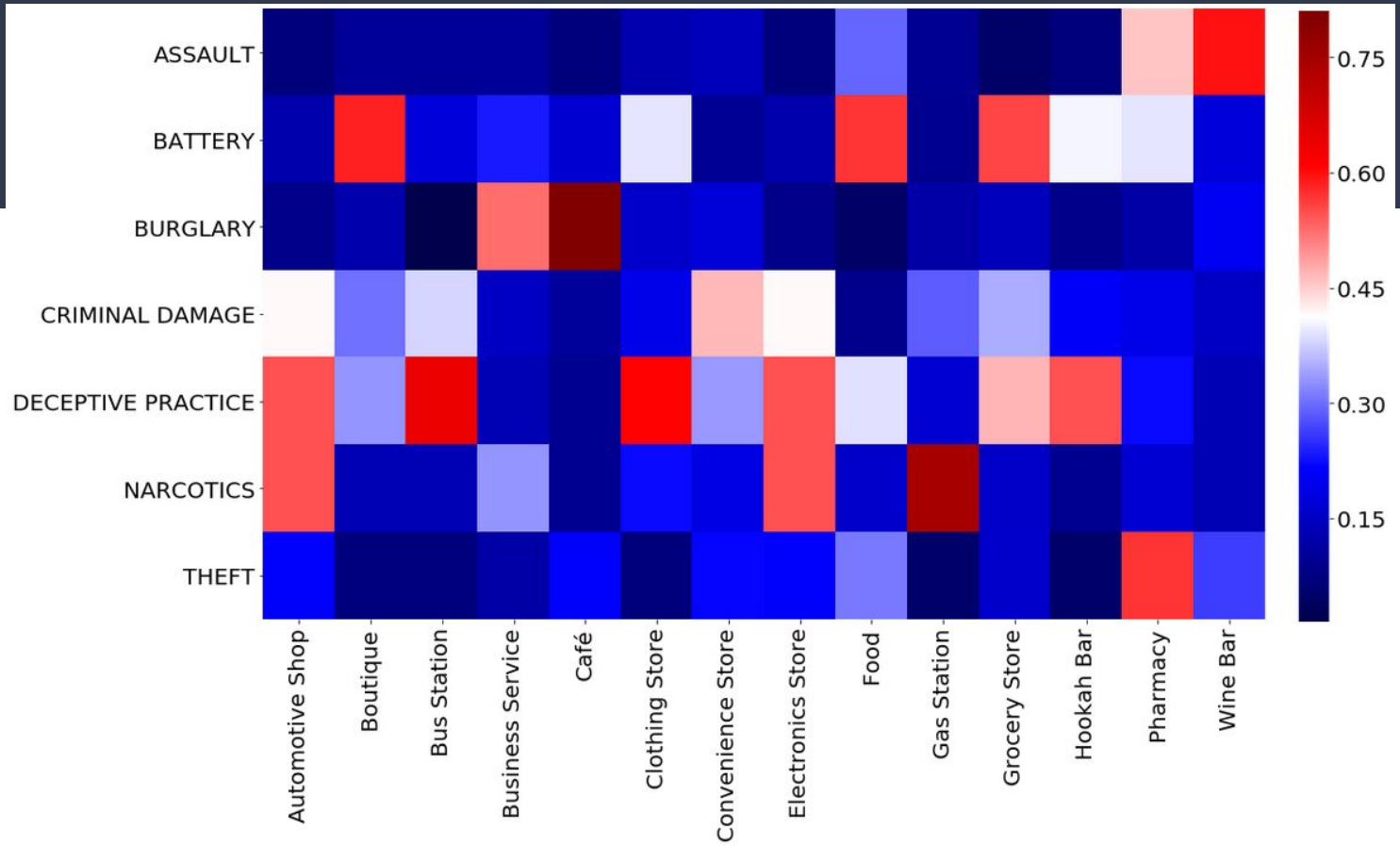
Cluster 1


ASSAULT
BATTERY
BURGLARY
CRIMINAL DAMAGE
DECEPTIVE PRACTICE
NARCOTICS
THEFT
Bar
Donut Shop
Sandwich Place
Seafood Restaurant
Video Store
Wings Joint
0.75
0.60
0.45
0.30
0.15
0.00

Cluster 2


ASSAULT
BATTERY
BURGLARY
CRIMINAL DAMAGE
DECEPTIVE PRACTICE
NARCOTICS
THEFT
Arcade
Athletics & Sports
Bakery
Brewery
Café
Cuban Restaurant
Fast Food Restaurant
Gastropub
Greek Restaurant
Liquor Store
Recreation Center
1.0
0.8
0.6
0.4
0.2
0.0

Cluster 3


ASSAULT
BATTERY
BURGLARY
CRIMINAL DAMAGE
DECEPTIVE PRACTICE
NARCOTICS
THEFT
Automotive Shop
Boutique
Bus Station
Business Service
Café
Clothing Store
Convenience Store
Electronics Store
Food
Gas Station
Grocery Store
Hookah Bar
Pharmacy
Wine Bar
0.75
0.60
0.45
0.30
0.15

Conclusions

Different cluster experience different amount of crime. The relations between crime and venues is different between clusters.

It provides a new way to study crime.