

Redirecting Chicago Police Department's Efforts Based on Data Analysis.

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1. Introduction

1.1. Background

The Chicago Police Department's Bureau of Records has been tracking and recording data regarding crimes since the beginning of the 20th century. Chicago has a higher than average crime rate, comparing it against the rest of the United States, and in spite of the fact that plenty of time has been dedicated by professionals in the research of this matter, there is still no consensus as to which are the reasons behind this.

1.2 Problem

Using the data collected by Chicago Police Department's Bureau of Records it might be possible to contribute to determining which areas would require tighter police controls.

1.3 Interest

The fact that Chicago shows a crime rate above US's average, raises interest in finding more details regarding the origin of this situation Chicago City.

2. Data Acquisition and Cleaning

2.1 Data sources

The data was obtained from a complete dataset from Chicago crimes, located in the web in csv format in the follow link:

<https://ibm.box.com/shared/static/svflyugsr9zbqy5bmowgswqemfpm1x7f.csv>

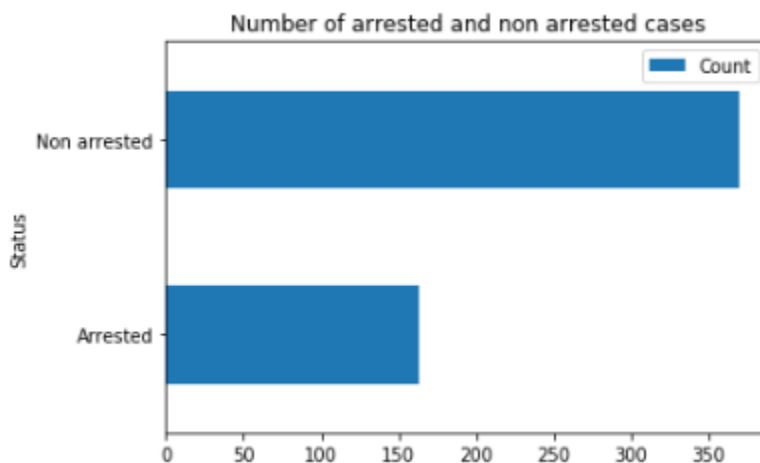
2.2 Data Cleaning

The downloaded data contained in the csv file was 99% ready to use, without having to do any data dropping or cleaning. The only thing done in this matter was that four rows were removed because there was a problem with the data typing on latitude and longitude columns.

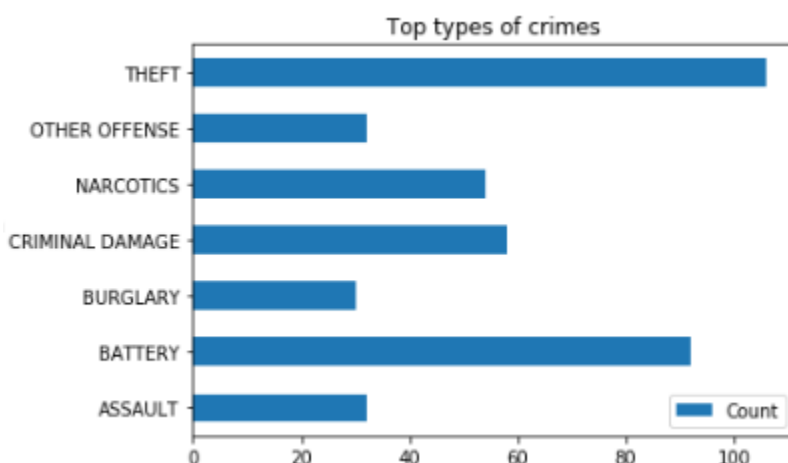
2.3 Feature Selection

After data cleaning, there were 508 observations and 8 features in the data. Upon examining the meaning of each feature, it was clear that there was some redundancy in the them. After all, 5 features were selected.

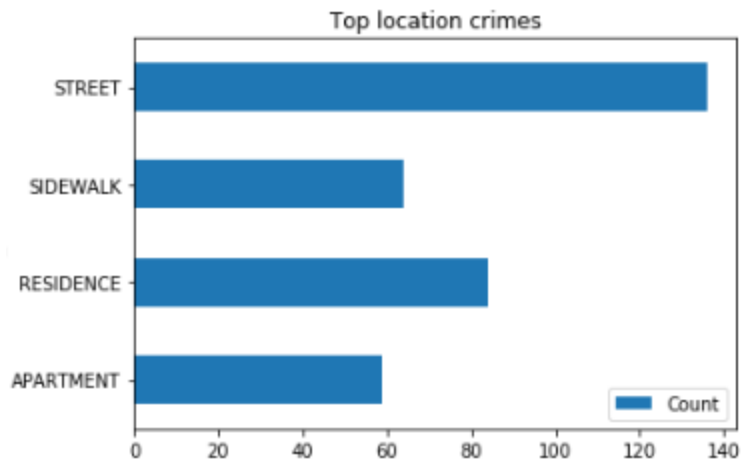
3. Exploratory Data Analysis



In the following image, as we can see, a good proportion of total cases implied arrests (lots of them are minor crimes).



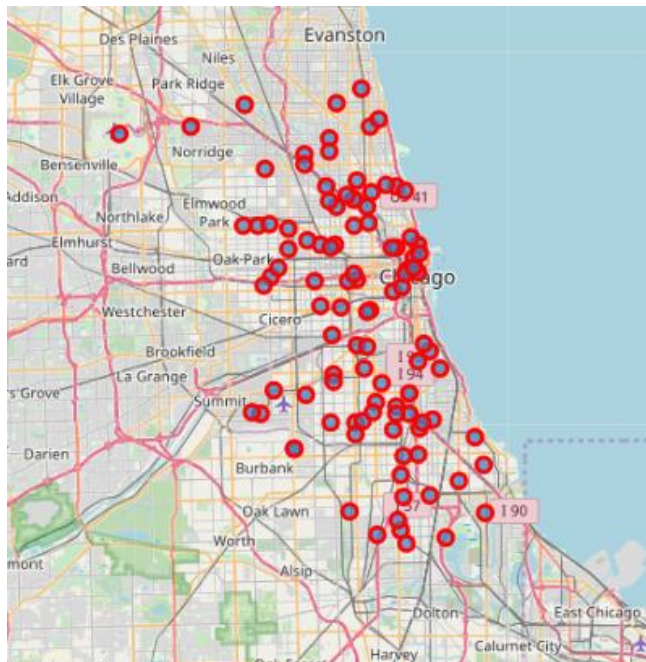
By observing only the types of crimes that show 30 cases or more, it can be clearly seen that the most common type of crimes happen to be thefts. More details will be provided into this type in following sections.



Just as it might be expected, most crimes happen on the streets/sidewalks, followed closely by residences/apartments. This reveals the fact that a more prominent presence of policemen throughout the city's public places could play a significant role fighting this problem.

4. Crime maps analysis

4.1 Theft Crime map

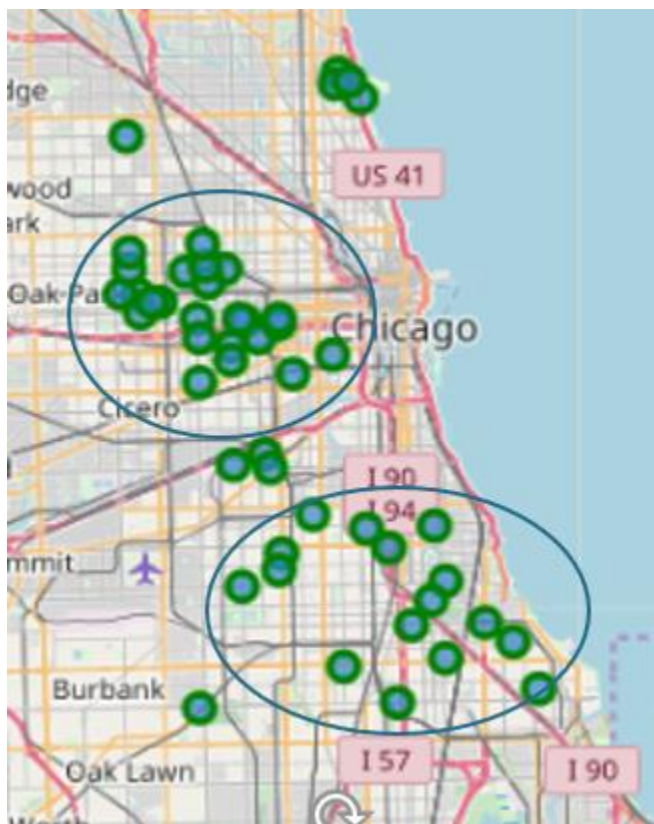


Using this image, no geographic pattern can be identified to describe thefts. They seem to be spread randomly, maybe showing a few areas that slightly concentrate more thefts than the rest. However, this is not completely clear.



Nonetheless, we can easily check that thefts do not escape the nature of crimes in general: streets are the most common type of location.

4.2 Narco Crime map



Regarding crimes related to narcotics, there seem to be two slightly defined clusters (I successfully applied k-means clustering with $k=2$, but failed at visually integrating said clusters in the map). This might indicate the existence of two separate organizations running the narcotics business in the city, which could be the first solid and important insight provided by this analysis. Keep in mind that this matter is extremely complex, and jumping into conclusions without proper evidence can be dangerous if our insights are actually used in the policy making decisions.



Once again, narcotics related crimes follow the general pattern regarding the type of locations where they take place. This can be explained by the fact that most drug dealers choose to do the selling activities out on the streets, and some do this in hidden or camouflaged residences.

5. Conclusions

The most relevant crimes are theft, battery, and narcotics. Based on this analysis, the recommendations I would provide are:

- Increase police presence in the streets and public places, given the fact that that is where the most crimes take place. Sadly, since there is no clear geographic pattern, we cannot provide more information about the specific places in which those extra policemen would be more useful.
- Conduct a new investigation focused in narcotic related crimes, using the hypothesis that two different “gangs” or organizations might be carrying out the drug trafficking and selling activities.