

# Chicago Rental Investments Prospect 2020

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## 1 Introduction

### 1.1 Problem

Real estate can be a very lucrative and profitable business. On the other hand, it can also be a financial disaster for an investor if poor investment decisions have been made. Some of important factors to consider when buying a real estate investments are costs such as price, property taxes, potential upgrades, repairs or renovations. Other factors include public safety, access to city's transportation, parking availability, shops, restaurants, entertainment etc.

### 1.2 Who may profit

Anyone with intention to invest in rental property in the city of Chicago in the near future, may want to consider results of this report while making their decision. Another group would be potential tenants, people who would like to find an area to rent an apartment or a house where they would get better quality of life for the money they have to pay in rental expenses.

## 2 Data Preparation

We will mainly use resources from the website[1] from city of Chicago, where one can find a very rich and detailed sets of data, ranging from affordable housing to census data.

We have found three data sets that are of interest to us, namely crime data for the city of Chicago in 2019[2], geojson file of Chicago[3], and per capita income in Chicago[4]. In our final portion of research we will rely on Foursquare[5] to determine areas that offer wide variety of venues, and thus make it more attractive for potential tenants.

### 2.1 Data Sources

In our research we will concentrate on locating neighborhoods in the city of Chicago that offer reasonable rental property investment. One of the biggest factors that might affect potential tenant's choice is the crime rate in a particular neighborhood before even considering searching for a suitable place. Therefore, our research starts with identifying low crime areas in the city of Chicago. Our research starts with evaluating all 77 Chicago Community Areas[2] regarding reported crime frequency.

## 2.2 Data Cleaning and Preliminary Evaluation

We have had rather large dataset[2] to start with, consisting of almost 240,000 rows, and new rows are continuously added as this report is being put together, as is usually case in big cities where crime activity never rests.

We have concentrated on the column "Primary Type", where one can find descriptions of crime activity, such as theft and robbery for example. All crime activity from "Primary Type" column is summarized in Figure 1:

THEFT	56884
BATTERY	45826
CRIMINAL DAMAGE	24750
ASSAULT	19124
DECEPTIVE PRACTICE	16074
OTHER OFFENSE	15378
NARCOTICS	12929
BURGLARY	8810
MOTOR VEHICLE THEFT	8228
ROBBERY	7306
CRIMINAL TRESPASS	6337
WEAPONS VIOLATION	5844
OFFENSE INVOLVING CHILDREN	2136
CRIM SEXUAL ASSAULT	1470
INTERFERENCE WITH PUBLIC OFFICER	1442
PUBLIC PEACE VIOLATION	1442
SEX OFFENSE	1157
PROSTITUTION	639
HOMICIDE	470
ARSON	341
LIQUOR LAW VIOLATION	224
STALKING	205
CONCEALED CARRY LICENSE VIOLATION	204
KIDNAPPING	158
INTIMIDATION	156
GAMBLING	140
OBSCENITY	54
HUMAN TRAFFICKING	12
PUBLIC INDECENCY	9
OTHER NARCOTIC VIOLATION	7
NON-CRIMINAL	4

Figure 1: "Primary Type" crime activity for all 77 community areas in Chicago in 2019, total numbers per type

One can see that theft is number one criminal offense, but others are also widespread, for example narcotics, burglary, motor vehicle theft and robbery. When we evaluate "Location Description" column, we find out that total percentage of all crime locations that happen in or around apartments is 13% of all crime activity.

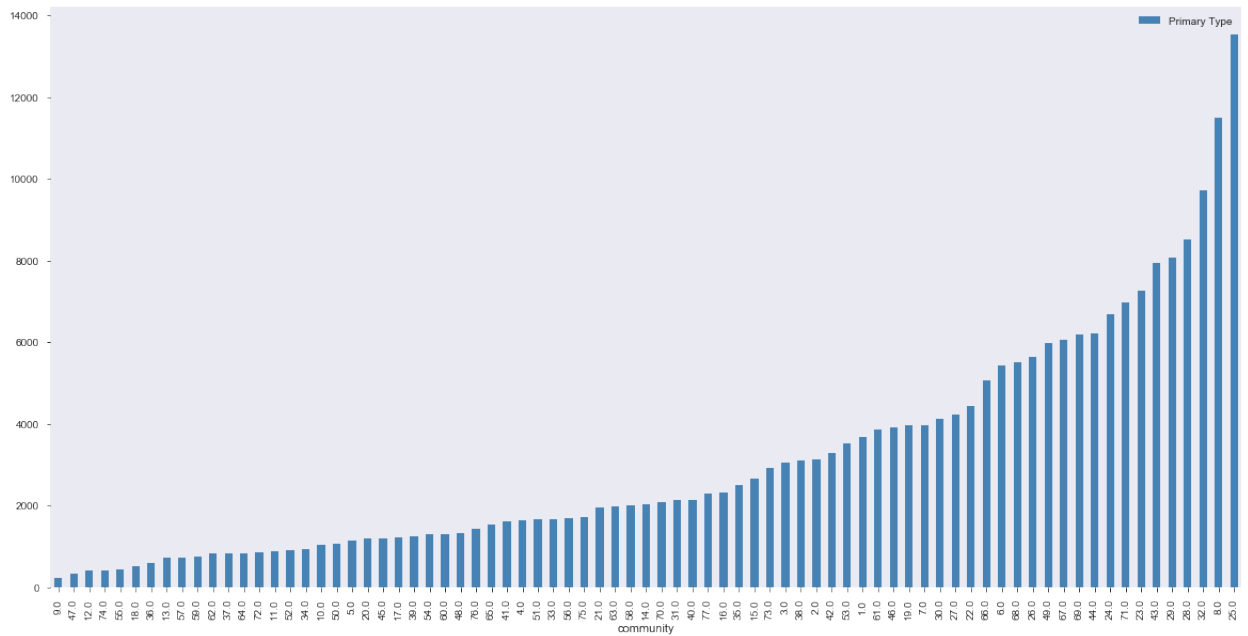


Figure 2: "Primary Type" per "Community", sorted in ascending order by "Primary Type"; Each community is represented by its respective number[3]

In Figure 2 our bar chart shows that crime activity is anything but evenly distributed throughout 77 Chicago communities. Some have a very low crime frequency that is less than 500, while others have very high frequency that goes over 10,000 and up.

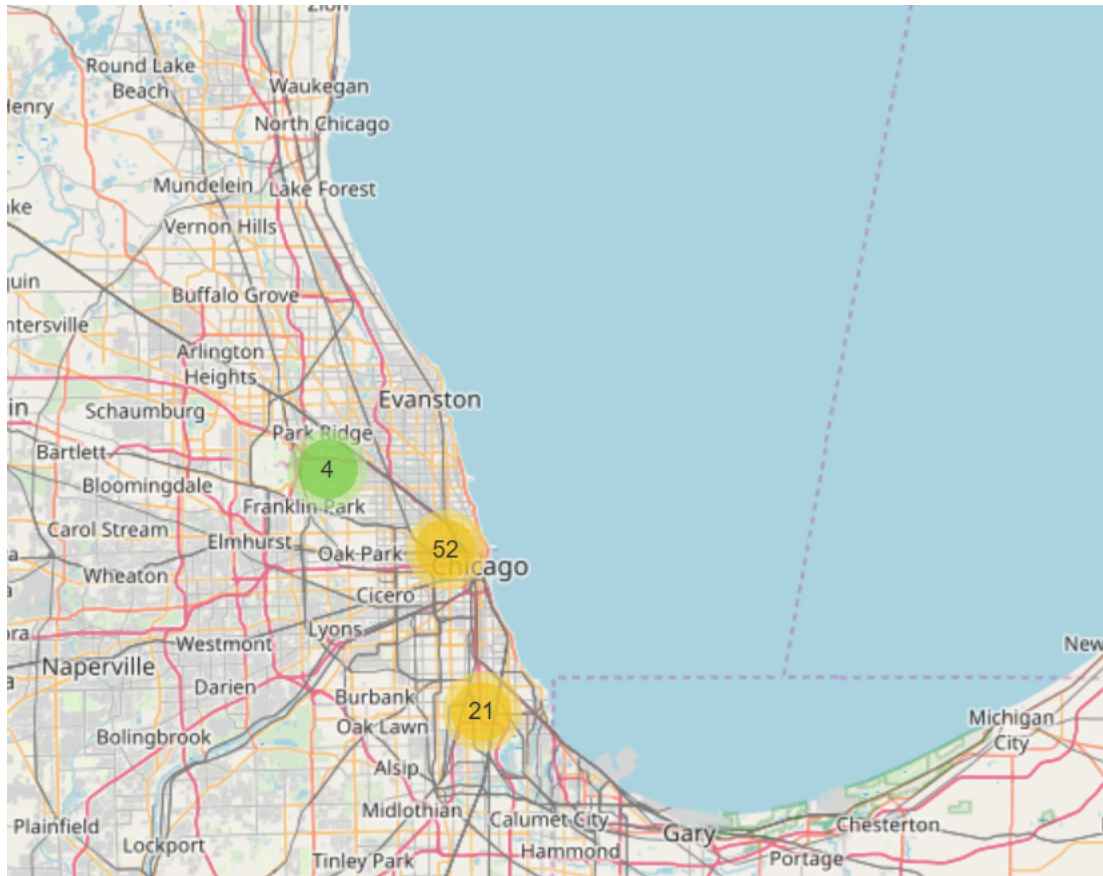


Figure 3: Communities in Chicago grouped in three major clusters; numbers represent number of communities in each cluster[3]

In Figure 3 we have Chicago 77 communities grouped in three major clusters based on the geographic occurrence of criminal activity. The tendency appears to be in the middle west part of the city, and on the near south side of the city.

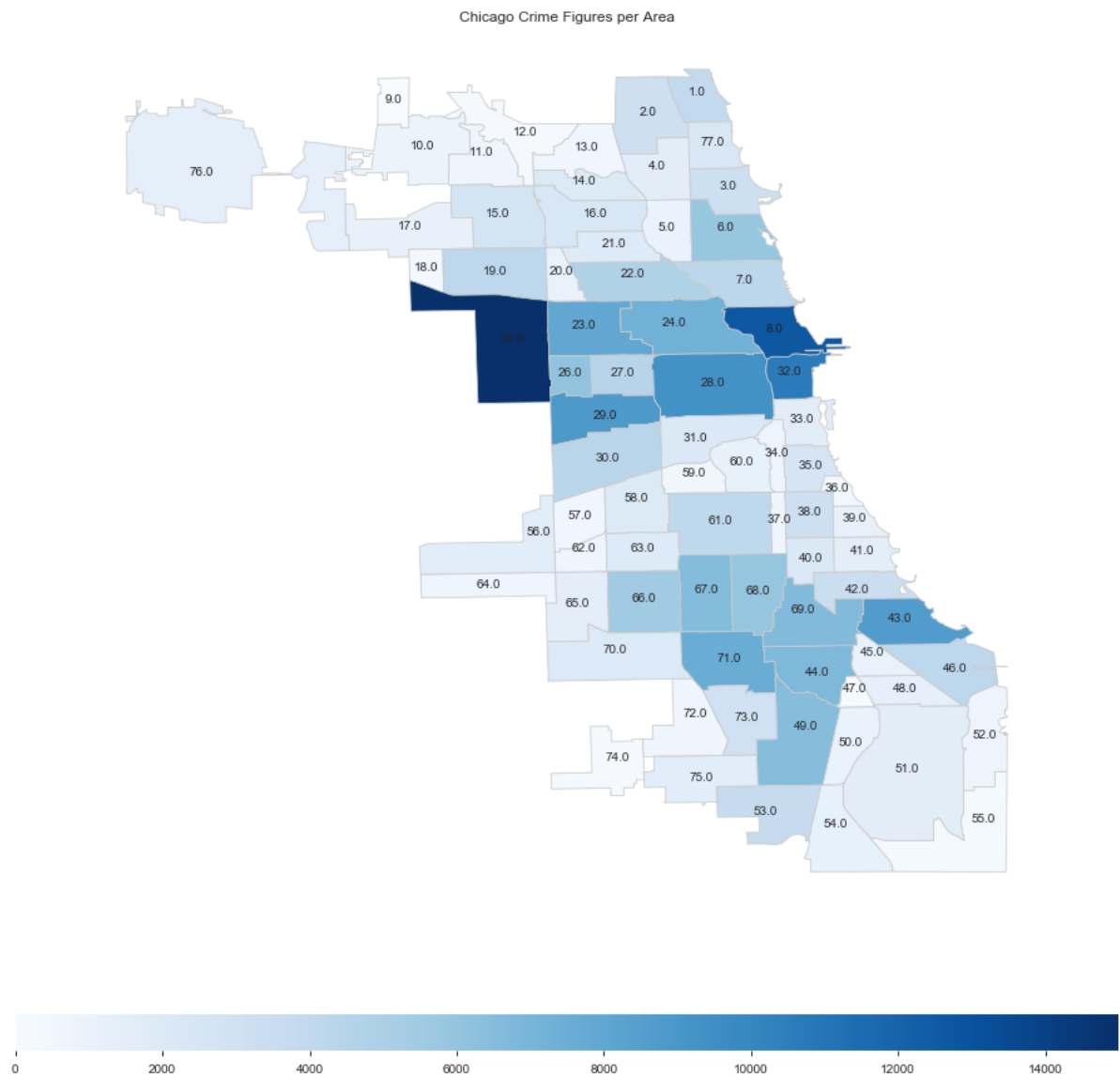


Figure 4: Choropleth map of Chicago 77 communities, crimes ranging from 0-14,000

This is even more evident in Figure 4, where we see that low crime areas are on near North Side, and near South Side of Chicago. There is also a pocket of areas in the midsection and downtown areas of Chicago that also have a low crime in comparison to areas on the near South Side and near North Side. We can disregard area 76, which is O'Hare Airport, where we do not have any rental real estate investments opportunity for obvious reasons.

### 3 Analysis

#### 3.1 Correlations

In this section we explore our third data set[4]. We start with correlation matrix of our data frame[4].

	Community Area Number	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	PER CAPITA INCOME	HARDSHIP INDEX
Community Area Number	1.000000	0.002316	0.147414	0.376196	0.175969	0.428011	-0.398344	0.314853
PERCENT OF HOUSING CROWDED	0.002316	1.000000	0.319403	0.165299	0.875959	0.224692	-0.541730	0.649574
PERCENT HOUSEHOLDS BELOW POVERTY	0.147414	0.319403	1.000000	0.800084	0.424294	0.435894	-0.567025	0.803267
PERCENT AGED 16+ UNEMPLOYED	0.376196	0.165299	0.800084	1.000000	0.355518	0.676532	-0.656619	0.792294
PERCENT AGED 25+ WITHOUT HIGH SCHOOL DIPLOMA	0.175969	0.875959	0.424294	0.355518	1.000000	0.408878	-0.709770	0.802538
PERCENT AGED UNDER 18 OR OVER 64	0.428011	0.224692	0.435894	0.676532	0.408878	1.000000	-0.754844	0.690844
PER CAPITA INCOME	-0.398344	-0.541730	-0.567025	-0.656619	-0.709770	-0.754844	1.000000	-0.849167
HARDSHIP INDEX	0.314853	0.649574	0.803267	0.792294	0.802538	0.690844	-0.849167	1.000000

Figure 5: "Community Hardship" and "Percent aged 25+ without high school diploma" per "Community Area Number"

We see that the strongest correlations are pairs :

HARDSHIP INDEX / PERCENT HOUSEHOLDS BELOW POVERTY 0.803267

PERCENT AGED 25+ WITHOUT HIGH SCHOOL DIPLOMA / PERCENT OF HOUSING CROWDED 0.875959

Hardship index ranges from 1 (which is very good) to 100(which is extremely bad). Let us see which community areas have the lowest hardship index, since they would represent lower chance of defaulting on a rental payment. Hardship values up to 15 are considered to be in acceptable range.

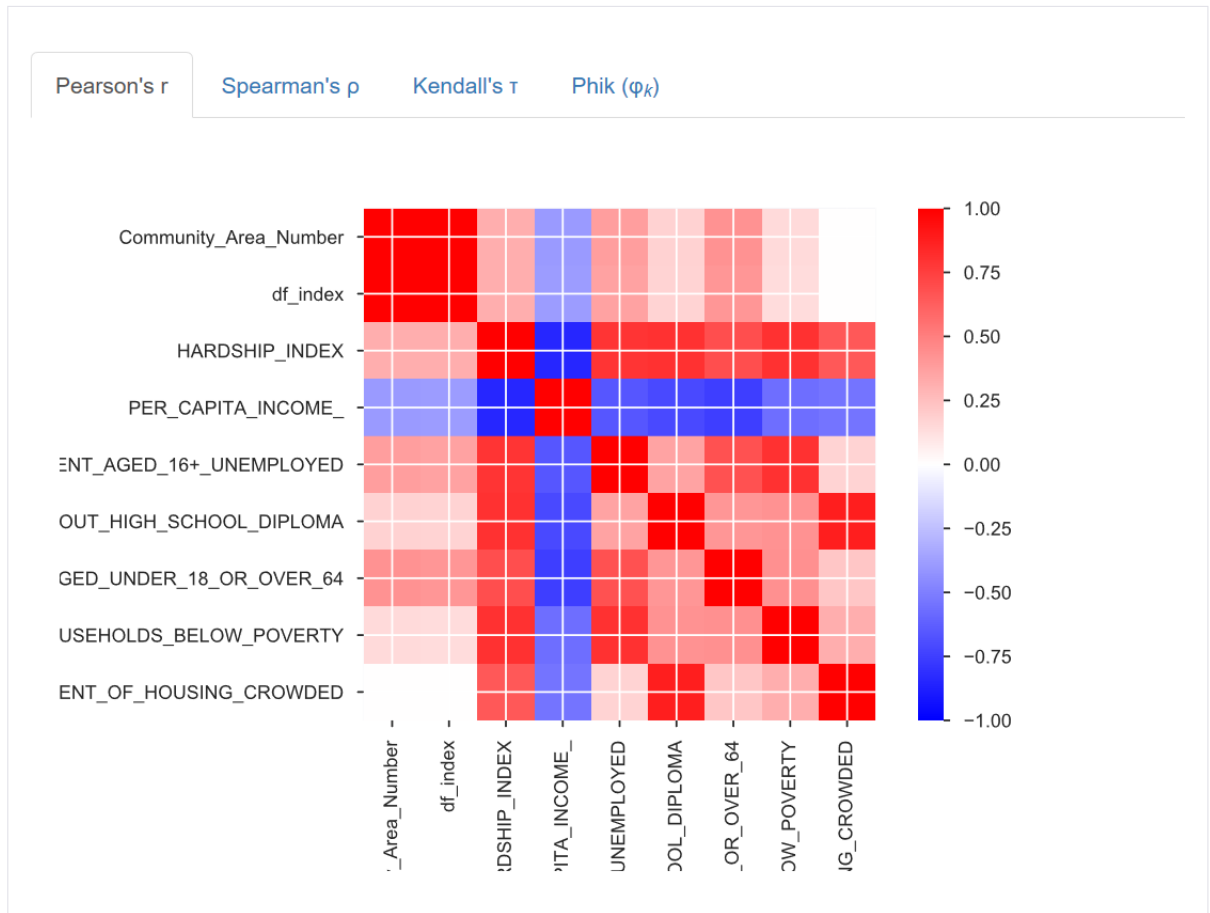


Figure 6: Pearson's r correlation heatmap matrix

Figure 6 shows us that "Hardship Index" has the most correlations with all other categories, which means that it is very significant category for our evaluation. Therefore we chose in Figure 7 to create a bar chart with both significant correlation categories and have graphed them in respect to "Community Area Number". We also have sorted them in ascending order, hardship index being the most significant sorting factor.

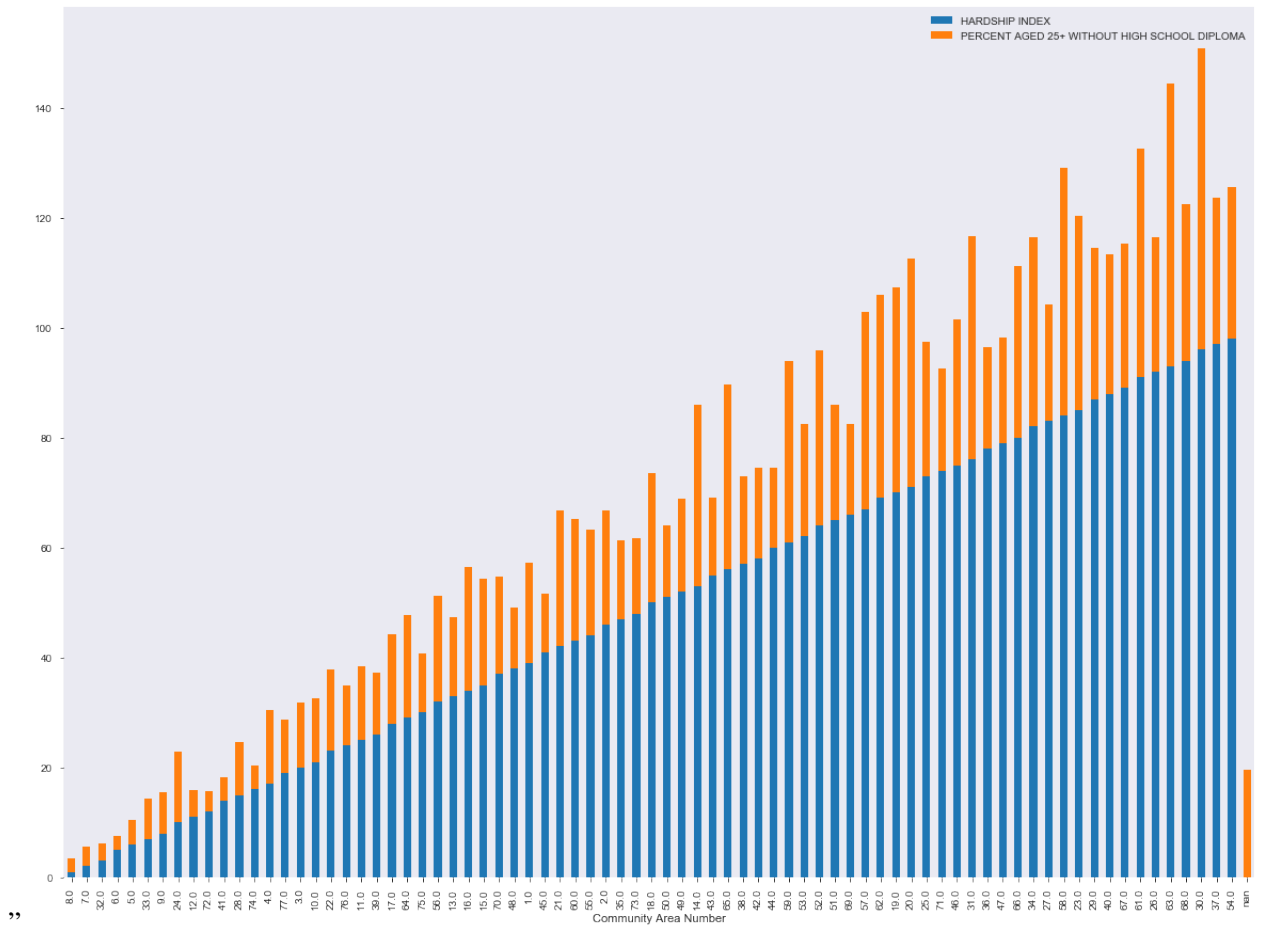


Figure 7: Correlation Table of[4];"Community Area Number" versus "Hardship Index" and "Percent Aged 25+ Without High School Diploma"

It appears that the higher crime frequency the higher a chance of crime activity in certain area. After looking at figure 7, we see that our areas of interest are numbers 8,7,32,6,5,33,9,24,12,72,41 and 28, which are respectively Near North Side, Lincoln Park,Loop,Lake View, North Center, Near South Side, Edison Park, West Town, Forest Glen,Beverly,Hyde Park and Near West Side. We have picked these areas based on the fact that all of them have a hardship index less or equal 15.

After we cross reference both data frames to see if we have any of our low hardship candidates in low crime range, we find out that average crime rate is 3087.73 and minimum crime rate is 223. We can settle on our range to be on conservative side, and consider only areas between 223 and 1500 crimes.



After intersecting both sets for common elements, we find out that our areas of interest are:

- 5 - North Center
- 9 - Edison Park
- 12 - Forest Glen
- 41 - Hyde Park
- 72 - Beverly

We use Foursquare[5] to map our candidates in clusters, which is shown in Figure 8 below:

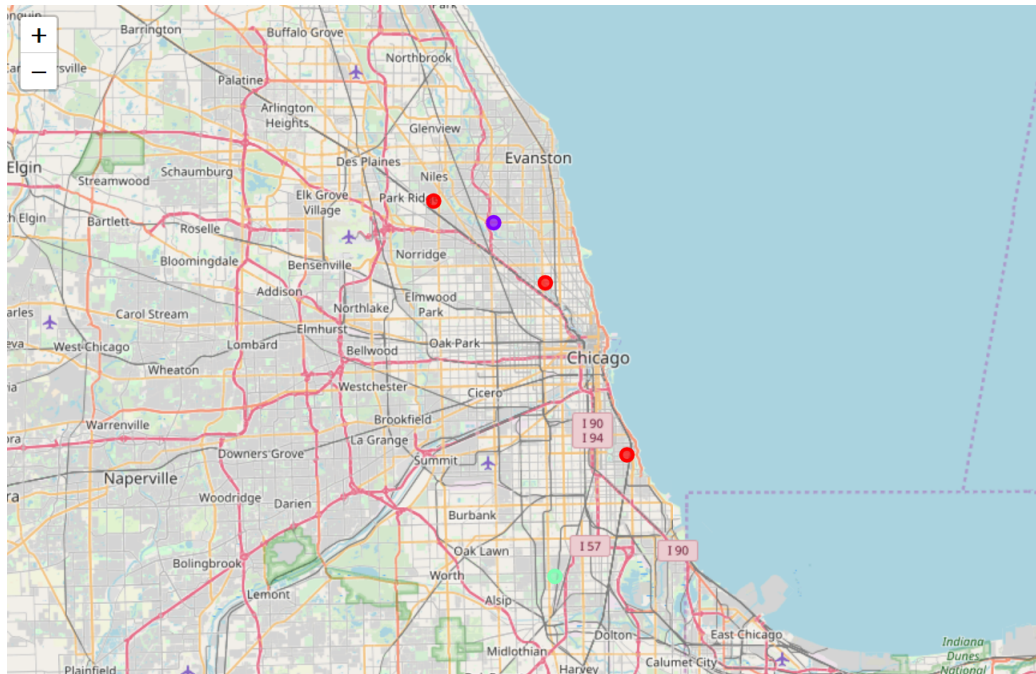


Figure 8: Clusters of our candidates

Our clusters are spread across Chicago. The only step left is to see what they can offer in terms of venues. Here we also use Foursquare to find top 10 venues for each candidate.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Beverly	Construction & Landscaping	Grocery Store	Train Station	Convenience Store	Gym	Furniture / Home Store	Frozen Yogurt Shop	French Restaurant	Fast Food Restaurant	Dog Run
1	Edison Park	Italian Restaurant	Bar	Chinese Restaurant	Park	Cuban Restaurant	Gym	Grocery Store	Furniture / Home Store	Frozen Yogurt Shop	French Restaurant
2	Forest Glen	Yoga Studio	Indian Restaurant	Gym	Grocery Store	Fast Food Restaurant	Mobile Phone Shop	Park	Furniture / Home Store	Frozen Yogurt Shop	French Restaurant
3	Hyde Park	Café	Sandwich Place	Bookstore	Yoga Studio	Pet Store	French Restaurant	Grocery Store	Coffee Shop	Wine Shop	Japanese Restaurant
4	North Center	Bar	Playground	Mexican Restaurant	Bus Station	Park	Pet Store	Wings Joint	Wine Shop	Gym / Fitness Center	Furniture / Home Store

Figure 9: Top ten venues according to Foursquare[5]

We can see that North Center is the least attractive area to rent, since there is no grocery store in top ten venues. However, all candidates offer variety of restaurants and other venues that most future tenants might find attractive.

Overall, Edison Park, Forest Glen and Hyde park offer better choices for top venues, which makes them good starting point for potential rental real estate investment. Hyde Park is very close to downtown area of Chicago, which could make it interesting for renters that do not like to commute for a long time to work if they happen to have employment in downtown.

Forest Glen and Edison Park are near suburbs of Chicago, which usually offer even more venues such as grocery stores, shopping malls, outlet stores and plenty of restaurants.

## 4 Conclusion

### 4.1 Summary

In our research we have looked at several data sets to find best community areas candidates for potential rental real estate investment. We have concentrated our preliminary work on public safety records that pointed us in the right direction, which is to identify low crime areas, since this factor plays a significant role in tenants decision making when looking for a place to rent. Our second part result gave us those areas with low hardship index, which is important since this would minimize future incidents of defaulting on rental payments. Our third step was to find intersection of these two criteria, which narrowed our choice to top five community areas in Chicago. And finally, we utilized Foursquare to see what our candidates have to offer to potential tenants.

## 4.2 Future Work

This model can be improved by taking in consideration property taxes and population size of each respective area to get crime rate per capita in order to get better picture about frequency of crime. One could also analyze particular frequency of crime activity, for example burglaries and motor vehicle theft, since these are most likely to occur while people are away from their homes working.

During this research it was considered to disregard some of the violent crimes from the data frame since their frequency in overall crime rate carries smaller percentages, but for the same reason they were left in the pool of all criminal activity.

## 4.3 Sources

## References

- [1] <https://data.cityofchicago.org>
- [2] <https://data.cityofchicago.org/Public-Safety/Crimes-2019/w98m-zvie>
- [3] <https://data.cityofchicago.org/Facilities-Geographic-Boundaries/Boundaries-Neighborhoods/bbvz-uum9>
- [4] <https://data.cityofchicago.org/Health-Human-Services/Census-Data-Selected-socioeconomic-indicators-in-C/kn9c-c2s2>
- [5] <https://foursquare.com/>