Capstone Project
IBM Data Science Professional Certificate

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Business Question

- Does the presence of constant police patrolling impact the number of homicides within the police district?

Introduction

- We visualize homicides occurred in the city of Chicago, Illinois along with the police districts and the police stations.
- This will help the police department in the city to identify areas of lesser presence and increase the patrolling in the city in reducing crimes.

Data Scources

- Chicago Crimes_2019 Dataset extracted from the Chicago Police Department's CLEAR (Citizen Law Enforcement Analysis and Reporting) system.
- Boundaries - Police Districts (current) dataset from the Chicago Data Portal. The data will be a ‘.geojson’ file type
- Locations of the different police stations in the city of Chicago, we use the FourSquare API.

	Latitude	Longitude	District
0	41.912661	-87.766141	25
1	41.977033	-87.657833	20
2	41.749683	-87.665847	6
3	41.858347	-87.717659	10
4	41.773277	-87.703007	8
...	...	...	...
499	41.695576	-87.623190	5
500	41.880394	-87.702954	11
501	41.902046	-87.772252	15
502	41.879672	-87.703978	11
503	41.900480	-87.749370	15

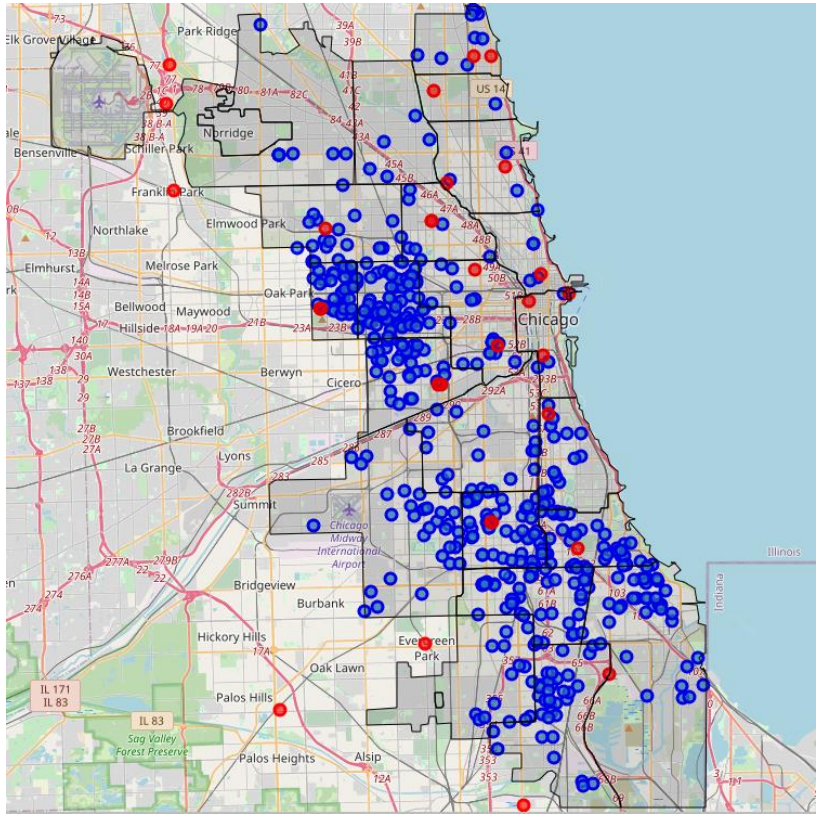
503 rows × 3 columns

Data Cleaning

- Imported the crimes.csv file and filtering out rows where the primary category value is Homicide
- Initial data preparation by removing unnecessary columns and rows
- Removing tows with null values that aren’t required
- We ended up a dataframe with Latitude, Longitude and District fields

Methodology

- Extracted the geographical coordinates for Chicago, Illinois with the help of geopy package
- FourSquare credentials along with the Category ID = 4bf58dd8d48988d12e941735 to identify all the police stations within the radius of 25000
- With the help of requests package, we connected with the FourSquared API to fetch the results of 30 police stations in the city of Chicago.
- Imported the .geojson file which contains the boundary details of each of the police districts in Chicago. Once imported, we converted the data to .json file for plotting the data.



Results

- Used Folium package to create the below map of Chicago.
- Added the locations of where the homicides happed in the year 2019 within the city identified as blue circles
- Added the locations of the police stations within the city identified as red circles
- Finally added the police district boundaries to separate the cities in order to identify patterns.

Discussion

- From the above graph, we were able to see that four out of the 25 districts had no police stations monitoring the region.
- There were clusters of homicide incidents especially Oak Park region and in East side of Chicago region.
- There were considerably lesser number of homicides in the districts closer to downtown Chicago attributing to the fact that there are larger number of police stations and high patrolling in the region.
- However same cant be said about districts such as 11, 6 and 7. These were the top three districts where the highest number of homicides were reported in the city.
- Surprisingly there are no police stations centered around all these three regions. This could have directly resulted in more crimes committed in these neighborhoods.

Conclusion

- We can confidently say and suggest to the police department in Chicago to increase patrolling in the Oak View and East side of Chicago. If the reports are true for the city of Los Angeles, we can definitely bring down the crime rates within the city
- United States have always been in the center of homicide repots whether its through gun violence or domestic violence
- Crimes are ever increasing around us but with the help of predictive analytics, we can be ever more cautious and be better prepared

References

- https://www.latimes.com/california/story/2020-01-16/l-a-homicides-are-down-again-police-credit-thousands-of-extra-patrol-hours , report on the homicide rate in Los Angeles
- https://data.cityofchicago.org/Public-Safety/Boundaries-Police-Districts-current-/fthy-xz3r , for the police district location data
- https://data.cityofchicago.org/Public-Safety/Crimes-2019/w98m-zvie , for the crimes 2019 dataset
- https://www.cnn.com/2018/12/31/us/chicago-murders-drop-2018/index.html, News article regarding the decrease in crimes in the City of Chicago