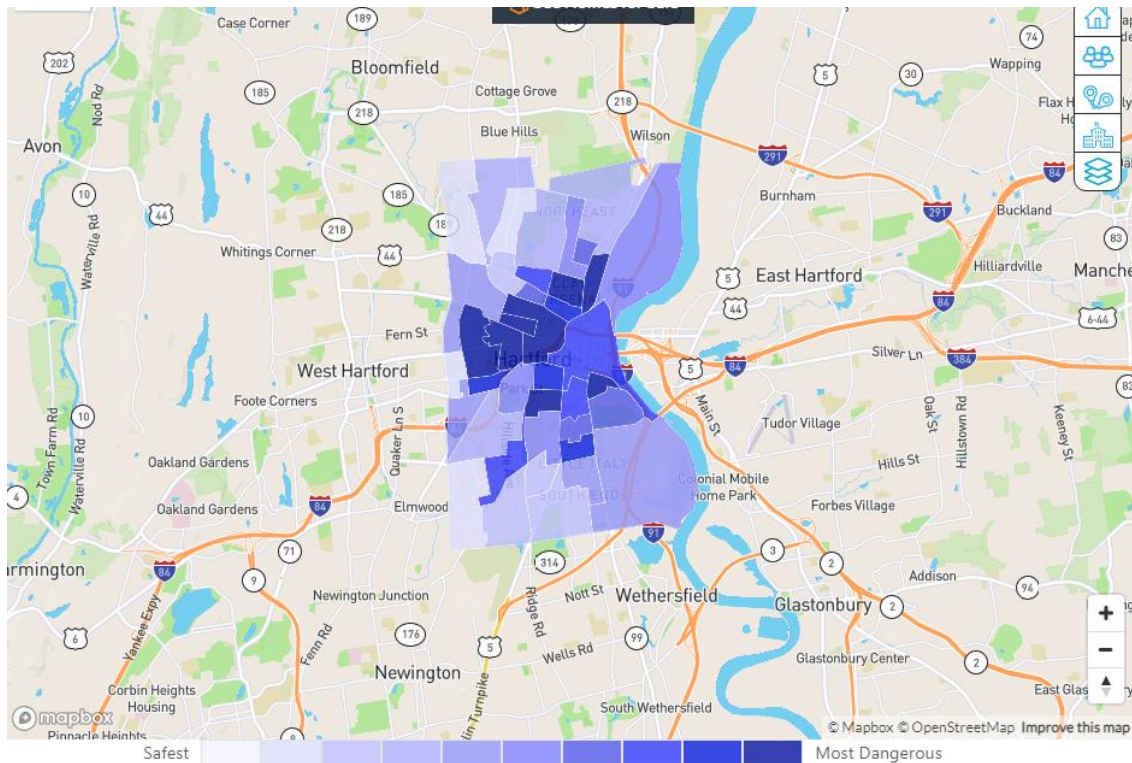**IBM Applied Data Science**

Coursera Capstone

Determining Location of Non-Violent and Violent Crimes in the Neighborhoods of Hartford, Connecticut

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Introduction

The United States has the largest prison population in the world and highest per-capita incarceration rate (Bureau of Justice Statistics). In 2018 in the US, there were 698 people incarcerated per 100,000, steadily increasing since the 1980s. In the 1980s, the war on drugs and tough on crime laws exponentially increased the incarceration rate and mostly for non-violent crimes. According to the World Prison Population List (11th edition) there were around 10.35 million people in penal institutions worldwide in 2015 [1]. The US had 2,173,800 prisoners in adult facilities in 2015 [1][2][4]. That means the US held 21.0% of the world's prisoners in 2015, even though the US represented only around 4.4 percent of the world's population in 2015 [1][2][4].

Mandatory minimum sentencing, "three strikes" laws, and reductions in the availability of parole or early release are responsible for quadrupling of the incarcerated population in the United States from 1980 to 2003 while violent crime rates have remained constant or declining over the same time. 47% of federal prisoners serving time in September 2016 were convicted of a drug offense. Mandatory sentencing for nonviolent crime can lead to life sentences.

Judicial, police, and corrections costs totaled $212 billion in 2011 according to the U.S. Census Bureau [1][2][4].   From 1982 to 2006 the direct expenditures for police, corrections and judicial increased by 420%, 660% and 503%, respectively. Housing the approximately 500,000 people in jail in the US awaiting trial who cannot afford bail costs $9 billion a year[1]. Most jail inmates are petty, nonviolent offenders.   More jails are being built at a great cost. According to a 2016 analysis of federal data by the U.S. Education Department, state and local spending on incarceration has grown three times as much as spending on public education since 1980.[1][2][4]. Within three years of being released, 67% of ex-prisoners are re-arrested, and 52% are re-incarcerated, according to a study based on 1994 data [1][2][4].

Business Problem

The exponential rate of increased incarceration for non-violent crime has become an epidemic in the US, and the related costs of arrest, sentencing, incarceration, and re-entry staggering. These funds and resources may be better allocated to education and other programs that will help people to become productive members of society, but we need to understand where to allocate these resources.

Law enforcement is better equipped to handle violent crime that requires the judicial and criminal system. Non-violent offenses (drug and alcohol abuse, mental health, etc.) may be handled more appropriately by other professionals trained in these types of situations. For example, determining which areas of a city have greater violent crime so we can assign our police officers to focus on those areas to reduce violent crime and bring offenders through the criminal system. While mental health and medical trained professionals should be focused on areas which have greater numbers of non-violent offenses (drug and mental health, etc.), so that these individuals can get the appropriate help they need. The right professional to handle the right situation with the goal of providing the help to people that need this help to lower crime and incarceration.

Incarceration for life due to repeat drug offenses is not helping the individual and not helping our criminal system by treating this individual the same as one would treat a violent offender. This is doing a great disservice to the person, our communities, and our systems and having an impact to our correctional and judicial system. With the high likelihood of re-arrest, the current system is not improving and is not being better served by greater number of arrests for these non-violent offenses. It is important to note that while only 13% of the US population is Black, with 40% of the incarcerated population black and overwhelmingly male, black men comprise 4,347 per 100,000 incarcerated adults [1]. We have an entire segment of our population being left behind.

Target Audience

Hartford is the capital of Connecticut, my nearest city, and the fourth-largest city in Connecticut, behind Bridgeport, New Haven, and Stamford [3]. In recent years, the city of Hartford has also had a revival of sorts, adding a new minor league baseball stadium, riverfront recapture, UConn Hartford campus, among other additions. Any company looking to invest in Hartford would be interested in the location of violent versus non-violent crimes in the neighborhoods of Hartford to determine where to develop and to understand what is being done to focus on various types of crime in the city. State officials and correction facilities would also be interested in this study to learn where to focus their resources to cut costs and lessen the high costs related to incarceration, so these funds can be allocated elsewhere such as education and community improvement where they will have the most impact.

For non-violent crime, the community would benefit to understand where community policing can decrease offenses to help to understand where to allocate more funds for trained professionals to handle these specific types of situations, while police officers handle the criminal violent offenders through the law and criminal system.

The goal is to reveal where the non-violent crime is in the city to allocate funds towards those neighborhoods to reduce crime and handle specific types of crime properly. Allocation of Funds Between Community Medical Trained Professionals and Law Enforcement to handle non-violent crimes typically involving drug related offenses versus Law Enforcement which will handle violent crimes through the legal system. The community will benefit and the reduction in the number of people in prisons, especially for non-violent crime, will enable people to get the help they need to become more productive members of the community again, while law enforcement and the judicial system handles violent crime and offenders appropriately. Police officers will be interested in the findings of the study because they are currently being tasked with handling situations that they are not trained to do which would be better suited for a mental health or addition specialist.

Data

Data Required

To address the problem of identifying neighborhoods in Hartford, Connecticut which have more non-violent offenses or violent crime, we will obtain the following data:

- A list of the 17 neighborhoods in Hartford, Connecticut. The scope of the project is defined to the capital city of Connecticut.
- Crime data for the city of Hartford by incident type category and neighborhood
- Latitude and longitude coordinates for each of the neighborhoods. The coordinates will be used to plot the map of the neighborhoods as well as obtaining venue data
- Venue data for Arts & Entertainment, Outdoor & Recreation, Nightlife Spots, and Events to determine where greater police presence is needed for violent crimes as opposed to trained professionals for non-violent crimes. This data will be used to perform clustering of the neighborhoods

Data Sources

The following Wikipedia page contains a list of the 17 neighborhoods in Hartford, Connecticut:

https://en.wikipedia.org/wiki/Neighborhoods_of_Hartford,_Connecticut

Crime data for the city of Hartford is found on the Hartford government website:

https://data.hartford.gov/Public-Safety/Police-Incidents-01012005-to-Current/889t-nwfu/data

This site contains all reported incidents of crime from January 1, 2005 to Current Date. The case #, date, address of the incident, category of the incident, and neighborhood.

Data Extraction

Web scraping techniques will be used to extract the data from the Wikipedia page using Python requests and Beautiful Soup packages. Geographical coordinates of the 17 neighborhoods will be obtained using the Python Geocoder package, providing the latitude and longitude coordinates of the neighborhoods. Crime data by neighborhood will also be extracted from the Hartford City government site so that we can determine which types of crime (violent versus non-violent) occur in each of the neighborhoods.

Foursquare API will then be used to obtain the venue data for the neighborhoods to determine the types of Arts & Entertainment, Outdoor & Recreation, Nightlife Spots, and Events so that law enforcement can focus on these venues for violent crime and other trained professionals for non-violent offenses.

References

[1] Incarceration in the United States. Wikipedia. Accessed on 12/01/2020.

https://en.wikipedia.org/wiki/Incarceration_in_the_United_States

[2] Bureau of Justice Statistics. Accessed on 12/01/2020.

https://www.bjs.gov/glance_redirect.cfm

[3] Neighborhood Scout. Accessed on 12/01/2020.

https://www.neighborhoodscout.com/about-the-data/crime-rates

[4] World Prison Brief, Institute for Crime & Justice Policy Research(link is external) (ICPR), at Birkbeck, University of London. Accessed on 12/01/2020.

https://www.prisonstudies.org/

[5] Neighborhoods of Hartford Connecticut. Wikipedia. Accessed on 12/01/2020.

https://en.wikipedia.org/wiki/Neighborhoods_of_Hartford,_Connecticut

[6] City of Hartford. Hartford Data. Police Incidents 01012005 to Current. Accessed on 12/01/2020.

https://data.hartford.gov/Public-Safety/Police-Incidents-01012005-to-Current/889t-nwfu/data

Appendix

Figure 1 – Increase in incarceration rates of state and federal inmates over time.

Incarceration rate of inmates incarcerated under state and federal jurisdiction per 100,000 population 1925-2014

A graph showing the incarceration rate under state and federal jurisdiction per 100,000 population 1925–2013. Does not include unsentenced inmates, nor inmates in local jails.[1][2]
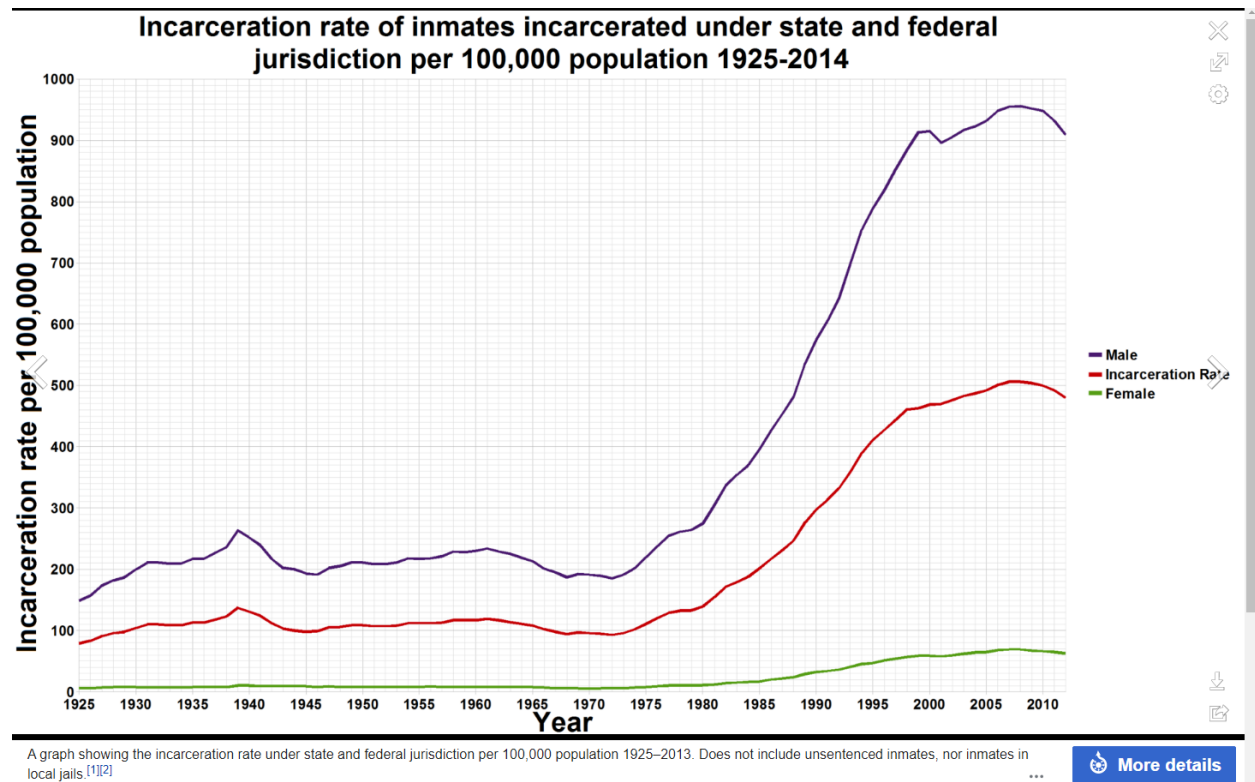
Figure 2 – Map of the city of Hartford Connecticut color coded by safest and most dangerous areas
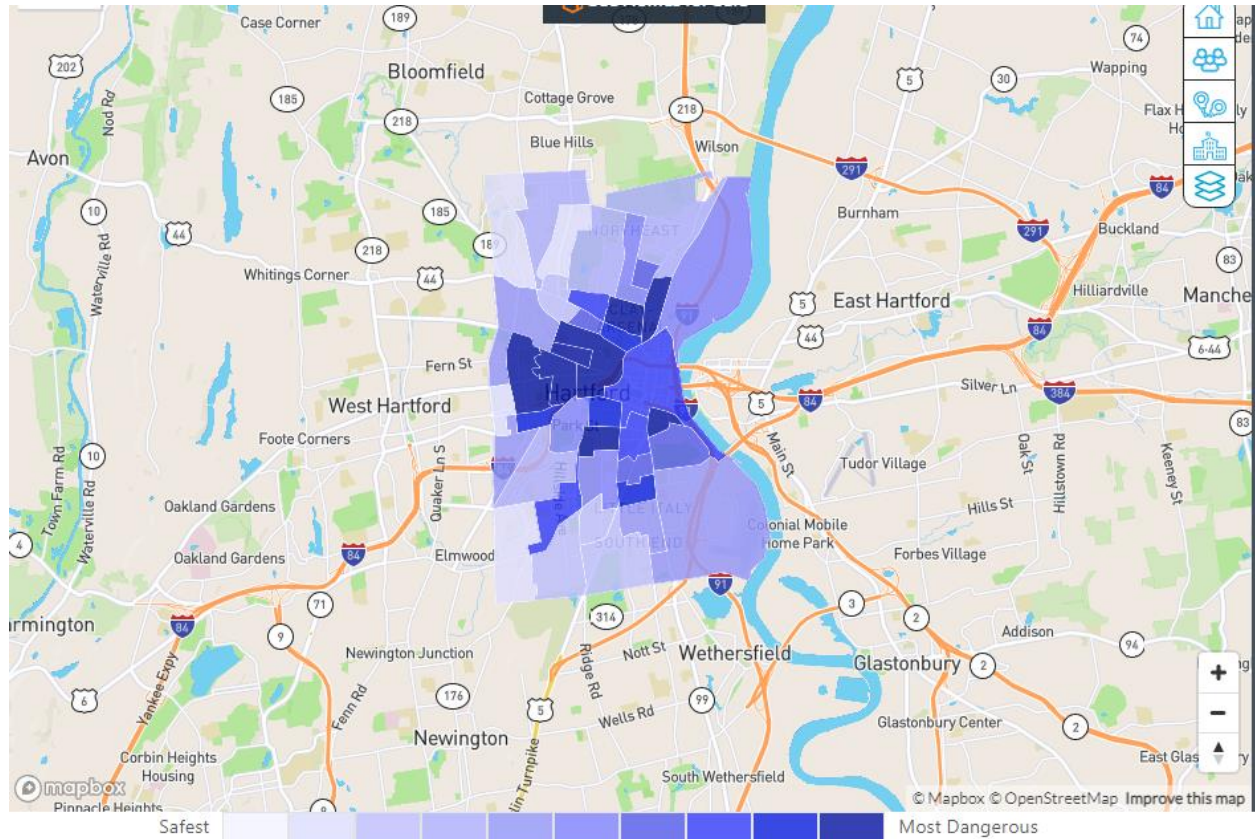
Figure 3 – Violent crime decrease in the US by gender per 1000 people over the course of 30 years

Violent crime rates by gender 1973-2003, per 1,000 people; (data: Bureau of Justice Statistics).
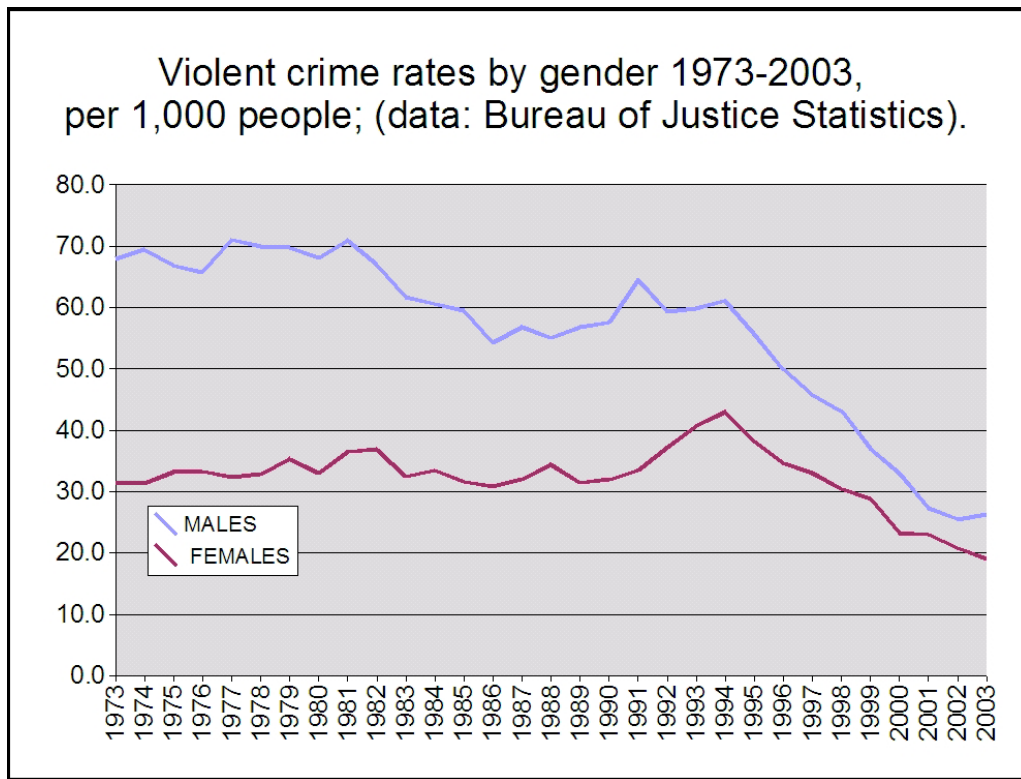
Figure 4 – Inmates in adult facilities, by race and ethnicity. Jails, and state and federal prisons

2010. Inmates in adult facilities, by race and ethnicity. Jails, and state and federal prisons.[72]			
Race, ethnicity	**% of US population**	**% of U.S. incarcerated population**	**Incarceration rate (per 100,000)**
White (non-Hispanic)	64	39	450
Hispanic	16	19	831
Black	13	40	2,306
Asian	5.6	1.5	210

Figure 5 – Demographics of the US Prison Population

Demographics of the US Prison Population
People in state or federal custody in 2015. The "white" category excludes Hispanics.

Data source: https://www.bjs.gov/content/pub/pdf/p15.pdf (US Department of Justice)
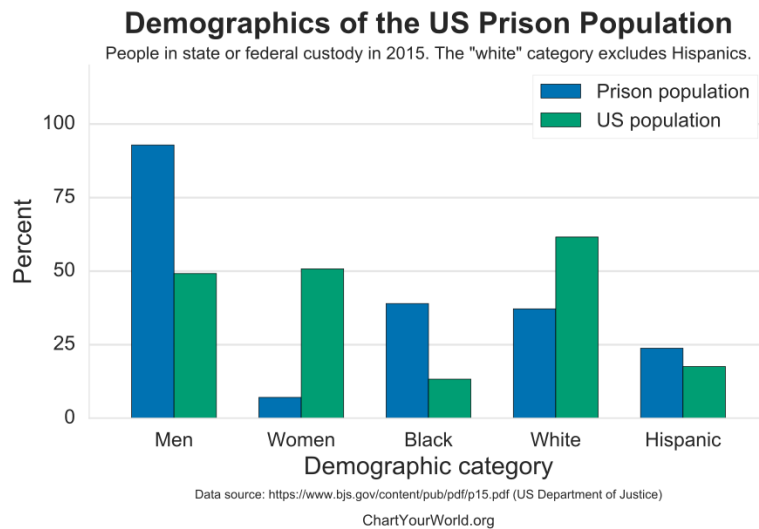
ChartYourWorld.org

Figure 6 – Adult incarceration rates by race, ethnicity, and sex per 100,000 adult US residents

2010 adult incarceration rates by race, ethnicity, and sex per 100,000 adult US residents[1]		
Race or ethnicity	Male	Female
White	678	91
Black	4,347	260
Hispanic	1,775	133

Figure 7 – Hartford's 17 Neighborhoods