

Rent Pricing & Venue Data Analysis of Chicago

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Background

- Problem - The size and diversity of the city can be daunting for potential immigrants, whether domestic or international. It is difficult to narrow down a neighborhood within your budget and interests. This project aims to ease this process by displaying average rent costs and popular venues within each neighborhood.
- Interest - I'm interested in this topic because sometime in the near future I hope to intern or work in Chicago and will have to go through the housing process. Others going through this process may be interested as well.

Data Sources

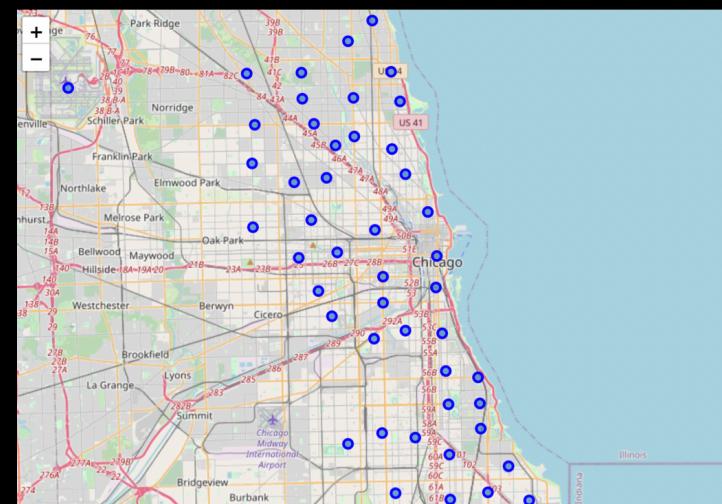
- Foursquare API was used to obtain the most common venues for each neighborhood of Chicago
- Rent Jungles' rent trend database was used to analyze and display average rent prices
- Spatial data from the Chicago Data Portal was used to display neighborhood boundaries on the choropleth map
- Google Maps was used in order to get center coordinates of each Neighborhood

Methodology

My master data frame contained
*Neighborhood, Average Rent,
Latitude, and Longitude* information
of the city of Chicago

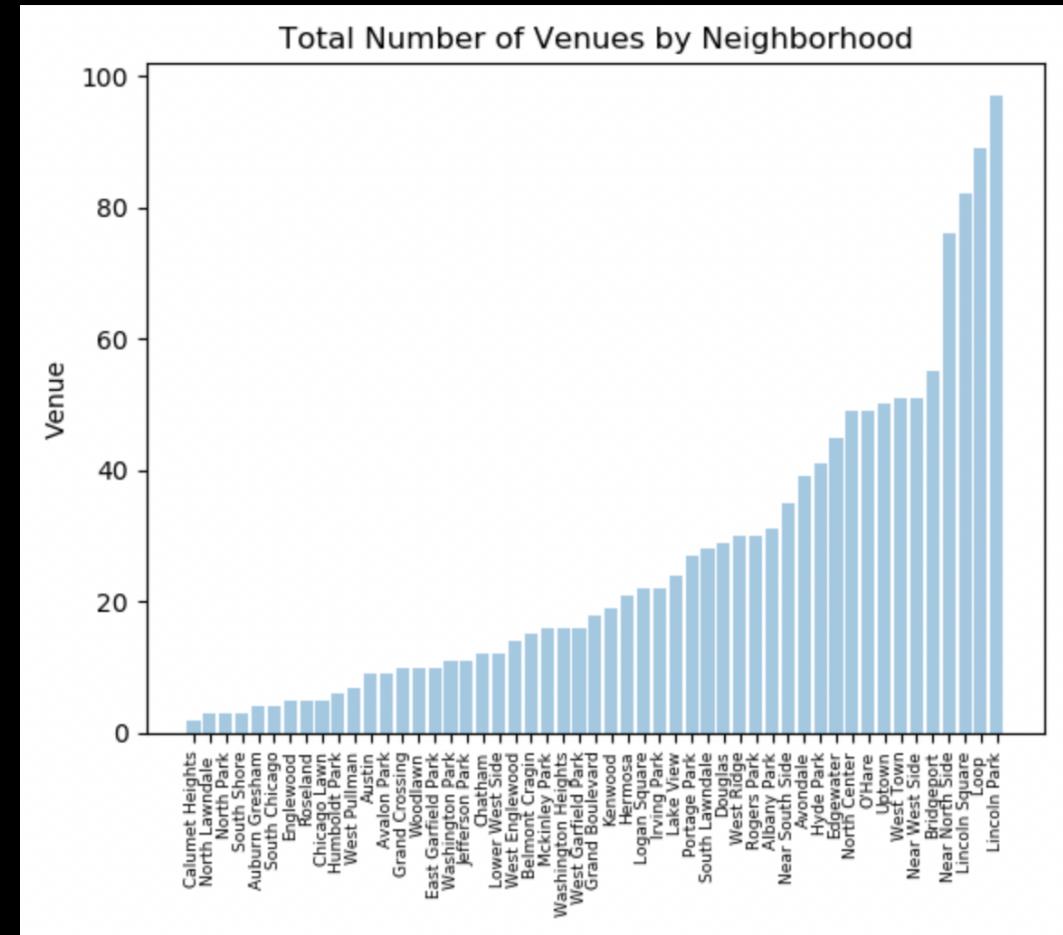
Neighborhood	Average Rent	Latitude	Longitude
Near South Side	\$2,803	41.8608	-87.6257
Near North Side	\$2,623	41.9039	-87.6315
Loop	\$2,470	41.8786	-87.6251
Near West Side	\$2,386	41.8668	-87.6664
West Town	\$2,122	41.8936	-87.6722
Lincoln Park	\$2,016	41.9255	-87.6488
North Center	\$1,925	41.9467	-87.6883
Hyde Park	\$1,752	41.7948	-87.5917
Avondale	\$1,730	41.9415	-87.7025
Lake View	\$1,703	41.9398	-87.6589

In order to visualize my analysis, I utilized the python folium library. The graph below displays a map of Chicago with a marker on each neighborhood, using the latitude and longitude values.



Venues by Neighborhood

The graph below displays the distribution of venues by neighborhood in Chicago. We can see central neighborhoods such as Loop, Lincoln Park, and Lincoln Square each contain more than 80 venues whereas the bottom 50 percent has less than 20 venues per neighborhood. A total of 1324 venues were found within these neighborhoods.



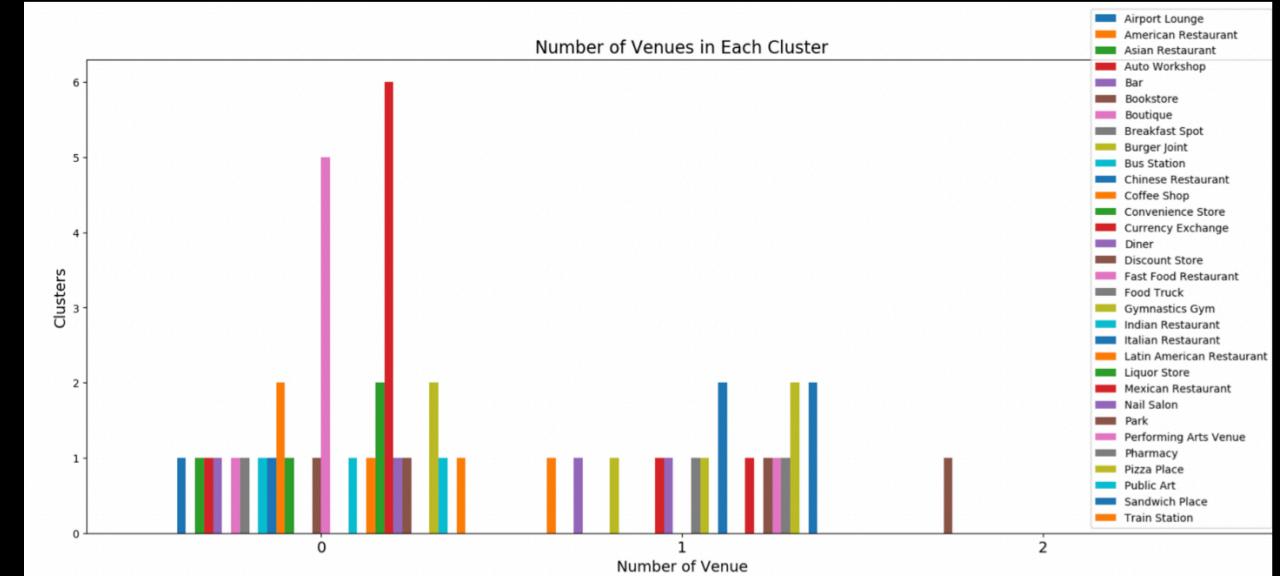
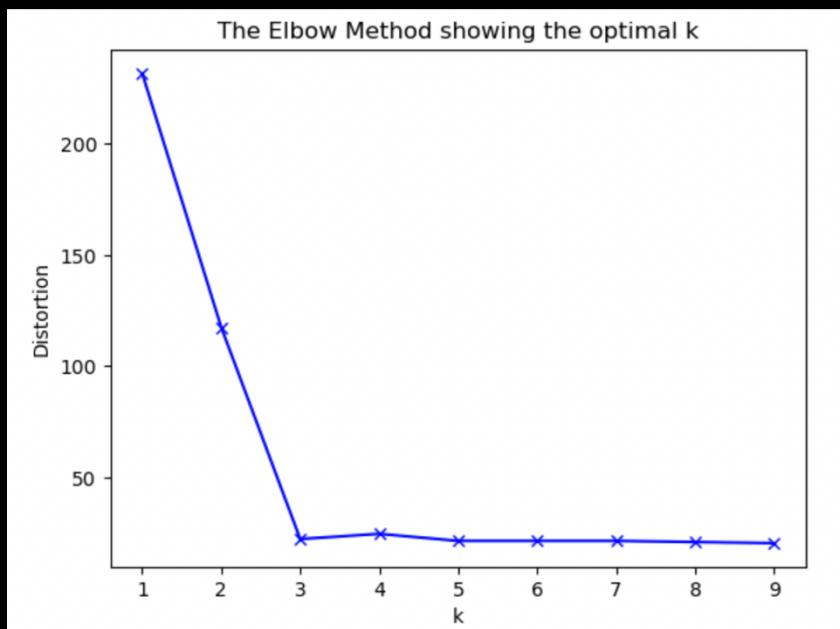
Top 10 Most Common Venues

To summarize the venue data, I compiled a data frame of the top 10 most common venues by neighborhood.

	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	Albany Park	Mexican Restaurant	Pizza Place	Korean Restaurant	Donut Shop	Bank	Discount Store	Dive Bar	Mobile Phone Shop	Fried Chicken Joint	Taco Place
1	Auburn Gresham	Discount Store	Pool	Basketball Court	Park	Dog Run	Food	Flower Shop	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant
2	Austin	Discount Store	Pizza Place	Breakfast Spot	Salon / Barbershop	Café	BBQ Joint	Food	Cosmetics Shop	Fish & Chips Shop	Filipino Restaurant
3	Avalon Park	Burger Joint	Pizza Place	Grocery Store	Boutique	Fast Food Restaurant	Sandwich Place	Diner	Cajun / Creole Restaurant	Deli / Bodega	Dance Studio
4	Avondale	Bar	Coffee Shop	Mexican Restaurant	Food Truck	Italian Restaurant	Pub	Beer Store	Big Box Store	Donut Shop	South American Restaurant

K-Means Clustering

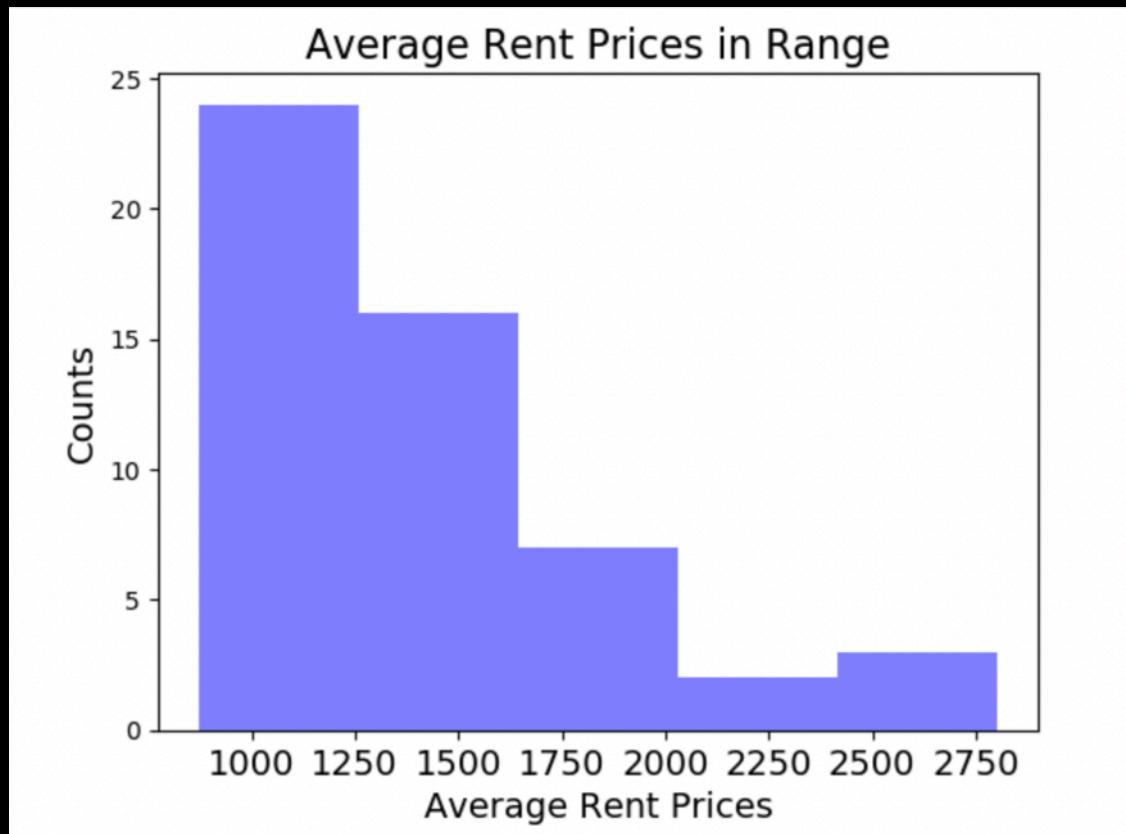
In order to determine the correct value for k, I ran the algorithm with a k value of 2 and used the elbow method to display the optimal value.



Once we have identified our clusters, using pyplot, we can analyze the distribution of most common venue types by cluster.

Average Rent Prices

We can also use a histogram to display the average rent prices throughout the city. As we can see the vast majority of properties are between \$1000 - \$1750 per month.



Merged Data frame

Neighborhood		Join
0	Albany Park	4 Korean Restaurant, 2 Mexican Restaurant, 2 P...
1	Auburn Gresham	1 Basketball Court, 1 Discount Store, 1 Grocer...
2	Austin	2 Discount Store, 1 Athletics & Sports, 1 BBQ ...
3	Avalon Park	2 Burger Joint, 2 Pizza Place, 1 ATM
4	Avondale	2 Coffee Shop, 2 Food Truck, 2 Mexican Restaurant

To provide a thorough summary of each neighborhood on the map I used the join function to display the count of the top three venue types for each neighborhood.

I then merged those results with all related cluster and venue information to create one cumulative data frame.

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	Join	Labels	Level_labels
Park	Bar	Grocery Store	Dog Run	Rental Car Location	Sushi Restaurant	Italian Restaurant	Steakhouse	Donut Shop	Candy Store	3 Park, 2 Bar, 2 Dog Run	Mexican Restaurants	High Level Rent
Italian Restaurant	Gym / Fitness Center	Coffee Shop	Gym	Café	Pizza Place	Steakhouse	Pub	Restaurant	Bar	5 Italian Restaurant, 4 Café, 4 Coffee Shop	Mexican Restaurants	High Level Rent
Sandwich Place	Plaza	Coffee Shop	American Restaurant	Theater	Bar	Art Museum	Public Art	Sculpture Garden	Boutique	5 Sandwich Place, 4 Coffee Shop, 4 Plaza	Mexican Restaurants	High Level Rent

Choropleth Map

Finally, I used the Geojson file from the Chicago Data Portal to display the boundaries of each neighborhood. I created a choropleth map in order to overlay the Average Rent Prices by neighborhood. When a neighborhood is selected the Neighborhood Name, Cluster Name, Rent Level, and Top 3 Venues are displayed.

