Location Research for a Coffee Shop location in Chicago's North Side

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Introduction

Background

In Chicago there are more than 200 neighborhoods. More affluent neighborhoods have options that are numerous for coffee shops. In more residential neighborhoods, outside of the city center, or more than 5 miles from downtown there are less options for consumers. Besides chain coffee stores or gas stations, many far northside and northwest side neighborhoods find the number of independent coffee shops lacking and welcome new independent coffee shops.

Business Problem

In an effort to assist a new independent coffee shop from earning and maintaining a new business in an ideal location, location data will be used to assist in analyzing optimal circumstances.

Data acquisition

The data used will be obtained through Foursquare and compared over several variables including number of surrounding business in the same category, mean frequency of the business and commonality of the business. The data on Chicago neighborhoods and corresponding community areas will be extracted from: https://en.wikipedia.org/wiki/Community_areas_in_Chicago

longitude latitude coordinates will be taken from: https://public.opendatasoft.com/

The corresponding zip codes with the neighborhoods will be crossed check with several sources to ensure accuracy.

Data Cleaning

Data from the all sources were inputted in to an excel file such that the data was in a centralized. The amount of data was vast and reduced down to the community areas of interest which were the Far North Side, the Northwest Side, and North side. The corresponding data was manually created in the notebook as a data frame and further examined (Table 1).

	Zip	Area	Neighborhood	Latitude	Longitude
0	60618	North Side	North Center	41.946	-87.705
1	60618	North Side	Avondale	41.946	-87.705
2	60640	Far North Side	Uptown	41.973	-87.667
3	60626	Far North Side	Rogers Park	42.010	-87.669
4	60625	Far North Side	Lincoln Square	41.972	-87.703

Table 1. Initial data table head.

The data was organized and grouped such that neighborhoods with similar zip codes were listed together and organized with their respective postal code, community area and latitudinal and longitudinal coordinates (Table 2).

	Zip	Area	Neighborhood	Latitude	Longitude
0	60618	North Side	North Center, Avondale	41.9460	-87.705
1	60618	Northwest Side	Irving Park	41.9460	-87.705
2	60624	Northwest Side	Dunning	41.9440	-87.797
3	60625	Far North Side	Lincoln Square, Albany Park	41.9720	-87.703
4	60626	Far North Side	Rogers Park	42.0100	-87.669
5	60630	Far North Side	Jefferson Park	41.9710	-87.759
6	60631	Far North Side	Edison Park, Noorwood Park	41.9960	-87.811
7	60639	Northwest Side	Belmont Cragain, Hermosa	41.9210	-87.754
8	60640	Far North Side	Uptown	41.9730	-87.667
9	60641	Northwest Side	Portage Park	41.9460	-87.746
10	60646	Far North Side	Forrest Glen	41.9950	-87.760
11	60659	Far North Side	North Park	41.9910	-87.704
12	60660	Far North Side	Edgewater	41.9910	-87.667
13	60666	Far North Side	OHare	41.9742	-87.907
14	60707	Northwest Side	Montclare	41.9230	-87.808

Table 2. Grouped data

Data Analysis

The data frame was used in the exploration of current business in each respective neighborhood using two methods. First, each of the selected neighborhood were explored through a venue category search using the Foursquare API to segment each neighborhood. The categories of interest for the research were "Café", "Coffee Shop", "Breakfast Spot", and "Donut Shop". The categories were chosen based on the relevance to a coffee shop and in the interest in what other venues that may provide the desired service may be categorized as in Foursquare. The mean occurrence was calculated Table 3 and examined to see areas of need with respect to a coffee shop.

	Neighborhood	Café	Coffee Shop	Breakfast Spot	Donut Shop
0	Albany Park	0.000000	0.000000	0.000000	0.000000
1	Avondale	0.000000	0.018519	0.018519	0.018519
2	Belmont Cragain	0.000000	0.052632	0.000000	0.157895
3	Dunning	0.000000	0.000000	0.000000	0.000000
4	Edgewater	0.000000	0.058824	0.000000	0.000000
5	Edison Park	0.000000	0.250000	0.000000	0.250000
6	Forrest Glen	0.000000	0.047619	0.000000	0.000000
7	Hermosa	0.000000	0.052632	0.000000	0.157895
8	Irving Park	0.000000	0.018519	0.018519	0.018519
9	Jefferson Park	0.000000	0.035714	0.000000	0.035714
10	Lincoln Square	0.000000	0.000000	0.000000	0.000000
11	Montclare	0.052632	0.000000	0.000000	0.052632
12	Noorwood Park	0.000000	0.250000	0.000000	0.250000
13	North Center	0.000000	0.018519	0.018519	0.018519
14	North Park	0.055556	0.055556	0.055556	0.000000
15	OHare	0.000000	0.134615	0.000000	0.019231
16	Portage Park	0.000000	0.000000	0.000000	0.000000
17	Rogers Park	0.000000	0.028571	0.028571	0.057143
18	Uptown	0.000000	0.020408	0.020408	0.000000

Table 3. Mean Frequency of Venues.

The mean frequency table revealed that within the selected neighborhoods there were occurrences that did not register any of the venue categories. The determination to further inspect each one of the neighborhoods without any returns was done through a search query of "Coffee" using each neighborhoods geographical coordinates to ensure no results applied to each neighborhood. The interest in these neighborhoods would be the focus of the exploration for the location of a new coffee shop to serve the residential portions of the North side of Chicago displayed in Figure1.
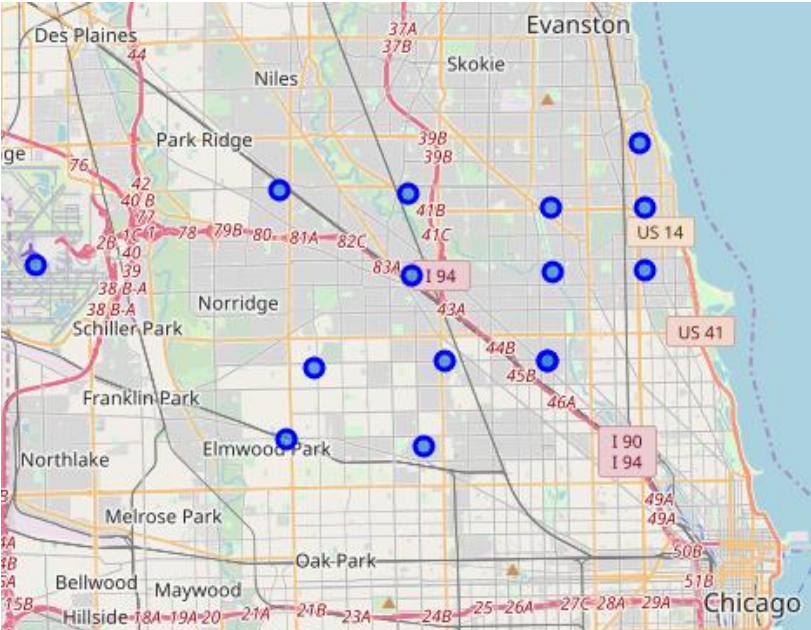

Figure 1. North Neighborhoods of Chicago

Neighborhoods of interest as a result of the mean frequency tables resulted in Albany Park, Dunning, Lincoln Square, and Portage Park. Given that each returned a mean value of zero for each venue category, a simple search query was done for each with a corresponding map to use as approximations to each other and other neighborhoods with initial returns in the frequency table.

Albany Park yielded no initial results and was furthered examined. Using the search query "Coffee" it returned two results shown in Table 4 and mapped in Figure 2.

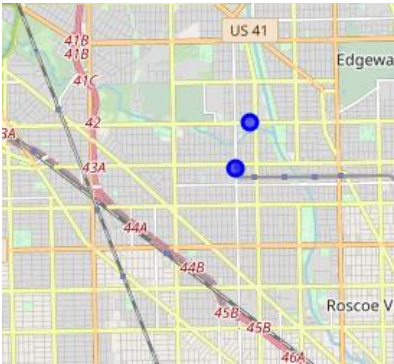|	name	categories	address	cc	city
0	Coffee Bean	Coffee Shop	NaN	US	Chicago
1	Starbucks	Coffee Shop	3232 W Foster Ave	US	Chicago

Table 4.

Figure 2. Albany Park Locations

Relative to Figure 1, the two locations returned in the Albany park are east of the Kennedy expressway and between two neighborhoods, to the north and south, that returned results within the mean frequency tables. The results signifying that along US 41corridor there are options that present themselves through the north side of Chicago.

Portage Park also yielded no initial results and was furthered examined. Using the search query "Coffee". It returned a result shown in Table 5 and mapped in Figure 3.

	name	categories	cc	city
0	Coffee Cafe	Coffee Shop	US	Chicago

Table 5.

Figure 3. Portage Park

Relative to Figure 1, the location returned in the Portage Park locations is West of the Kennedy expressway and public train transportation that runs along Interstate 94 (Kennedy Expressway). It would seem that the need for a coffee shop in this area would benefit in its location based on the proximity to public transportation and access to downtown.

Lincoln Square also yielded no initial results and was furthered examined. Using the search query "Coffee" it returned a result shown in Table 6 and mapped in Figure 4.

	name	categories	address	cc	city
0	Groundswell Coffee Roasters	Coffee Shop	5008 N Lincoln Ave	US	Chicago
1	Lavazza Coffee	Café	NaN	US	Chicago
2	Bmsm Coffee Shop	Coffee Shop	5074 N Lincoln Ave	US	Chicago

Table 6.

Figure 4

The options for the Lincoln Square returned three locations in a centralized location along Lincoln Avenue. The neighborhood center offers multiple options for consumers and commuters who choose the Brown line rail trains, due south, as means for transportation into and out of downtown.

The final neighborhood that yielded no initial results in the mean frequency table (Table 3) was Dunning. The Dunning neighborhood did not yield results in the search query method as well. The neighborhood is located in Chicago's Northwest side, which is more residential that the other neighborhoods and further away from city train services, and the interstate. In comparison to the other neighborhoods the Dunning neighborhoods finds itself bordered by suburbs to the west and partially to the north and south. The result is that their neighborhoods commercial spaces are less than what other neighborhoods offer and can be an

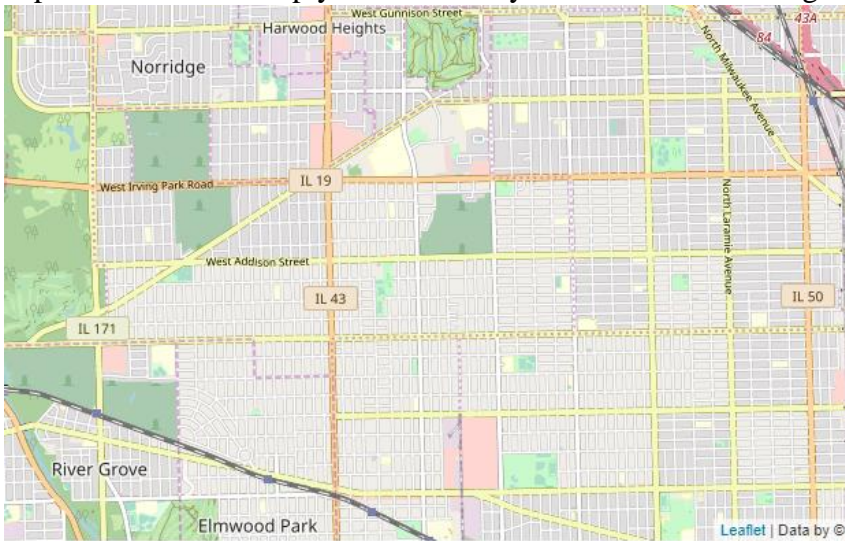explanation for the empty set in results yielded. Centered in Figure 5 is the Dunning neighborhood.

Figure 5. Dunning

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue
Albany Park	10	10	10
Avondale	54	54	54
Belmont Cragain	17	17	17
Dunning	5	5	5

Table 7. Results of Venues

Conclusion

In the analysis of the neighborhoods of Chicago's north side there was a void discovered in the number of coffee places for Northwest side Chicagoans. The neighborhood in most need proved to be Dunning. As revealed by two types of searches obtained through Foursquare: 1) Venue search and 2) Search Query. The maps generated through folium allowed for further interpretation that shed light on the possible reasons for the lack of such venues.

The mostly residential area that is Dunning is located to the west of major public city train lines and north of private train services. This creates a pocket area with few major cross streets and no nearby transportation hubs. Dunning also has no centralized neighborhood center and a grid-like structure that contributes to the lack of possible businesses or optimal locations. Table 7 shows the discrepancies in number of venues and how the location of Dunning may impede the number of business in the area. While others returned numerous venues of all types before filtered for ones providing coffee; Dunning yielded only five total results compared to neighboring neighborhoods of Avondale and Belmont Cragain with five times and three times as many, respectively.

My recommendation for a new independent coffee shop location is for the residential area of Dunning near its major intersections. The intersections of IL171 with either IL43 or IL50 may be an ideal location in the neighborhood. Also, the options along any major road can be explored to take into account any new developing areas that are witnessing new business developments.