

The slide features abstract green geometric shapes. On the left, a solid green triangle points downwards. On the right, a complex arrangement of overlapping translucent green triangles and polygons creates a layered effect. The main title is centered in a bold, green, sans-serif font.

An Exploratory Analysis of Venues in Cabarrus County, NC - A Charlotte Metropolitan Suburb

---- Venues Comparison for 2 Popular Zip Code Areas in the City of Concord

Fuxia Jin
January 1, 2021

Executive Summary

- Give the relocators a glimpse of Charlotte, NC suburban area
- Help corporate HR and hiring managers for an introduction of the area
- Exploratory analysis of venues data from Foursquare.com was performed to compare two zip code areas of the neighboring city Concord.
- Both zip code areas have a wide variety of venues especially places to eat.
- Zip code area 28027 was shown to have more venue categories and venue counts than zip code area 28025.

Introduction

- **Background :** Charlotte, North Carolina was ranked among the country's fastest growing metro areas.
- **Problem:**
 - Relocators need information to buy a house, send kids to schools, enjoy after-work life and mingle with family or friends at the nearby venues.
 - Corporate HR, hiring managers or the relocation assistants in the company need to be equipped with knowledge about the surrounding areas
- **Interest:**
 - Due to its proximity to uptown Charlotte, affordable housing, excellent schools, the city of Concord is naturally a hot spot for relocators.
 - Exploratory venue data analysis is necessary to serve such purpose.

Data

- **Data sources:**
 - Master address datasets <https://www.nconemap.gov/datasets/spatial-data-download-nc-emergency-management>.
- **Data wrangling:**
 - Filter data for Cabarrus County and save the file as a local csv file.
 - Save the unique zip codes to a pandas dataframe.
 - Get geo-coordinates for each unique zip code and populate 3 more columns: Latitude, Longitude, and City.
 - The updated dataframe will be used to generate folium geo-maps of the county, the interested zip code areas, and create url requests to query venue data.

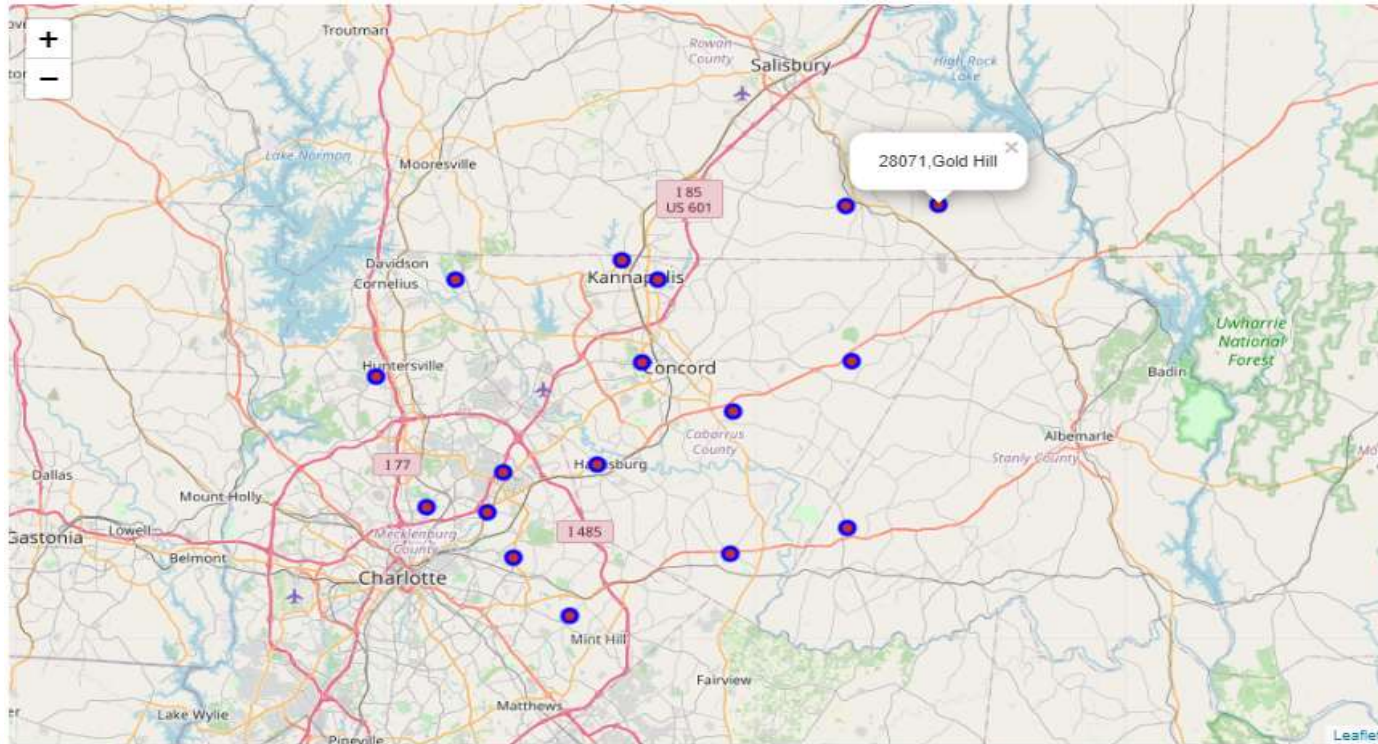
Methodology

- **Foursquare venue exploratory analysis**
 - Register a new developer's account at [foursquare.com](https://foursquare.com/for-business) to get credentials.
 - Define credentials, version, limit, radius parameters for the venue exploratory url to be created.
 - Clean up the returned json data structure and generate a new pandas dataframe to store venue information: name, category, latitude and longitude.
 - Create a pandas dataframe of venue category/counts information for both zip code areas 28027 and 28025.
- **Folium map visualization**
 - Generate map of Cabarrus County, NC using zip code areas as circular markers and label with zip code and city name.
 - Generate maps of both zip code areas 28027 and 28025, superimposed with the venues markers, and labeled with venue name and category.
- **Bar plot visualization**
 - The dataframes of the venue category and venue counts were plotted in vertical bar charts.
 - These bar charts provide a straight-forward visualization of the type of venues present in each zip code area and the number of such venues in the defined radius.

Results

- **Map of Cabarrus County with zip code areas superimposed**
 - Cabarrus county has 17 unique zip codes which represent 11 cities with some cities having 2 or more zip code areas.
 - Cabarrus county has total land area of 940 km², with latitude and longitude of (35.4045503, -80.564371) and an estimated population of more than 0.2 million in year 2019.
 - The city of Concord is county seat and other surrounding cities include Kannapolis, Harrisburg, Davidson, Huntersville, Gold Hill, Locust, Midland, Rockwell, Mount Pleasant and Charlotte.

Figure 1. Map of Cabarrus County.



Map of Cabarrus County with superimpose zip code areas as circular markers. Markers were labeled with both zip code and city.

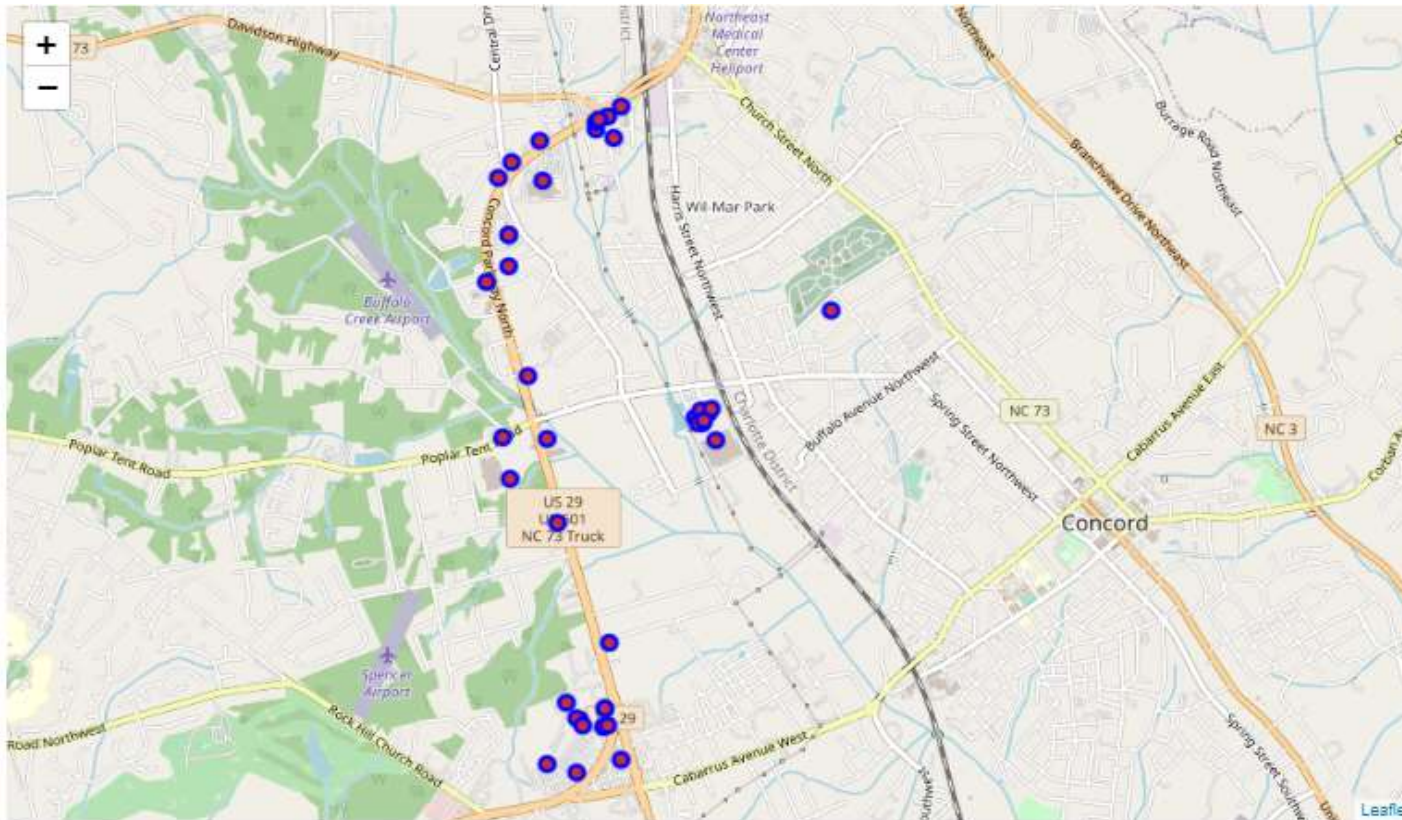
Venues list and location in zip code area 28027

- A total of 41 venues were returned by foursquare.com and they come from 26 categories of venues.
- Fast Food Restaurant, Diner, and Mexican Restaurant are among the top 3 categories of venues and accounts for about 1 quarter of all venues that have been returned.
- Other popular venues include Convenience Store, Brewery, Gas Station, Car Rental, Ice Cream Shop, Shopping Mall, etc.
- In general, there are a great variety of venues in this zip code area.

Figure 2. List of Venues in Zip Code 28027.

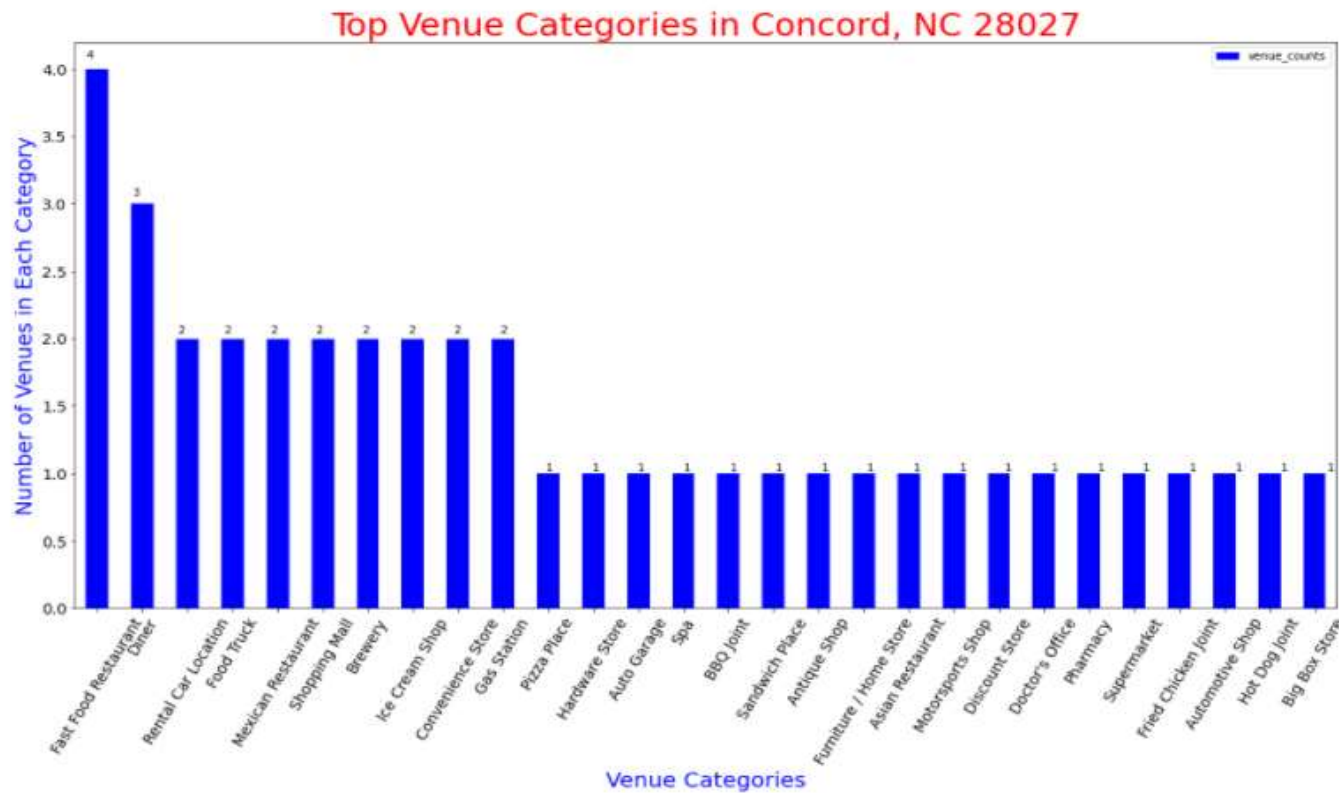
	name	categories	lat	lng
0	The Smoke Pit	BBQ Joint	35.421985	-80.614559
1	The Depot Antique and Designer Mall	Shopping Mall	35.414700	-80.603026
2	Cabarrus Brewing Co.	Brewery	35.414246	-80.603316
3	High Branch Brewing Co.	Brewery	35.414306	-80.603357
4	Sonic	Fast Food Restaurant	35.403428	-80.608745
5	Punchy's Diner	Diner	35.413463	-80.612312
6	QuikTrip	Convenience Store	35.428672	-80.609508
7	Fiesta Mexicana	Mexican Restaurant	35.428205	-80.608472
8	BP	Gas Station	35.413560	-80.614920
9	Lowe's	Hardware Store	35.426144	-80.612610
10	Speedway	Gas Station	35.409320	-80.611786
11	Hertz	Rental Car Location	35.416542	-80.613469
12	Concord Family Restaurant	Diner	35.426262	-80.615162
13	Taco Bell	Fast Food Restaurant	35.429262	-80.608797
14	Whiteowl Antique Mall	Antique Shop	35.419795	-80.595864
15	Andele Mexican Resraunt	Mexican Restaurant	35.429781	-80.608060
16	Family Dollar	Discount Store	35.423488	-80.614548
17	Enterprise Rent-A-Car	Rental Car Location	35.400254	-80.609022
18	Miso Sushi & Grill	Asian Restaurant	35.399672	-80.610447
19	CVS pharmacy	Pharmacy	35.427063	-80.614417
20	Burger King	Fast Food Restaurant	35.399310	-80.609100
21	Subway	Sandwich Place	35.399729	-80.610677
22	Arby's	Fast Food Restaurant	35.397107	-80.610614
23	Little Caesar's	Pizza Place	35.411524	-80.614499
24	Precision Eye Center	Doctor's Office	35.421175	-80.615885
25	KFC	Fried Chicken Joint	35.400261	-80.609032
26	Luxury Nails	Spa	35.423488	-80.614548
27	TJ's Diner	Diner	35.414545	-80.603739
28	Masterbacon	Food Truck	35.414268	-80.603612
29	Vintage Motor Club	Auto Garage	35.414833	-80.603455
30	Cabarrus County Food Truck Friday	Food Truck	35.414407	-80.603216
31	Gibson Mill	Shopping Mall	35.414915	-80.602831
32	Carolina Rustica	Furniture / Home Store	35.413395	-80.602547
33	Big Lots	Big Box Store	35.397532	-80.612384
34	Food Lion Grocery Store	Supermarket	35.397729	-80.608035
35	RideNow Powersports Concord & Indian Motorcycl...	Motorsports Shop	35.400535	-80.611264
36	SpeedDee Oil Change & Auto Service	Automotive Shop	35.428064	-80.612824
37	Heavenly Cow Ice Cream	Ice Cream Shop	35.399415	-80.610280
38	QT	Hot Dog Joint	35.429000	-80.609499
39	Moo- Town Icecream	Ice Cream Shop	35.399376	-80.608849
40	Quick Stop Convenience Store	Convenience Store	35.429120	-80.609310

Figure 3. Venues in zip code 28027 area.



Venue distribution in zip code area 28027.

Figure 4. Venue bar chart “category vs. counts”.



+ 5%
Mean: 0.0315
- 5%

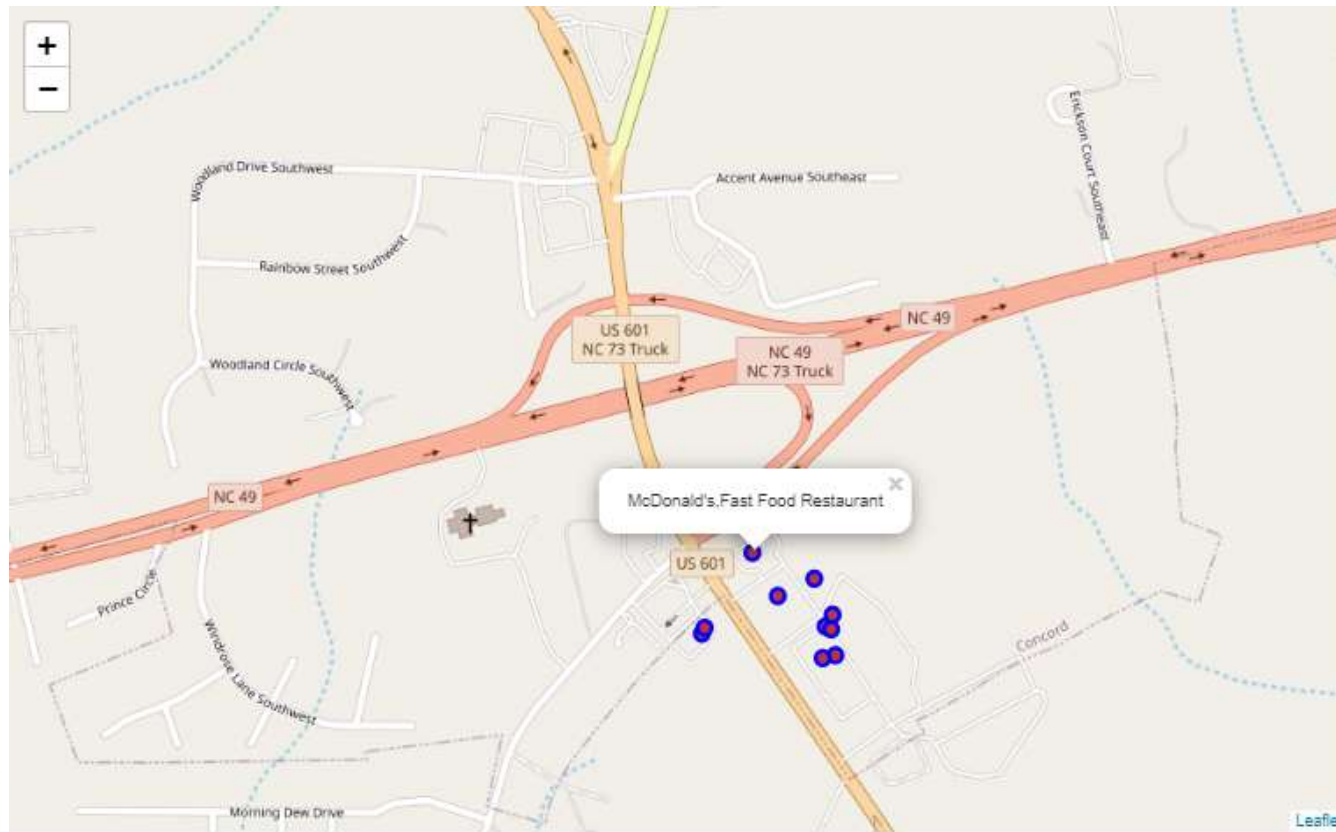
Venues in zip code area 28025

- A total of 11 venues were returned by foursquare.com. There are 8 categories of venues for the 11 returned venue names.
- Pizza Place, Fast Food Restaurant, and Supermarket are among most numbered venues.
- The remaining venue categories are Pet Service, Chinese Restaurant, Construction & Landscaping, and Hunting Supply.
- Both categories and number of venues are less in 28025 than those of 28027.

Figure 5. List of Venues in Zip Code 28025.

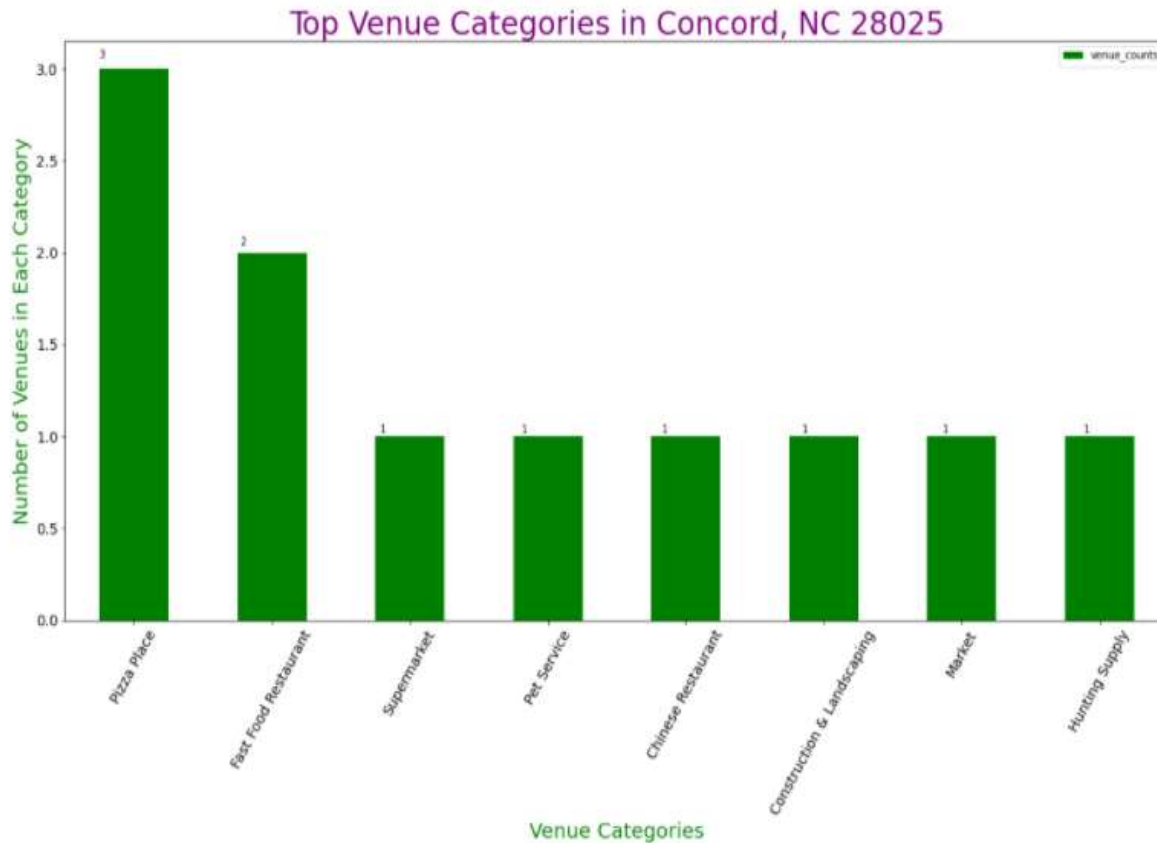
	name	categories	lat	lng
0	Brooklyn's Pizzeria	Pizza Place	35.370512	-80.548243
1	Food Lion Grocery Store	Supermarket	35.370149	-80.548098
2	Pizza Hut	Pizza Place	35.370409	-80.550117
3	China Garden Restaurant	Chinese Restaurant	35.370475	-80.548159
4	Bojangles' Famous Chicken 'n Biscuits	Fast Food Restaurant	35.370871	-80.548965
5	Tesh-Troxler Landscapes & Designs	Construction & Landscaping	35.371748	-80.513842
6	Brooklyn's Pizza	Pizza Place	35.370647	-80.548134
7	Southgate Commons Shopping Center	Market	35.370127	-80.548286
8	Swiftdogz	Pet Service	35.371082	-80.548411
9	Ideal Sportsman	Hunting Supply	35.370491	-80.550095
10	McDonald's	Fast Food Restaurant	35.371397	-80.549348

Figure 6. Venue locations in zip code 28025.



Venues distribution in zip code area 28025.

Figure 7. Venue bar chart “category vs. counts” in 28025.



Discussion

- Zip code area 28027 has more venue categories and number counts than zip code 28025 area.
- Zip code area 28027 has returned about 4 times more venue categories and number of venues than zip code area 28025.
- Zip code 28027 area is the area of choice to hang out for more activities, more options of ethnic food choices, and potentially more fun if you like to eat out and enjoy a busy bustling life.
- In contrast, zip code 28025 area best suits you if you look for less traffic, more quiet surroundings, typical mom-pop's places to eat, and have your shopping done in a less congested area.
- According to data from usa.com, zip code 28027 area has land area of about 63% of that of 28025 but a population of 111% of that in zip code 28025 area.
- With more houses under construction and businesses expanding, zip 28027 area seems to have attracted and is still attracting more relocators to move in.
- Two of the notable attractions in the 28027 area, namely the Concord Mills Mall, and the Charlotte Motor Speedway are most likely the major contributors of such diverse and dense venue spread.

Conclusion

- Geo-coordinates coupled with foursquare.com venue information provided a glimpse of two sought-after zip code areas in the Charlotte-Concord-Gastonia metro area.
- Both venue locations and distribution help relocators learn more about the area when considering relocation, visiting or settling down in this area.
- Foursquare.com is a powerful tool to gather general information about venues in areas with known geo-coordinates. If such information is used in combination with other information including housing, schools, crime rate, demographics etc, professionals will make more informed and intelligent decisions when considering relocation to the metro area.
- By the same token, corporate HR and hiring managers that work on attracting top talents to the Charlotte metro region could use the information as educational material for an introduction of the region.
- In summary, results from the current project are beneficial not only to corporate HR and hiring managers but also job seekers who are looking forward to relocation to this area.

Acknowledgments

- First and foremost, I wanted to thank my husband for allowing me the luxury of learning data science skills for fun.
- I wanted to thank my wonderful kids for enduring my long hours of studying and working in front of my computer while they take care of chores, and their own school work during this crazily insane pandemic isolation year.
- I would like to acknowledge the teaching staff for IBM Coursera “Applied Data Science Capstone” for fun introduction of foursquare.com.
- Moreover, I am thankful to all the teaching staff for the IBM Coursera “Data Science Profession Certificate” online program for a wonderful and meaningful learning experience!
- Of course, thank you to foursquare.com for making the geo information to use for free.
- Thank you to the reviewer for their time and valuable comments.
- Last but not least, thank you to all who contributed and improved the python libraries for millions of users to use.

References

- 1. Here's Why Charlotte Became One of The Fastest Growing Cities in The Country Recently.
<https://www.charlottestories.com/heres-charlotte-became-fastest-growing-city-country-past-decade/>.
- 2. Charlotte metro's population keeps climbing, new Census figures show.
<https://www.bizjournals.com/charlotte/news/2020/03/26/charlotte-metros-population-keeps-climbing-new.html>.
- 3. Cabarrus County. <http://www.usa.com/cabarrus-county-nc.htm>.
- 4. NC OneMap. Geographic Data Serving a Statewide Community Data Source.
<https://www.nconemap.gov/>.
- 5. Pgeocode: a Python library for high performance off-line querying of GPS coordinates, region name and municipality name from postal codes.
<https://pypi.org/project/pgeocode/>.
- 6. Information about people and information about places.
<https://foursquare.com/>.
- 7. QuickFacts Cabarrus County, North Carolina.
<https://www.census.gov/quickfacts/fact/table/cabarruscountynorthcarolina/POP060210>.