Exploring neighborhoods of Bangalore for new restaurant business

Sanjay Godiya

February 24, 2020

1. Introduction

1.1. Background

Bengaluru (old name Bangalore) is IT hub of India. College grads migrate from different states to start their IT career in Bengaluru. 50% population of this city is migrant. Bengaluru comes in top 10 Indian cities for multilingual people. Because of massive development of IT industry in this city, there are other industries and businesses growing here like real state, hotel/hospitality industry, restaurants, e-Commerce and retail industry. Because of the diversity, different type of people like to spend their weekends and holidays differently, some people like visit restaurants and bars, some people like to spend time with family and kids in shopping malls and some people like to go for trips.

1.2. Problem

If someone is looking to open a new business, a restaurant or superstore, s/he would need to understand population density of different neighborhoods of Bengaluru and already existing restaurants, bars and superstores.

1.3. Interest

New investors who is looking to start a new restaurant business or existing business holders who is looking to expand their footprints in other neighborhoods of Bangalore

2. Data acquisition and cleaning

2.1. Data Source

Bangalore's population data is available on Bruhat Bengaluru Mahanagara Palike (BBMP) official website.

The population data is collected every ten years in India by Census of India. Last census was conducted in 2011 and same data is available on BBMP official website for Bangalore.

http://bbmp.gov.in/documents/10180/460906/BBMPR_ward_master_BBMP+Restructuring+03-08-2015.pdf

2.2. Data cleaning

The census data collected from official website has many unnecessary details and the pdf could also not be converted into well-defined python dataframe. So, I have cleaned the data offline and prepared an excel with only two columns ward name and population density. The cleaned data sheet in available here.

2.3. Feature selection

After cleaning the data, there were 198 samples and 2 features, neighborhood name and its population density. To explore each neighborhood, I needed the geo location (latitude and longitude) of these neighborhoods so I used GeoPy library for this and finally and appended latitude and longitude. The final dataframe had 168 samples and 4 features (GeoPy library couldn't find latitude and longitude for 30 samples).

Table 1. Sample dataframe

Neighbourhood	Population_density_(persons_per_sq_km)	Latitude	Longitude
Kempegowda	3182	13.109018	77.601900
Chowdeswari	5635	13.120459	77.579618
Atturu	6606	13.100409	77.858725
Yelahanka Satellite Town	9224	13.089139	77.582717
Jakkuru	2215	13.098320	77.625146

3. Exploratory Data Analysis

3.1. Different venues in a neighborhood

A neighborhood can have venues for different categories like restaurant, café, coffee shop, bakery etc. I explored all the venues for a neighborhood using Foursquare API and stored in a dataframe. As we are focusing on restaurant business, I grouped all the venues of restaurant category and calculated the total count of a venue category for a neighborhood. Now I have a dataset of all the restaurant with their count for a given neighborhood.

3.2. Plotting the venues on map

To understand the distribution of the restaurants in each neighborhood, I plotted the restaurants with their category and neighborhood name. Distribution of restaurants differs based on their category.

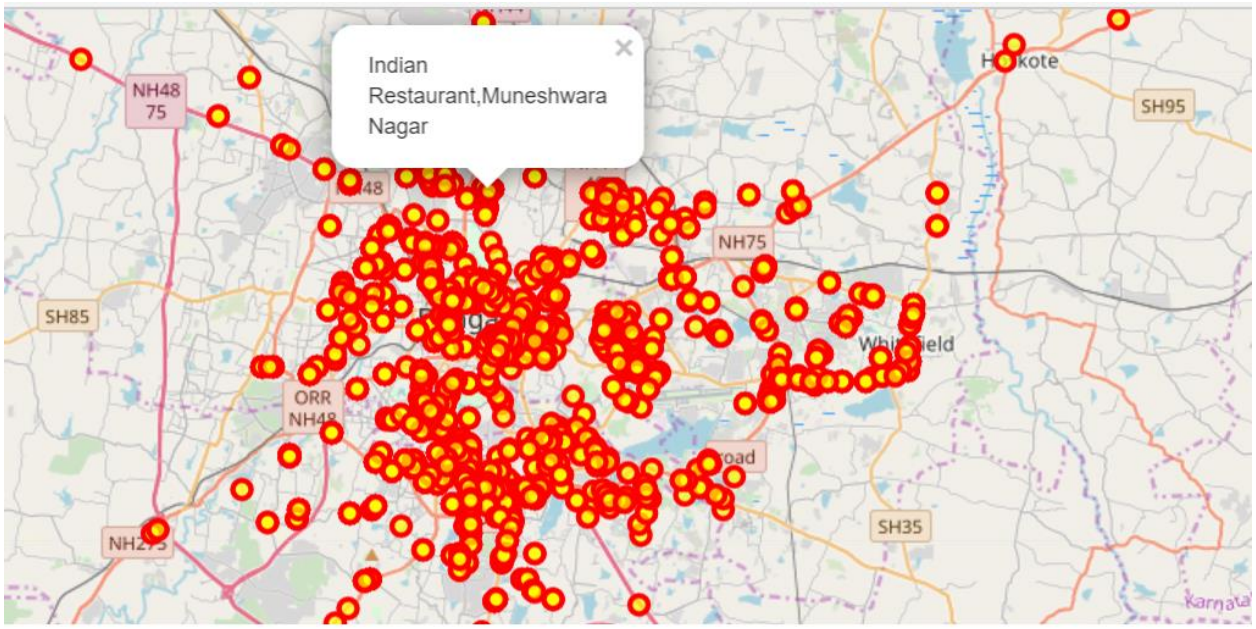

Figure 1. All restaurants of Bangalore with their category and neighborhood labeled

3.3. Relationship between density and number of restaurants

The number of venues depends on the number of potential customer/consumers. I calculated the number of restaurants (category wise) for top 10 most dens and to 10 least dens neighborhoods of Bangalore. Results are explained as:

3.3.1. Restaurant counts for top 10 most dens neighborhoods of Bangalore

The most dens neighborhoods with their population density are:

Neighbourhood	Population_density_(persons_per_sq_km)	Latitude	Longitude
Padarayanapura	118059	12.963801	77.547523
Kempapura Agrahara	113291	13.154848	77.289579
Nilasandra	94287	12.951245	77.614791
Shivaji Nagar	87856	12.989158	77.606089
Rayapuram	81770	12.964870	77.556562
Dayananda Nagar	80035	12.991025	77.564519
Muneshwara Nagar	74511	13.014081	77.611474
Bapuji Nagar	72549	12.954321	77.539697
Gurappana Palya	72068	12.920758	77.603333
Kadugondanahalli	65514	13.015587	77.620031

Figure 2. Top 10 most dens neighborhoods of Bangalore

After the calculation I found that these most dens areas have restaurants in quite good numbers and most of the restaurants come under “Indian Restaurant” categories.

Neighbourhood	Venue_Category	Population_density_(persons_per_sq_km)	Venue_Category_Count
Padarayanapura	Asian Restaurant	118059	2
Padarayanapura	Fast Food Restaurant	118059	6
Padarayanapura	Indian Restaurant	118059	17
Padarayanapura	Restaurant	118059	1
Padarayanapura	Seafood Restaurant	118059	1
Kempapura Agrahara	Indian Restaurant	113291	2
Kempapura Agrahara	Himalayan Restaurant	113291	1
Kempapura Agrahara	Vegetarian / Vegan Restaurant	113291	1
Kempapura Agrahara	Karnataka Restaurant	113291	1
Nilasandra	Kerala Restaurant	94287	1
Nilasandra	Korean Restaurant	94287	1
Nilasandra	Mediterranean Restaurant	94287	1
Nilasandra	Southern / Soul Food Restaurant	94287	1

Figure 3. Sample for restaurants in top 10 most dens neighborhoods of Bangalore

3.3.1.1. Plotting of restaurants in top 10 most dens neighborhoods of Bangalore

To understand the distribution of the restaurants in top 10 most dens neighborhoods of Bangalore, I plotted them on a map.

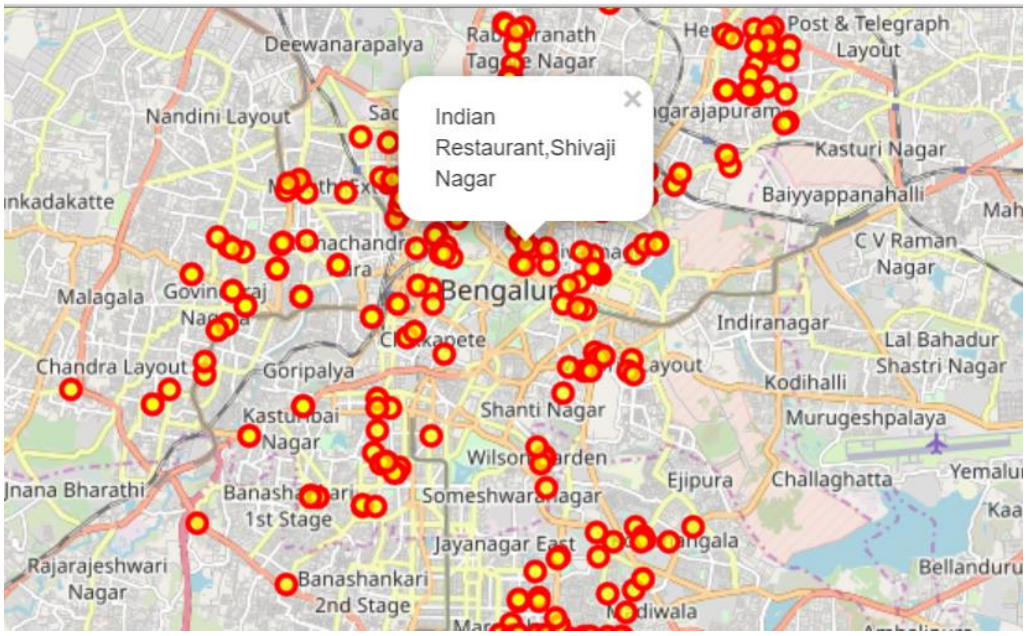

Figure 4. All restaurants in top 10 most dens neighborhoods of Bangalore

3.3.2. Restaurant counts for top 10 least dens neighborhoods of Bangalore

The least dens neighborhoods with their population density are:

Neighbourhood	Population_density_(persons_per_sq_km)	Latitude	Longitude
Hemmigepura	1652	12.881929	77.485497
Varthur	1929	12.940615	77.746994
Jakkuru	2215	13.098320	77.625146
Bellanduru	3041	12.929211	77.677042
Kempegowda	3182	13.109018	77.601900
Agaram	3345	12.945704	77.637886
Hudi	3349	13.058506	77.671339
Kadugodi	3934	12.998577	77.760972
Anjanapura	3997	12.858081	77.558071
Hagadur	4003	12.963344	77.747285

Figure 5. Top 10 least dens neighborhoods of Bangalore

After the calculation I found that these least dens areas have restaurants in very good numbers and most of the restaurants come under “Indian Restaurant” categories.

Neighbourhood	Venue_Category	Population_density_(persons_per_sq_km)	Venue_Category_Count
Hemmigepura	Indian Restaurant	1652	6
Hemmigepura	Indian Chinese Restaurant	1652	1
Hemmigepura	Restaurant	1652	3
Hemmigepura	South Indian Restaurant	1652	1
Hemmigepura	Vegetarian / Vegan Restaurant	1652	1
Hemmigepura	Fast Food Restaurant	1652	1
Hemmigepura	Chinese Restaurant	1652	1
Varthur	Eastern European Restaurant	1929	2
Varthur	Indian Restaurant	1929	12
Varthur	Andhra Restaurant	1929	2
Varthur	American Restaurant	1929	1
Varthur	Italian Restaurant	1929	2
Varthur	Kerala Restaurant	1929	2

Figure 6. Sample for restaurants in top 10 least dens neighborhoods of Bangalore

3.3.2.1. Plotting of restaurants in top 10 least dens neighborhoods of Bangalore

To understand the distribution of the restaurants in top 10 least dens neighborhoods of Bangalore, I plotted them on a map.

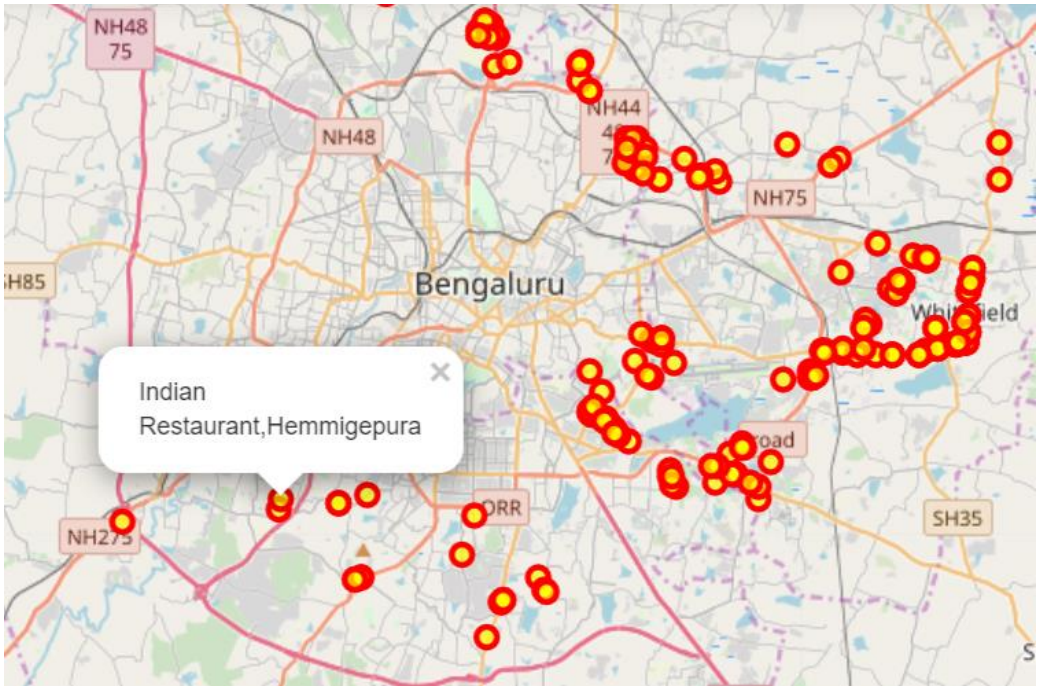

Figure 7. All restaurants in top 10 least dens neighborhoods of Bangalore

4. Observations

After calculating the density and restaurant counts relationship and plotting them for visual analysis, I observed that the number of restaurants in top 10 least dens areas are very high compare to number of restaurants in top 10 most dens areas, which can be seen in below side-by-side comparison.

Neighbourhood	Population_density_(persons_per_sq_km)	
Bapuji Nagar	72549	23
Dayananda Nagar	80035	39
Gurappana Palya	72068	48
Kadugondanahalli	65514	47
Kempapura Agrahara	113291	5
Muneshwara Nagar	74511	43
Nilasandra	94287	25
Padarayanapura	118059	27
Rayapuram	81770	29
Shivaji Nagar	87856	38

Neighbourhood	Population_density_(persons_per_sq_km)	
Agaram	3345	31
Anjanapura	3997	16
Bellanduru	3041	25
Hagadur	4003	32
Hemmigepura	1652	14
Hudi	3349	26
Jakkuru	2215	19
Kadugodi	3934	35
Kempegowda	3182	15
Varthur	1929	41

There are two neighborhoods having no venues of any category. These neighborhoods could be potential locations to start a new business.

	Neighbourhood	Population_density_(persons_per_sq_km)	Latitude	Longitude
38	Chokkasandra	15752	13.187971	77.901090
33	Gangenahalli	22226	12.983417	77.391874

5. Conclusion

The number of restaurants in top 10 least dens areas are very high compare to number of restaurants in top 10 most dens areas. It means there are opportunities to open new restaurants in dens areas.

Kempapura Agrahara having population density of 113291 person/sq-km has only 5 restaurants which is very less compare to its nearby neighborhood Padarayanapura (population density 118059 person/sq-km) which has 27 restaurants. Kempapura Agrahara can also be a good location to start a new restaurant business.