The Battle of Neighborhoods – Finding hospitals in the neighborhood of highly populated areas

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Business Problem

Problem Background

- Most of the hospitals are located in the center of the city. People had option to choose the hospital and travel to the desired hospital
- In the current scenario of COVID19 and lockdown restrictions, movement is not easy in case of emergency
- Hospitals were running at higher utilization
- Quick Access to hospital on emergency given all these constraints
- Adequacy of Hospitals in the area and in neighborhood based on populations

Problem Description

- The first objective is to find the highly populated areas/wards are highly populated. Some of these wards can be in the center of the city and some in outskirts. Hospitals are not planned based on population density, number of hospitals in the same neighborhood. Given these, Do we have hospitals in and around the highly populated areas/wards that is identified?
- What is the radius in which the first hospital is available? In case, there are no beds in that hospital what are the list of other hospitals can be explored??

Future Enhancements

- This model can be integrated with COVID19 applications to help the patients / care takers
- This model can also be used in case of any emergency situation

Data Description

1

Identification of data required
- Areas / Wards in Chennai
- Population in each of the areas
- List of hospitals in the neighborhood of the highly populated area

2

Identify Data Sources
- Areas in Chennai :
  http://www.tamilselvi.com/List-of-Corporation-wards-in-Chennai.html
- Population in each of the areas : Population.xls
- List of all Hospitals in the neighborhood from foursquare

3

Data Cleanup
- Remove samples with missing data
- Merge the data from different sources to create one list

Methodology

1.Data Collected from different sources

Data is collected by scrapping web pages and public website published by government

2. FourSquare be used to locate all Hospitals in the neighborhood

The data retrieved from Foursquare contained information of hospitals located within a specified distance of the longitude and latitude. The information obtained per venue as follows: Hospital name, category, location

3.Exploratory Data Analysis and Ranking

Refer to next slide for details
Ranking is the Search algorithm used

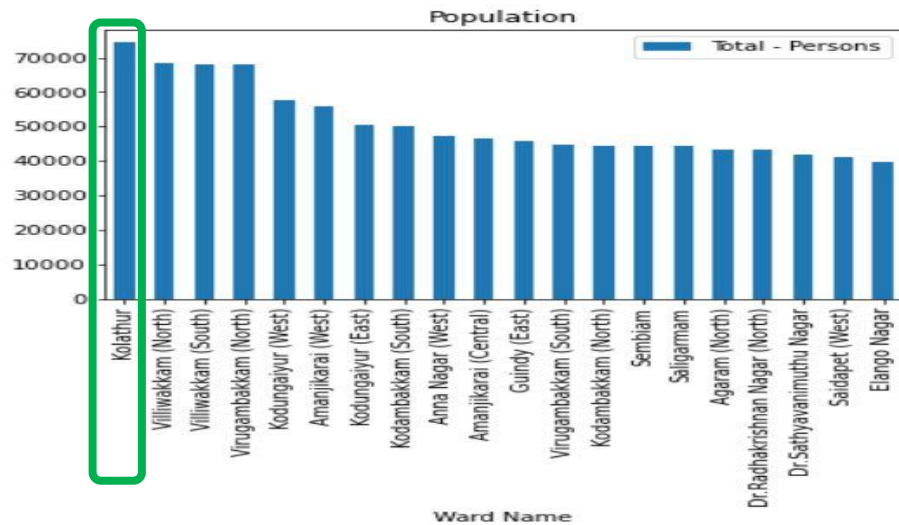**4.Visualize the findings in the map**

Findings are grouped into 2 clusters and color coded for the ease of presentation
First cluster is 10 hospitals closer to the highly populated area is **blue**
Second cluster is the remaining hospitals denoted in **green**

Exploratory Data Analysis
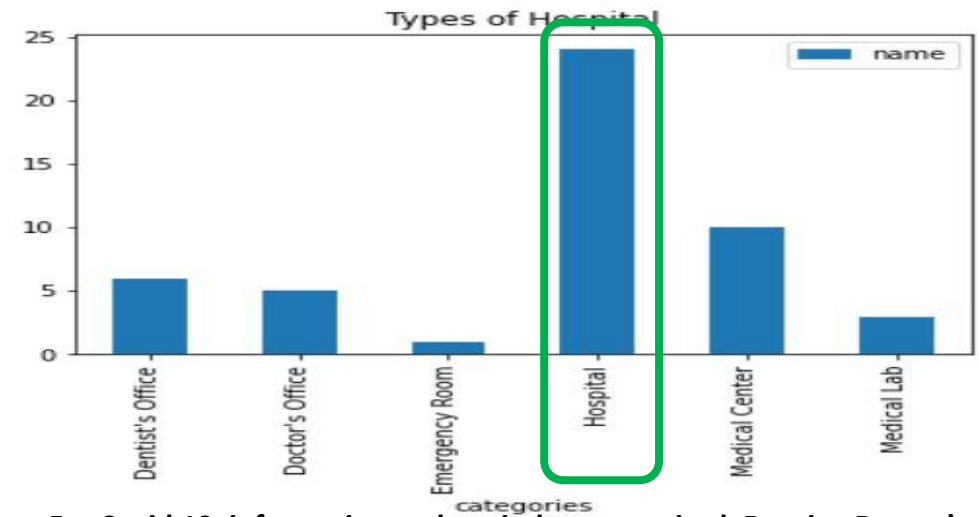
Data Representation
- Data Cleanup
  - Missing data
  - Extracting the data that is to be focused
- Visualization
  - Bar Graphs where used prioritizing

1. **Visualize** the population in different areas in Chennai to identify highly populated regions

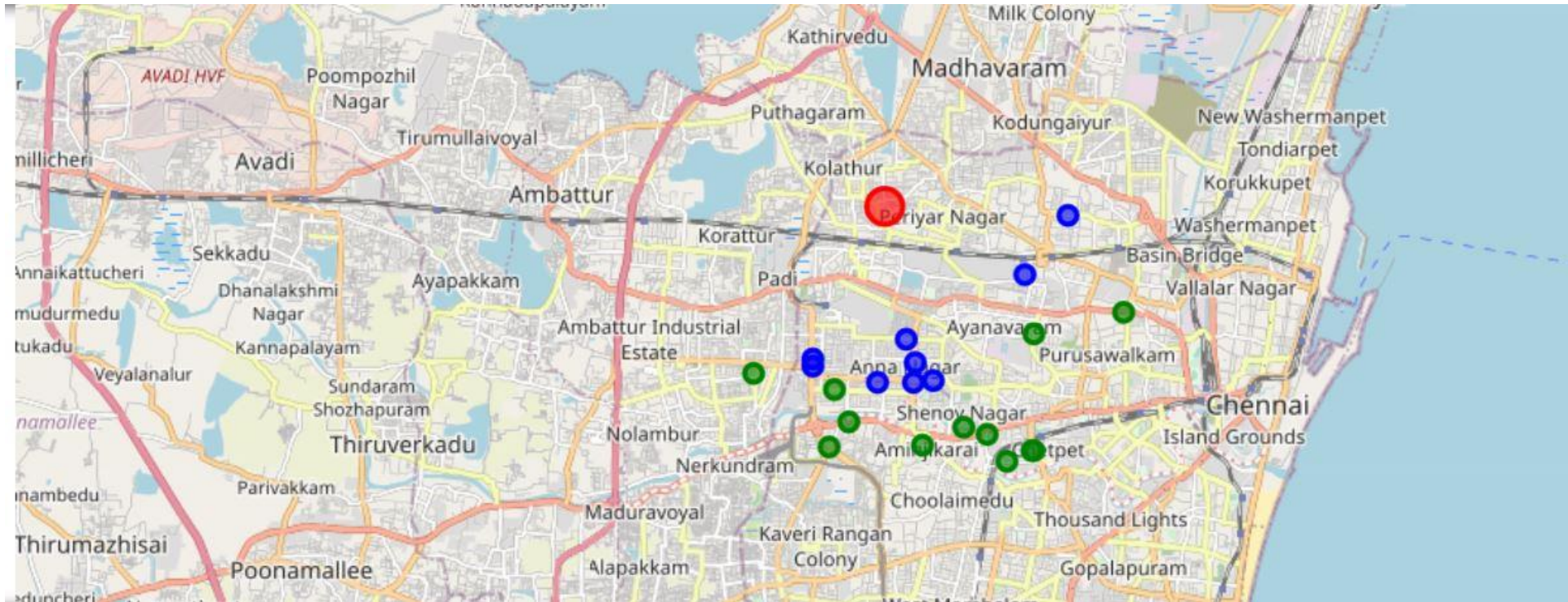**Kolathur is highly Populated Ward / Area among 143 wards in Chennai**

2. **Visualize** different categories of Medical centers within 5KM radius

For Covid 19, information on hospitals are required. Dentist, Doctor's office and labs are not of focus in this context

Results

- Kolathur is highly Populated Areas in Chennai
- No hospitals in within 3.5 KM from highly populated area identified (Kolathur)

Findings are grouped into 2 clusters and color coded for the ease of presentation

First cluster is 10 hospitals closer to the highly populated area is blue

Second cluster is the remaining hospitals denoted in green

Results

Venue Details that can help user to reach out to hospital or find way

```
Address ['Chennai', 'Tamil Nadu', 'India']
Likes 0
Tips  0
Hospital Name soundarapandian
Contact {}
Address ['India']
Likes 0
Tips  0
Hospital Name Apollo Medical Centre
Contact {}
Address ['India']
Likes 1
Tips  0
Hospital Name Ashwin Clinic
Contact {}
Address ['India']
Likes 0
Tips  0
Hospital Name Sundaram Medical Foundation OP Services
Contact {}
Address ['Chennai', 'Tamil Nadu', 'India']
Likes 0
Tips  1
Hospital Name km hospital
Contact {}
Address ['India']
Likes 0
Tips  0
Hospital Name Madras Medical Mission (MMM Hospital)
Contact {'phone': '+914426565961', 'formattedPhone': '+91 44 2656 5961'}
Address ['4-A, Dr. J. Jayalalitha Nagar, (Mogappair)', 'Chennai 600037', 'Tamil Nadu', 'India']
Likes 2
Tips  4
Hospital Name physiotherapy clinic
Contact {}
Address ['India']
Likes 0
Tips  0
Hospital Name Frontier Lifeline Hospital
Contact {}
Address ['India']
```

Conclusion and Future Directions

- The population visualization showed Kolathur had higher population than other areas within Chennai City.
- FourSquare API was used to collect all the hospitals in the surrounding of Kolathur within 5 KM radius by using venue category selection filters
- No hospitals in within 3.5 KM from highly populated area identified (Kolathur)

Limitations
- The accuracy of data depends purely depends on the data provided by FourSquare
- Number of Foursquare API is limited for developer version

Future Directions
- This is an example of how data analysis can help people find list of hospitals given constraints of lockdown and distance
- This model can be integrated with COVID19 applications for recommending medical help in remote locations of the city