Capstone Project – Delhi Population Control

Data based suggestions, to Indian Government by Uday Pratap Singh, to control Delhi population growth.

-By Uday Pratap Singh

(udaychauhan94@gmail.com)

INTRODUCTION

Delhi, officially the **National Capital Territory of Delhi** (**NCT**), is a city and a union territory of India containing New Delhi, the capital of India. It is bordered by Haryana (Gurugram, Faridabad, Jhajjar and Sonipat) on three sides and by Uttar Pradesh (Gautam Budh Nagar, Ghaziabad and Baghpat) to the east. As of 2016, recent estimates of the metro economy of its urban area have ranked Delhi either the most or second-most productive metro area of India. Delhi is the second-wealthiest city in India after Mumbai and is home to 18 billionaires and 23,000 millionaires. Delhi ranks fifth among the Indian states and union territories in human development index. Delhi has the second-highest GDP per capita in India.

However, Delhi is also one of the most polluted cities in India. Delhi faces many other issues too. One of the main root causes is its huge population. Delhi had an estimated 2016 population of over 26 million people, making it the world's third-largest urban area according to United Nations. Increased rate of population growth in Delhi is a matter of concern (Shown in Figure below). Delhi also has huge population of daily or frequent visitors, which makes the situation worse. This is already showing result as shortage of resources, increase in pollution, system breakdowns, etc.
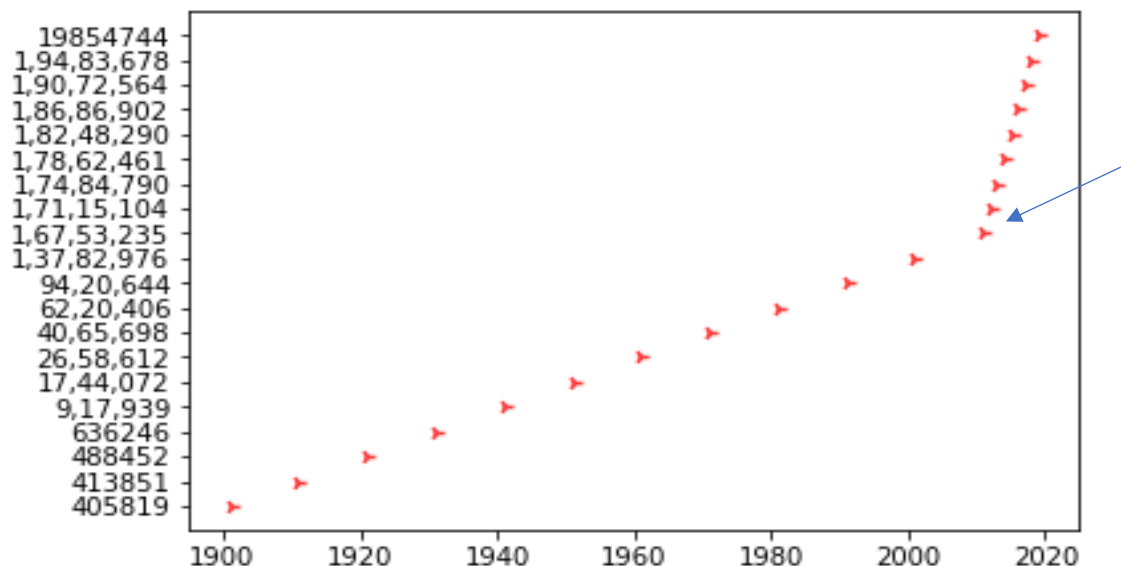

Figure: **Year**   vs   **Population of Delhi**

In the above plot, we can clearly see how population has increased over time and slope slope of the plot increased tremendously for past few years.

DATA

In order to accomplish this goal, locations a data of places in Delhi and nearby cities was be needed. I used Foursquare services to gain data of various places in Delhi and nearby areas, in order plot them on map.

'https://data.gov.in/' is a Government of India website that provide opensource data to public. I utilized this website to gain insights on employers in India, and Hospitals in National Capital Region. I also used Wikipedia, 'https://propstory.com', and 'www.mca.gov.in' to gain data on hospitals education sector and companies registered in India.

Our data was finally in 4 splits: foursquare database of Railway, foursquare database of Institutions of National Importance, a csv file of area wise distribution of prominent hospitals, and a csv file of state wise distribution of active companies.

METHODOLOGY

There are mainly 2 kind of population in Delhi, that significantly contributes to pollution and other issues:

- Who are resident of Delhi These are further of 2 kind:

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  - Who are by birth, resident of Delhi.
  - who have moved to Delhi for Job or Business.
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- Who regularly visit Delhi.

  One thing common in all of above is that they have some incentive to live in or visit Delhi: whether it is career, or best quality health care service of AIIMS, or anything else. Problem of Delhi can be solved if we can provide these incentives, at much more convenient location outside Delhi, to above mentioned population. Four most common type of such incentives are:

  - •Connectivity and availability.
  - •Education.
  - •Healthcare.
  - •Professional Career.

In this project, I utilized our data to examine some most popular incentive that people get in Delhi, and well do nearby area of Delhi perform on those incentive. I tried to find out where the scope for those incentives lies, nearby to Delhi.

In the process, I used location plots on maps to compare performance of Delhi vs nearby areas on for their development in education sectors and healthcare sectors. Mainly, I compared railway stations for connectivity, to check if there is any area nearby that depends on Delhi or other city to be connected to other parts of the country. A traveller who has to pass through Delhi for going to other city for some incentives, will prefer Delhi if he can find

same incentive in Delhi also. Similarly, for education sector, I compare count of Institutions of national importance, to get idea about the development of these areas in education sector. For these plots and comparisons I did input data from Foursquare data base. Some necessary data wrangling was done on that data to prepare it for plot. For plot data on map, we used 'folium' library. I also used some bar charts to compare numeric data, like no. companies in Delhi and nearby states, or companies' density in Delhi and nearby states, and no. of prominent hospitals in Delhi and nearby area.

RESULT & DISCUSSION

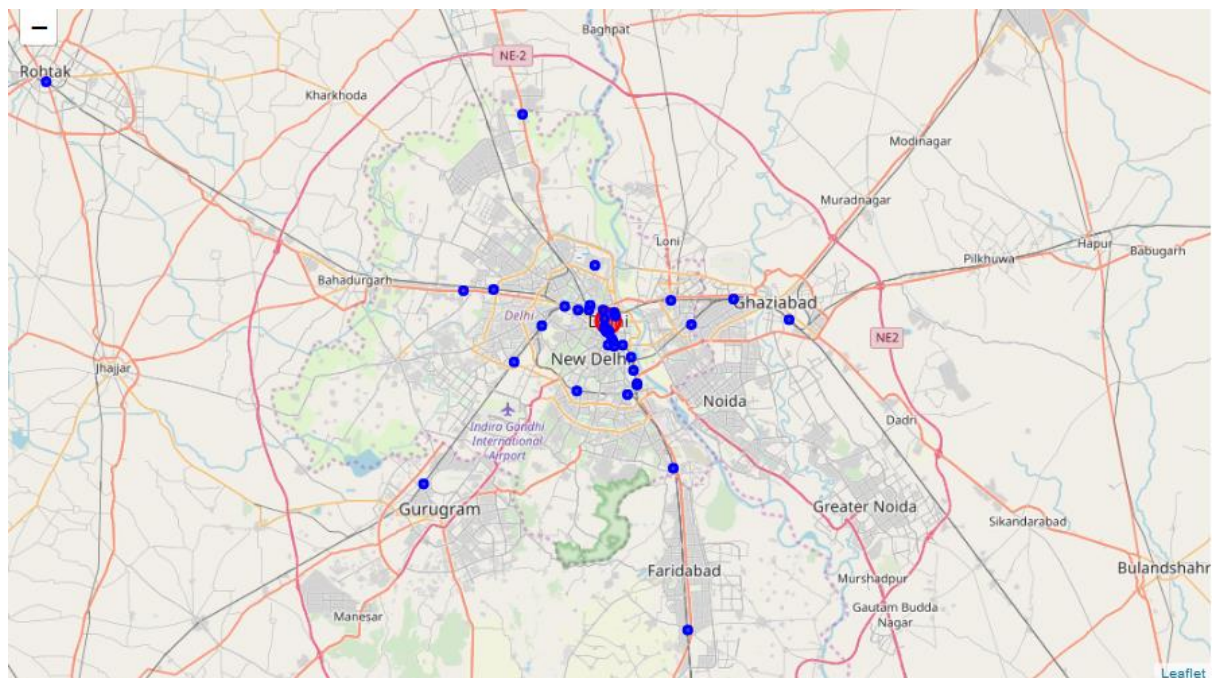## 1. Connectivity and availability:

Figure: Locations of Railway stations as Blue Dots.

In above plot, we can clearly see that there's no railway station in Noida or Greater Noida, while there are many railway stations in Delhi. Thus, if someone usually travels a lot will prefer to live in Delhi over Noida. I someone come here from another city to buy something or some services, or for medical purposes, etc, by train, he/she will have to pass through Delhi, even if he wants to go to Noida. If he has to go through Delhi and service or product he is looking for is available in Delhi, then why will he go to Noida instead of Delhi?

SOLUTION: There must be a railway station in Noida, so that people do not need to enter Delhi, if Noida, with a railway station, is more convenient to them.
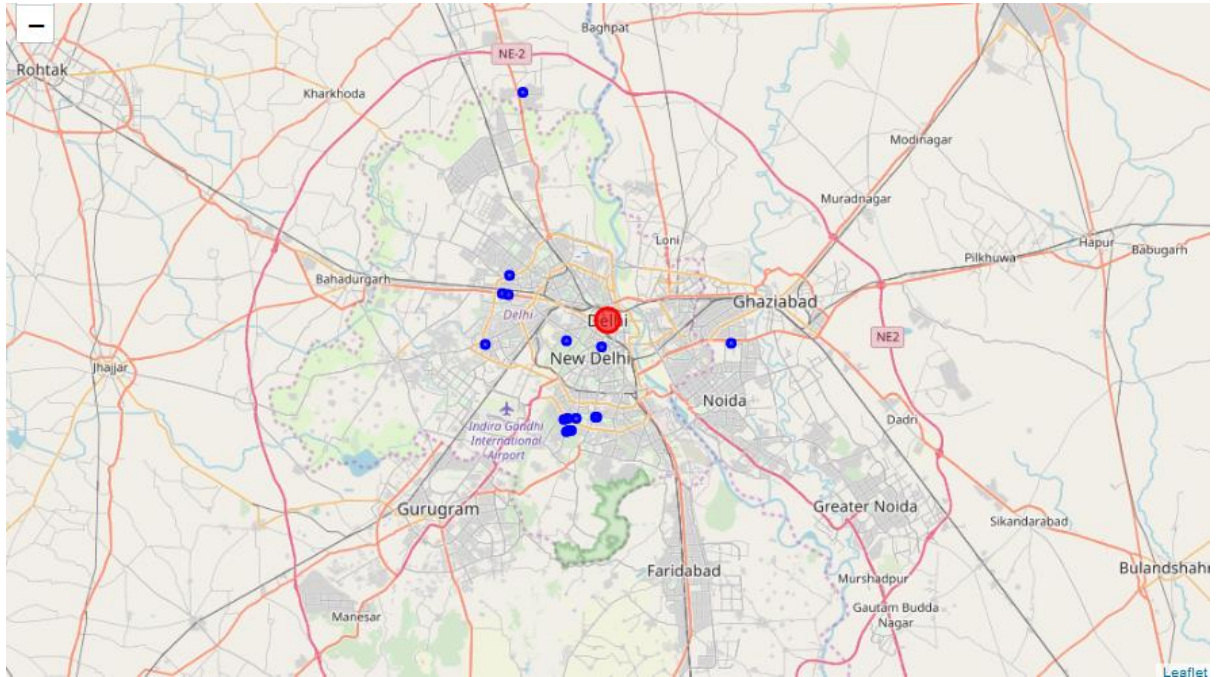
2. Education:

Figure: Locations of Institutions of National Importance as Blue Dots.

Above plot displays that some of the best institutions of country are densely situated in Delhi, while few in surrounding. Even though NCR region is known for quantity of private institutions, still lack of best quality institutions as compared to Delhi make these places much less attractive than Delhi.

SOLUTION: With quantity, NCR and nearby cities also need some best quality education bodies to attract people as much as Delhi do.

3. Healthcare:

Number of Prominent Hospitals in Delhi and neighboring cities
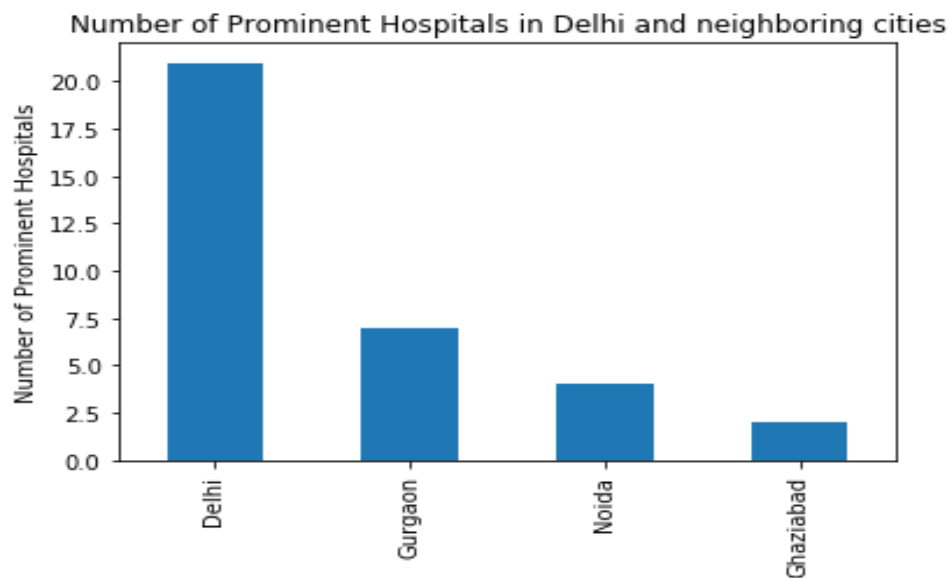

Graph shows, neighbouring cities are incapable of attracting public, to their hospitals, as much as Delhi do.

SOLUTION: All the neighbouring cities of Delhi need more quantity of prominent hospitals, to divert public from Delhi to these cities.

4. Professional Career:

Companies Counts of Delhi and Neighboring States
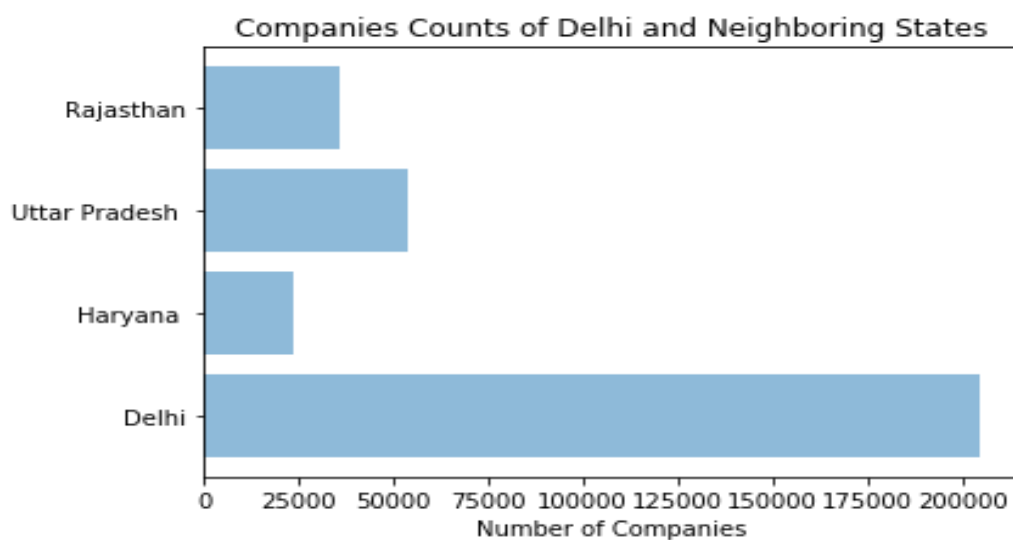
Plot tells, there is a huge difference in the no. of companies in Delhi and that of in any of the neighbouring state. But wait, Delhi is much smaller in area than any of these neighbouring states. To get the true idea of the situation, let's plot average density of companies in these states.
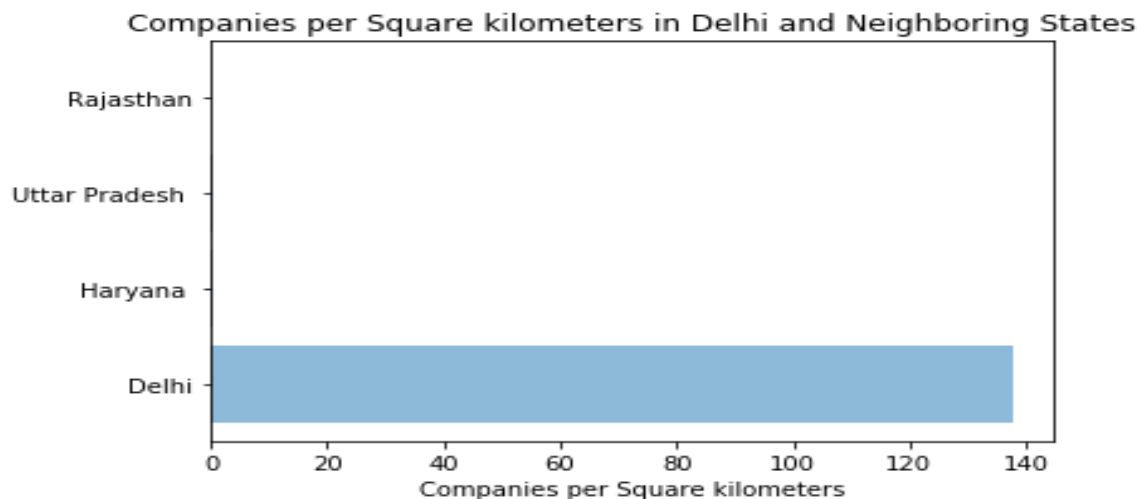
Companies' densities are almost negligible in these neighbouring states when compared to companies' density of Delhi.

SOLUTION: Policies should be made to attract new companies and old well settled companies to build their offices and provide employment in different cities

CONCLUSION

Growing population of Delhi is a serious matter of concern; following steps may help, up to some extent to decelerate the population growth:

1.There must be a railway station in Noida or greater Noida, so that people do not need to enter Delhi, if Noida, with a railway station, is more convenient to them.

2.With quantity, NCR and nearby cities also need some best quality education bodies to attract people as much as Delhi do.

3.All the neighbouring cities of Delhi need more quantity of prominent hospitals, to divert public from Delhi to these cities.

4.Policies should be made to attract new companies and old well settled companies to build their offices and provide employment in different cities of these neighbouring states.

Data Sources:

- https://foursquare.com/
- https://data.gov.in/
- https://en.wikipedia.org/wiki/List_of_hospitals_in_India
- https://propstory.com/top-5-hospitals-in-noida/
- www.mca.gov.in/.../Monthly_Information_Bulletin_CorporateSector_Jan_2016.pdf
- https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html
- https://economictimes.indiatimes.com/news/politics-and-nation/delhi-could-be-the-worlds-most-populous-city-by-2028-but-is-it-really-prepared/articleshow/68027790.cms?from=mdr

Disclaimer:

Some data may not be totally accurate, but data are accurate enough to give us the real scenario insights.