

# PREDICTIVE MEASURES FOR MITIGATION OF COVID-19 COMMUNITY TRANSMISSION

SUBMITTED BY:

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# INTRODUCTION

## Coronavirus !

- Coronaviruses are family of viruses that cause diseases generally in birds and animals, which in some cases get transmitted to humans, like the one the whole world is currently facing
- COVID-19 or Coronavirus Disease 19 is the name WHO (World Health Organization) coined for this new disease which as of 26 April 2020, consumed at least 203,705 lives and more than 2,935,876 confirmed cases
- It causes respiratory tract infections that can range from mild to lethal.

# Situation In India

- ❖ India being world's second most populous country with its high population density was at high risk if the contagion spread
- ❖ A pre-emptive 21 days lockdown and then extended 19 days lockdown indeed helped in containing the rate of spread of the virus
- ❖ IMA (Indian Medical Association) & ICMR (Indian Council of Medical Research) have been on their feet even before the first case was recorded in India, still as we speak there are at least 27.3k active cases and as many as 825 deaths and we are only in 2nd Stage of Transmission

# Problem & Stakeholders

- ❖ All economic machineries have come to a standstill and the liquidity in market has dried out.
- ❖ Every government in the world, every CEO of every company, every worker either daily-wage or salaried, every front-line COVID worker is interested in finding some way that can break the existing transmission chain and slowly the world returns to normalcy. Hence, a large number of people are stake holders in this

# Data Acquisition & Pre-Processing

## ❖ Datasets included:

- ❖ Daily COVID-19 patient database across Indian states
- ❖ Case time series database, which included patient data attributed by date
- ❖ Covid-19 Daily tests dataset
- ❖ Some other supporting datasets which included, Indian coordinate

## ❖ Data Pre-processing:

- ❖ Extensive duplicity and missing values were removed
- ❖ Irrelevant datatypes of columns corrected
- ❖ Formatting of data corrected

# Methodology ?

- ❖ Identification of the districts worst hit by coronavirus and use them as hotspots
- ❖ Make use K-Means Clustering algorithm to cluster them into similar cluster
- ❖ Find the centroid of these clusters and use those coordinates to identify the location of interest using Foursquare API

# Observations

- ❖ Total Confirmed cases:
- ❖ Maharashtra was worst hit by coronavirus with over 8 thousand total infections.

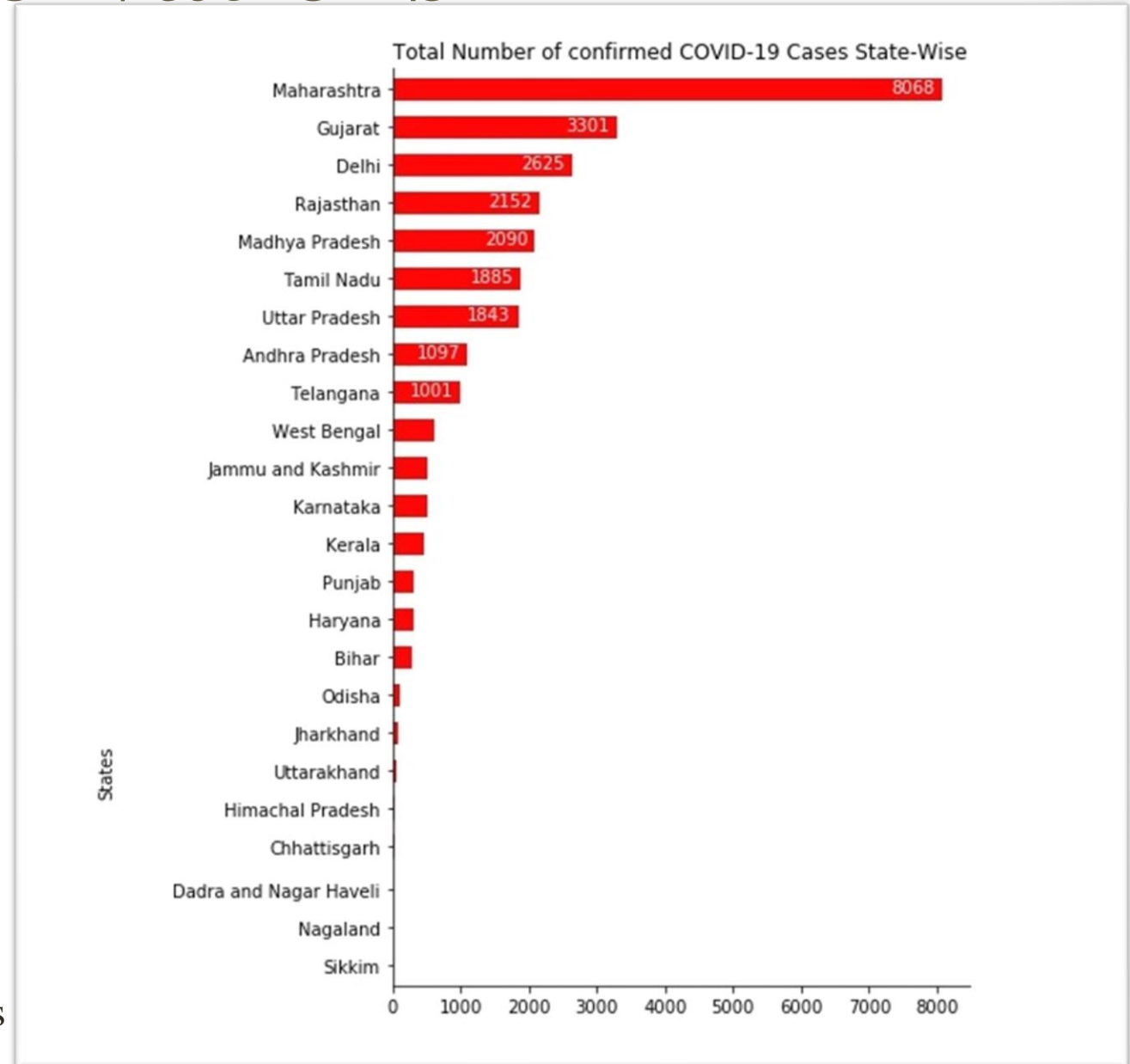
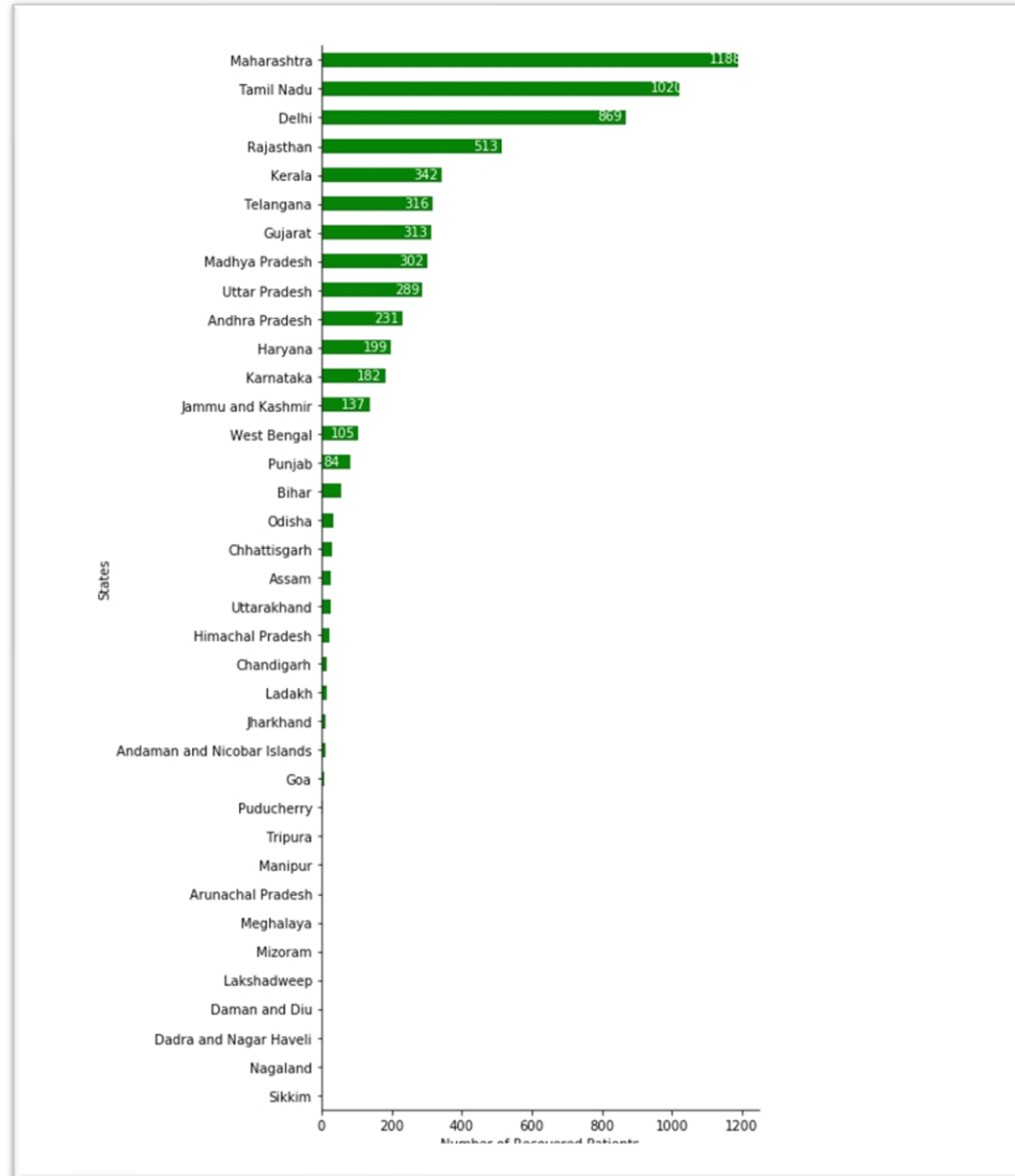


Fig. 1 Total Confirmed Cases

## ❖ Total Recovered:

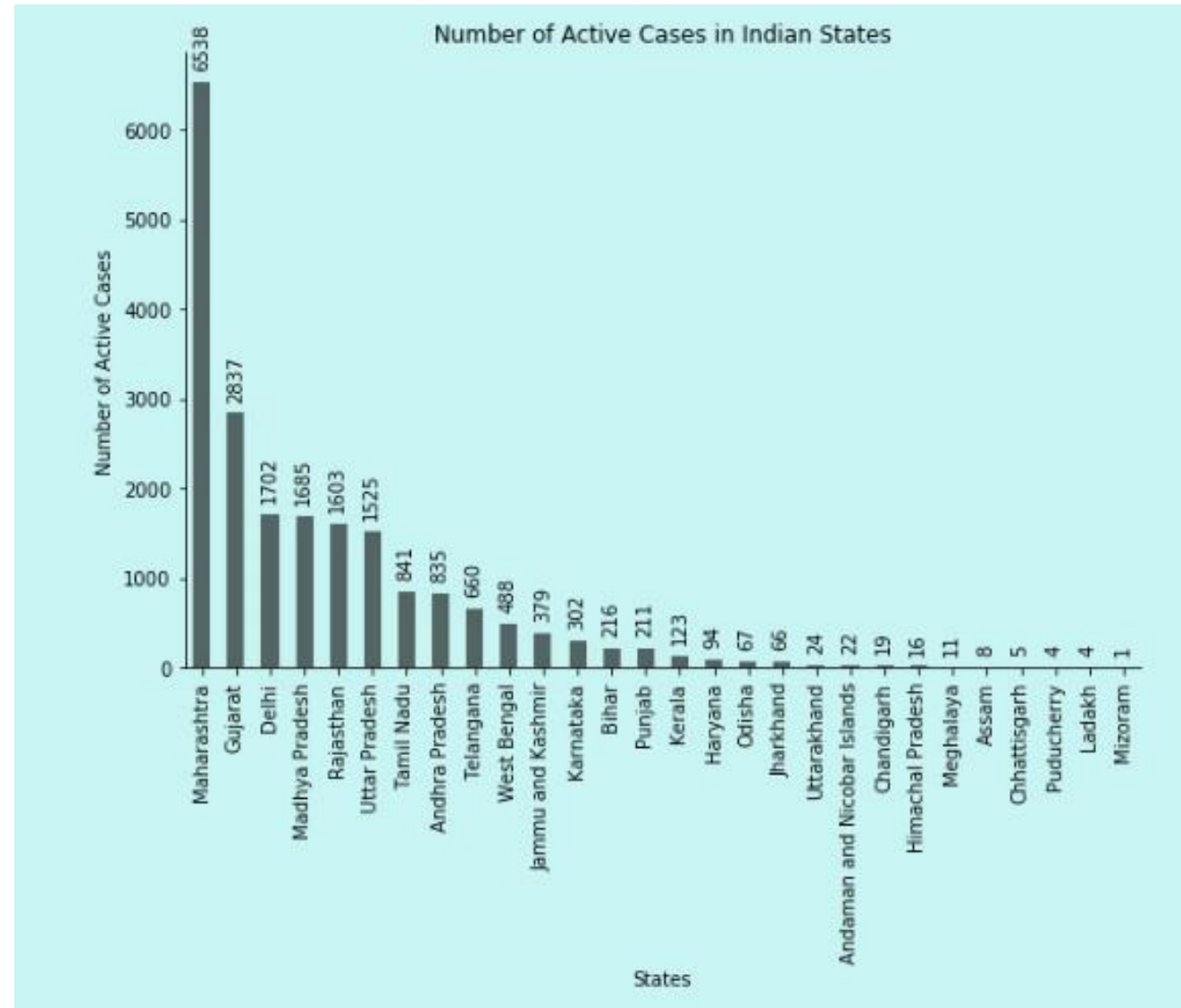
❖ Maharashtra again has the most recovered cases, followed by Tamil Nadu and Delhi





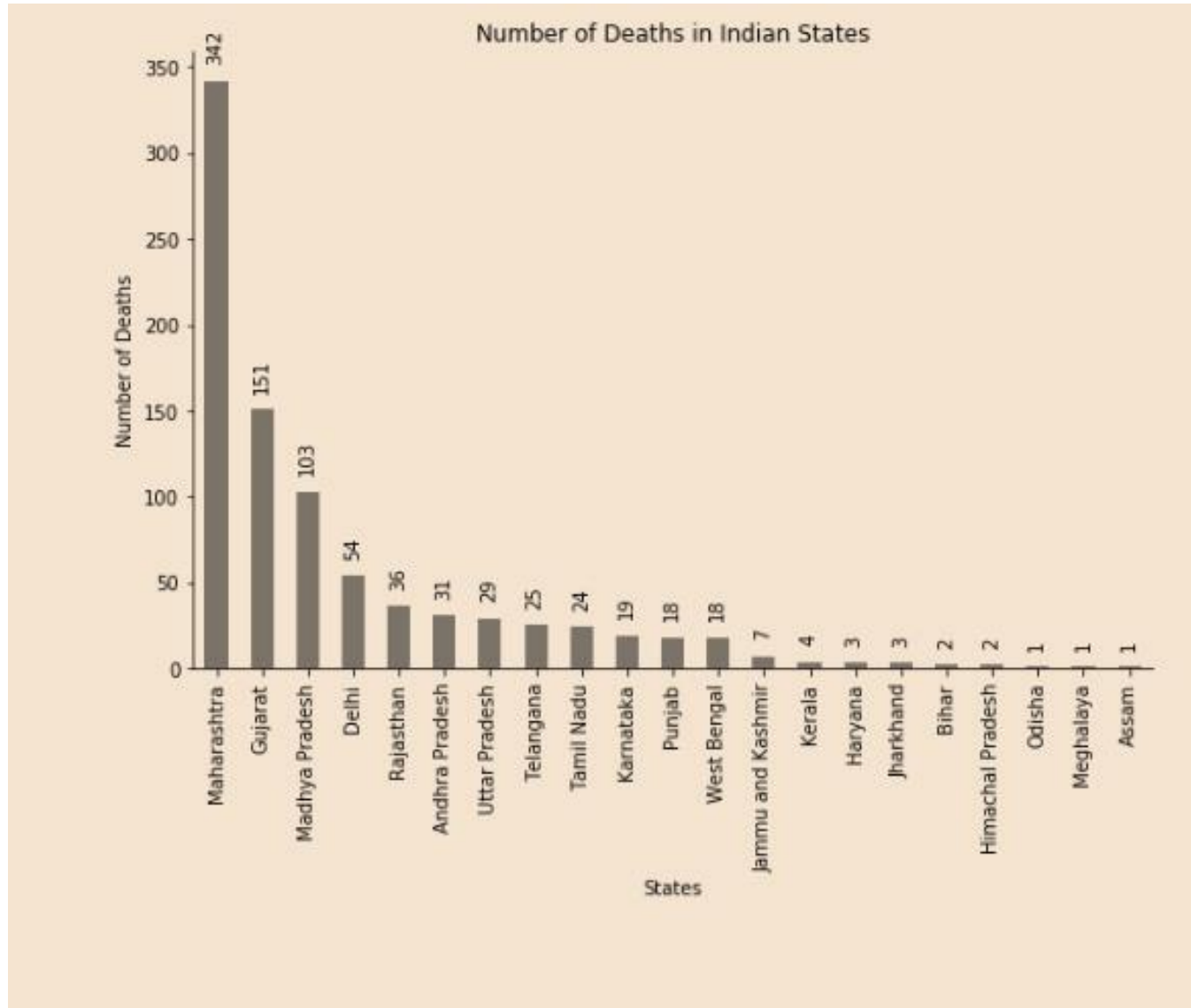
## ❖ Total Active Cases:

- ❖ When we are trying to differentiate between multiple treatment techniques used by states to counter patients and their response
- ❖ Hence, pick the one with best response



## ❖ Total Deaths:

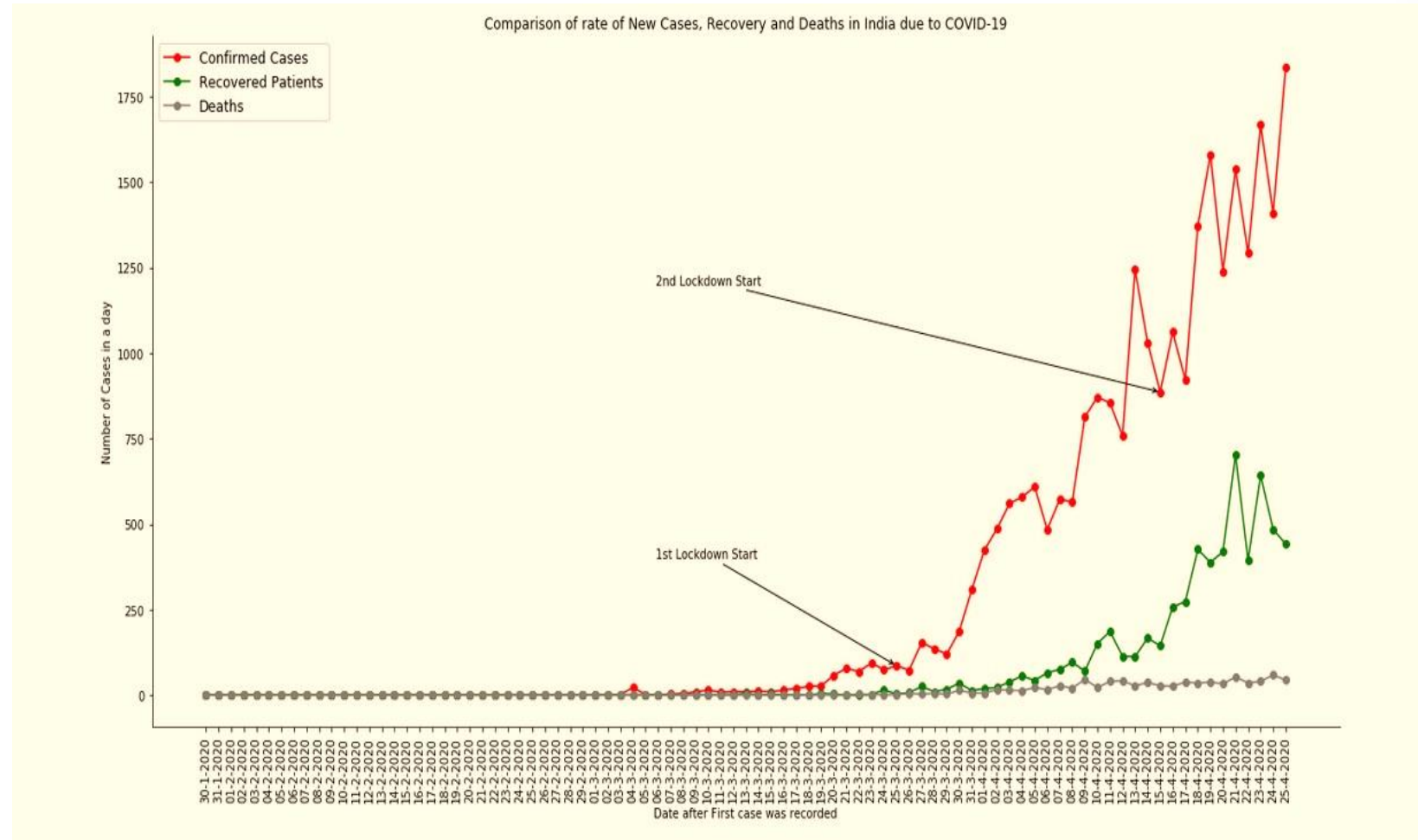
❖ Maharashtra again recorded most deaths



# Effect of Lockdown

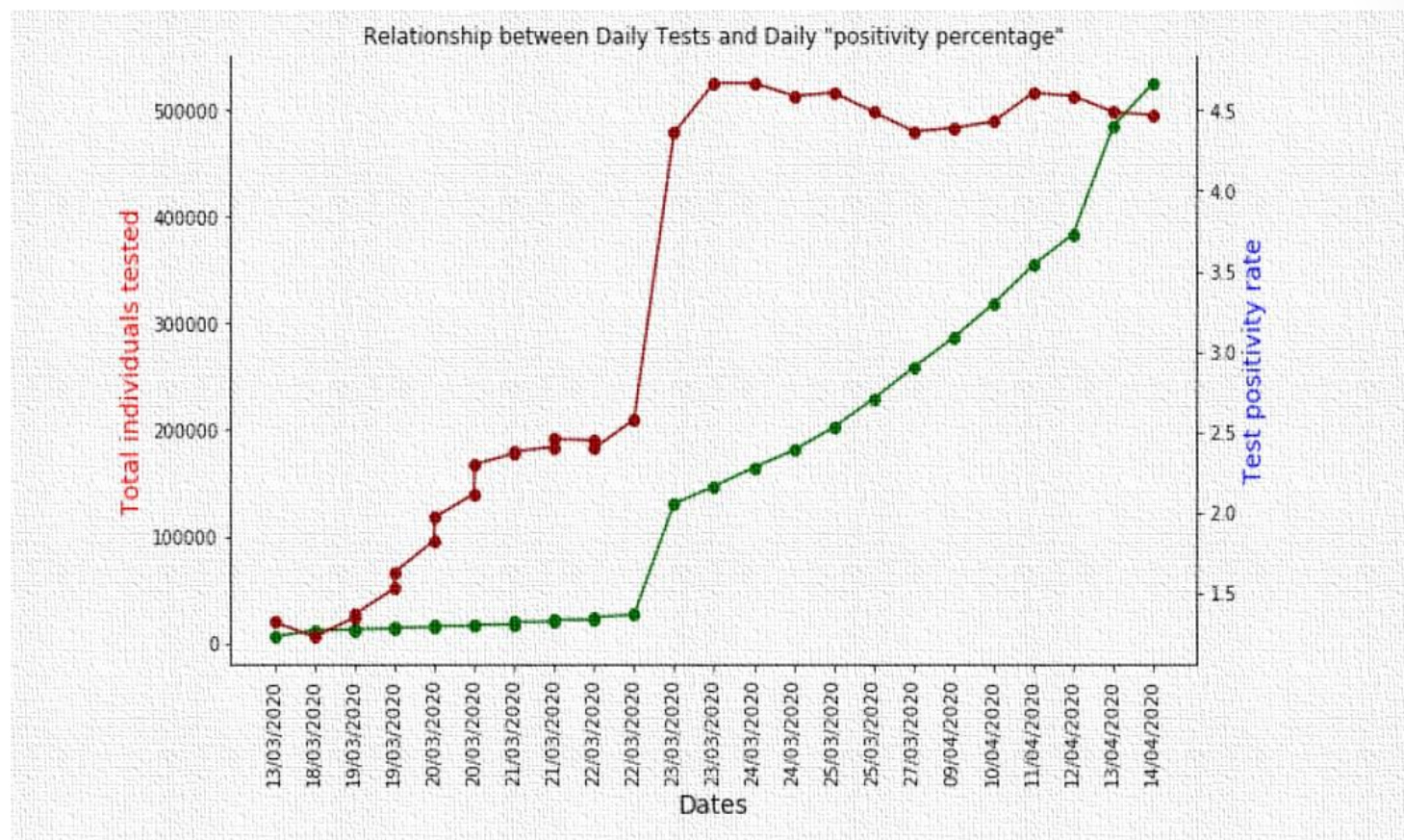
## ❖ Takeaways:

- ❖ Post lockdown the daily confirmed cases rose
- ❖ The sudden rise can be attributed a huge chunk of people found positive in congregation in Nizamuddin, Delhi, India



# Total Daily tests vs Percent Positives

- ❖ Testing numbers drastically improved immediately after imposing the first lockdown
- ❖ So did the percent positive rate
- ❖ But we can still observe that the increase is almost linear and not exponential
- ❖ Hence, we evaded the gloomy ‘Stage III’ of Community Transmission.





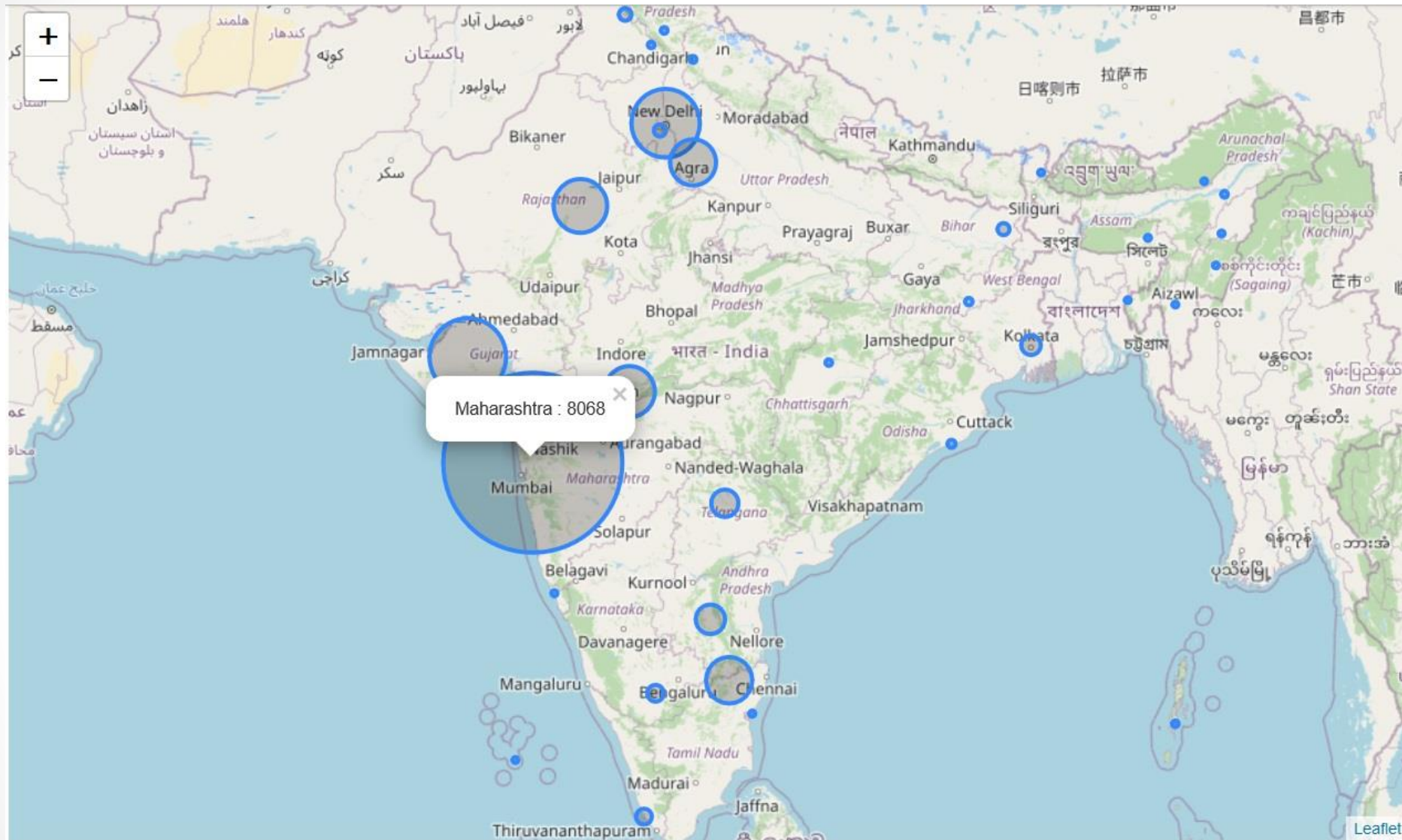


Fig 6 Indian States based on Severity of Cases

# COVID-19 Clusters Identified in India

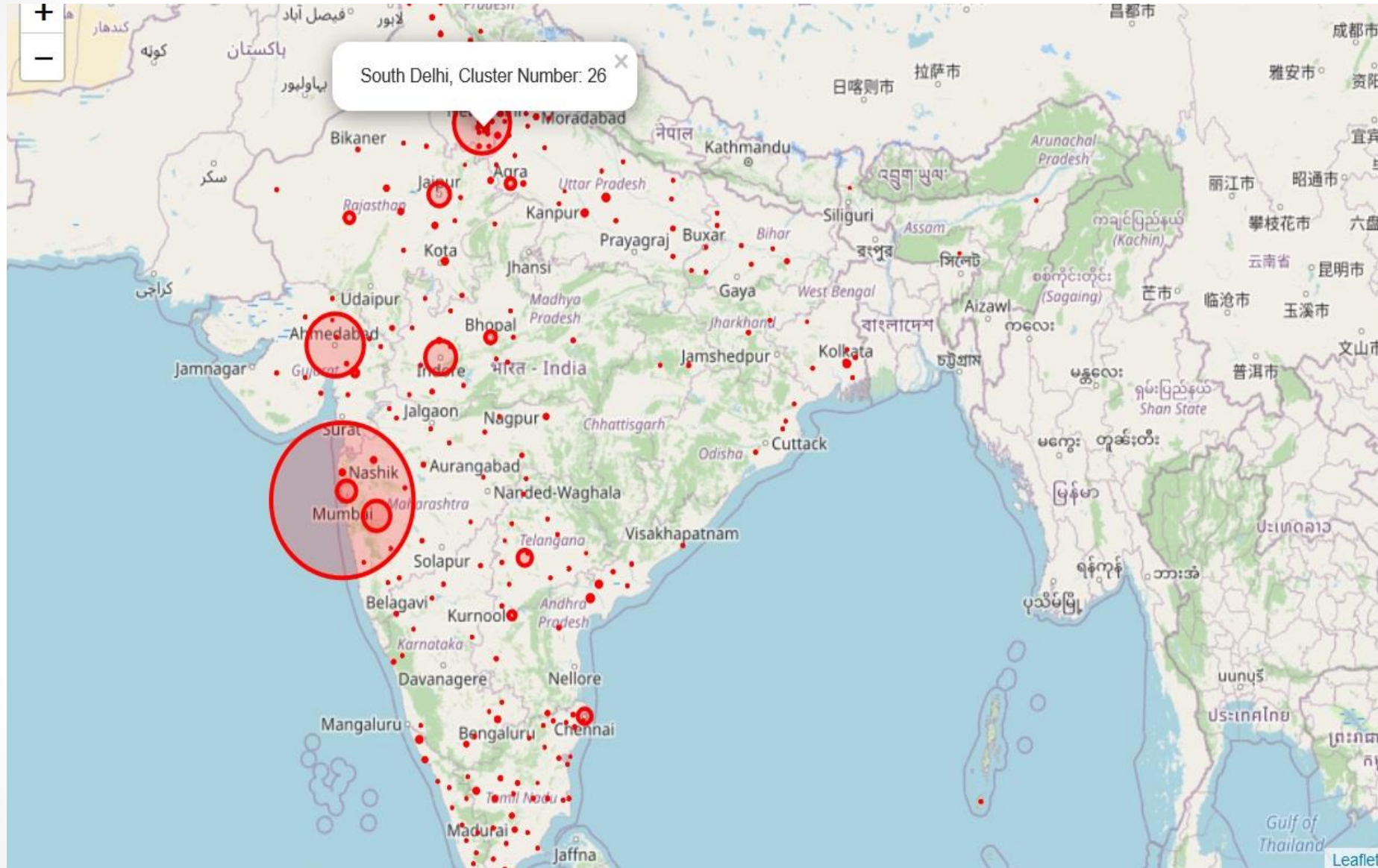
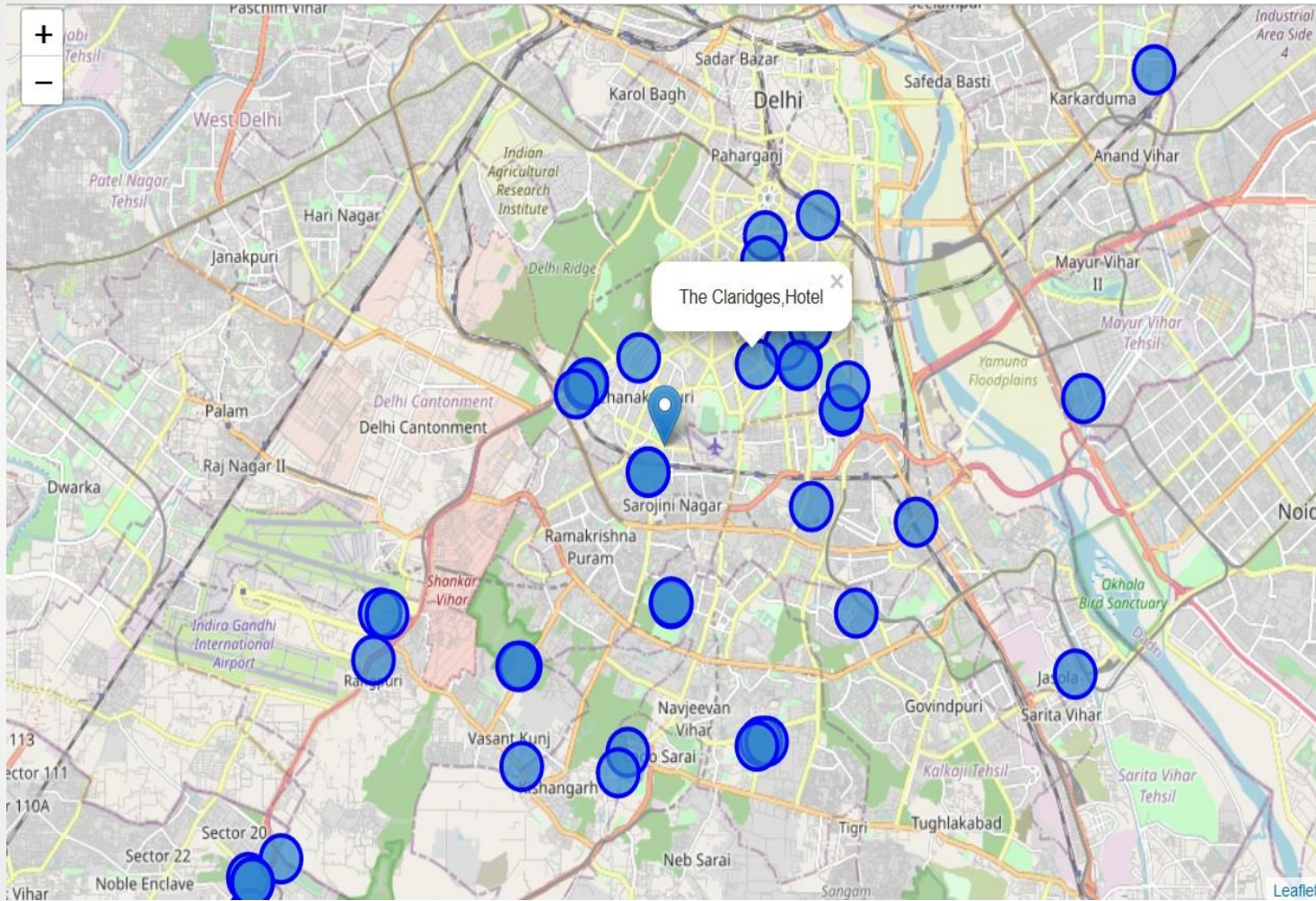


Fig. 7 COVID-19 Clusters in India



# CONCLUSION



- ❖ Method was highly efficient in identifying the mean location of clusters, and we as we can observe from the figure, we are easily able to identify the locations of interest
- ❖ We can easily approach these venues
- ❖ Recommended locations for 'Testing Centres' was not provided as there were restrictions to the category of venues fetched by Foursquare API

# FUTURE SCOPE

- ❖ The analysis can be further improved by better recording the data in patient database
- ❖ More information about testing will provide better insights as to what is actually happening in the states and how the state governments are handling this crisis
- ❖ Foursquare API can be improved as more categories of venues can be added into it for better analysis



# THANK YOU...

FOR YOUR PATIENCE