

Graph Frequency Analysis of COVID-19

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Abstract/Aim of the project:

- Analysis of COVID-19 cases across 100 districts of India
- Study of pattern of contagion spread during the second wave.

Importance/Application of the task:

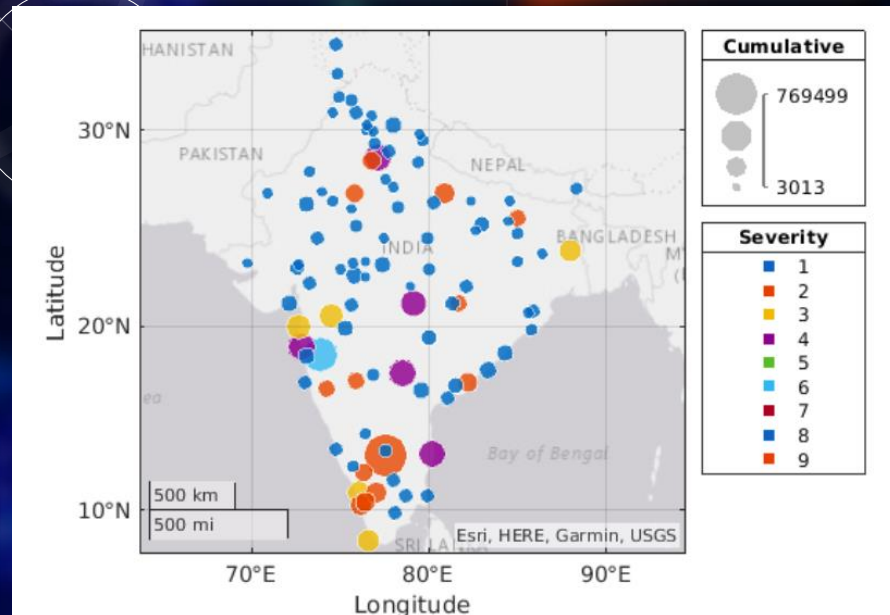
1. Using the analysis we can map contagion spread to distance parameter.
2. We can decide if the outbreak was due to movement of people(inter-district) or a sudden one(intra-district)
3. Provided us a future scope for plausible solutions

Challenges and Motivation:

1. The existing studies are only bases upon time but the analysis done here links the time and distance
2. Use of distance as a parameter instead of commute flow gives a different perspective

Methods/ Algorithms/ Important Concepts:

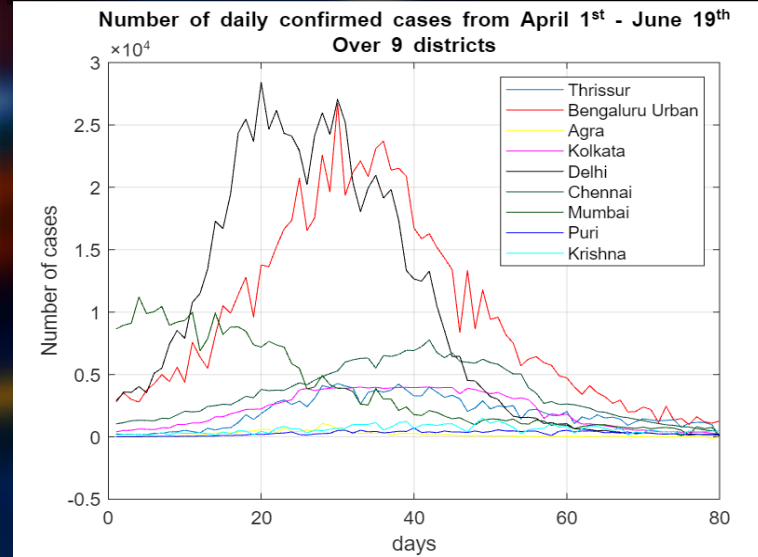
1. Graph Fourier Transform
2. Graph Filtering
3. Eigenvalues and Eigenvectors of Laplacian Matrix
4. Geographical plotting on MATLAB



References:

- https://en.wikipedia.org/wiki/Laplacian_matrix
- https://en.wikipedia.org/wiki/Haversine_formula
- <https://api.covid19india.org/csv/latest/districts.csv>

Sreenya Chitluri – 2020102065
Smruti Biswal – 2020112011



Conclusion:

- Getting Spatio-temporal analysis of COVID-19 cases in the second wave
- Application of graph signal processing into future pandemics and hopefully controlling them.

- Introduction to graph signal processing - Ljubisa Stankovic, Milos Dakovic, and Ervin Sejdi
- http://data.icrisat.org/dld/src/definition_standard.html