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Problem Statement:

Prioritization Vaccine Delivery and effective allocation of limited vaccines among the Districts of India considering the important Factors like Demographics, Health System, Cold Chain Infrastructure and Vulnerable Population (Co-Morbidity, Senior Citizens) using AI/ML.

Like How Human Development Index computed. I have computed a composite index of vulnerability at district levels based on above 4 Domains using Geometric Mean. And compared the composite index with Present Mortality Rate of corresponding District. The reason for this approach is to achieve the High interpretability of model.

Variables Considered to calculate sub-indices
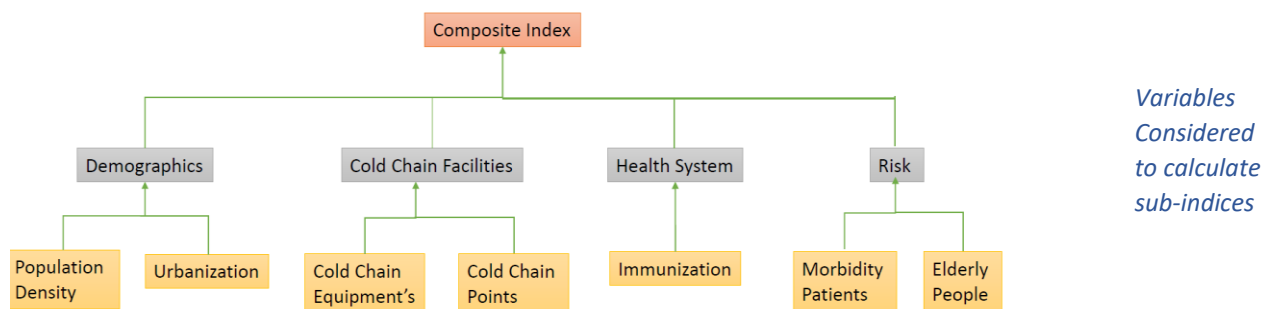
Higher the District Composite Index represent the negative effects like Higher chances of getting infected, vaccine wastage. A Detailed understanding on individual factors can be achieved by observing sub-indices (Indices of 4 Domains).

Using Machine Learning Frameworks like Scikit-Learn I have applied Unsupervised ML Algorithms to Find the Best Clustered Groups of Districts and derived a score to each district for ranking

Benefits of the Model are:

Effective Allocation of Vaccines: Based on the Derived scored for each District We could Allocate the Optimal Number of Vaccine to all Districts

Risk Management: Using the data, we could find the early sign warnings of vulnerable districts due to any of above factors.

Cold Chain Infrastructure: Factors that affects the cold chain infrastructure were considered like Inequal Distribution of Cold Storage Capacity, Cold Chain Points across Cities and Rural Areas

Interpretability: Model can be used to make decisions and understand the cause of it
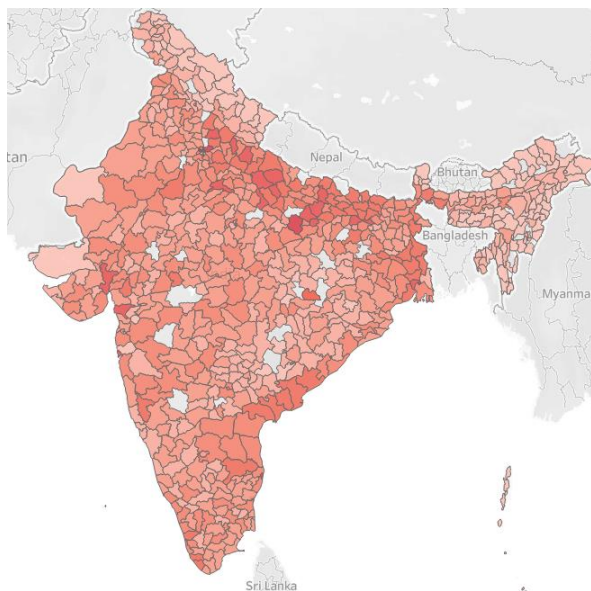
The above choropleth map depicts the vulnerability score of districts for vaccine prioritization