Name: CMVS (Covid19 Mobile vaccination support)

The Problem It Solves:

CMVS is designed to solve broadly four aspects of the mobile vaccination drive
1) Registration process
2) Higher priority to critical regions
3) Distribution of the vaccine
4) Vaccine wastage reduction

1)Registration process: Due to a shortage of vaccines in our nation, it is challenging for the general public to register for the vaccine. One needs to constantly keep an eye on the availability of the slots for vaccination only to find out that slots get filled within milliseconds, making it practically impossible to book the slot if you are not tech-savvy enough to use scripts/browser extensions to book the slots.
To counter this, CMVS eliminates the slot booking system and makes the process of registration simple by providing the following two ways:

- _Geotagged registration_: Users can register using a simple form that automatically records users' geo-location for easier dispatch of mobile vaccination vehicles.
- _Telephonic registration_: CMVS allows for telephonic registration of vaccine so that non-privileged people without Access to the internet can also have a chance, To enable this CMVS plans to Partner with NGOs and volunteers for aiding telephonic registration

Post-registration users can get an estimated time of availability of vaccine based on many factors such as the severity of cases, Age demographic in the area, and other logistical factors, such that areas facing critical situations can be given higher priority.

2)Higher priority to critical regions:
As of now Vaccination is done on a first come first serve basics, which on its is fine but due to The usage of scripts/browser extensions creates an artificial barrier of entry and promotes a discriminatory environment rather than helping the people in need. The current process caters to a small group of tech elites.
Hence CMVS considers the severity of cases in the area (deaths, critical cases) to prioritize the availability of the vaccine to critical regions

3)Distribution of the vaccine:
CMVS uses the data from the form to create zones based on the proximity of the people and the maximum number of vaccines that can be carried by a single vehicle to said zone.
These zones are then allocated with a point system that ranks zones based on the factors such as.

- _The density of registered users_
- _Age demographic of the area_

- *The severity of cases in the area (deaths, critical cases)*
- *Accessibility to the zone (roads and traffic)*
- *Proximity to other zones*

Then the zones are mapped onto a weighted graph to find the optimal way of routing by using Dijkstra's algorithm to optimize

- *Time*
- *Distance*
- *Impact*

So that vaccination can be dispatched to the areas efficiently.

4)Vaccine wastage reduction:

To minimize vaccine wastage, vaccines are pre- rationed (calculated) based on the demographic of the zone, Only the required number of vaccines are then dispatched to that area.

Features:

1)Geo-tagging registration

During registration location of the user is automatically recorded and saved in the DB

2)Priority Routing

Using the location, recorded zones are created based on the proximity of the people and the maximum number of vaccines that can be carried by a single-vehicle.
And the most efficient route is created to optimize.

- *Time*
- *Distance*
- *Impact.*

Each zone is given weighted points such as:

- *The density of registered users*
- *Age demographic of the area*
- *The severity of cases in the area (deaths, critical cases)*
- *Accessibility to the zone (roads and traffic)*
- *Proximity to other zones*

This weighted graph can be used to route the mobile vaccine van for optimized distribution of the vaccine.

3)Vaccine dosage estimation (based on number of people in the particular zone)

As Vaccine get supplied in vials and each vial contains 10 dosages and we have to use all 10 dosages within 4 hour

- *To eliminate the wastage of vaccines, the doses are pre-calculated based on the number of people registered for the vaccine in the area.*

- *We'll make an algorithm that makes pairs of 10 nearest people for the nearest available mobile vaccination van So that we get everyone vaccinated within the 4hr time limit.*

- *We'll prevent temperature freezing, as the vaccine range of temp is only 2°C - 8°C and prevent wastage.*

- *We'll make sure we are using those vaccines first, which have an earlier expiry date.*

4)Auto booking based on the availability of the vaccine
Based on the availability of the vaccine user can opt to auto book, such that as and when the vaccine is available, his slot can be booked

5)ETA on Vaccination date
Estimation regarding time and date of vaccination can be given to the user based on previously collected data (routing/availability)