HACKATHON 2k21 e-cell IIIT Pune

1. NAME (Van-Xinate)

2. TAGLINE (Vaccine jab at your finger tips)

3. FEATURES

User End

1. Registration:

Users will be able to register themselves for vaccines by using setu api. Once registered for the vaccine they can register for home delivery of the vaccine by submitting their location.

2. Receive updates from Vaccine provider:

Once opted for home delivery of the vaccine, the vaccine provider can send updates like registration confirmation and date and time scheduled of the arrival of the van for vaccination so that users are informed about the vaccination time .

Admin End

1. View Van Data:

Admin will be having a database of available vans and their status which would be manually updated.

2. View Customer Data:

Customer's data of registration number and location will be visible to admin for better administration.

3. View Cluster's location on the map:

Using sophisticated algorithms our program will form clusters of areas where vans should reach for door to door vaccination. The centroid and radius of the cluster will be visible to the admin on a map.

4. Change status as Vaccinated people:

Once vaccinated the website will automatically change status of the user as vaccinated once or twice depending upon vaccines received it's database.

5. Send Notifications to Customers:

Whenever vans are ready with vaccines and have scheduled a time for vaccination, a notification will be sent to users to inform them about the vans arrival time so that they stay ready.

6. Send Notifications to Van Drivers:

Whenever clusters are ready the admin will send a message to all the van drivers to give information about location of clusters.

Backend:

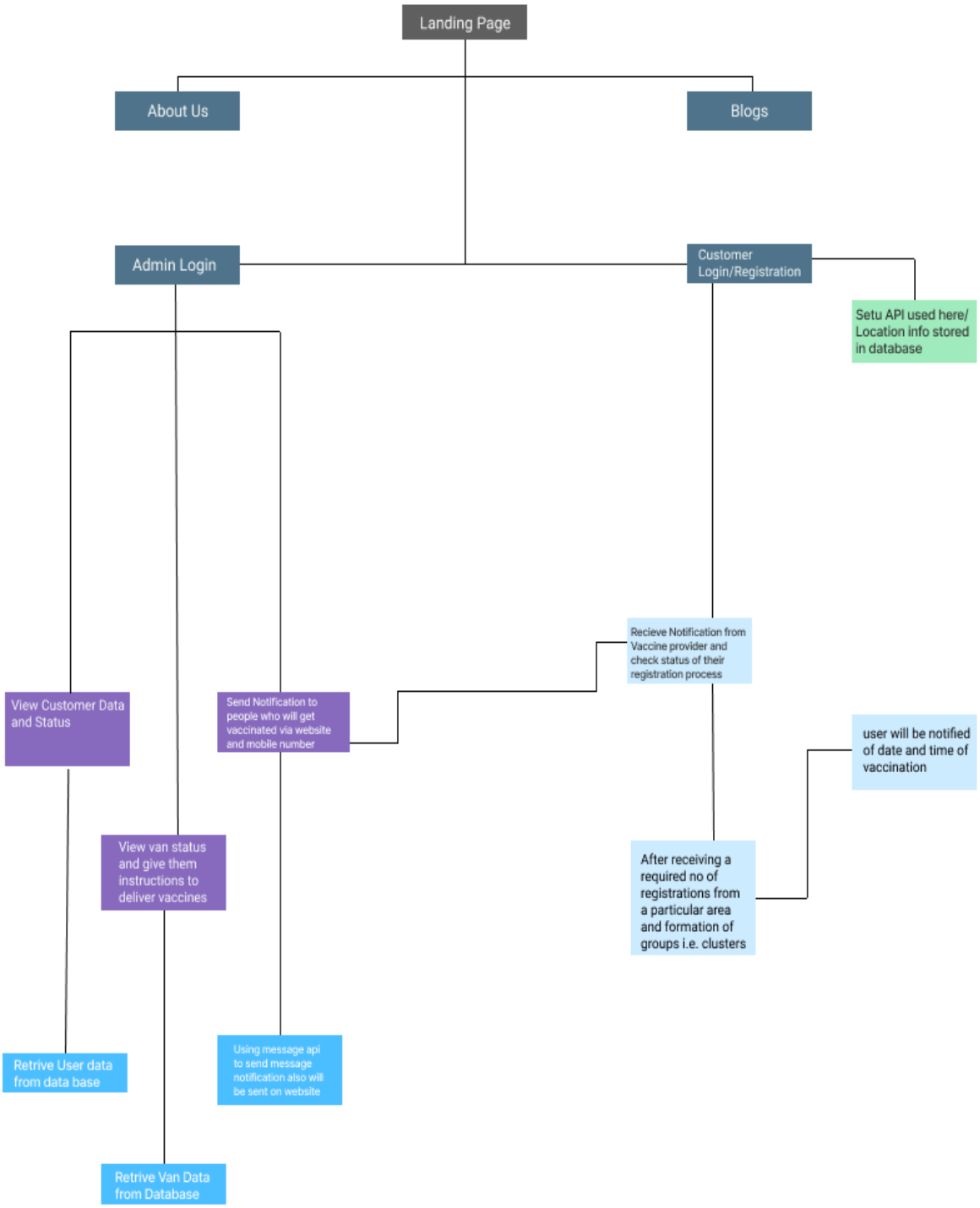
1. **Formation of Clusters:**

   By using location data of users our algorithm will form clusters and centroids where vans should reach to vaccinate people.

2. **Handling Databases:**

   Database of customer data and van data would be hand

4. UI(Flowcharts, Webpages , and how website will look like)



Site Title

Menu

Hello

Vaccinating at doorsteps

We help vaccines reach people when people can't reach vaccines.

Register Yourself

Services

Some interesting stories

Photo by Olya Kobruseva on Pexels.com

Why is the Second Dose so Important? #LargestVaccineDrive

Photo by Miguel u00c1. Padriu00f1u00e1n on Pexels.com

COVID-19 Vaccine and Heart Issues: Myths and Facts | Dr. Bharat Vijay Purohit | CARE Hospitals

Photo by August de Richelieu on Pexels.com

Why Should I follow COVID Appropriate Behaviour, even after vaccination?

Meet us better

Our Vaccine Drive in Numbers

370
People completed with First Dose

23
People completely Vaccinated

5
awards won

100%
Implementation

★★★★★

"Excellent Service"

Their service is brilliant! I really hope some of them are
Their service is brilliant! I really hope some of them are
now using your service.

Fiona

★★★★★

"Love the flexibility"

We are very happy with the box and we value that we can have the standard box or choose our own.

Joseph

★★★★☆

"Fantastic quality"

I'm really appreciating the quality and presentation. The flavour of the veg is outstanding.

Michelle

figma link:https://www.figma.com/file/L8bp7zTETufddjENE9IC7Y/UI-for-IIITP-hack?node-id=0%3A1

5. IMPLEMENTATION(algorithm and processes)

1. We will build our website mostly using react. All the databases will be recorded in mySQL and retrieved as per required.

2. We will use a modified version of k-means++ algorithm to mark clusters on the map where people are located. When such clusters are marked, vaccine providers will be able to find where they should send vans to ensure maximum utilization of vaccines.

3. We will implement k-means clustering by using skmeans library of javascript. Once we receive location data in the form of longitude and latitude from users it would be saved in the database. This data will be retrieved in this javascript program and then we will find the number of clusters to be made first by finding minimum variation for some sample values of k (k is the number of clusters to be formed).

4. Once we get k value with minimum variation, we will run the skmeans program and find the final centroids of the clusters.

5. We will define radius as a property of a cluster as the distance from centroid to farthest point of the cluster.

6. We will plot all the location and data on the map using node plot lib and some google map api.

7. Finally this map would be visible to the admin.

8. Also this program will record data of clusters of respective users in the database.

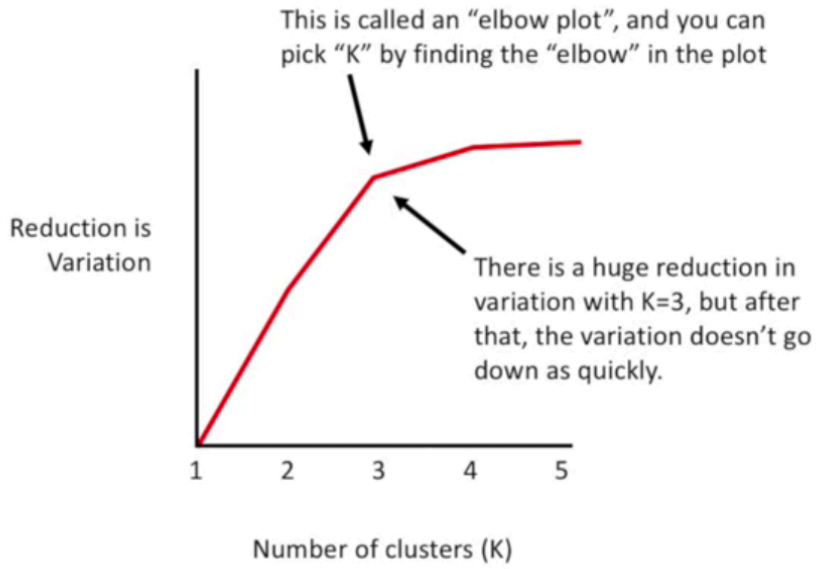
9. Finally all this data will be visible to the admin. As per availability of vaccines the admin will send instructions to van providers for vaccination. Also the admin at the same time will also send notification to users to inform them about their time of vaccination.

10. In the end, the vans with the required number of vaccines will reach the user's location and vaccinate them.

11. Notifications sent to users will be visible to users on the website. Notification will also be sent via sms to their mobile phones.

6. Challenges

1. There were a lot of algorithms we tried to implement theoretically and the best one we found was the k-means clustering method . Yet in this method also some hurdles are there like we need to define the number of clusters. We researched some youtube videos and then found a proper method to define this k value. This was achieved by checking the change in variation we get in each successive value of k, and when we get an elbow point (see fig). All this coding was done in JavaScript.



2. Even after getting k value we still have to properly plot all this data on the map. Finding all the map APIs and then going through it's documentation was tiring work. Since we wanted to run the entire application properly, we needed to ensure every api, database and javascript programs work properly with the frontend. We will achieve this by properly dividing all the work between all team members.

Problem:

The main concern in the door-to-door vaccination process was the task to consume vaccine vials within the limited time . Since after opening a Covid-19 vaccine vial, all doses in it have to be administered within four hours. Else, they will go waste and have to be destroyed which will be a huge loss to the current situations of the country.

A vaccine vial contains a certain number of doses and to avoid wastage we need to use a maximum amount of it.

Another problem in the door-to-door vaccination process is the travel time required to reach one house to another.

Solution:

The vaccination process can be made user friendly by sorting and grouping registered people on the basis of their location in a defined range i.e. cluster formation.
And confirming their registrations only when we receive enough(doses in a vaccine vial) registration from a given area so that no or minimum wastage of vaccines occurs.
This will help us solve the hurdles of wastage and time taken in travelling as we will have to cover places which are near that are within the defined range
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