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HEALTH APP

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ABSTRACT

The COVID-19 pandemic has taken the world by storm. Countries all over the world are devising various policies and processes to combat the deadly virus. For a thickly populated and large country like India, the challenges are manifold when dealing with diseases spread; infectious epidemiologists play a vital role. To support them, but also to offer a self-protecting tool to everyone in the context of COVID-19 pandemic, we propose a cross platform app to track the infected persons, by using their location history. This paper mainly focuses on the development of an Android application which is able to track the individuals who had contact with the infected ones, getting the travel history of primary contacts ,taking some question based Covid Self-Assessment for the user , alert people about staying away from covid hotspots and wearing a mask while going out will reduce the covid cases in big numbers. Not even covid perspective this app will Providing home medication for minor health issues like headache, finger cuts etc. and also we built patient monitoring system which is to make monitoring more flexible. To achieve all these functionalities, many tools, and APIs from Google like Firebase and Geofencing API are used in this application. Therefore, this application can be used as a tool for creating further social awareness about the arising need of precautionary measures to be taken by the people of India and also We claim that the app might be useful in any diseases spread, not only in the current global situation.

Keywords: Geofencing, Covid - 19, Android App, Home Medication, Covid Hotspot, Wear Mask.

I. INTRODUCTION

Corona virus created a huge impact by affecting not only the people but also the world economy. Since the first case, the disease had consumed thousands of lives in 4 months because of its viral spreading capacity. Corona virus disease (COVID-19) is an infectious disease caused by a newly discovered corona virus. COVID-19 affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization. Most common symptoms include fever dry cough tiredness, less common symptoms include aches and pains sore throat diarrhea conjunctivitis headache loss of taste or smell a rash on skin, or discoloration of fingers or toes and serious symptoms difficulty breathing or shortness of breath chest pain or pressure loss of speech or movement. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. Corona virus spreads when a people getting contacted with the infected person or the droplets generated by them when they cough or sneeze. The major issue with this disease is the symptoms; you will get to know that you are infected after a period of one week. Until that point, you might have infected more than hundred's. The best way to control the disease is by isolating the patients from others. Isolating the infected person is very simple. But the people who got contacted with the infected ones will be roaming and spreading the disease. To solve this problem there is a need of perfect system to track the people who had contact with the infected person. This project, include the development of an Android application which can able to track the individuals who had contact with the infected ones and alerting people about staying away from covid hotspots, wearing a mask while going out will reduce the covid cases in big numbers.

II. METHODOLOGY

The block diagram comprising of the different components of the presented system for health app represented asshowninFig.1

A. Login Activity: Whenever a user installs an application, it is directed to login activity where the user should enter his mobile phone number and should enter One Time Password to get login. Login activity is just one time activity. If the same user comes back to use the application, the user will be directed to Home activity instead of asking the user again to get login.

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B. Home Activity: In this Layout, all the available features will be listed out. Users can use UI (User Interface) to interact with the application and make use of available functionalities in an app.

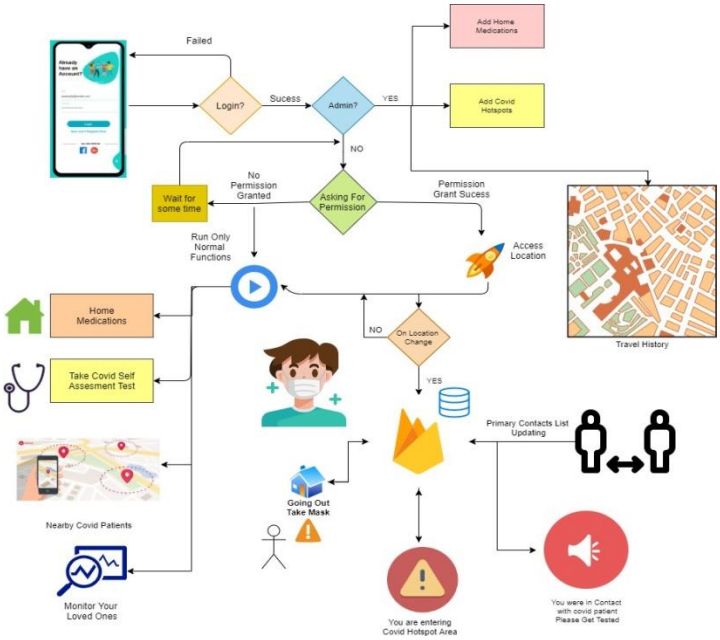

Fig. 2.1: Proposed block diagram

C. Permission: Asking the user to grant the permission to access location is also a key area. Without user permission, Android OS will not allow us to access the location and proceed further. If permission is not granted by the user, the user can make use of only normal functionalities.

D. Home Medication: Users can search for home remedies for minor health problems and get the medication which can be made in home itself. For example: Headache, Back Pain, Cough and others. Feedback is taken at the end whether it really worked for them ornot.

E. CovidSelf Assessment Test: User can self assess them whether they got covid or is it just a normal cold or fever. To do that they need to take a quiz based on symptoms they have. They will be asked some questions based on symptoms and at the end suggestions will be given accordingly. Whether it is critical or it's just a normal cold or fever nothing related to covid.

F. Admin Activity: Admin have some features that the normal user can't access. Admin can add new home medicines through the admin panel. In Maps activity, admin can add or delete covid hotspot list. So that other users will get alert whenever they cross or dwell inside covid hotspot area.

G. Take Mask Alert: Users can add Home or Office location using GUI Map interface. Whenever a user goes out of that location, User will get an alert message to put on a mask. This will be helpful for those who regularly forget to take a mask with them. Users can add or delete home areas any time they wish. By deleting home locations they won't be getting notification again regarding wearing a mask for that particular deleted area.

H. Near By Covid Patients: It's very much vital to know about the current covid cases nearby to stay alert as much as possible. For that Map activity will be available inside the application, if the user wants to know nearby covid cases, users just need to select an option regarding this and all the nearby covid cases will be shown on the Map, which is easily understandable.

I. Covid Hotspot Alert: When one is travelling from one place to another, there are a lot of chances that he/she might pass through covid area. Chances are too less of covid spread when they are travelling by their own vehicle but if they are going by walk and passing through covid area. There are high chances of covid spread and it is very essential to take care during that condition. Our app will raise a notification whenever they dwell inside covid area. They get an alert message, to take care of themselves.

J. Primary Contacts: Whenever the same app two users are nearby approximate 10m in distance they will be considered as primary contacts and all these details will be sent to firebase and can be accessed later. As we collect all the primary contacts, if a user is found to be covid positive after some days, a list of primary contacts

will be accessed from firebase and an alert to get tested will be sent to those who were in contact with these users

K. Tracking Travel History: If one of the users of our application found to be covid positive, his travel history is accessed from firebase and made a plot on Map to visually analyse where and all a user roamed and to take care about making those area covid hotspot ornot.

L. Patient Monitoring: Here User can monitor sensor readings of loved ones either it might be a small kid or elder one. Users will get an alert message or notification when something goes wrong at the other side.

III. MODELING AND ANALYSIS

To meet all the objectives, Major key Technology this project make use of are:

a) GPS

b) Geofencing

GPS: GPS stands for Global Positioning System. It's a technology developed by the U.S. Navy and currently owned by the U.S. government and overseen by its Air Force. It's free for everyone to use and primarily a North American utility even though GPS is commonly a regional name for the same sort of system in other locales. GPS is a radio navigation system. It uses radio waves between satellites and a receiver inside a mobile phone to provide location and time information to any software that needs to use it. Mobile Phones don't have to send any actual data back into space for GPS to work; only need to be able to receive data from four or more of the 28 satellites in orbit that are dedicated for geolocation use. Each satellite has its own internal atomic clock and sends a time-coded signal on a specific frequency. Receiver chip determines which satellites are visible and unobstructed then starts gathering data from the satellites with the strongest signals. GPS data is slow, and this is by design, satellites run on rechargeable batteries, and sending a fast signal hundreds of thousands of miles would require more power. So it'll take up to a minute to get geolocation. Phone's GPS receiver uses the data from these signals to triangulate where you are and what time it is.

Geofencing: Geofencingis a location-based service in which an app or other software uses GPS, RFID, Wi-Fi or cellular data to trigger a pre-programmed action when a mobile device or RFID tag enters or exits a virtual boundary set up around a geographical location, known as a geofence.

Fig. 3.1

Depending on how a Geofencing is configured it can prompt mobile push notifications, trigger text messages or alerts, send targeted advertisements on social media, allow tracking on vehicle fleets, disable certain technology or deliver location-based marketing data. Some geofences are set up to monitor activity in secure areas, allowing management to see alerts when anyone enters or leaves a specific area. Businesses can also use geofencing to monitor employees in the field, automate time cards and keep track of company property.

Location Access in Android:

GPS and network providers are two different ways to get Android device location (latitude and longitude). GPS and network location providers have got their own advantages and we may have to use both in sync. In in-door situations GPS may not provide the location quickly and the network location provider is quick. Network location provider uses our mobile connectivity provider and will give the nearest tower location. GPS gives the exact location of where we are standing.

a) Network Location provider is comparatively faster than the GPS provider in providing the location

coordinates.

b) GPS providers may be very slow in in-door locations and will drain the mobile battery.

c) Network location provider depends on the cell tower and will return to our nearest tower location.

d) GPS location provider will give our location accurately.

Feature 1: Primary Contacts

As explained above the working of geofencing technology. To build the list of primary contacts of users, we make use of GEOFENCE technology i.e for all nearby users geofence will be created and monitored by the android system. If in the case, a user entered the geofence of another user, It means that those two users are very much nearby and it is considered as a primary contact and the phone number of the other user will be added as primary contact. Shortly, we can say that if another user comes in contact they exchange the phone numbers and these details will be stored in the firebase for future use cases. Which will be helpful in sending them alert messages after one gets covid positive.

Feature 2: Put on a Mask alert

Users will add home location by clicking on Map Activity. And that location is considered a home location. Users can add more than one location as home. Application creates virtual geofences at all the added home locations. And now the application will monitor whether the user enters, dwells or exits that geofence. Here we are monitoring Home geofences. Indirectly we can say that whether a user is entering or leaving the premises, and we can give them an alert at suitable condition. Application checks geofence id, if triggered geofence has the name starting with home "it raises a notification like Going out take Mask?".

Feature 3: Entering Covid area alert

This feature works as similar as feature 2 but here geofences are added by admin at admin panel. While rising notification, Application checks whether triggered action is related to feature 2 or feature 3 based on geofenceid which was given during creation of geofence.If triggered geofence has the name starting with covid "it rises notification like

"You are Entering a Covid Area" or "You are Leaving Covid Area"

Feature 4: Past visited location of covid patient

As we can access the user location regularly, we will be storing all the location coordinates in the firebase with respect to date. If any user found to be covid positive, his location data is fetched from firebase and plotted on Map. Authority can visualize and take suitable actions to make some areas as covid hotspots.

Feature 5: Near By Covid Patients

Admin will be having the list of covid patients and their respective locations. All these locations will be updated to firebase. Whenever any user wish to see the nearby covid patients, they just need to select the option and can visualize the nearby patients on map plot.

Feature 6: CovidSelf Assessment test

Users can self assess them whether they got covid or is it just a normal cold or fever. To do that they need to take a quiz based on symptoms they have. They will be asked some questions based on symptoms and at the end suggestions will be given accordingly. Whether it is critical or it's just a normal cold or fever nothing related to covid.

Feature 7: Home medication

Users can search for home remedies for minor health problems and get the medication which can be made in home itself. For example: Headache, Back Pain, Cough and others. Feedback is taken at the end whether it really worked for them or not.

Feature 8: Patient Monitoring

Here User can monitor sensor readings of loved ones either it might be a small kid or elder one. Users will get an alert message or notification when something goes wrong at the other side. The Other end for demonstration purposes we will be placing an esp8266 with a heart rate sensor. All the readings are being uploaded to firebase with the help of our own site which is developed from scratch. Users can send some basic commands from android to esp8266.

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IV. RESULTS AND DISCUSSION

1) Fig 4.1 (a) , (b) , (c) , (d) shows all the features we add in app

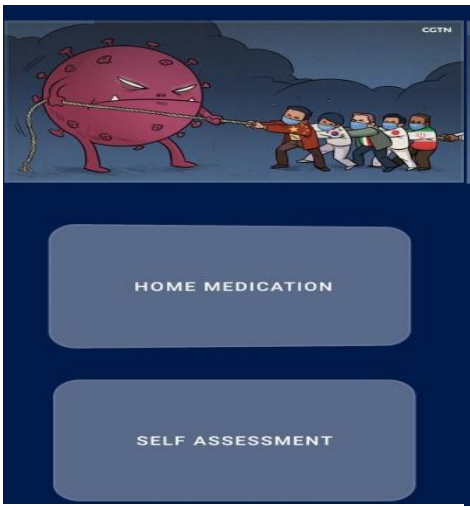

Fig. 4.1(a)

Fig. 4.1(b)

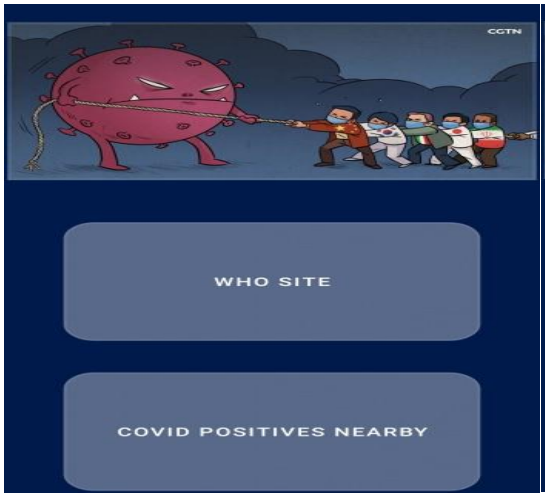

Fig. 4.1(c)

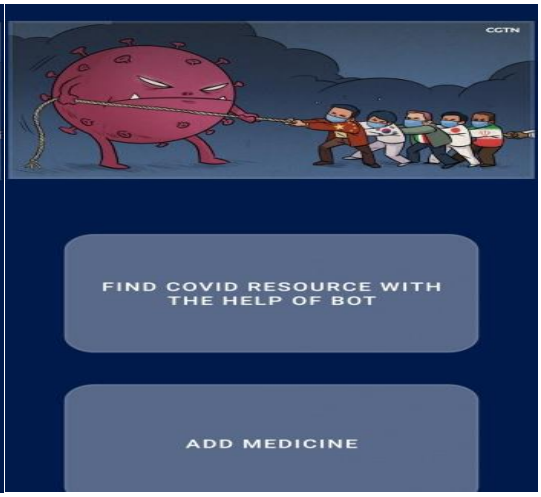

Fig. 4.1(d)

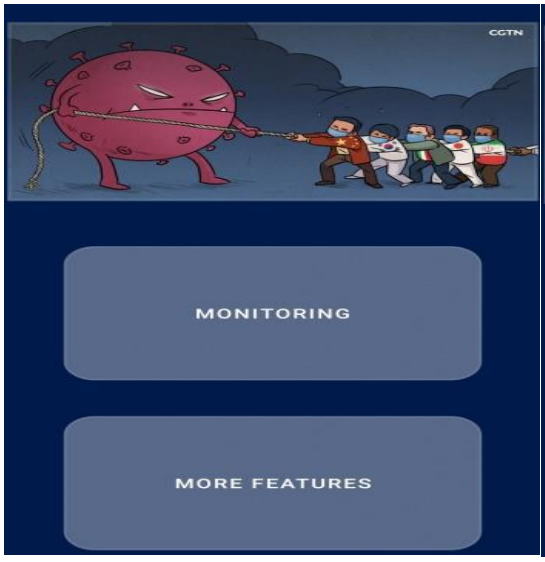

Fig. 4.1(e)

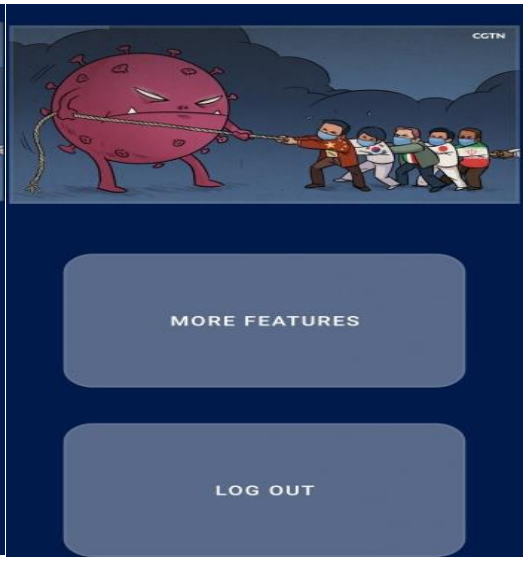

Fig. 4.1(f)

2) App users can search for home medications, according to symptoms they have. This Applications includes various type of home medications. We collect feedback from users, whether suggested home

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medication helped them or not. If medications are not showing any effect, we will remove from application.

Fig. 4.2(a)

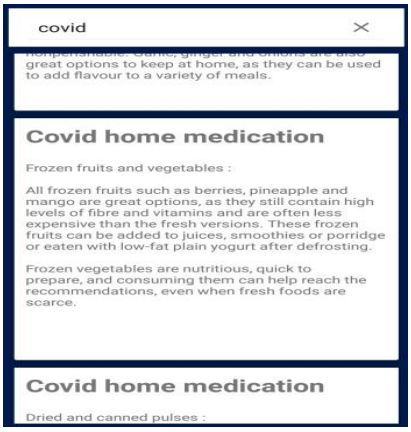

Fig. 4.2(b)

Fig. 4.2(c)

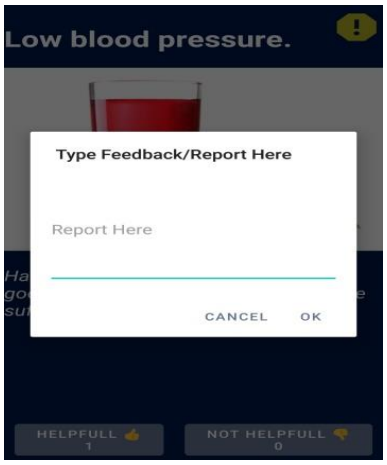

Fig. 4.2(d)

3) If users have a doubt about, they might be suffering from covid or is it just a normal fever. Users Can take quiz. Quiz Consists of questions based on Covid symptoms. If high symptoms match found, we will ask the user to get tested. If user's symptom is not matching with covid symptoms, we will show text, User is completely safe.

Fig. 4.3(a) **Fig. 4.3(b)**

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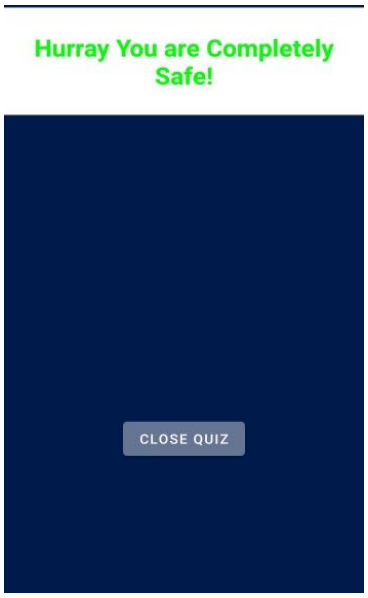

Fig. 4.3(c)

4) To tackle the current covid situation, users can make use of this android app. Some Features are, Users can see nearby covid patients on MAP. User will get notification to wear mask while stepping out of home or office. Users also get notification, if they are inside covid hotspot, it will be helpful for user to take prevention measures.

In the backend, we will collect data on which users are interacting with each other. It will be later helpful, in detecting primary contacts.

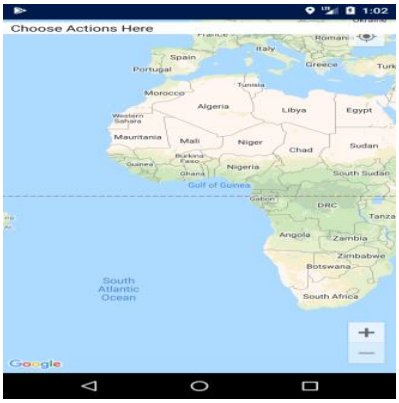

Fig. 4.4(a)

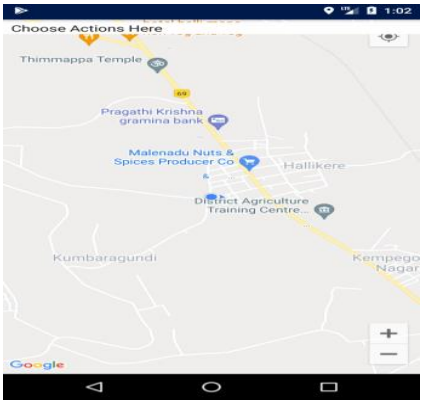

Fig 4.4(b)

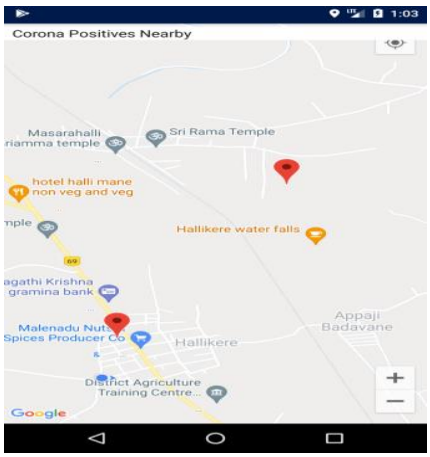

Fig 4.4(c)

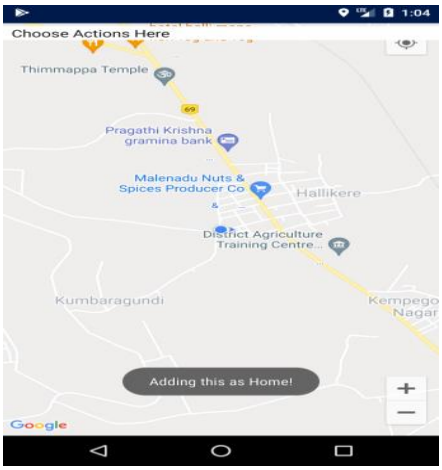

Fig 4.4(d)

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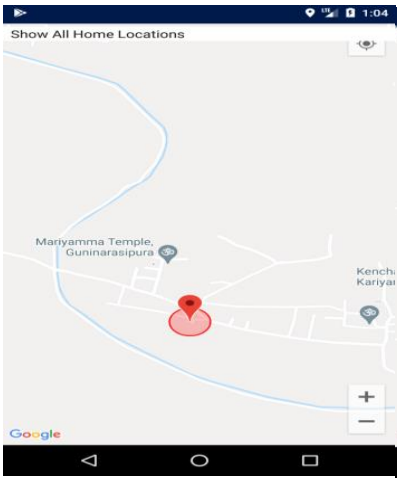

Fig 4.4(e)

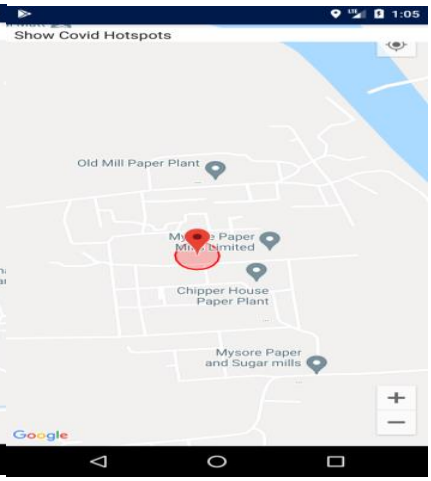

Fig 4.4(f)

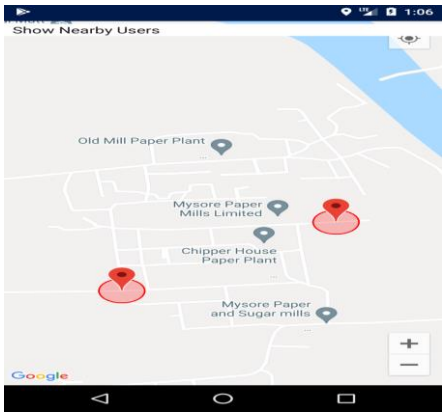

Fig 4.4(g)

5) Some Famous and helpful sites are attached to this application using Web View. So that user can access sites like WHO, Covid-19 tracker inside this one single mobile application. Helpful in keeping all the important sites in one place.

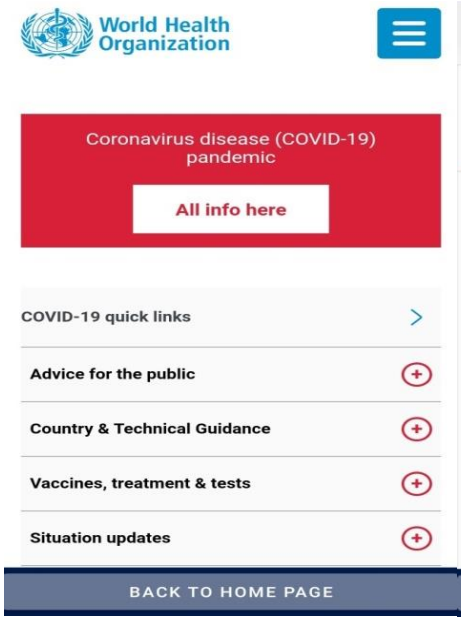

Fig. 4.5

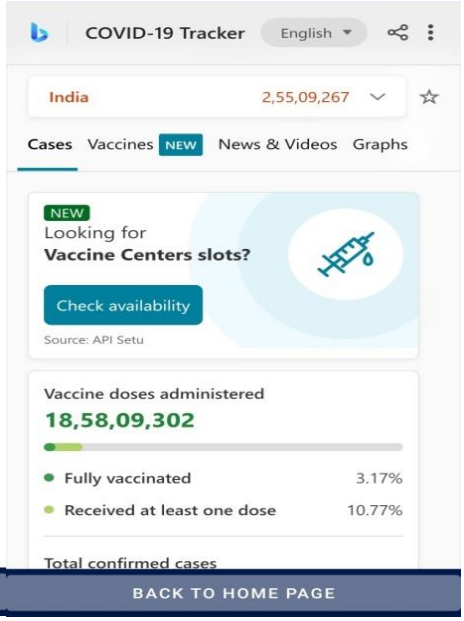

Fig 4.6

6) This is developer window. Only developer can access this activity. Developer will upload home medications here.

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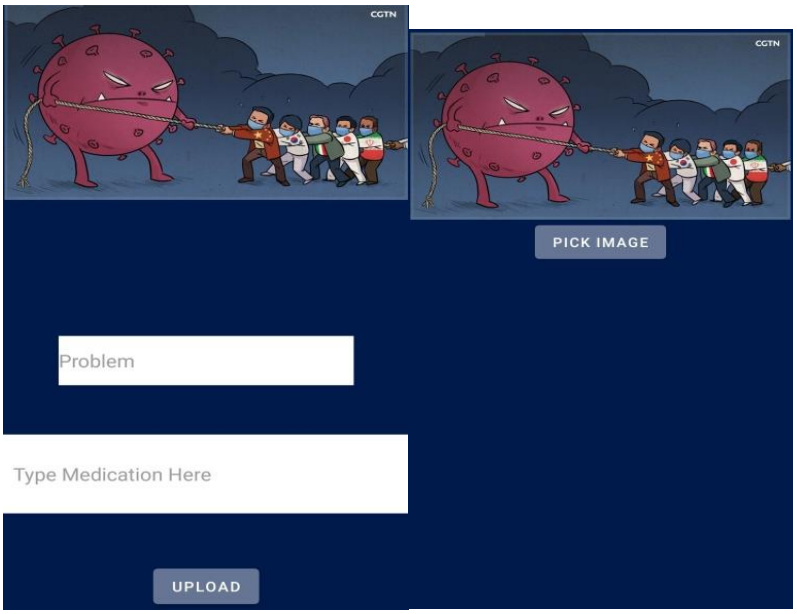

Fig. 4.7(a) **Fig. 4.7(b)**

7) If App user wishes to monitor Oxygen level in any of their family member. User can monitor from this application. User should do some hardware configurations at other side; all the updated readings can be seen from here.

Fig. 4.8(a) **Fig. 4.8(b)**

V. CONCLUSION

Covid is conquering the whole world. World needs a solution to fight against this covid battle. We proposed a software solution, which helps current system to tackle the covid 19. Our Android Application features includes contact tracing, Oxygen level monitor, alerting user to wear a mask when going out from home, alerting user when entering covid hotspot regions, covid self-assessment quiz, home medication, redirection to popular websites, redirect to what's app chat bot.

Contact tracing comes at first place to avoid spreading covid. Contact tracing is the process of identifying, assessing, and managing people who have been exposed to a disease to prevent transmission. Properly done, contact tracing and follow-up health interventions will ensure that the infection spread is limited and retard or stop the pace of the epidemic to the third stage community transmission.

Our android application makes use of GPS and will help in contact tracing. Application will identify nearby same app users and add to the contact list. The same list can be used for contact tracing.

A pulse oximeter measures how much oxygen is in someone's blood. It is a small device that clips onto a finger, or another part of the body. They are used often in hospitals and clinics and can be bought to use at home. Any

sensors which are compatible to nodemcu, can be attached and the readings of O2 can be monitored in our android applications, from anywhere across the globe. This will be very much helpful when one need to monitor old age people in home.

Masks are a simple barrier to help prevent one's respiratory droplets from reaching to others. Studies show that masks reduce the spray of droplets when worn over the nose and mouth. Our android application makes use of Geofencing technology and alerts the user to wear a mask when user leaves home. Same Geofencing technology is used to identify whether user is entering inside any covid hotspot. And Proper alert will be delivered to user, user can take proper measures accordingly. Using this application, user can self-assess them by answering some simple questions based on symptoms they are facing. The results of quiz will say the probability that the user might have covid. If the probability is too less. User is no need to worry.

Home remedies are a very effective and cheap way to cure myriads of problems, whether they be skin, hair, diet or health related. Our application lists variety of home medications, and feedback is collected from users. All the medications are added from thorough research. So, user can get the cure for any problems in a fingertip using our application.

Application is integrated with Web View so that user can access some trusted covid information related sites in the same single app, user no need to search for sites at all the places. If user wishes to find covid resources in this hard time, user can make use of chat bot option. On clicking chat bot button, it will be redirected to popular chatting platform what's app.

Our solution might not be the optimistic solution. But we believe our solutions will surely help in some or the other way to fight against this covid 19. We do have some drawbacks in our applications; our application will get success, only when we have huge number of app users.

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