COVID-19 TRACKER ANDROID APPLICATION

Project report submitted in fulfilment of the requirement for the degree of Bachelor of Technology

In

Information Technology

By

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CANDIDATE'S DECLARATION

I hereby declare that the work presented in this Project report entitled **"COVID-19 tracker"**, submitted in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in **Information Technology**, submitted to **NSUT WEST CAMPUS, India** is an authentic record of my own work carried out during the period from **1 April 2021** to **july2021** under the guidance of **Dr. Sanjeev Kumar** (assistant professor, IT).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

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This is to certify that the above statement made by the candidate is true to the best of my knowledge.

Dr. Sanjeev Kumar
Assistant Professor and HOD

Dated: 19/16/2021
Place: New Delhi

Acknowledgement

I hereby Declare that all my efforts to complete my project is become possible all because of my partners who give their great contribution and support me time to time due to which I completed my project successfully. I will not have so much courage to Develop a project but due to proper corporation and guidance of my mentors and partner who will show confidence on me and Develop a courage in me to become a programmer and to develop a project which will be very helpful for other peoples also in a future life.

I will also very thankful to my mentor who will give their grateful contribution to my project. The stage at which I am standing now to develop a project is due to proper guidance, support and supervision of my mentor who will give a proper direction to my track.

I will also very thankful towards my Parents who will develop a feeling in me that I can do something in life and achieve the desired target. They will always support me at every stage and the love and encouragement of them will provided me protection layer around me which will always prevent me from going on a wrong way of life.

At last I want to thank to my college department who will give us a platform on which we will provide a shape to our dreams for making our future bright and full of happiness. As everybody knows that the life is full of competition in the today times and everybody want to get success in life and the guidelines and direction required at this stage is very necessary for achievement of the desired objectives.

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ABSTRACT

COVID-19 tracking tools or contact-tracing apps are getting developed at a rapid pace by different governments in their respective countries. This study explores one such tool called *covid -19 tracker*. It is a mobile based application by the team, to track and sensitize the citizens of India in a joint battle against COVID-19 spread. The study aims to understand various useful features of this tool and to present different concepts used in the application along with its importance in managing the ongoing pandemic. The application uses the API named as https://corona.lmao.ninja/ to fetch the number of case of COVID-19 spread in world , the data updates in every 30 minutes. The application can fetch the data for different countries. The study would be useful for mobile technology professionals, data science professionals, medical practitioners, health-related frontline workers, public administrators, and government officials.

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Abbrevation

IDE: Integrated Development Environment

API: Application Programming Interface

UI: User Interface

JSON: JavaScript object notation

AIM OF STUDY

As a comparative exercise, the overarching goal of the INGSA-COVID-19 project is to understand the kinds of evidence and mechanisms used to develop and implement Covid-19 interventions by governments in different jurisdictions globally. The aim is not to compare and assess the success of these interventions, but rather to compare the various ways in which evidence has been marshalled and applied, first to articulate a country-specific response goal and then to address it within particular national contexts. Chronologically, the first aim of the study has been to document the policies in real time through an online Tracker tool, while the memory of interventions and their context is still fresh

The second and key aim is to understand how the factors of influence most often cited in the literature interact with and affect the use (or non-use) of evidence in the choice, development and implementation of national response strategies and regimes. It is in this aim that the work is distinct from other analyses of pandemic policy processes

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INTRODUCTION

1.1 Project overview

The contagious coronavirus, or more technically known as COVID-19, has spread all over the world and is listed as a pandemic by the World Health Organization.

Many countries are trying to develop contact-tracing techniques through which they can trace the person suspected of the infection. A similar kind of mobile tracing application has been developed by our team named as “covid tracker”.

1.1.1 ABOUT THE APPLICATION

Covid tracker is an android based application developed to fetch the data of covid infected persons. The application uses some **libraries and rest api’s** named as **Blackfizz library** to show the pie chart, **volley library** is used to fetch the data that is coming from rest api named as **corona.lmao.ninja**, the data coming from this library is in json format to fetch the json data we are using volley library , simple arc loader is used to show the pie chart according to the incoming data.

This application is having an ability to fetch the data of the world and user can filter the data according to the country, city, and a particular location of the city also. The data showing in the application is having 99% accuracy because we ae using the corona.lmao.ninja library and they ensure that the data is refreshing in every 10 minutes and having multisource named as **“john Hopkin University , New york Times, Worldmeter”.**

1.2 Researching the problem studied

Currently there are several research works undergoing in the country to prevent Covid-19 cases from rising. Previously our country was importing medical kits like PPE (Personal Protection Kits), mask from outside, but now it has been successful in developing these kits. Along with taking initiatives to fight this disease**, our country has also taken steps to make people aware of the disease**. The news and media have a great part in creating this awareness by informing the public about the preventive measures that can keep them away from infection. Awareness among the people to carry out all the preventive measures can immensely help to reduce spread of the virus. The country has created containment zones throughout the cities wherever Covid-19 cases have been reported to prevent further spread of the virus. These containment zones have been kept isolated from the outside public to ensure no contamination occurs outside.

After more than 2 months of the lockdown, the government has relaxed some of the lockdown rules and has permitted reopening of government offices, bus and other road transportation facilities and shopping markets. People can move inside the city for work and other purposes. But the containment zones are still being kept isolated, and new containment zones are being formed wherever Covid-19 cases have been reported. These zones are highly contagious as droplets with virus coughed out from an unscreened asymptomatic patient can travel up to 8 m . Though these containment zones are guarded by policemen, still there remains a chance that people might unknowingly step into them. In this situation where people can move in the city, these containment zones pose a risk of infection to these city dwellers. Therefore, informing people about the location of the containment zones can help them bypass and avoid these zones and thereby reduce the chance of community transmission.

In this project, we focus on developing a mobile based application to provide information regarding the Covid-19 total cases that can be filtered out by the city or country. The application further tracks the user's location and provides notification alert if the user has entered a containment zone. The application also provides daily Covid-19 case statistics to the users to keep them updated. The application is developed on Android SDK and uses Firebase Cloud Firestore to store the location data. Android's geofencing client is used to create geofences around the containment zones and notification manager is used to provide notifications. The application also uses RESTful API to show the Covid-19 cases in World.

We have tested our application with different users in different locations and is able to attain our target.

WORKING OF PROJECT

Detail working: when the user will open the application he will get the screen as shown in fig 1.1 this is the main screen where we are having a pie chart that is showing the global data . At the bottom of the home screen we are having a button using this one user can search the data for different countries doing this we will get the screen as shown in fig 1.2 now we can search for particular countries showing in the list

It is using different libraries and api's

1. Library
   I Blackfizz: As shown in home screen fig1.1 we are representing the data in pie
   chart format and some square boxes near it so, black fizz provide the feature to
   represent the data in pie chart or graphs .
   II Volley : volley is a library that is used to fetch the data which we are getting in json
   Format. JSON stands for java
   III Simple arc loader : The color of the different field in pie chart is changing according to the data that we are getting this thing is getting possible because of simple arc loader.

2. Rest API:
   I. Corona.lmao.ninja
      Features :
      - Free of cost
      - Multisource : They are sourcing from johns Hopkin university , newyork times and worldmeters that gives us acomprehensive view of data .
      - Up to date : Their source update the data in every 10 minutes for better result.
      - JSON formatted: The response are served in json format making for easy and reliable integration to the service.

2. PROPOSED APPLICATION

2.1Proposed Work

The Android application shows the location of the containment zones to the users. It also notifies the user when he or she trespasses the boundary of a containment zone or stays in the containment zones.

2.2 Software used

To work on a project we need ide . ide stands for integrated development environment .

An integrated development environment (IDE) is software for building applications that combines common developer tools into a single graphical user interface (GUI). An IDE typically consists of:

- **Source code editor**: A text editor that can assist in writing software code with features such as syntax highlighting with visual cues, providing language specific auto-completion, and checking for bugs as code is being written.
- **Local build automation**: Utilities that automate simple, repeatable tasks as part of creating a local build of the software for use by the developer, like compiling computer source code into binary code, packaging binary code, and running automated tests.
- **Debugger**: A program for testing other programs that can graphically display the location of a bug in the original code.

To develop this project Android studio is used as an ide.

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems or as a subscription-based service in 2020. It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development.

Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0.

Fig 2.1 IDE

2.3 Application Design

Fig: Illustrate the COVID-19 Cases in the world

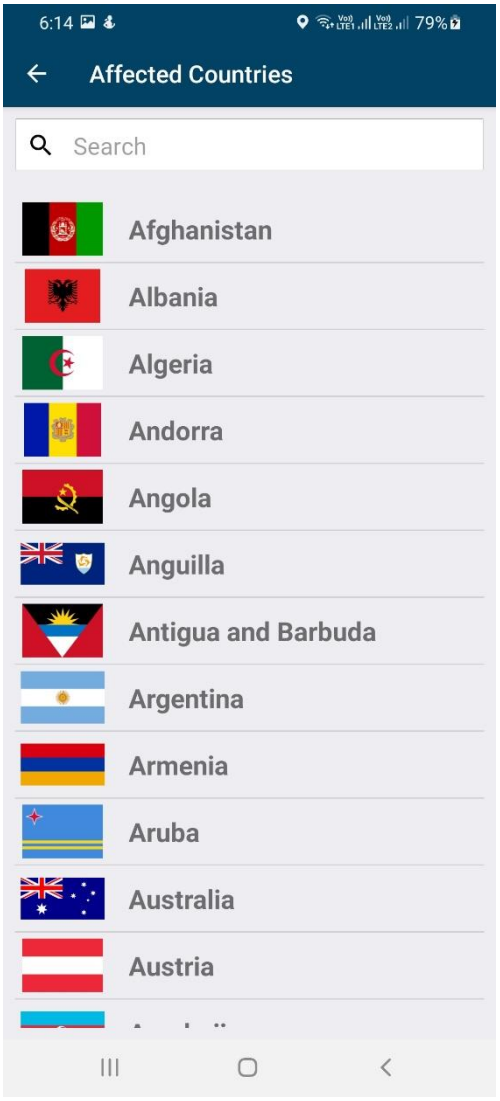


Fig: List of the Countries

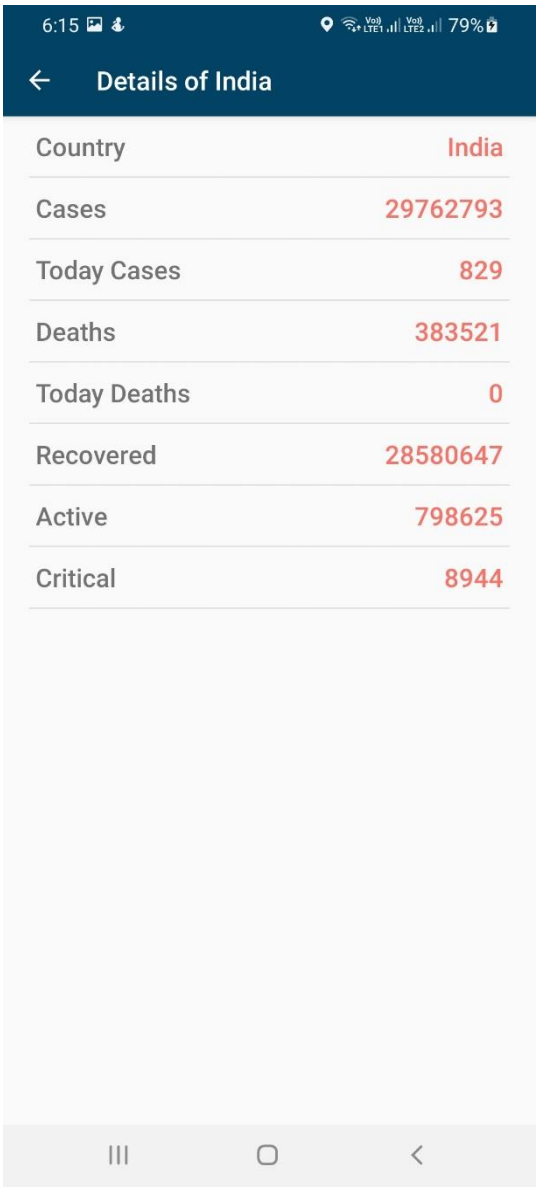


Fig: Shows number of cases in India

3.CODING

3.1 MainActivity.java

```
1  package com.developer.arsltech.covid_19tracker;
2
3  import androidx.appcompat.app.AppCompatActivity;
4
5  import android.content.Intent;
6  import android.graphics.Color;
7  import android.os.Bundle;
8  import android.view.View;
9  import android.widget.ScrollView;
10 import android.widget.TextView;
11 import android.widget.Toast;
12
13 import com.android.volley.Request;
```

Fig 3.1 mainactivity.java

3.2 AffectedCountry.java

```
40      public static List<CountryModel> countryModelsList = new ArrayList<>();
41      CountryModel countryModel;
42      MyCustomAdapter myCustomAdapter;
43
44      @Override
45      protected void onCreate(Bundle savedInstanceState) {
46          super.onCreate(savedInstanceState);
47          setContentView(R.layout.activity_affected_countries);
48
49          edtSearch = findViewById(R.id.edtSearch);
50          listView = findViewById(R.id.listView);
51          simpleArcLoader = findViewById(R.id.loader);
52
53          getSupportActionBar().setTitle("Affected Countries");
54          getSupportActionBar().setDisplayHomeAsUpEnabled(true);
55          getSupportActionBar().setDisplayShowHomeEnabled(true);
56
57          fetchData();
58
59          listView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
60              @Override
61              public void onItemClick(AdapterView<?> parent, View view, int position, long id) {
62                  startActivity(new Intent(getApplicationContext(),DetailActivity.class).putExtra("position",position));
63              }
64          });
65
66
67          edtSearch.addTextChangedListener(new TextWatcher() {
68              @Override
69              public void beforeTextChanged(CharSequence s, int start, int count, int after) {
70
71              }
72
73              @Override
74              public void onTextChanged(CharSequence s, int start, int before, int count) {
```

Fig 3.2 affectedcountry.java

3.3 CountryModel.java

```
7       }
8
9       public CountryModel(String flag, String country, String cases, String todayCases, String deaths, String todayDeaths, String recovered, String active, String critical) {
10          this.flag = flag;
11          this.country = country;
12          this.cases = cases;
13          this.todayCases = todayCases;
14          this.deaths = deaths;
15          this.todayDeaths = todayDeaths;
16          this.recovered = recovered;
17          this.active = active;
18          this.critical = critical;
19      }
20
21      public String getFlag() {
22          return flag;
23      }
24
25      public void setFlag(String flag) {
26          this.flag = flag;
27      }
28
29      public String getCountry() {
30          return country;
31      }
32
33      public void setCountry(String country) {
34          this.country = country;
35      }
36
37      public String getCases() {
38          return cases;
39      }
40
41      public void setCases(String cases) {
```

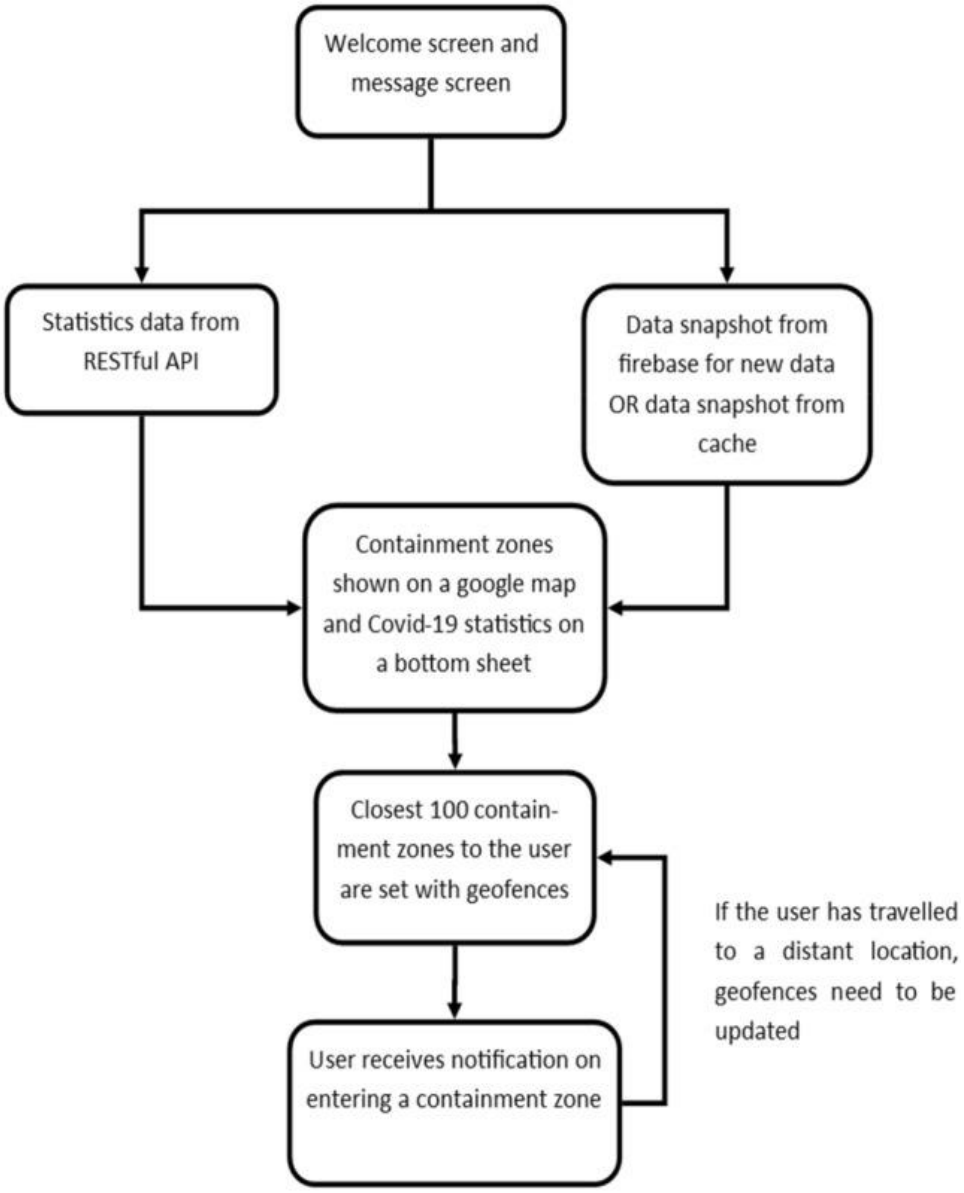
Fig 3.3 CountryModel.java

3.4DetailActivity.java

```java
package com.developer.arsltech.covid_19tracker;

import androidx.annotation.NonNull;
import androidx.appcompat.app.AppCompatActivity;

import android.content.Intent;
import android.os.Bundle;
import android.view.MenuItem;
import android.widget.TextView;

public class DetailActivity extends AppCompatActivity {

    private  int positionCountry;
    TextView tvCountry,tvCases,tvRecovered,tvCritical,tvActive,tvTodayCases,tvTotalDeaths,tvTodayDeaths;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_detail);

        Intent intent = getIntent();
        positionCountry = intent.getIntExtra("position",0);

        getSupportActionBar().setTitle("Details of "+AffectedCountries.countryModelsList.get(positionCountry).getCountry());
        getSupportActionBar().setDisplayHomeAsUpEnabled(true);
        getSupportActionBar().setDisplayShowHomeEnabled(true);



        tvCountry = findViewById(R.id.tvCountry);
        tvCases = findViewById(R.id.tvCases);
        tvRecovered = findViewById(R.id.tvRecovered);
        tvCritical = findViewById(R.id.tvCritical);
        tvActive = findViewById(R.id.tvActive);
        tvTodayCases = findViewById(R.id.tvTodayCases);
        tvTotalDeaths = findViewById(R.id.tvDeaths);
```

Working of the application

The application gets data from the Cloud Firestore database. A collection is created in Cloud Firestore with containment zones as documents. Each document has four fields: latitude, longitude, location name and radius. Accordingly, a Java object is created which can get the data from the document. In the map's activity, the firebase Firestore instance and collection references are created to which a snapshot listener is attached. The snapshot listener retrieves the document snapshots which are then converted into the Java object mentioned earlier. With the help of getters each data from the document is retrieved and are converted to string. Markers and circles are set using the location coordinates and radius and tags are given by the location names. The google map gets populated with these markers surrounded by circles which represents the containment zones. A JSON request is made with the get method to the REST API URL which returns the West Bengal Covid-19 case data as a response. The response is converted to a JSON object and the information is extracted.



4.1 Firebase Cloud Firestore

The application uses Firestore which is a flexible and scalable database for mobile, web and server developments from Firebase and Google cloud platform (Cloud Firestore 2020). In Cloud Firestore, the mobile application supports serverless app architecture where the application connects to the Cloud Firestore database directly without any intermediate servers in between (Cloud Firestore SDKs and client libraries 2020). The application receives data from the database using WebSocket. The Web Socket transfers data at a higher speed than HTTP.

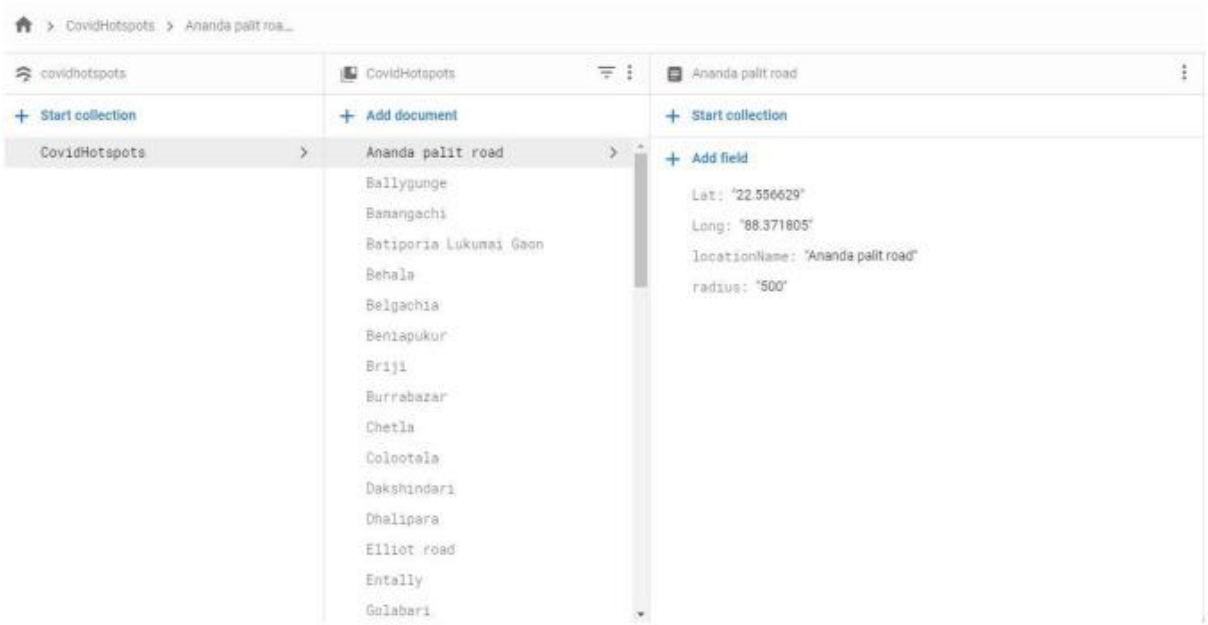


Fig: cloud firebase database with location data of zones

4.2 Geofencing

Geofencing API from Android is used to create virtual boundaries or fences around geographical locations (Create and monitor geofences 2020). The developers can add geofences at different locations by providing the latitudes and longitudes along with radius to define the virtual boundary at that location. Geofencing technology senses the user's current location and checks whether the location is inside any of the geofences created. A broadcast receiver receives

intent contained in a pendingintent (an android API) sent by the location services when the user has entered, dwelt, or exited a geofence.

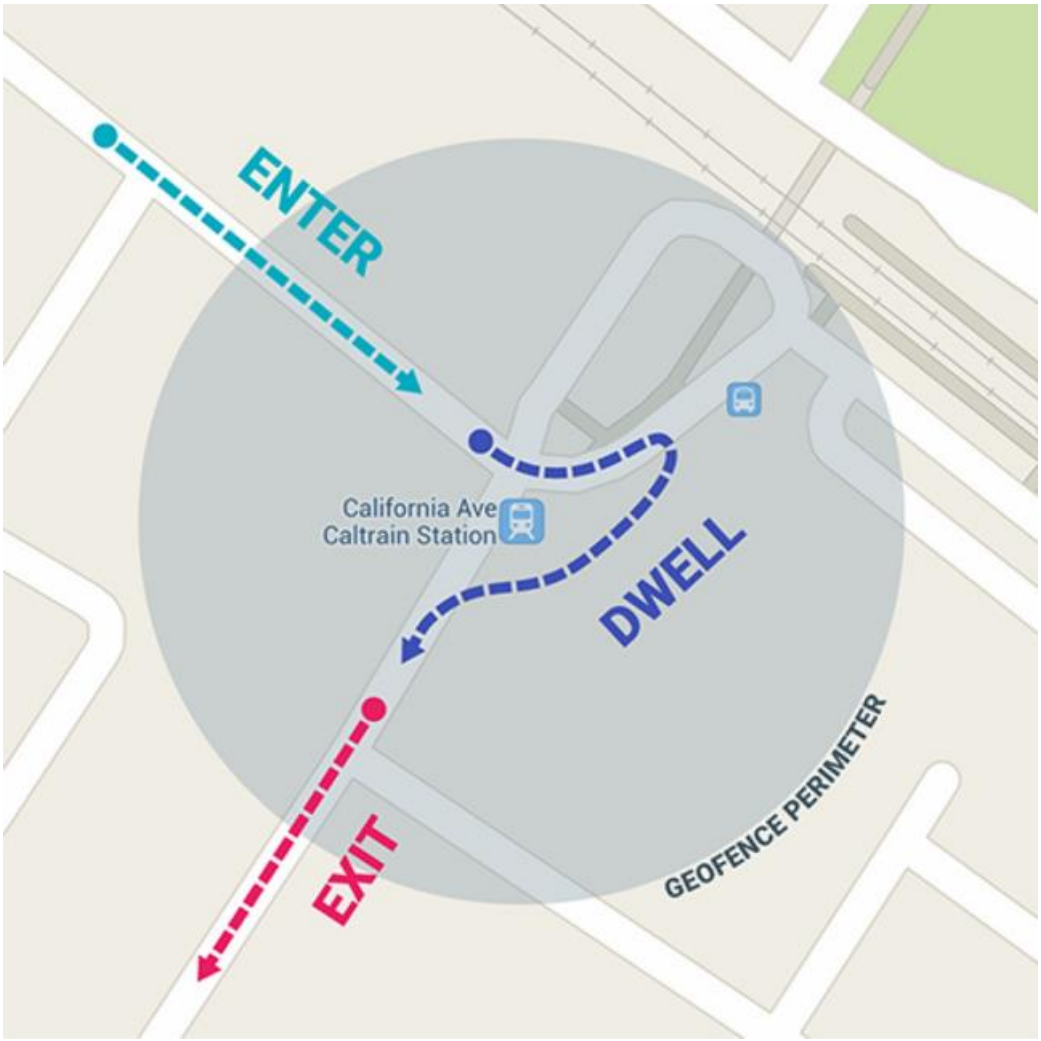


Fig: geofencing trigger events

4.3 RESTful API

Representational State Transfer (REST) API or RESTful web services are architectural styles for communications often used in web services development (RESTful API 2020). These APIs use less bandwidth than the Simple Object Access Protocol (SOAP) and hence they are useful for cloud applications. The RESTful API uses the HTTP methodologies which are defined by the RFC

2616 protocol. The information stored in a RESTful API are resources which can be read, updated, or deleted using resource methods like GET, POST or DELETE.

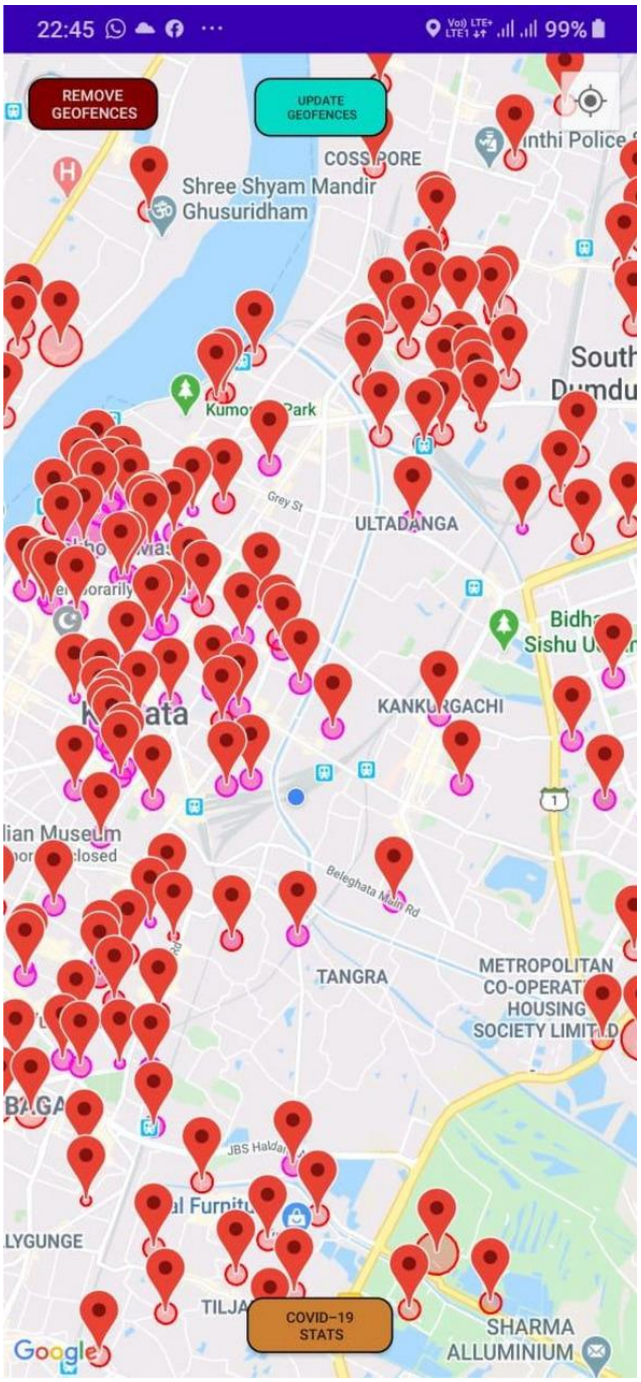


Fig: Selection of closest containment zones

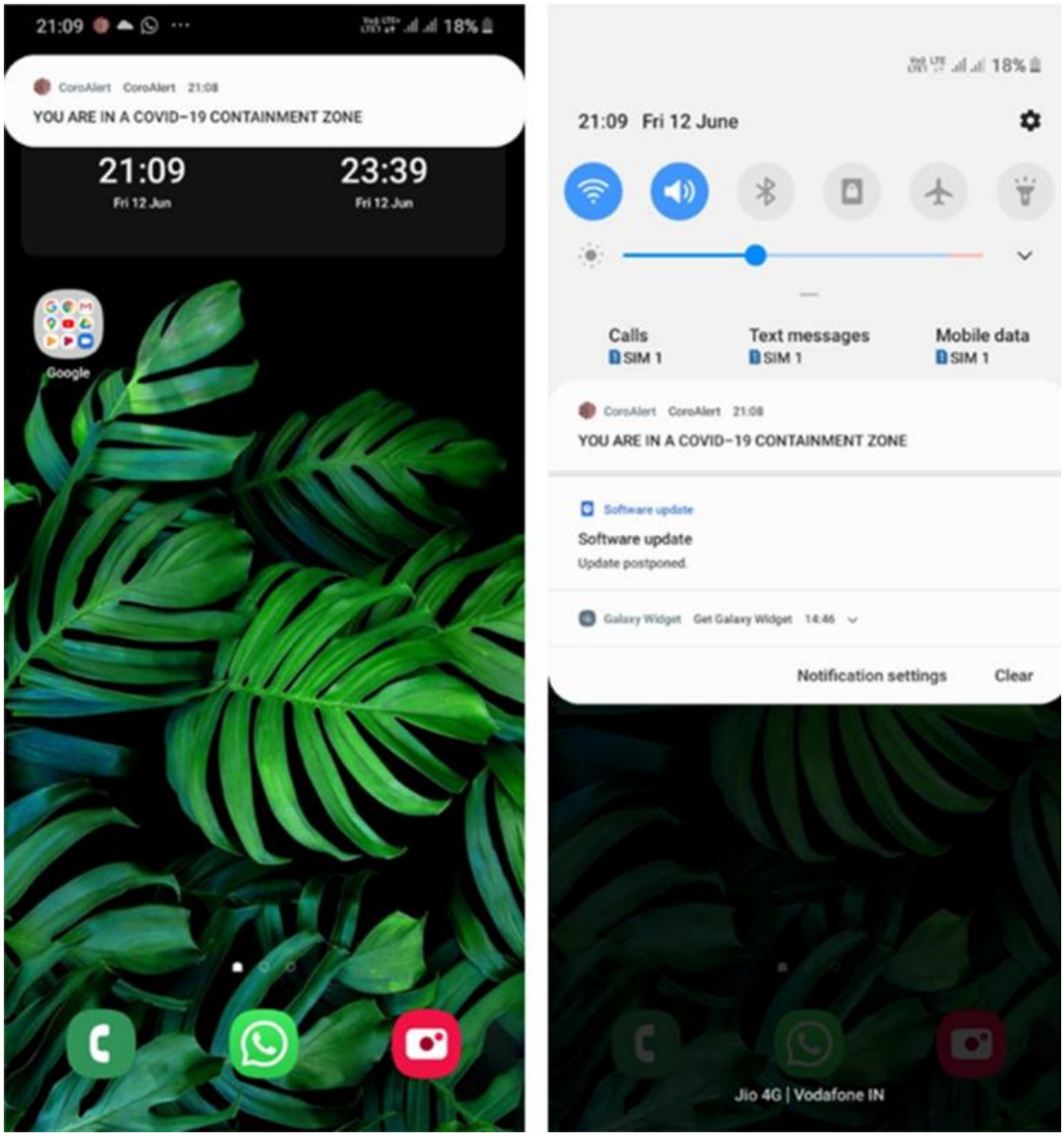


Fig: Notification without app running

Analysis and Updates

In march 2020, Alexis Madrigal and Robinson Meyer sought to reveal how little covid -19 testing had been conducted in United State. Recognizing a critical need for publicly available, comprehensive data, they founded the covid tracking project **relied on hundreds of volunteers who entered data manually on a daily and weekly basis for a year.**

As march 2020 progressed, some states launched covid -19 data dashboard, others reported data in conferences it quickly became that daily close contact with the data was necessary to understand what states were reporting.

The Covid-19 data that we collected- testing and outcomes, races and ethnicity and long term care were largely unstandardized and fragmented.

Conclusion and Future Scopes

The application provides an efficient way of showing the identified Covid-19 containment zones to the users in a Google map. With the alarming increase of Covid-19 affected cases throughout the world, this developed application can be employed as a tool for creating further social awareness among the people. This application further tracks the user's location and checks whether it is present in the list of identified containment zones. It sends separate notification alerts to the user on entering. The developed android application further extracts the IMEI Number of the trespasser in the containment zones which can be useful to the local police to track and identify people who are frequently trespassing the containment zones. Thereby this application identifies the containment zones and highlights the need for taking further precautionary measures for combating Covid-19. The application has been tested in various locations and has been found to yield accurate results.

The application can be further used for many purposes like maritime and forest safety to prevent users from entering restricted areas.

APPENDICIES

Appendix 1 Data statistics for the Tracker

(As at 22 August, 2020)

Jurisdiction	Number of policies tracked
United States	788
Canada	314
Democratic Republic of the Congo	147
New Zealand	135
Japan	115
Netherlands	115
Venezuela	115
South Africa	114
Iraq	113
Brazil	104
Hungary	93
Spain	90
Lithuania	86
Sri Lanka	80
Bulgaria	79

Region	Number of Policies
Asia	1256
Africa	671
North America	1214
Central America	102
South America	446
Europe	1608
Oceania	238

Appendix 2: INGSA COVID-19 RAPPORTEUR FORM

(A Google Docs version of this form has been made available to all volunteer rapporteurs via link to a Google form for regular use and automatic uploading to the database.)

E-mail Address: pre-filled field

Country: select from drop-down list of all countries, can be pre-filled

Level of Jurisdiction: free-entry field eg: Supranational

(eg: European Union), National, Federal, State, Regional, City, or nongovernmental organisation - please name the state (e.g. the two or three letter code) or subnational jurisdiction if applicable. Intervention Date: date/calendar entry field Type of Intervention: multi-select checkbox e.g. Advisory (e.g. a formal warning from official sources), Executive Order (e.g. an order coming directly from the office of the head of government), Financial and Economic (e.g. economic 'rescue' interventions, stimulus packages), Guidance (e.g. informal information provided to the public), Judiciary (e.g. court judgments), New Tool/Service/Body (e.g. new website, app, testing, council, committee), Regulation (e.g. order-in-council, legislation), Specific Action (e.g. significant actions such as expatriate evacuations, cancelling large events, airport checks, quarantine announcements), Other Announcement (e.g. first case of COVID-19, co-operation agreement, other significant event)

-Advisory

- Executive Order

- Financial and Economic

- Guidance

- Judiciary

- New Tool / Service / Body

- Regulation

- Specific Action

- Other Announcement

- Other: [free-entry field]

Sectors: multi-select checkbox

At which sector is the intervention aimed? NOTE: Interventions associated with a lockdown or movement/mobility restrictions should be categorised as Civil Defence. Border lockdowns should be categorised as Immigration.