PROJECT REPORT

PROJECT NAME	CONTAINMENT ZONE ALERTING APPLICATION
PROJECT ID	PNT2022TMID32760
MEMBERS	K.KIRTHIGA,A.KAVYA,I.KEERTHANA,S.DHIVYA,P.KEDZI JERO KATHRIN

INTRODUCTION

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 , 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 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.

PROJECT OVERVIEW

This application is to provide information about containment zones in the affected areas by alerting people, through continuous monitoring of an individual's location.

PURPOSE

The purpose of the application is to monitor people's activity and alerting them for their safety movements.

LITERATURE SURVEY

Name of the paper:

A Detection, Tracking and Altering system for COVID -19 using Geofencing and Machine learning.

Published year: 2021.

Authors:

Dipali Koshti, Supriya Kamoji, Kevin Cheruthuruthy, Surya Pratap Shahi, Mayank Mishra.

Topic: Containment Zone Alerting Application.

Disadvantage:

Where many believe that Coronavirus Tracking apps are an effective tool to mitigate the outbreak, technologists also warn that apps may not be as effective as actually testing the population.

On the flip side, even the leading nations have no further provisions or backup continuity plan to handling bulk user data which may lead to critical server issues like data handling and redundancies.

Limitations:

a. Network is an issue in some areas we cannot make all the people to use this application.

b. Symptomatic quiz should have all the languages otherwise it is crucial to establish this application among illiterate people.

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b. Symptomatic quiz should have all the languages otherwise it is crucial to establish this application among illiterate people.

c. At the same time covid may be asymptomatic too we cannot assure that with a quiz but we can know the severity of the covid.

Overall Inference

This is a application that uses Geofencing and Machine learning together to combat the spread of Coronavirus. The first fold is a Detection System for a user to undergo a Symptomatic Quiz based on a Risk Assessment ML Model to detect the presence of Covid in the user's body. The second fold is an efficient Tracking system that uses Geofencing technology to keep track of all the people who come into contact with the user. And the third fold is an Alerting system that sends the alert message to all those people who came into contact with the user. The whole process of backtracking is the virus is called "contact tracing".

The system has been developed to satisfy the following core objectives:
A. Using Machine Learning algorithm and appropriate credible Database from official sources, to create an efficient Symptomatic Quiz that predicts the possibility of Corona with the highest possible accuracy.
B. Creating the perfect contact-tracing and alerting system to replace the manual procedure done by Medical Volunteers under the Ministry of Health and Family Welfare in the country.
C. Provide Medical Assistance to the people who seek Statistical Reports, Medical Emergency Assistance or Precautions to undertake in regards to Covid -19.

On the basis of Data Collected from positive & negative Corona tested patients, there is a Symptomatic Analysis Quiz carried out by the user. This helps the user to find out the presence of the Corona virus in the user's body. If a user is diagnosed Covid positive after getting a proper laboratory testing, the Covid positive user notifies the system about being Covid Positive. Followed by which, the system initiates notifications to all those who the Covid Positive user came in contact with in the past few days. This app boots the inbuilt function of Geofencing on the application which creates a geo-fence around the user and also broadcasts him/her to the other users around him. Other users that come in close contact with this user by infiltrating his fence have their IDs exchanged with this user. Their Associated Risk labelled earlier will be stored in the database and if they are Corona Positive with respect to the application, then an alert will be signalled to the user.

Whenever a user presses the "Step Out" button, the application asks the user to access his/her location. Based on that location, our application performs the tracking function. The location of the user is updated in our firebase database

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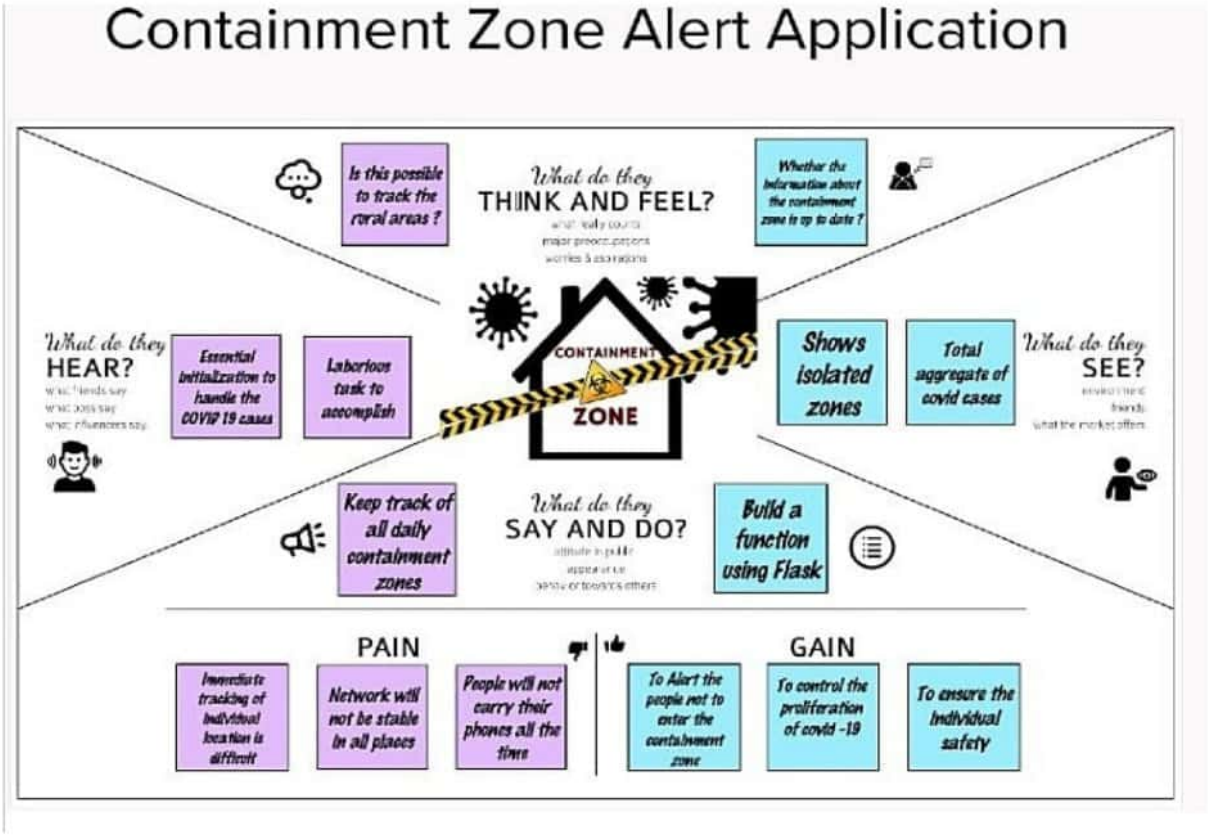
Whenever a user presses the "Step Out" button, the application asks the user to access his/her location. Based on that location, our application performs the tracking function. The location of the user is updated in our firebase database every time it changes and thus tracking the user and also maintaining the database of their location which is used in further processes. Based on this location and the results of the above-mentioned quiz, the application will create "hotspots" for all users to identify the possible areas which might be risky to visit.

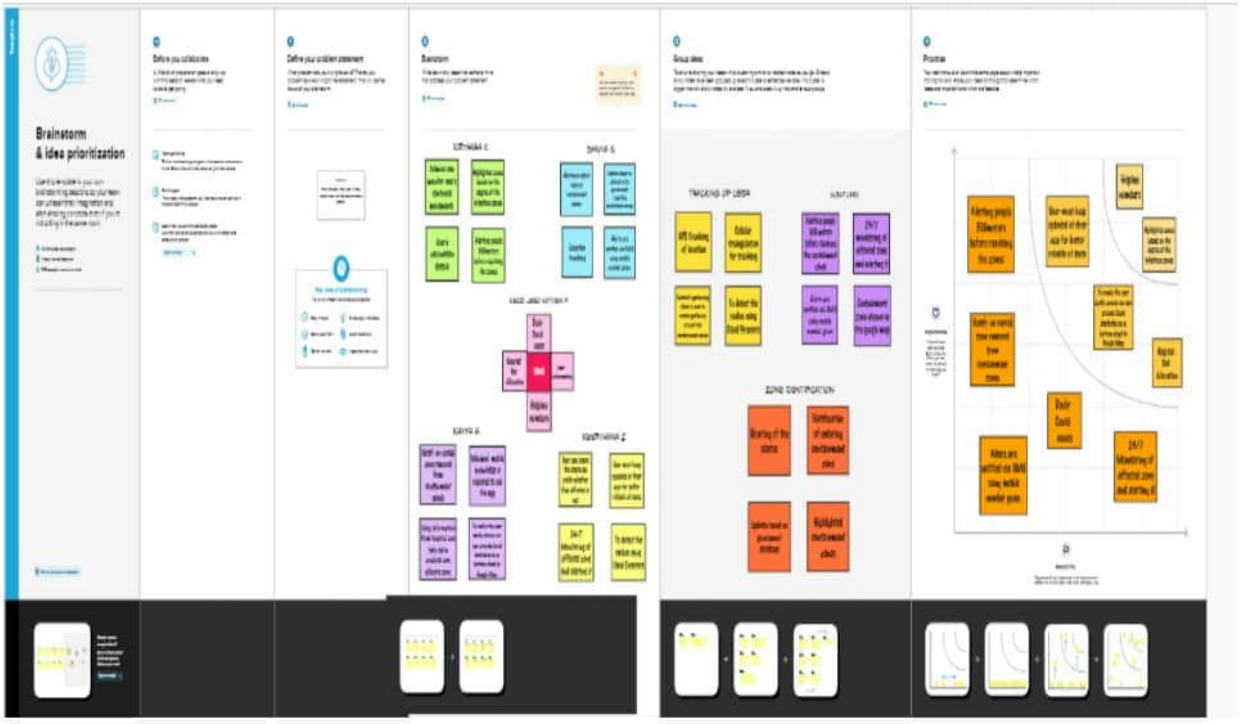
The usage of XG Boost Algorithm stands out to create a machine learning model that provides the highest accuracy for covid risk prediction on a large data set. Geofencing being used in a first of its kind application plays a vital role in Contact Tracing Front. This, overall curbs the potential of massive transmission of the Corona Virus, thus creating an efficient Health care system.

IDEATION AND PROPOSED SOLUTION

EMPATHY MAP CANVAS



IDEATION AND BRAINSTORMING

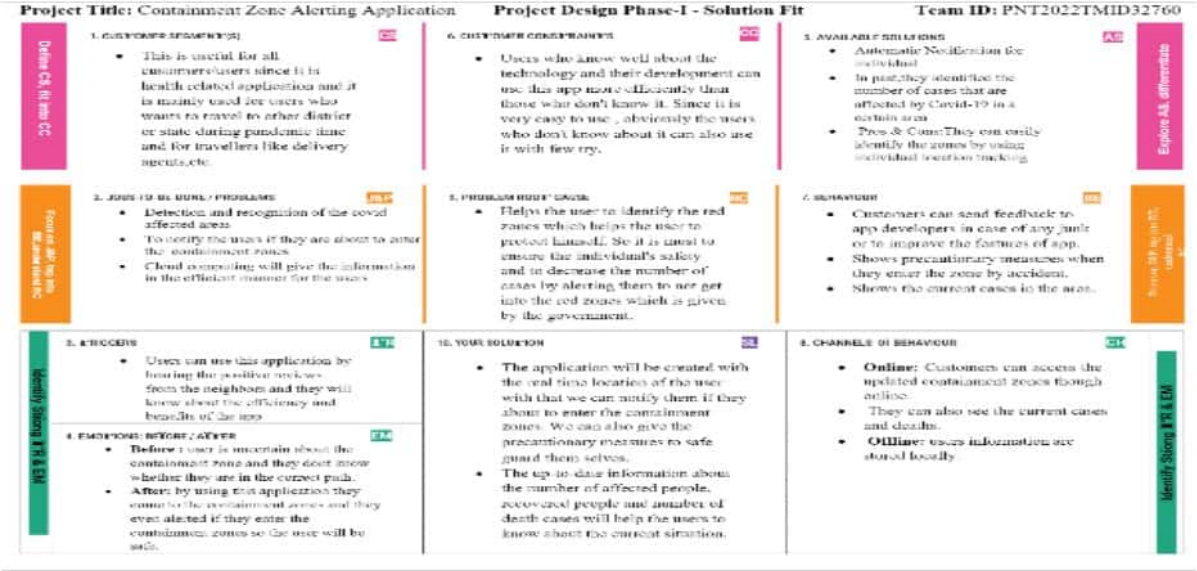


PROPOSED SOLUTION

Proposed Solution Template:

S. No	Parameter	Description
1.	Problem Statement (Problem to be solved)	Development of an android application for viewing the covid containment zones and also alerting the users by sending notification not to enter the affected area using cloud and geofencing.
2.	Idea / Solution description	The project aims at building an application that provides information about the containment zones of a particular region by continuously monitoring an individual's location .Location of individual must be stored in the database .Alerts are sent using the notification service.
3.	Novelty / Uniqueness	• Development of an Android application is necessary which can inform people of the Covid-19 containment zones and prevent trespassing into these zones. • Android application updates the locations of the areas in a Google map which are identified to be the containment zones. • The application also notifies the users if they have entered a containment zone and upload the details of individual in online database.

PROBLEM SOLUTION FIT



REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENTS

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	User can register through Email id or current phone number.
FR-2	User Confirmation	Confirmation can be done by verification code through mail or OTP.
FR-3	Track the location	Trace the trespassers by using Google map API.
FR-4	Affected areas are shown	Containment zones were marked and trespassers are indicated by geofencing.
FR-5	Alert notification	By tracking their location using GPS system, notification or message will be send if the user enters the containment zone.

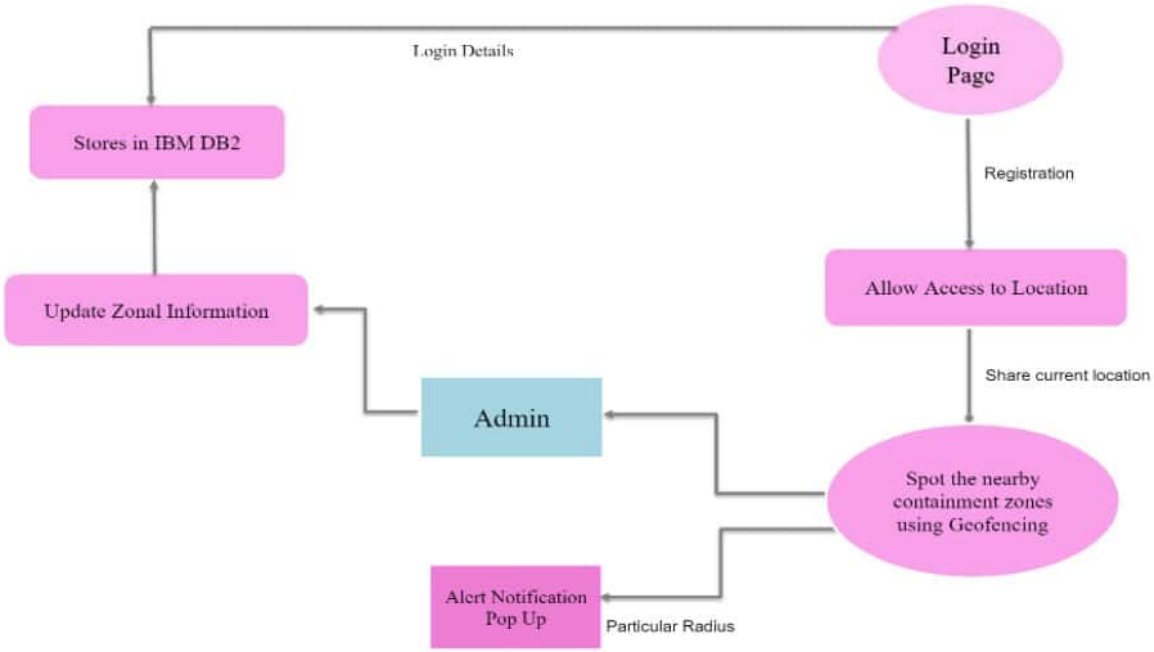
NON- FUNCTIONAL REQUIREMENTS

Following are the non-functional requirements of the proposed solution.

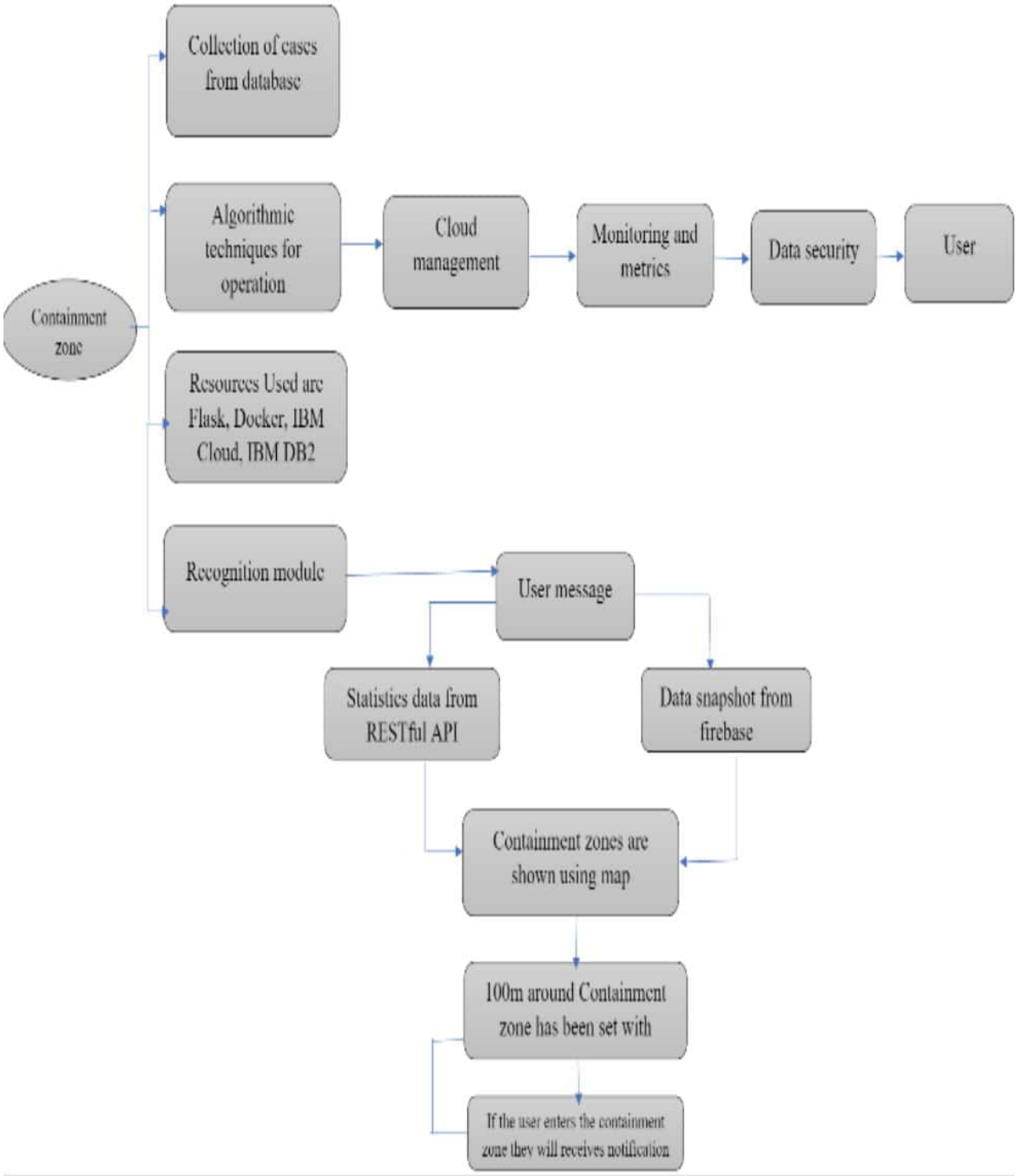
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	User interface is very effective to use when compared with other.
NFR-2	**Security**	Data from the user will be secured properly.
NFR-3	**Reliability**	User can trust this application and travel safely.
NFR-4	**Performance**	Most appropriate results can be achieved due to using the Geofencing and GPS.
NFR-5	**Availability**	The application uses the network to load the google maps to retrieve containment zones. It is available for good range of network bandwidth.
NFR-6	**Scalability**	This application can be accessed from anyplace and information about the zones are up to date.

PROJECT DESIGN

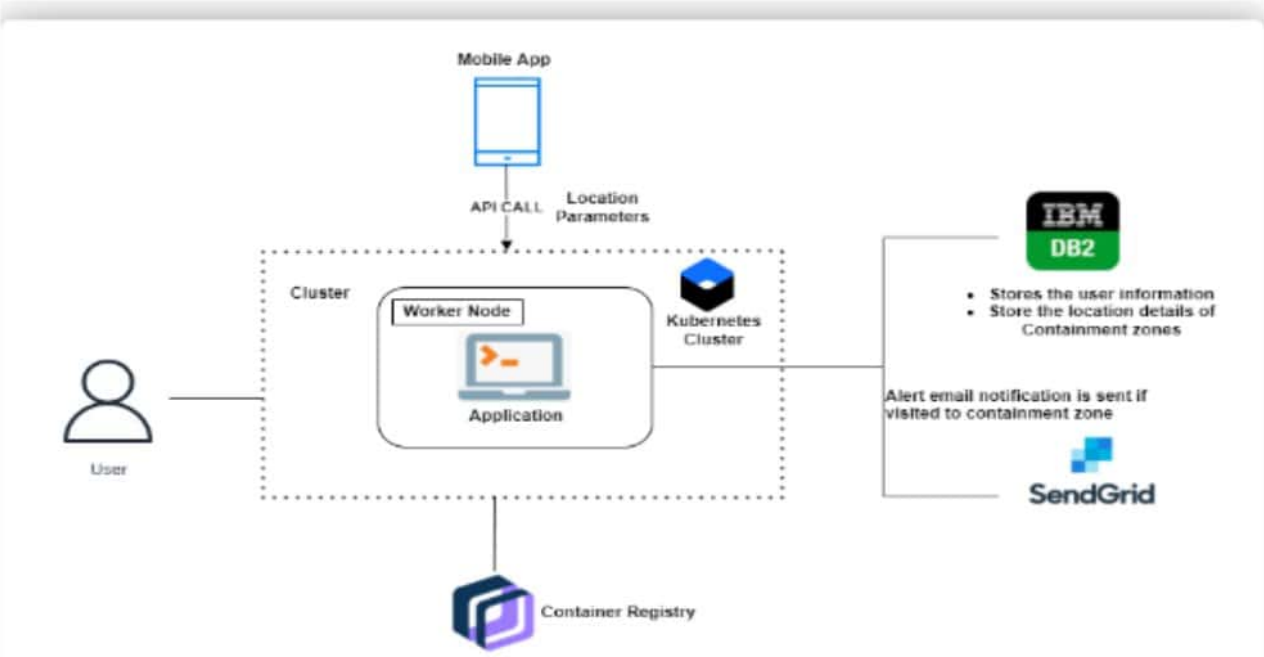
DATA FLOW DIAGRAMS



SOLUTION & TECHNICAL ARCHITECTURE



Technical Architecture :



USER STORIES

User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I can register for the application through mobile number.	I can register & access myzone's information	Low	Sprint-1
	Login	USN-3	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-4	As a User , Can I manually plot the alerted zone for my convenience only.	It can be viewed in the user dashboard	Low	Sprint-2
Customer (Web user)	Alert message via notification	USN-7	As a user, I can travel safely and get out ofthe infected zone.		Medium	Sprint-3
	Location Access	USN-6	As a User , I can viewed into the page , if there is any condition to access the location	Location can be turned through Control center	High	Sprint-2
Administrator	Login information	USN-1	The information received by administrator regarding login details from user is stored in DataBase.	I can store the information for future use	High	Sprint-4
	Update infected zone information	USN-1	The administrator gets the information regarding the infected zones and updates it.	I can get the results and update it.	High	Sprint-4

PROJECT PLANNING & SCHEDULING

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	User: I can register by providing information like username, email, password ,mobile number.	3	High	Dhivya
		USN-2	User: Once I have registered ,I will receive the verification mail through the given mail id.	2	High	Kirthiga
		USN-3	Management: we need to register hospitals available near to their surroundings.	2	High	Kedzl Jero Kathrin
	Login	USN-4	User: I can login to the application by entering my username,email & password	3	High	Keerthana
		USN-5	Management: I may store the Personal information of User in the cloud.	5	Medium	Kavya
	Dashboard	USN-6	User: I have to give permission to access myLocation	5	High	Kedzl Jero Kathrin

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2		USN-7	User: After Login Page the dashboard which shows a map with containment zones will appear.	5	High	Keerthana
		USN-8	Management: I have to update the daily cases based on the information Provide by government.	5	High	Kirthiga
	Services	USN-9	Admin: I need to provide valid information about the pandemic situation.	5	High	Dhivya
Sprint-3	Dashboard	USN-10	Management: It is necessary to store information of user in cloud for safety measures.	5	High	Kavya
	Services	USN-11	Admin: I can provide medical Advice and suggestions through a chathot.	5	Medium	Kedzl Jero Kathrin
		USN-12	Admin: I need to provide medical advices to the patients based on the consultation provided by doctors.	5	Low	Dhivya
		USN-13	Admin: I need to provide precautionary measures for the users.	5	High	Kirthiga
	Services	USN-14	Admin: I have to alter the trespasser by sending notification about 500meter before the containment zones.	3	Medium	Kavya
	Data Collection	USN-15	Admin: I need to store all the user information on the cloud	5	Medium	Keerthana

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
		USN-17	Admin: I need to collect the recent List of symptoms, death total and daily affected cases.	5	Low	Kodzi Jero Kathrin

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Velocity:

It will be updated after the first week of work is completed.

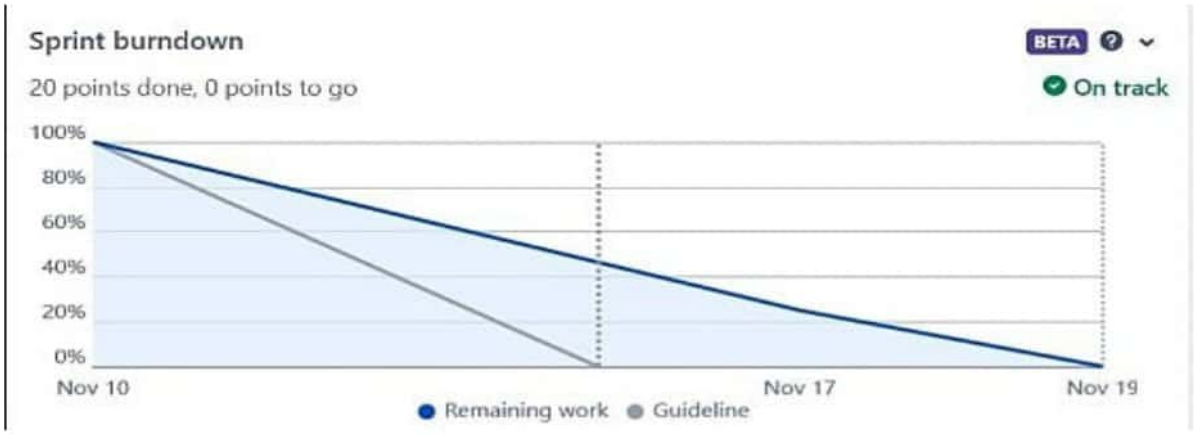
$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

SPRINT DELIVERY SCHEDULE

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey was done by collecting information from various research and technical papers.	03/09/ 2022
Prepare Empathy Map	Users pains and gain was captured to prepare empathy map and list of problem statement was prepared.	10/09/ 2022
Ideation	Various brainstorming ideas are organised and based on the feasibility and importance top three ideas were prioritised.	16/09/2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact, scalability of solution, etc.	24/09/2022

Problem Solution Fit	Prepare problem - solution fit document.	1/10/2022
Solution Architecture	Prepare solution architecture document.	1/10/ 2022

REPORT FROM JIRA



CODING AND SOLUTIONING

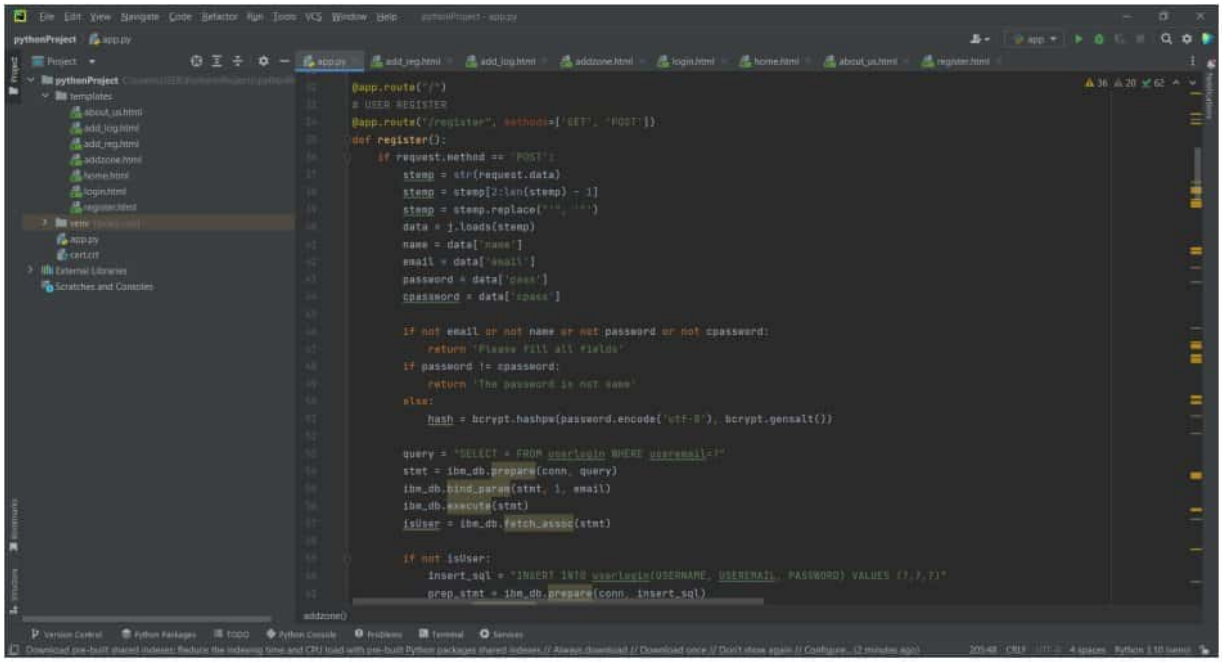
FEATURE 1

They should login to the app and update the containment zones locations in the portal. Based on the location a Geofence will be created within a 100 meters radius.It shows whether they are inside the containment zone.

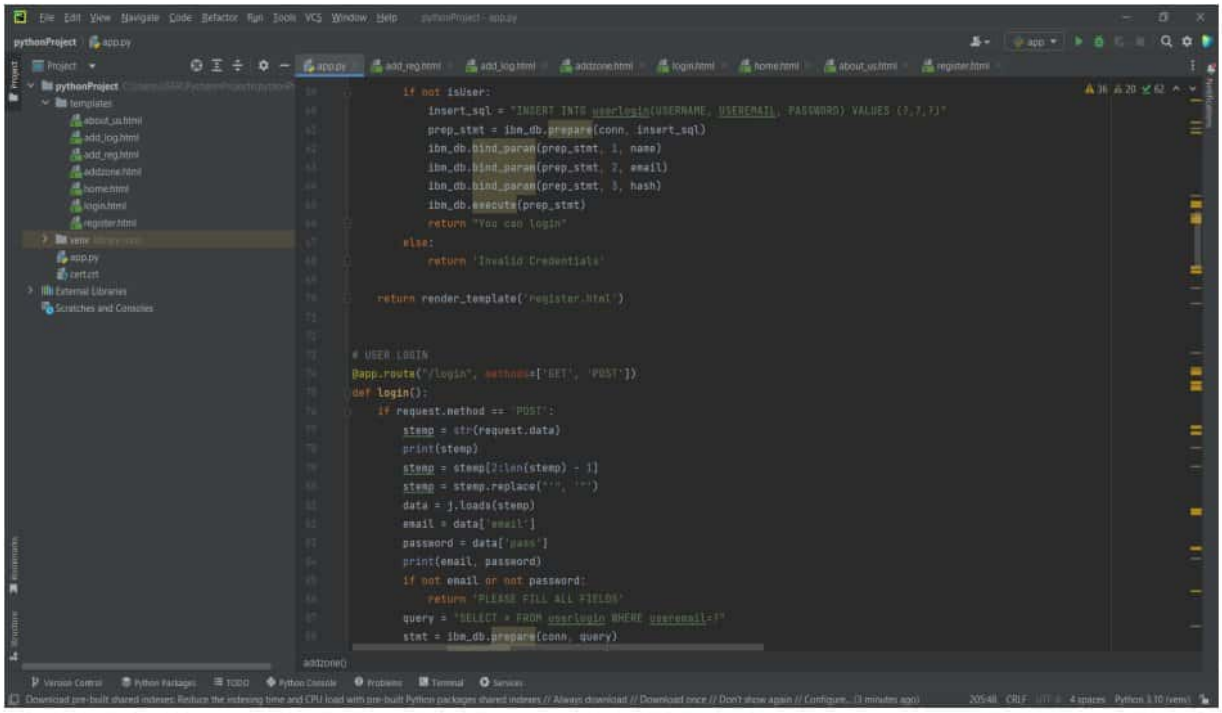
FEATURE 2

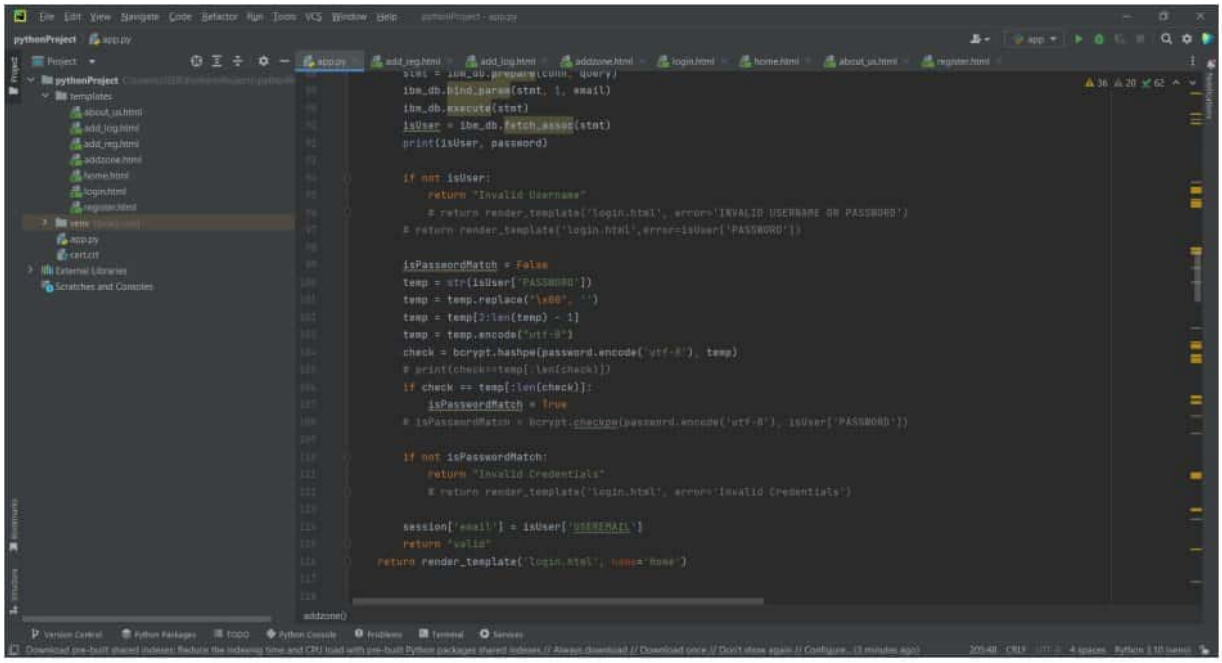
The app should have a user registration and login. After the user logged into the app it will track the user's location and update the database with the current location. If the user is I the containment zone he will get an alert notification.

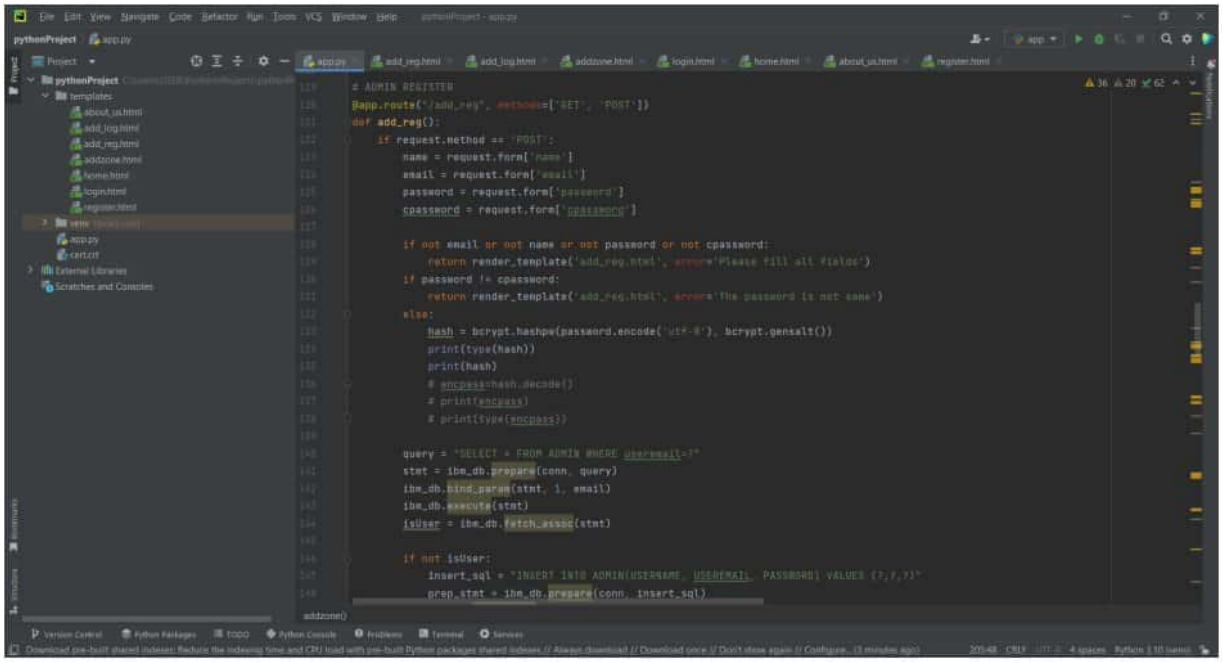
app.py

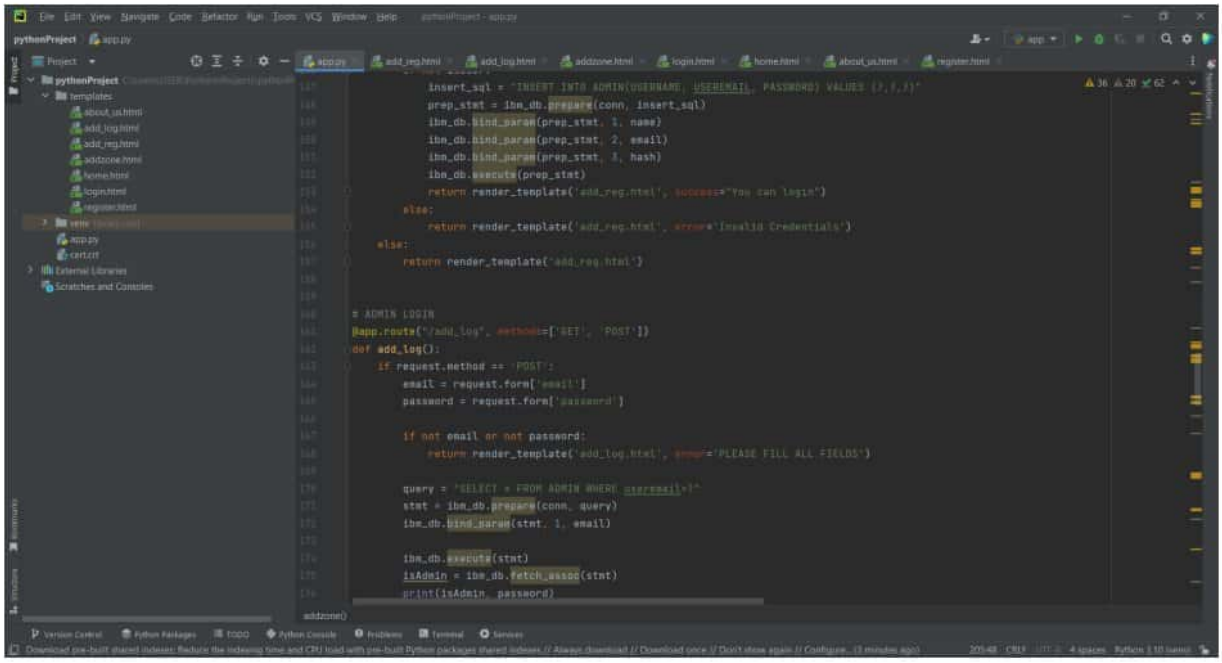


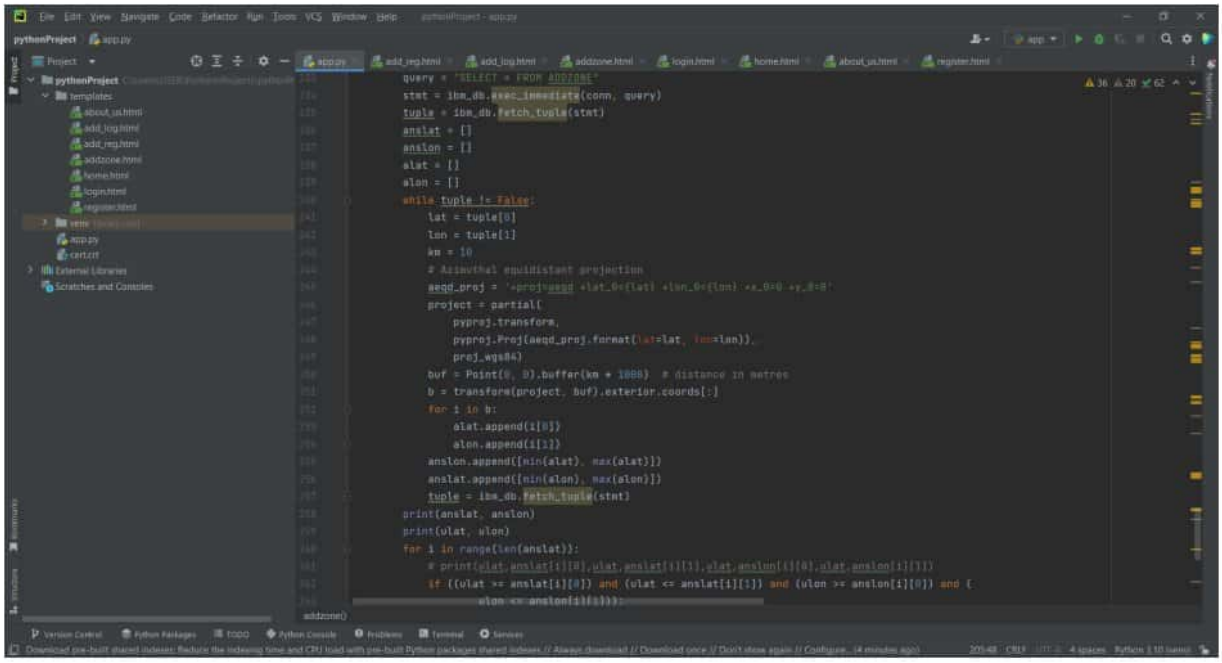
```
@app.route("/")
# USER REGISTER
@app.route('/register', methods=['GET', 'POST'])
def register():
    if request.method == 'POST':
        stemp = str(request.data)
        stemp = stemp[2:len(stemp) - 1]
        stemp = stemp.replace("'", '"')
        data = j.loads(stemp)
        name = data['name']
        email = data['email']
        password = data['pass']
        cpassword = data['cpass']

        if not email or not name or not password or not cpassword:
            return 'Please fill all fields'
        if password != cpassword:
            return 'The password is not same'
        else:
            hash = bcrypt.hashpw(password.encode('utf-8'), bcrypt.gensalt())

        query = "SELECT * FROM userlogin WHERE useremail=?"
        stmt = ibm_db.prepare(conn, query)
        ibm_db.bind_param(stmt, 1, email)
        ibm_db.execute(stmt)
        isUser = ibm_db.fetch_assoc(stmt)

        if not isUser:
            insert_sql = "INSERT INTO userlogin(USERNAME, USEREMAIL, PASSWORD) VALUES (?,?,?)"
            prep_stmt = ibm_db.prepare(conn, insert_sql)
```

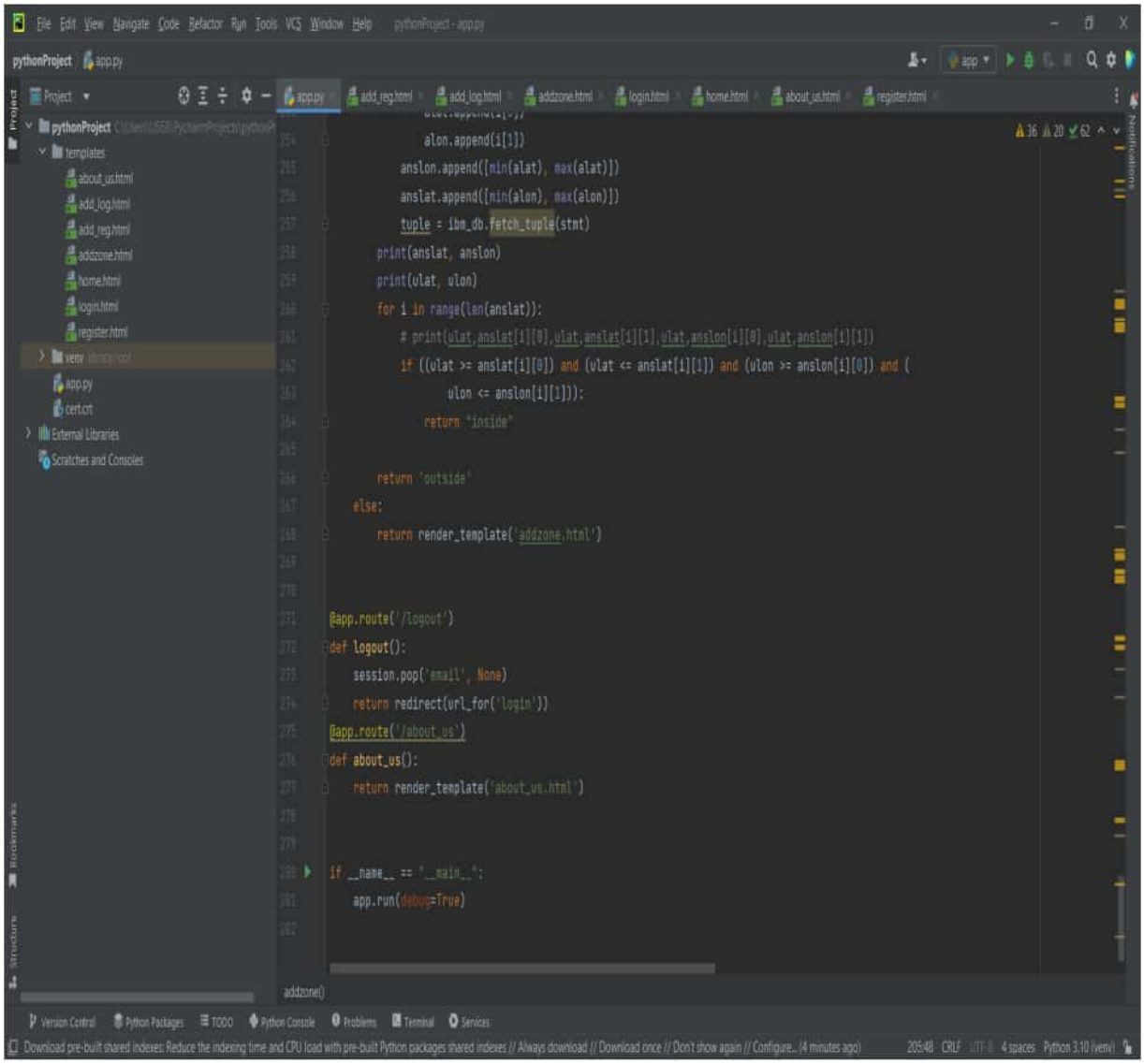




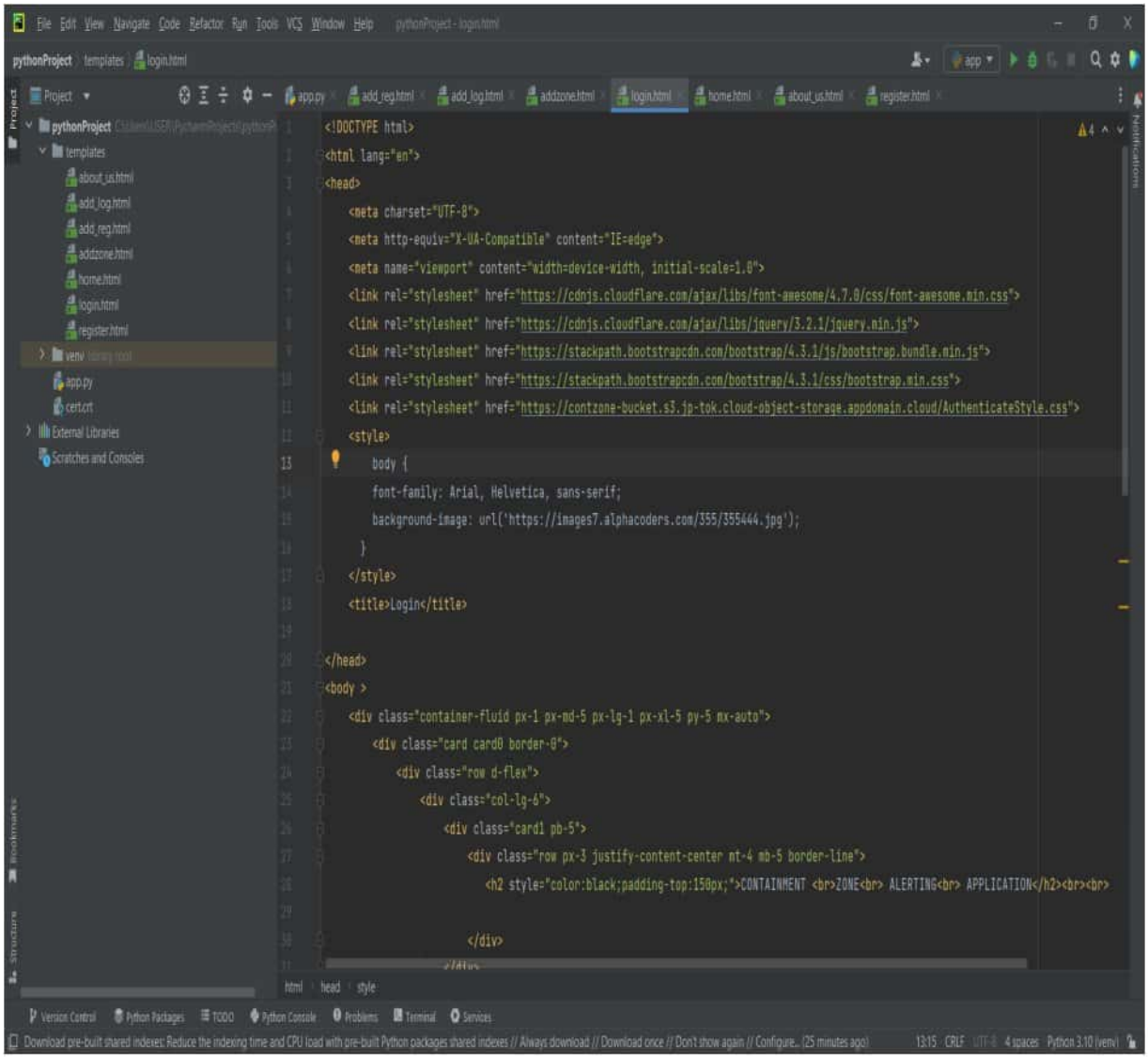


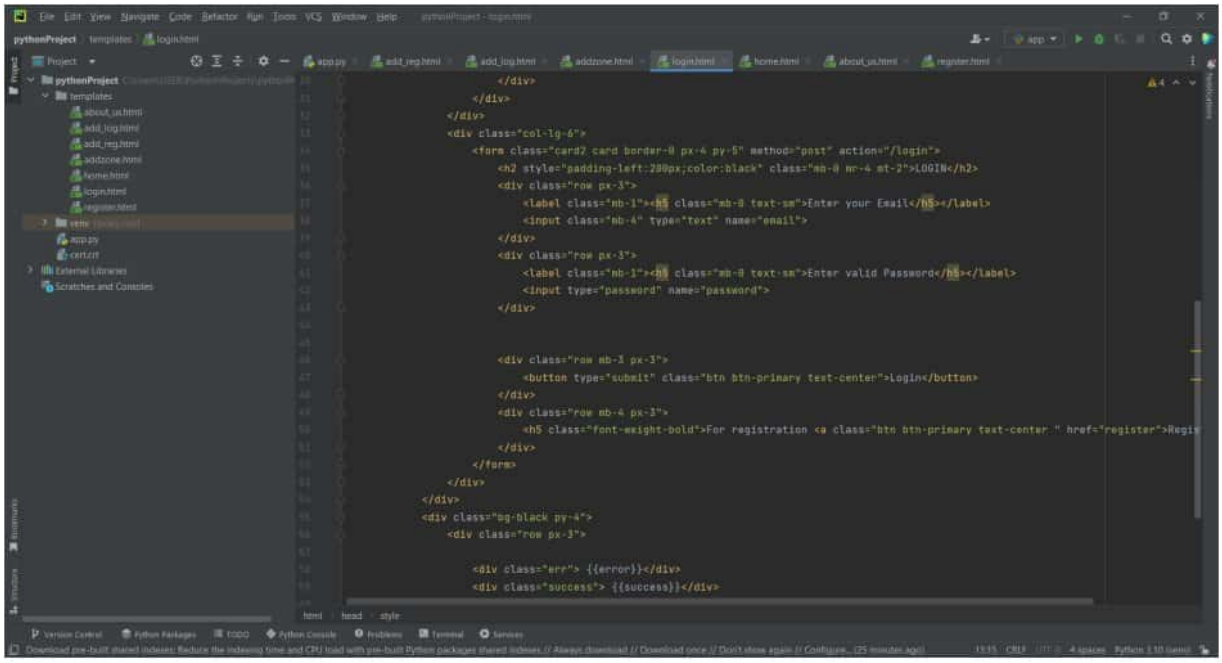




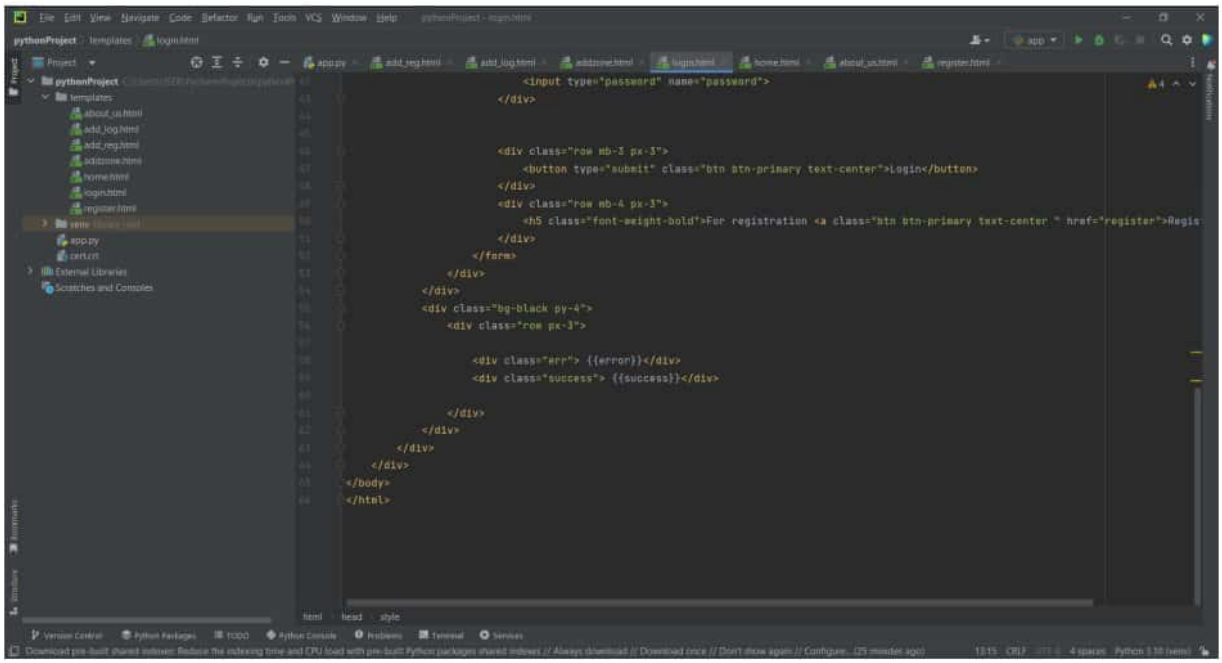


login.html

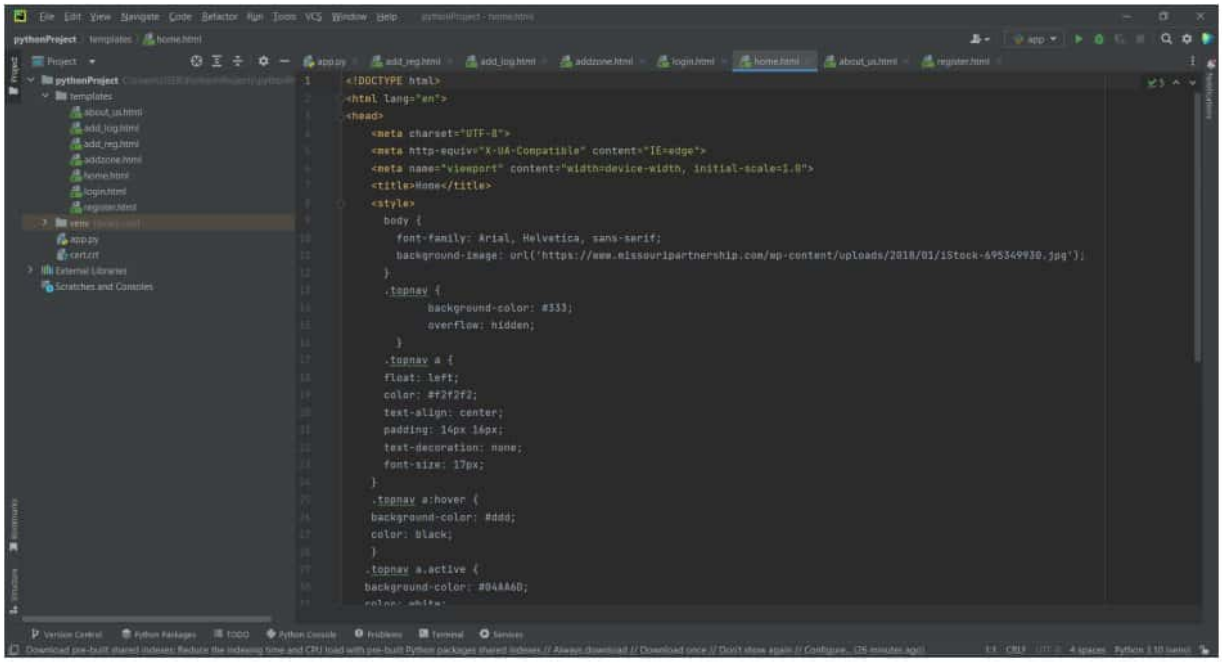




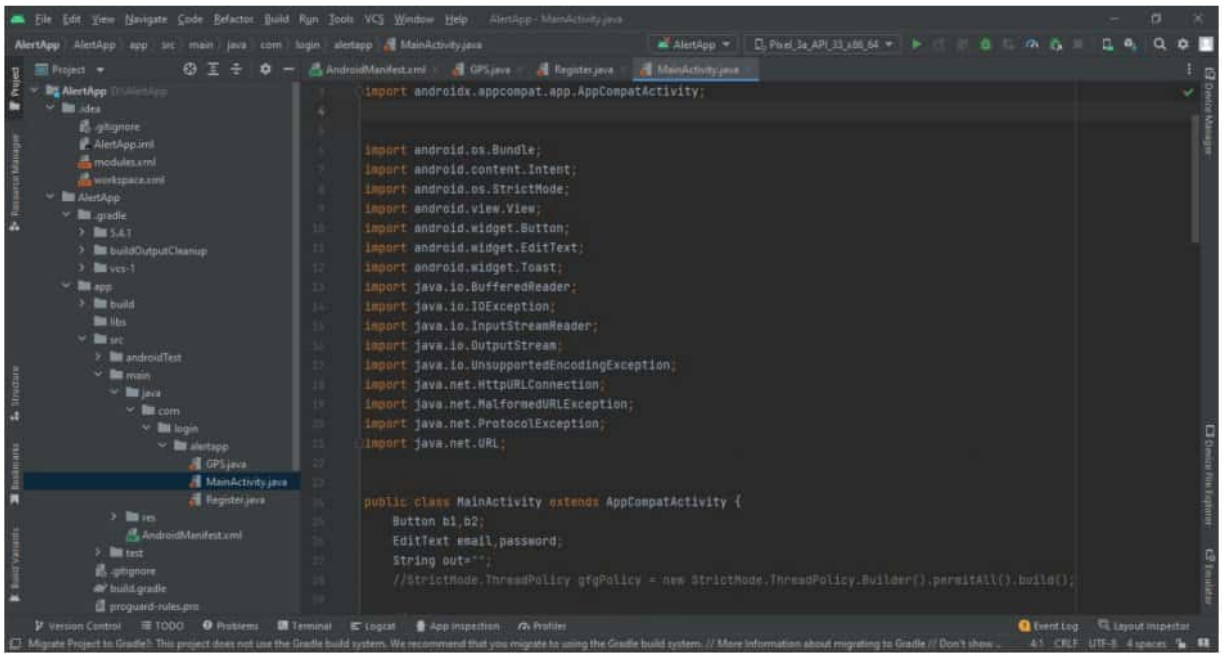
```
                    </div>
                </div>
            </div>
            <div class="col-lg-6">
                <form class="card2 card border-0 px-4 py-5" method="post" action="/login">
                    <h2 style="padding-left:280px;color:black" class="mb-0 mr-4 mt-2">LOGIN</h2>
                    <div class="row px-3">
                        <label class="mb-1"><h5 class="mb-0 text-sm">Enter your Email</h5></label>
                        <input class="mb-4" type="text" name="email">
                    </div>
                    <div class="row px-3">
                        <label class="mb-1"><h5 class="mb-0 text-sm">Enter valid Password</h5></label>
                        <input type="password" name="password">
                    </div>


                    <div class="row mb-3 px-3">
                        <button type="submit" class="btn btn-primary text-center">Login</button>
                    </div>
                    <div class="row mb-4 px-3">
                        <h5 class="font-weight-bold">For registration <a class="btn btn-primary text-center " href="register">Regis
                    </div>
                </form>
            </div>
        </div>
        <div class="bg-black py-4">
            <div class="row px-3">

                <div class="err"> {{error}}</div>
                <div class="success"> {{success}}</div>
```



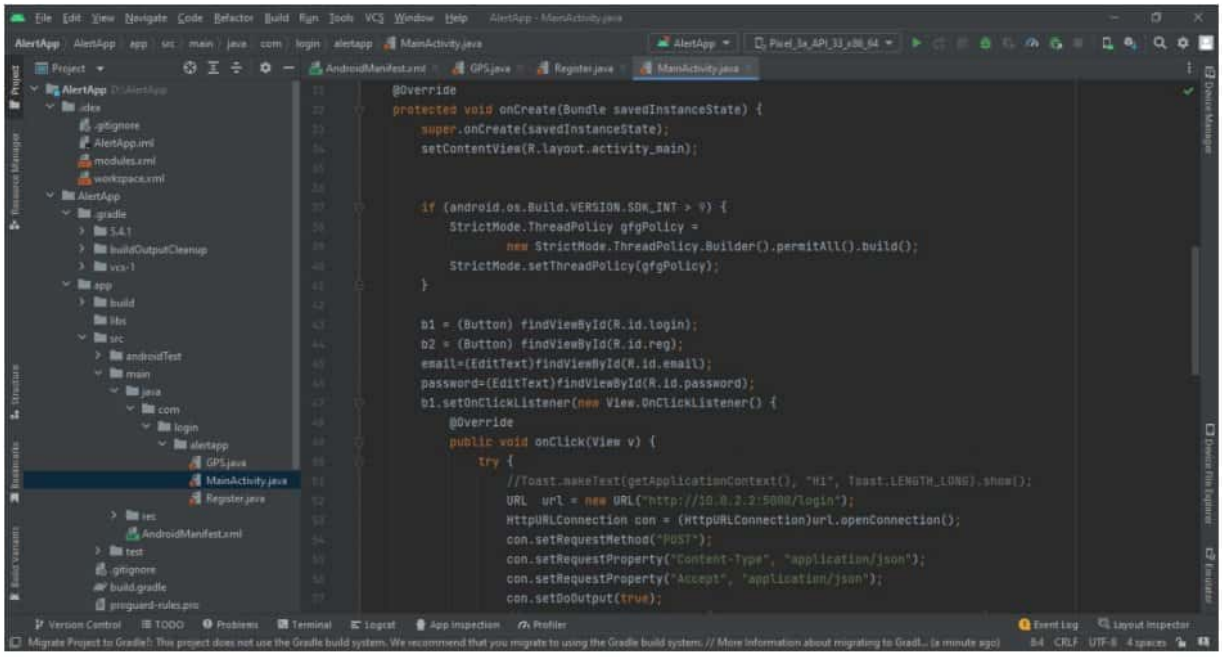
```
                    <input type="password" name="password">
                </div>


                <div class="row mb-3 px-3">
                    <button type="submit" class="btn btn-primary text-center">Login</button>
                </div>
                <div class="row mb-4 px-3">
                    <h5 class="font-weight-bold">For registration <a class="btn btn-primary text-center " href="register">Regis
                </div>
            </form>
        </div>
    </div>
    <div class="bg-black py-4">
        <div class="row px-3">

            <div class="err"> {{error}}</div>
            <div class="success"> {{success}}</div>

        </div>
    </div>
</div>
</div>
</body>
</html>
```

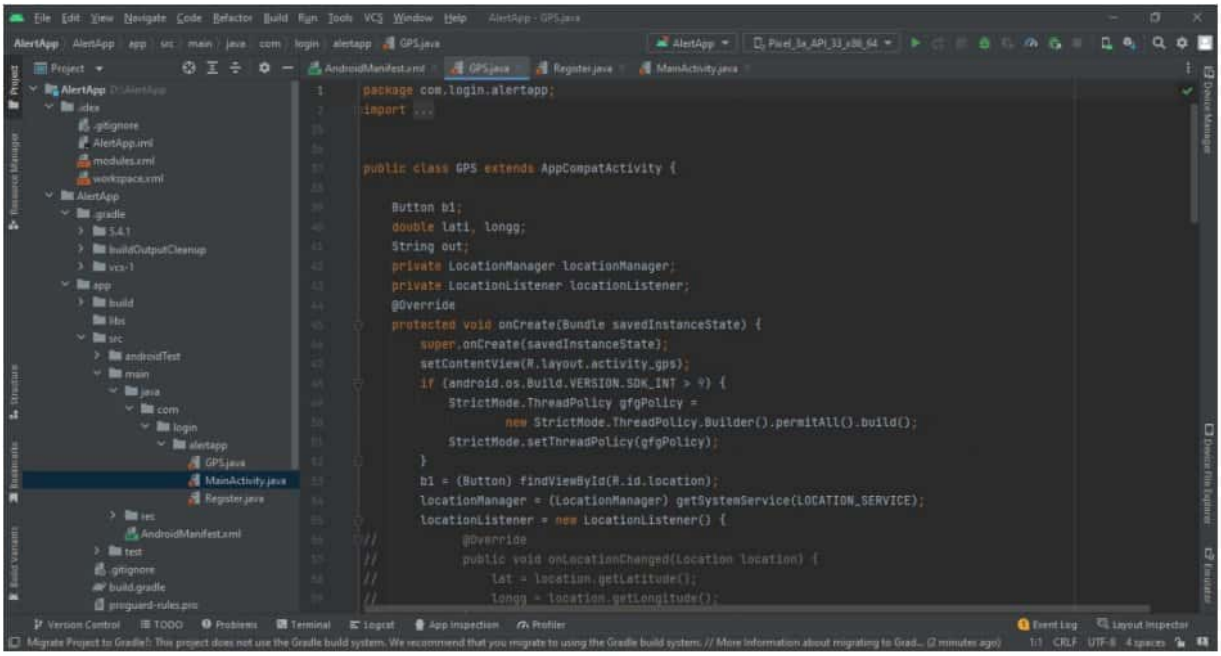


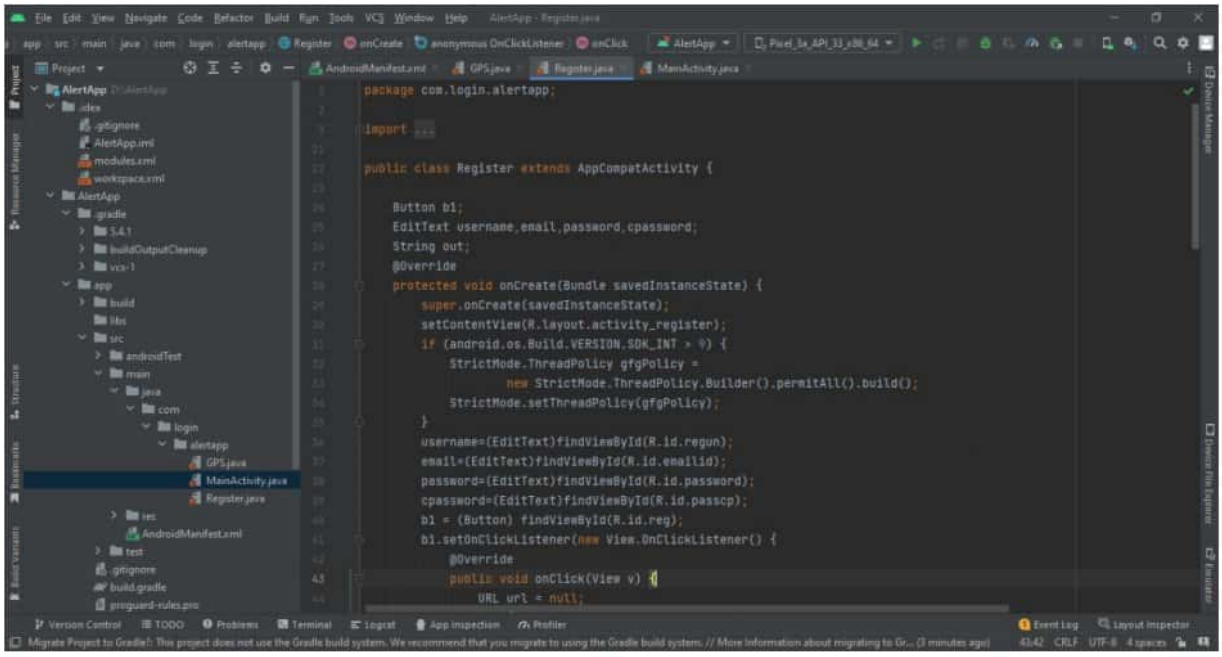
```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Home</title>
    <style>
      body {
        font-family: Arial, Helvetica, sans-serif;
        background-image: url('https://www.elssouripartnership.com/wp-content/uploads/2018/01/iStock-695349930.jpg');
      }
      .topnav {
            background-color: #333;
            overflow: hidden;
      }
      .topnav a {
      float: left;
      color: #f2f2f2;
      text-align: center;
      padding: 14px 16px;
      text-decoration: none;
      font-size: 17px;
    }
    .topnav a:hover {
    background-color: #ddd;
    color: black;
    }
    .topnav a.active {
    background-color: #04AA6D;
```

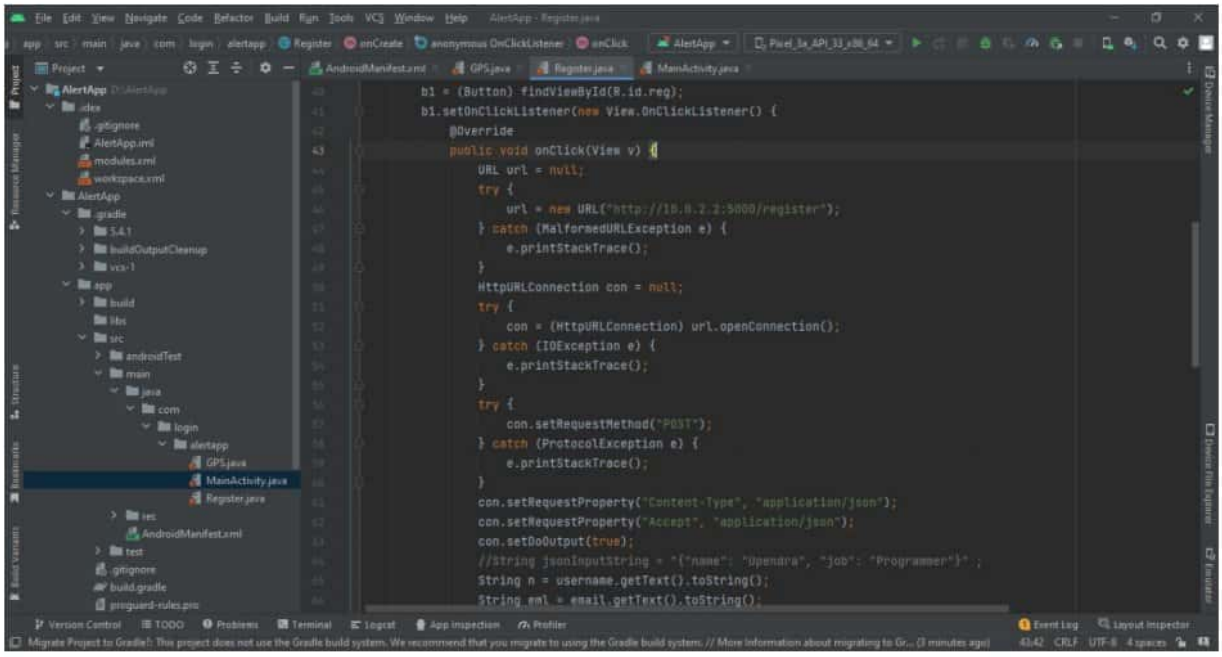


```
import androidx.appcompat.app.AppCompatActivity;


import android.os.Bundle;
import android.content.Intent;
import android.os.StrictMode;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;
import java.io.BufferedReader;
import java.io.IOException;
import java.io.InputStreamReader;
import java.io.OutputStream;
import java.io.UnsupportedEncodingException;
import java.net.HttpURLConnection;
import java.net.MalformedURLException;
import java.net.ProtocolException;
import java.net.URL;


public class MainActivity extends AppCompatActivity {
    Button b1,b2;
    EditText email,password;
    String out="";
    //StrictMode.ThreadPolicy gfgPolicy = new StrictMode.ThreadPolicy.Builder().permitAll().build();
```









TESTING

A test case has components that describe input, action and an expected response, in order to determine if a feature of an application is working correctly. A test case is a set of instructions on “HOW” to validate a particular test objective/target, which when followed will tell us if the expected behavior of the system is satisfied or not

Characteristics of a good test case:

- Accurate: Exacts the purpose.
- Economical: No unnecessary steps or words.
- Traceable: Capable of being traced to requirements.
- Repeatable: Can be used to perform the test over and over.
- Reusable: Can be reused if necessary

RESULTS

This app alerting the users from entering into the affected areas by giving alerting notifications by checking them by geofence and the location tracking.

ADVANTAGES & DISADVANTAGES

Advantages

- people can be alerted before entering the affected zone.
- spread of virus can be reduced

Disadvantages

- Access to personal information and geographical location
- With more stress out on user's privacy and widespread of the pandemic, Mountains of user data is one the edge of exposure

CONCLUSION

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

FUTURE SCOPE

The application can be further used for many purposes like Safety purpose and forest safety to prevent users from tresspassing into restricted areas.

APPENDIX

GITHUB -https://github.com/IBM-EPBL/IBM-Project-16550-1659617157

PROJECT DEMO-

https://www.kapwing.com/videos/63791bde308f0900bebbd2c5