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COVID DETECTOR

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Introduction

Abstract

Due to current covid-19 pandemic, people are un-safe everywhere. People have to protect themselves by wearing masks, washing their hands and staying at home. But staying at home is very difficult as everyone has his own work which has to be done so people has to go for their works and get mixed with each other which makes the number of infected people increases exponentially and increases number of death cases. Our application tries very hard to decrease infection rate and makes people go wherever they want but with taking care about precautionary measures. Briefly our application allows each user to know level of risk in his current position using the map of the current location and shows the closest infected cases to the user to take care about himself. Also our application makes user detect the level of any destination or location he wants to go before going there. User can also get a preliminary insight about his current medical situation by giving the user a test consists of world health organization questions about covid. User can also get an idea about symptoms and preventions about the corona virus and keep following current pandemic statistics.

Background

COVID-19 (coronavirus disease 2019) is a disease caused by a virus named SARS-CoV-2 and was discovered in December 2019 in Wuhan, China. It is very contagious and has quickly spread around the world. Its symptoms are like a cold, or flu. COVID-19 may attack more than your lungs and respiratory system.

Currently, many people don't care about symptoms or mixing with each other which increases rate of infection as there's little health awareness. Unfortunately, many people who are infected don't stay at home due to their works and without take care about precautionary measures.

Problem Definition

Due to the current world pandemic, we try to reduce the infection rate as possible. Everyone have to go everywhere to do their works without taking care to if they are surrounded by infected people or not so it increases number of infected people exponentially. Also when the symptoms appear on someone, he doesn't care as he thinks that he catches a cold and ignore it. Some people also do not care about preventions to protect themselves.

Scope

- We try to develop an application which can work on multiple platforms (IOS and android) that can help users along their movement.
- Application will allow users to move carefully based on each area.

Project Objectives

Our application aims to:

- Helps user to know the risk in his current location.
- Helps user to know the level of risk in any destination location he wants to know.
- Makes user specify his current medical situation (infected or not).
- Makes user get a preliminary insight about his medical status by doing an exercise.
- Allows user to keep updated with the numbers of the infected cases.
- Allows user to get an idea about symptoms and preventions of the Covid-19.

Tools and Techniques

Flutter

Flutter is an open source framework by Google for building beautiful, natively compiled, multi-platform applications from a single codebase.

Dart

Dart is a client-optimized language for fast apps on any platform.

Firebase

Firebase is Google's mobile platform that helps you quickly develop high-quality apps and grow your business.

Visual paradigm

Visual Paradigm features a rich set of Agile and Scrum tools for project management.

Figma

Figma is a web-based graphics editing and user interface design app.

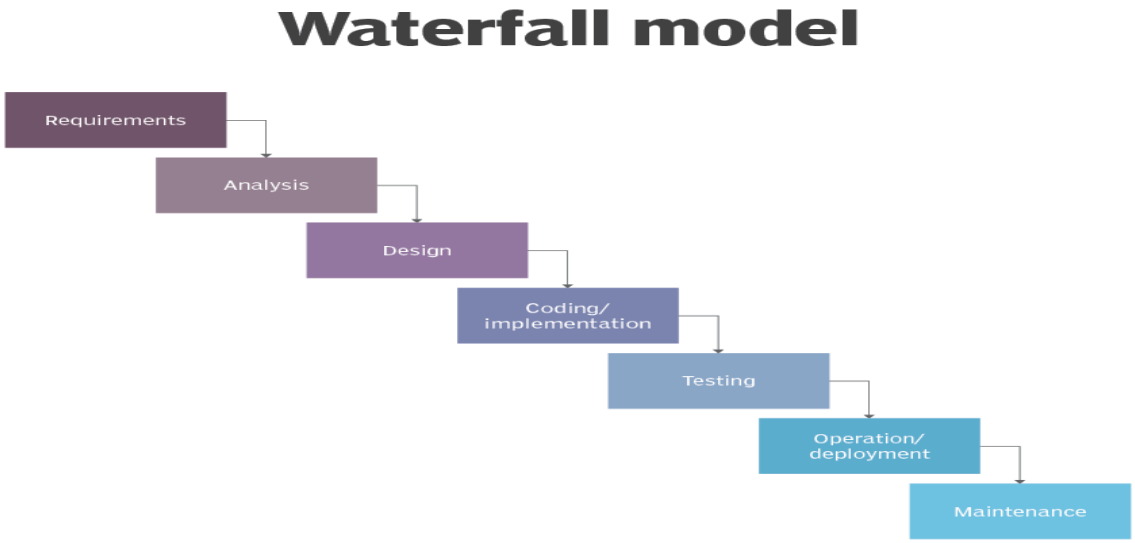
APIs

An API is a set of programming code that enables data transmission between one software product and another.

GitHub

GitHub is a code hosting platform for collaboration and version control.

Methodology



Our application will use waterfall development life cycle as the requirements are very well understood and no need for continuously changing requirements. It is a sequential model. Each of its stages must be entirely concluded before the next can begin. Waterfall divides development into separate phases, each phase is considered as the input for the next phase. It contains 7 different stages which are system requirements, software requirements, analysis, program design, coding, testing and operations.

Related Work

NHS COVID-19: The NHS COVID-19 app is the official contact tracing app for England and Wales and is one of the fastest ways of knowing if you're at risk from COVID-19.

For your vaccination status, it lets you know the level of coronavirus risk in your postcode district. It finds out when you've been near other app users who have since tested positive for coronavirus or if you have visited a venue where you may have come into contact with the virus using QR code scanner.

But its disadvantage is that the user has to scan the QR code of every place he visits. The user may forget to do that so he may be infected. Also it lets you know the level of risk in the user's postcode district. What if the user travels continuously? What if the user doesn't know the postcode? Our application makes it easier.

Co-WIN: is a search vaccination center which helps everyone in India to get vaccinated by suggesting each user the nearest vaccination center by map, pin, or district.

Its goal is limited only for vaccination and getting vaccinated only. It doesn't help users to know anything about the risk in their current location or any other location.

Solution

Our application: Lets you know the level of coronavirus risk in your current location. It finds out when you've been near other app users who have since tested positive for coronavirus or if you have visited a venue where you may have come into contact with the virus using GPS to have the latest updates. Also if you want to go to someplace it can tell you the level of risk there.

Future Work

We will try to make a feature that enables to warn people (if you detect that you are infected) that were in the same place as you in the previous two days by checking first what places you visited in the previous two days then warn people who were there, that they were mixed with infected ones then it suggests the nearest hospitals for you.

Stakeholders

- Users
  - ➔ Citizens
    - ❖ **Age:** 15-60, Median 37.
    - ❖ **Education:** intermediate.
    - ❖ **Mobile experience:** intermediate.
- Ministry of Health

Project Specifications

System Architecture

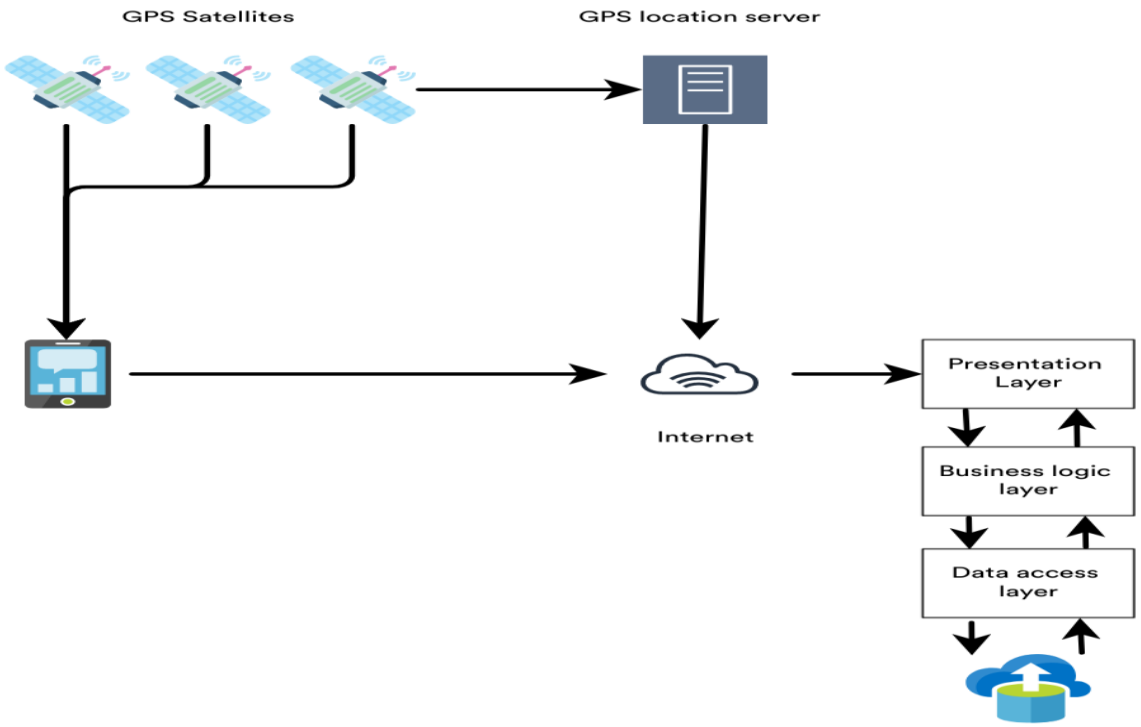


Figure 1: System Architecture

Functional Requirements

Function Name	Description
Check infected	It will ask user to specify his current medical status.
Detect destination	User will detect the destination he want to go.
Detect destination risk	It will detect destination risk for the user
Detect current location	It will show a map for user with his current location and display if he is in a safe area or not.
Update map	System updates map when detecting a new infected case.
Display WHO questions	It acts like a test for each user to get preliminary insights about his current health situation.
Display cases	It displays current status for infected, recovered and death cases.
Update cases	It updates cases.
Display symptoms	It displays symptoms that user should be aware of.
Display preventions	It displays preventions that user should.

Non-Functional Requirements

Usability

Application interface is highly usable which makes the application easy-to-learn and easy-to-use by users. Interface behaves similar to other very-known applications such as uber and google maps in menu format, color schemes, etc.

Usability Features

- Persistent navigation.
- Presentation and content.
  - ❖ Color theory.
  - ❖ Memory Recognition.
- Design principles.
  - ❖ Feedback.
  - ❖ Affordance.

Security

Flutter provides various security and authentication plugins. By integrating a sign-in plugin, developers can easily add an authentication check in an app. It also offers a secure data storage plugin named *NSUserDefault* for IOS and *SharedPreferences* for Android.

Use case diagram

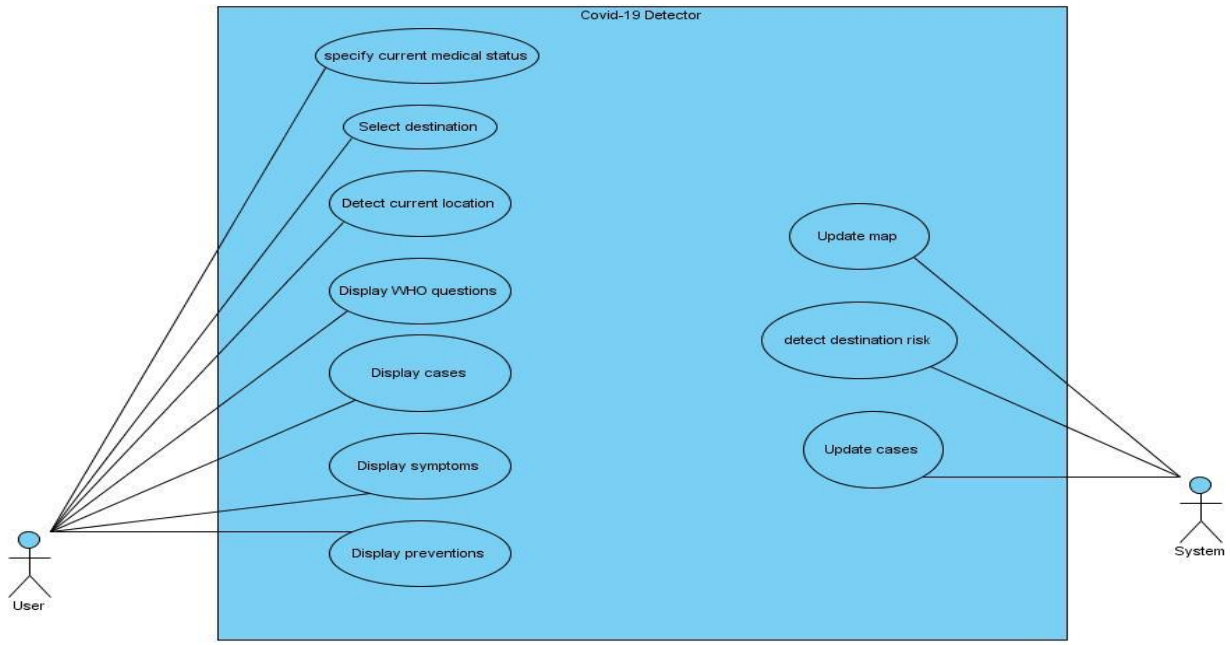


Figure 2: Use-case Diagram

Use case ID	1	
Use case name:	Specify current medical status.	
Brief description:	User detects his current medical status (infected or not).	
Actor:	User.	
Related use case	Update map	
Pre-conditions:	User must be logged in.	
Post-conditions:	If he is infected the system will show him as an infected case for other people to be far from him.	
Flow of activities:	User	System
	1. User select his medical state,	1.1. System updates map for other users.

Use case ID	2	
Use case name:	Select destination	
Brief description:	User detects the destination that he wants to know the level of risk there.	
Actor:	User.	
Related use cases:	Detect destination risk.	
Pre-conditions:	GPS is on and user is logged in.	
Post-conditions:	The system will show the user level of risk in the selected destination	
Flow of activities:	User	System
	1. User select destination.	1.1. System detects destination risk. 1.2. System shows level of risk.

Use case ID	3	
Use case name:	Detect current location	
Brief description:	User can see for his current location the nearest infected cases.	
Actor:	User.	
Pre-conditions:	GPS is on and user is logged in.	
Post-conditions:	The system will show the infected cases around the user.	
Flow of	User	System

activities:	1. Opens map to see his current location.	1.1. System shows nearest infected cases around the user.

Use case ID	**4**	
Use case name:	Display WHO questions	
Brief description:	User does an exam test to get a preliminary insight about his medical status.	
Actor:	User.	
Pre-conditions:	user is logged in.	
Post-conditions:	The system will show the user level of risk in the selected destination	
Flow of activities:	User	System
	1. User selects to do the test.	1.1. System shows test questions and displays the result after the user ends the test.

Use case ID	**5**	
Use case name:	Display cases.	
Brief description:	User wants to see current pandemic statistics.	
Actor:	User.	
Related use cases:	Update cases.	
Pre-conditions:	User is logged in.	
Post-conditions:	The system will show current pandemic statistics.	
Flow of activities:	User	System
	1. User selects pandemic statistics.	1.1. System updates cases. 1.2. System shows pandemic statistics.

Use case ID	**6**
Use case name:	Display symptoms.
Brief description:	User wants to get an idea about virus symptoms.

Actor:	User.	
Pre-conditions:	User is logged in.	
Post-conditions:	The system will show symptoms of the virus.	
Flow of activities:	User	System
	1. User select symptoms.	1.1. System shows symptoms.

Use case ID	**7**
Use case name:	Display preventions
Brief description:	User wants to get an idea about virus preventions.
Actor:	User.
Pre-conditions:	User is logged in.
Post-conditions:	The system will show preventions of the virus.

Flow of activities:	User	System
	1. User select preventions.	1.1. System shows preventions.

Class Diagram

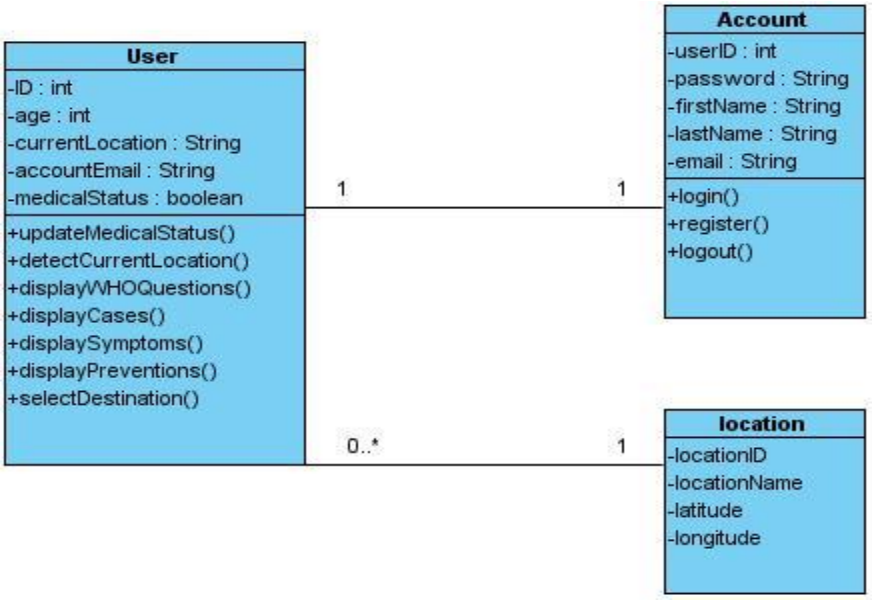


Figure 3: Class Diagram

Sequence Diagrams

Register

Figure 4: Register Sequence Diagram

Login

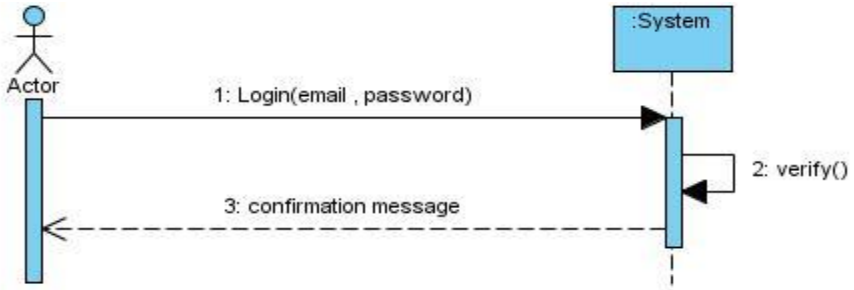


Figure 5: Login Sequence Diagram

Specify current medical status

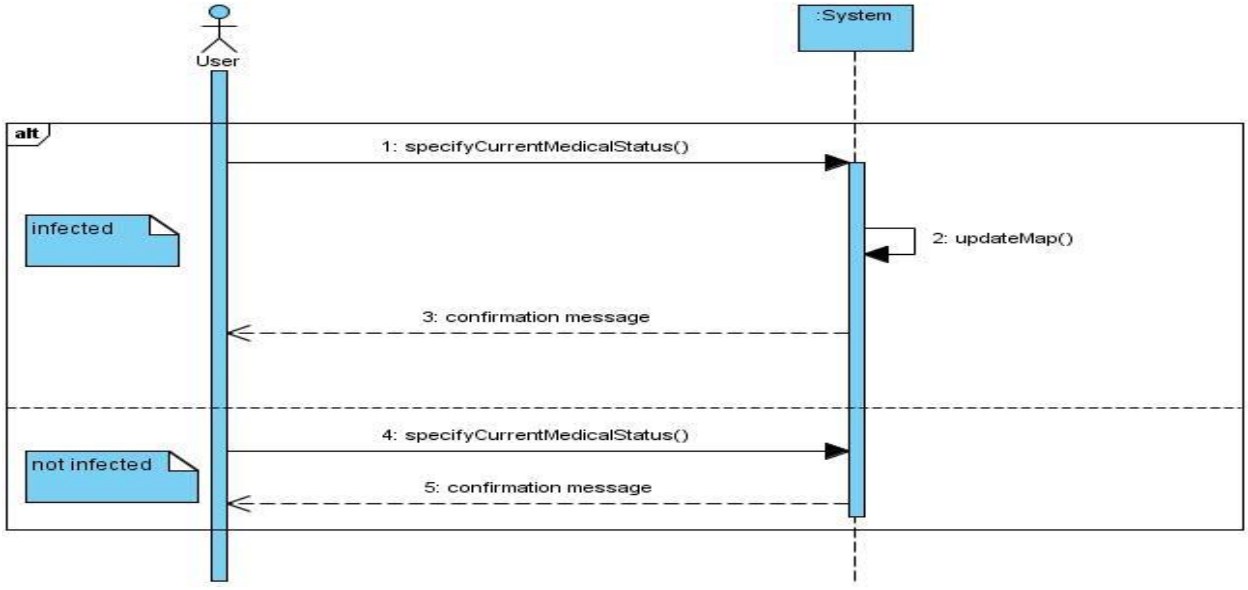


Figure 6: Specify current medical status Sequence Diagram

Detect current location

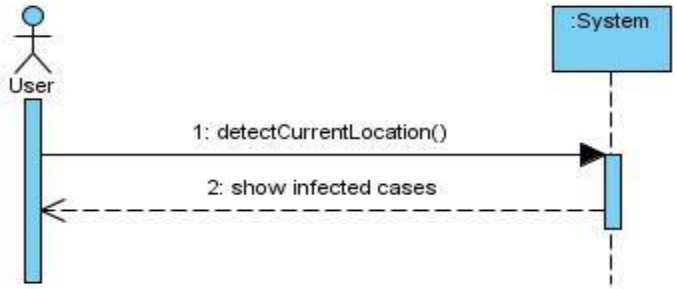


Figure 7: Detect current location Sequence Diagram

Select destination

Figure 8: Select destination

Display WHO questions

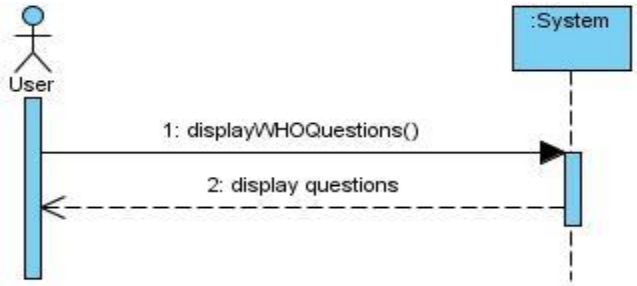


Figure 9: Display WHO questions Sequence Diagram

Display cases

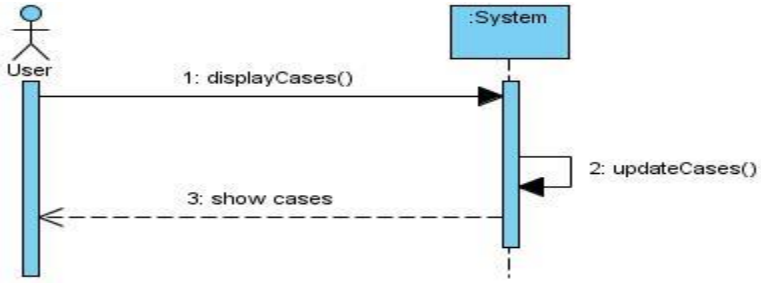


Figure 10: Display cases Sequence Diagram

Display symptoms

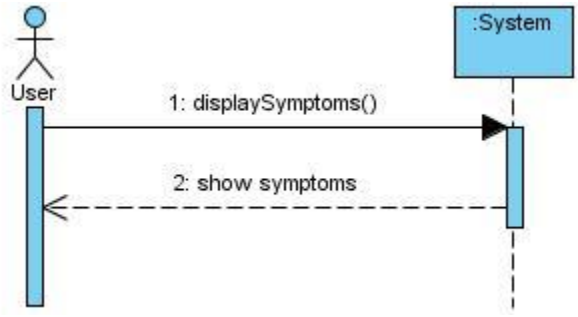


Figure 11: Display symptoms Sequence Diagram

Display preventions

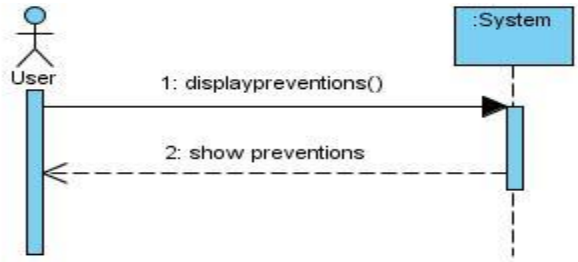


Figure 12: Display preventions Sequence Diagram

Entity-Relationship Diagram (ERD)

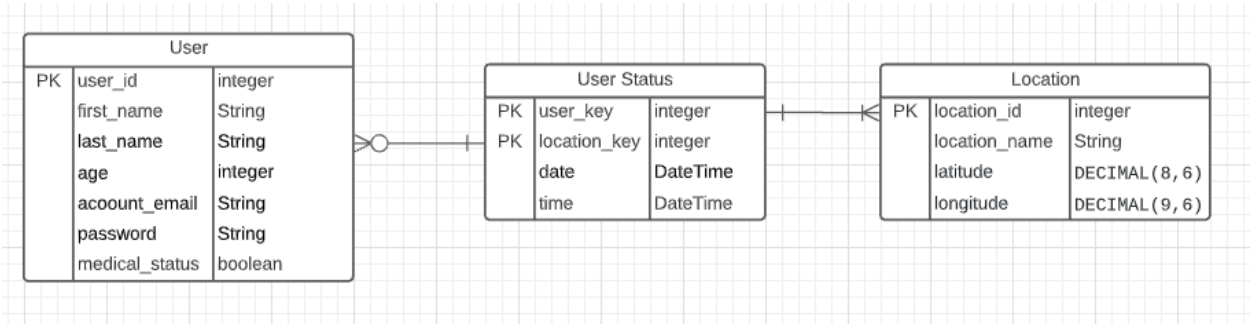
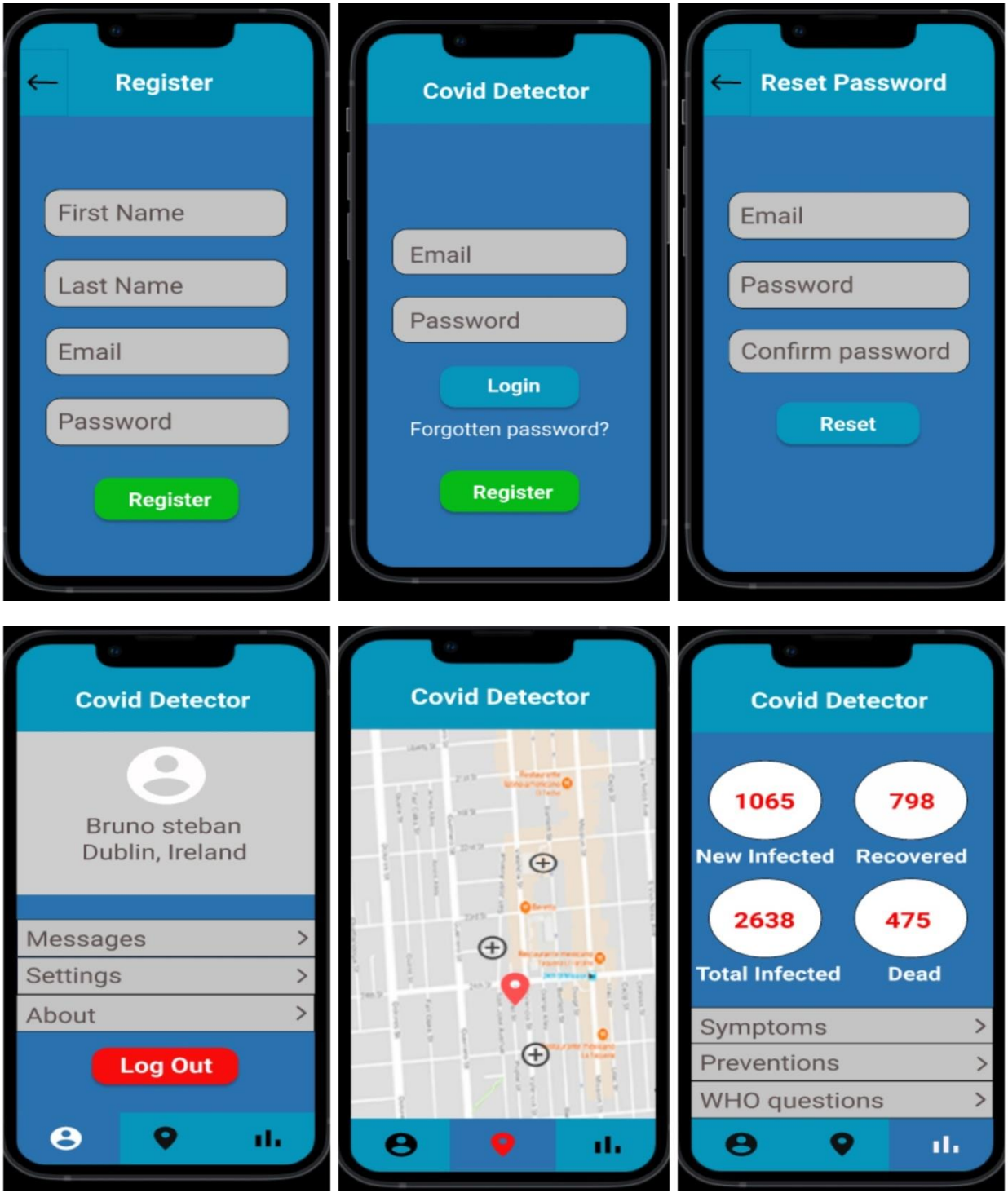


Figure 13: Entity-Relationship Diagram (ERD)

Prototype


Register
First Name
Last Name
Email
Password
Register
Covid Detector
Email
Password
Login
Forgotten password?
Register
Reset Password
Email
Password
Confirm password
Reset
Covid Detector
Bruno steban
Dublin, Ireland
Messages
Settings
About
Log Out
Covid Detector
Covid Detector
1065
New Infected
798
Recovered
2638
Total Infected
475
Dead
Symptoms
Preventions
WHO questions

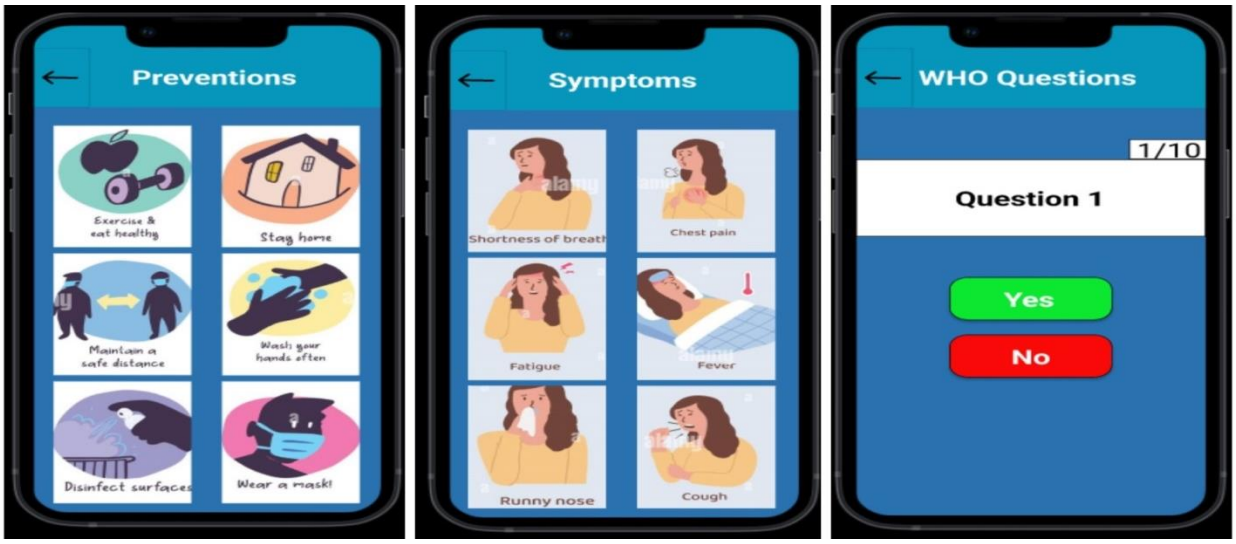


Figure 14: Prototype

Work Plan

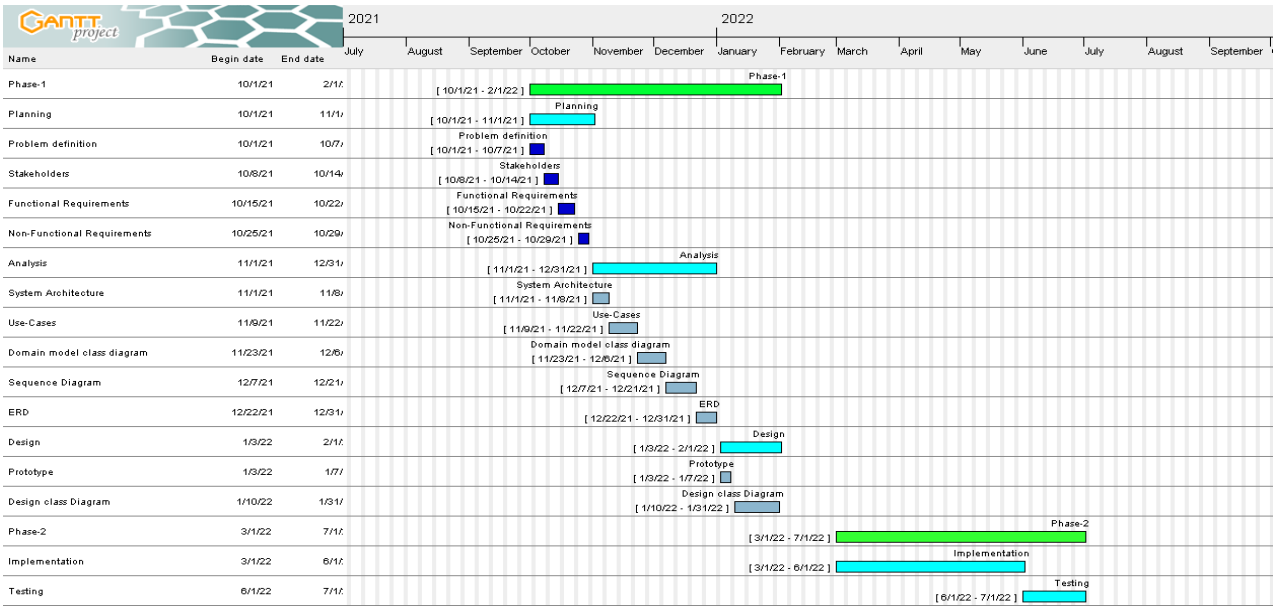


Figure 15: Gantt chart

Task	Task title	Description	Task Status
1	Phase-1	Analysis and Design Phases	Completed
2	Planning Phase	Planning the overall project and project development life cycle.	Completed
3	Problem Definition	Identify the problem and document the objective of the solution system.	Completed

4	Stakeholders	Define persons who have an interest in the successful implementation of the system.	Completed
5	Functional Requirements	Identify activities that the system must perform to support user's work.	Completed
6	Non-Functional Requirements	Identify required system characteristics other than the activities it must perform.	Completed
7	Analysis Phase	Identify what is required for the new system to solve the problem.	Completed
8	System Architecture	Define system overall architecture	Completed
9	Use-cases	Identifying the activities that a system must perform in response to a request by a user.	Completed
10	Domain model class diagram	Identifying classes included in the problem domain.	Completed
11	Sequence Diagram	Diagramming the sequence of messages between actor and system.	Completed
12	ERD	Define entities, their attributes and their relationships.	Completed
13	Design Phase	Identify how the system will operate to solve the problem.	Completed
14	Prototype	Making a demo of the application.	Completed
15	Design Class Diagram	Design overall class Diagram.	Completed
16	Phase-2	Implementation and Testing phases	Incomplete
17	Implementation	Actual implementation of the application.	Incomplete
18	Testing	Perform unit and integration testing.	Incomplete

References

NHS COVID-19 - Apps on Google Play

Security | Flutter

CoWIN

https://flutter.dev