

# Covid-19 Infection Tracker

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# Introduction

- Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.
- 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.
- The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.

Source: WHO

# Aim & Objectives

- To develop a software application that tracks and subsequently lead to the effective containment or the COVID-19 virus.
- To protect the anonymity of the users.

# Solution (user application)

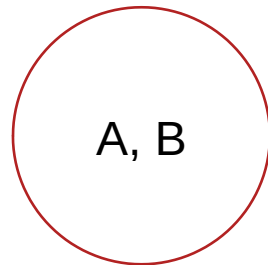
- The solution is based on GPS location sharing capability of mobile devices.
- It consists of a mobile application which gathers location data of the installed device and sends this to a cloud based server.
- Each user is assigned a unique ID.
- The data sent to the server consists of the: User's Unique ID, GPS coordinates, and the exact time the data was collected.
- Anonymity is maintained by the use of the user's Unique ID.

# Solution (web-based application)

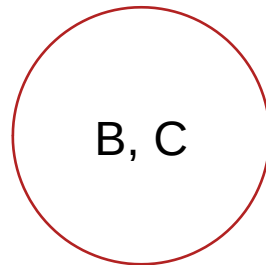
- A web-based application will be provided to healthcare facilities charged with combating the virus.
- The application collects the time a user is admitted for testing and the result of that test and sends it to the server for processing.

# Solution (server)

- The server builds clusters from data collected from the user application.
- Each cluster represents GPS coordinates within a three metre (3m) radius.
- Clusters retain transitivity. i.e if A is 3m away from B and B is 3m away from C yet C is more than 3m away from A, two clusters are created such that:



Cluster 1



Cluster 2

# Solution (server)

- In every cluster, each user is assigned “time\_joined” and “time\_left” properties which represent the times a user is added to the cluster and the last time the user’s presence was recorded in the cluster.
- These times are used in tracking users who have come in contact with a confirmed case.

# Solution (Tracking)

- The solution employs a time-based recursive search to track possibly infected users.
- When a healthcare facility logs a user as positive, the user's time of admittance for testing is sent along.
- This time is used to establish a base time for tracing cases.
- The base time is calculated as 14 days prior to the time the user was admitted.



# Solution (Tracking)

- All clusters to which the user was added since the calculated base time are retrieved.
- The users in this clusters are then scanned for likelihood of contagion.
- Possibly infected users are then added to a list and this process is repeated for each one them using the times they joined and left the cluster.

# Possible Cases

- Any user that joined the cluster after or at the time an infected user or other possible case joined the cluster.
- Any user joined the cluster before an infected user or possible case but leaves after an infected user or possible case joins.

# Possible Cases

A : time\_joined: 10:00AM, time\_left: 10:30AM


E : time\_joined: 10:20AM, time\_left: 3:30PM


B : time\_joined: 06:00AM, time\_left: 08:00AM

C : time\_joined: 07:00AM, time\_left: 07:33AM

D : time\_joined: 09:00AM, time\_left: 10:30AM

 **Infected User**

 **Possible Case**

 **Not infected user**



**Thank You**