

Contact Tracing

Propoject proposal
by

Chandresh Kumar Maurya
Assistant professor
NIT Delhi

Nitesh Kumar
Assistant professor
IIITM Gwalior

The Problem

- Recent covid-19 pandemic created a worldwide emergency
- It is estimated that the root cause of covid-19 is human-to-human transmission
- As a result, we need to track people who came in contact with other peoples:
 - Having travel history
 - Asymptomatic
 - Not yet symptomatic but in future can be

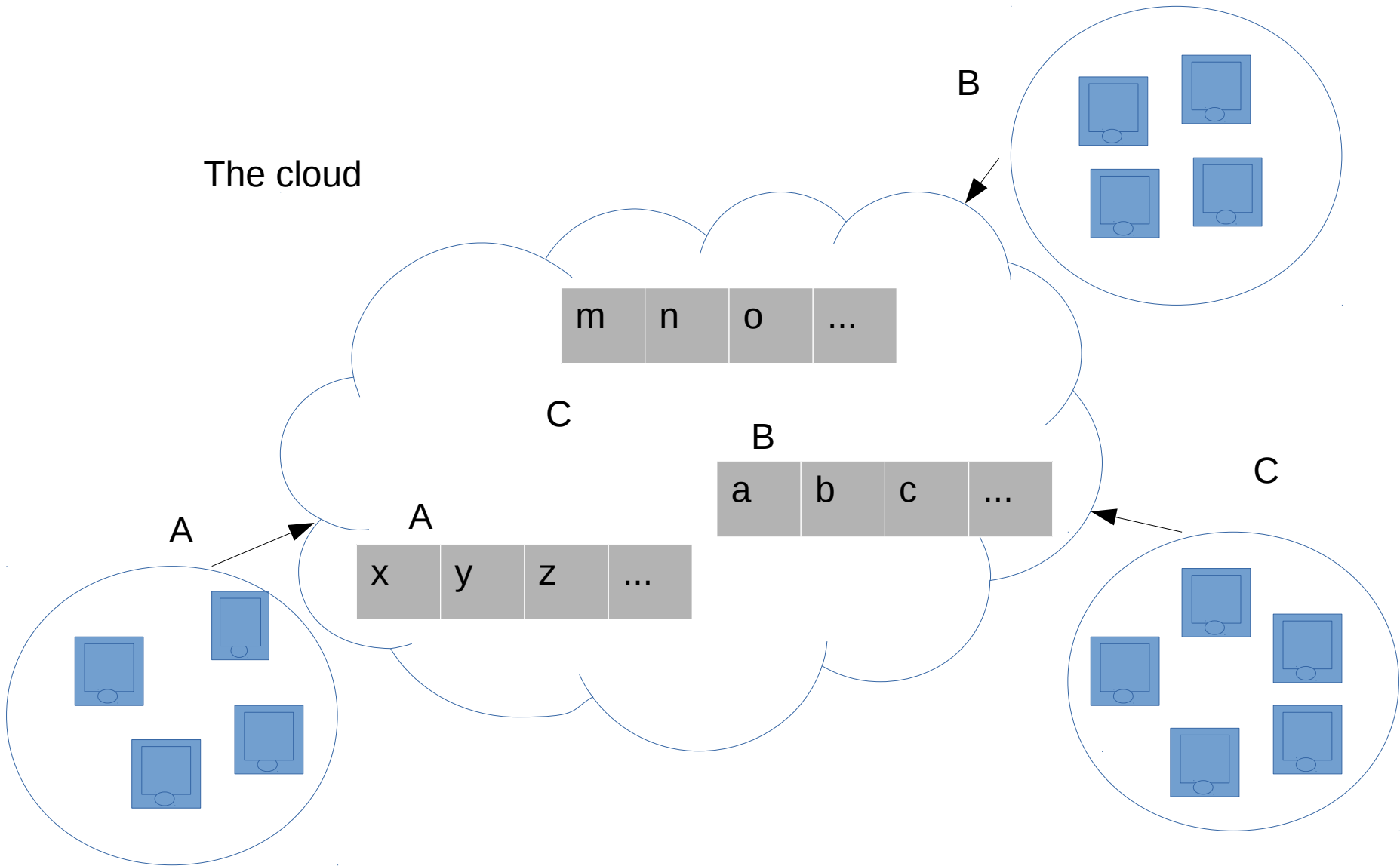
Current Solutions

- By following contacts of the patients-**difficult to scale and cumbersome**
- Using Aarogya setu app- works on location sharing and bluetooth. Secondly, it tells us that we are in contact with a covid +ve person.
- Limitations of Aarogya Setu-
 - **Does not tell if we were in contact with a person a week or month ago who got diagnosed with covid-19 recently.**
 - **It also does not tell which areas are hotspot and should be avoided.**
 - **It is based on self-assessment only and hence reliability is a concern**

The Proposed Solution

- We propose a solution for contact tracing
- Our solution is based on GPS and cloud computing
- Each user is required to install the app
- Once installed, it will send GPS data to cloud
- Whenever two devices whose GPS coordinates are within 5 Mt, A bit along with other details of the user is stored over cloud.
- To find out, which devices are within permissible limit of 5 mt, we perform clustering over GPS coordinates and track the clusters for about 3-5 mins so as to allow the measure of spread. We assume that it takes around 3-5 mins to get the virus from an infected object.

The System Architecture



The solution Methodology

- We maintain a vector of values (for each user) which indicate the persons whom the particular user came in contact with within 5 Mt and stays around 3-5 mins (tunable paramter)
- We can store data of close contacts for about 5 days (can be extended if memory allows). This is the time period when an infected person starts showing symptoms.
- Storing details of close contacts also helps in case close contact is asymptotic but the other person is symptomatic.
- It will help the authority to alert the user.

Contd...

- Whenever any of the close contacts is found covid +ve, then hospital can trigger an alert informing everybody that they were in close contact with a **verified and genuine** +ve patients. (unlike the Aarogya setu which is based on the self-assessment test). Since we store close contact details for about 5 days, we can back track and know whom the user was in close contact. Thus, it helps to crack a case happened in the past but became a hot topic recently (such as Tablighi Markaz event).
- Our system does **not rely on bluetooth** and can work as long as GPS is working.
- Further, whenever there is cluster with a large number of +ve patients, we can make that area as hotspot, a missing feature in the Aarogya setu.
- It can also help police to know if people in self-quarantine are following the guidelines or not.

Implementation details

- Need GPS data
- A fast and dynamic clustering algo
- Cloud space.