

Impact of Digital Technology fighting against Covid-19 Pandemics in 2020

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ABSTRACT: In history of human life, pandemics and epidemics have been threatening the human life time to time. SARS, H1N1, Ebola, Plagues and more have shown their teeth in the past, but with each such outbreak, we are learning new ways of fighting and managing such pandemics and that can killed millions of human life. Information Technology cannot prevent the all of the pandemics; but, it can help prevent the spread, educate, track, warn, and empower those on the ground to be aware of the situation, and noticeably lessen the impact. Today, with converging technologies like mobile, bluetooth, GPS, cloud, analytics, robotics, AI/ML, 4G/5G, and high-speed internet, it has become possible to test several innovative approaches to pandemic response. In case of pandemic management, big data analytics can help in quickly identifying infected individuals, connect with people, track who they have come in contact with people, and so on. Facial recognition technologies along with data can accurately identify people even if they are masked. Bluetooth and GPS technologies can help in monitoring movement and tracking of people who are quarantined. It can also help in keeping a records of people and ascertaining whether or not they have been in contact with an infected person. Some CCTV cameras along with facial recognition technologies and stored records in database can help in identifying infected people who break the rules and step out from quarantined.

Keywords: Aarogya Setu app, Bluetooth, Covid-19, GPS, Pandemics, Self assessment.

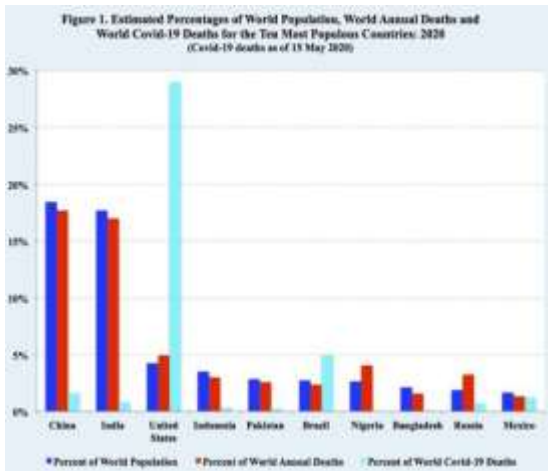
I. INTRODUCTION

The government-owned application is being posed as the primary contact tracing tool in India. During Prime Minister Narendra Modi's address to the nation, while announcing the second phase of the lockdown, he requested citizens of

India to download and use the Aarogya Setu application to combat coronavirus.

The purpose of Aarogya Setu app is to spread awareness of COVID-19 and to connect essential COVID-19 - related health services to the people of India and store record of infected person. This app is developed in advice by ministry of health to contain covid-19 outbreak and educate best practices and advisories. It is not only uses for spreads awareness but also used as tracking app which uses GPS and Bluetooth features to track the infected persons. Aarogya Setu app is available on play store for android user and app store for iOS users in free. Bluetooth uses for alerting people, it tries to determine risk within 2 meter a covid-19 infected person, by scanning through central based database. GPS, used for track the infected person, many times infected people hides where they are visited but by using aarogya setu GPS authorities can easily track the location of infected persons. Aarogya Setu app is updated version of earlier launched "Corona Kavach " by government of India but currently this app is discontinued.

Aarogya Setu means The bridge for liberation from disease is an Indian open-source cross-platform CoVID-19 "Contact tracing, mapping and Self-assessment" digital service, primarily a mobile app, developed by the National Informatics Centre(NIC) under the Ministry of Health and Family Welfare and Ministry of Electronics and Information Technology.



The app reached 100 million installs in 40 days. On 26 May, amid growing privacy and security concerns, the source code of the app was made public.



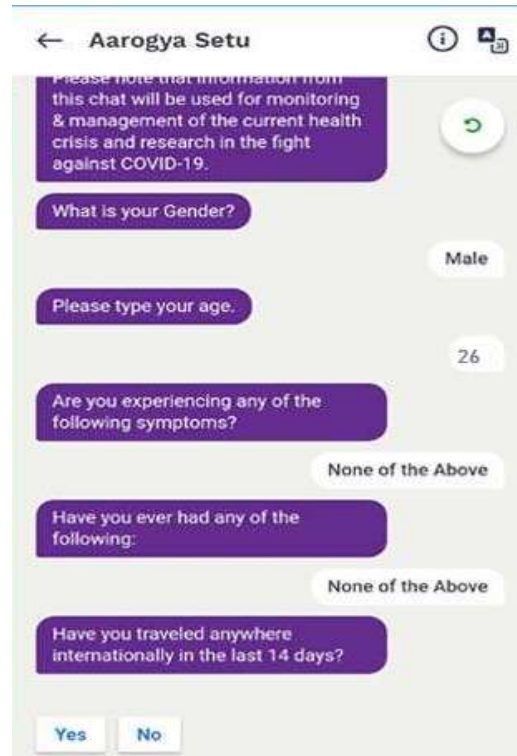
II. WORKING OF AAROGYA SETU APP

Aarogya Setu app uses mobile phones Bluetooth and GPS. Bluetooth uses for keeping records of users that is detected nearby mobile devices. GPS uses for store all the places where devices had been visited within 15 minutes time period.

This records are stored in mobile devices till time user is shown test positive or declare covid-19 symptoms in self assessment survey in mobile app. If user declare him self as test positive then all records uploads to the central based servers.

Aarogya Setu app is available eleven Indian languages including English, Hindi, Marathi, Tamil etc. All central government employees and private sector workforce, have been directed to download the app. Prime Minister Narendra Modi on 14th April 2020, during address to nation appealed to Indian people to download Aarogya Setu App and update on time to time.

A. Flow of events



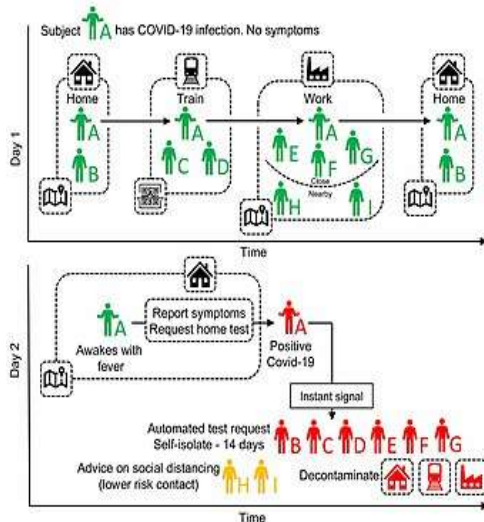
1. Registration
2. Self Assessment
3. Use
4. Contact
5. Testing
6. Contact tracing and containment

Once the user provides these permissions (Bluetooth and GPS), when users click on self assessment the app will requests for some basic information which help build data about the app users. The information consists name, age, gender, current health status or condition and also ask for countries that app user has been visited within 2 weeks. The app will also ask if user belongs to any essential category like doctor, nurses, paramedical professionals. Then app will asks if the user willing to help in time of need and app will generate e-pass to the users which certify users belongs to essential services.

In the Second step, a self-assessment test where the user is asked about their current health status and whether they are showing any of the symptoms of Covid-19 like fever, cough, any problems during respirations etc. The user will also have to declare their travel history of last 2 weeks. In case users are medical professionals, the app will ask if you were exposed to Covid-19 patients. Depending on the answers, the app will suggest a

result in three color green, orange and red. Green means user is safe, Orange means have some symptoms and need to quarantine for 15 days and red means user is infected and data will stored in central database.

B. How does contact tracing work?



The app uses Bluetooth range as sensors which helps the user to alerts from infected person (COVID-19 positive patients). When two users having smart phone with Aarogya Setu app installed come in each other’s Bluetooth range the app will exchange data about user using database. If one user is positive then other person will be alerts about possibility of being infected. And this types possible cases are notified to government server for further testing and improvements.

The alerts are accompanied by instructions to help self isolate and even provide support if you develop symptoms.

C. Bluetooth Low Energy (BLE) Technology

When used to create wireless connections with other Smartphone’s – offers a way to address this problem. A Smartphone discovers other Smartphone’s in its neighborhood by detecting their Bluetooth signals, much like the phone would discover a headphone or speaker.

Post discovery, the Smartphone’s need to exchange at least three pieces of information with each other: a device id (that is tied to each Smartphone, like a unique name), signal strength, and a timestamp when the phones encountered each other. Phones have to be in proximity at least for a few minutes because the Bluetooth beacon emits signals periodically. This data is stored for all encounters that occur over a given period, typically

30 days, like a list inside the mobile phone (this list cannot be viewed by the user and the entries are encrypted).

If the owner of a given Smartphone gets the infection then this list is sent to a central server which then informs all the phones found in the list, that they have had a “contact” with an infected person, and so should take whatever action is mandated by the rules (go for a test, or impose self quarantine or report current state of wellness). All the data exchange between phones is mediated through the (same) app on both the Smartphone’s, as also the interaction of the phone with the server. This is how a minimal system works and nothing more is really required for contact tracing.

D. Global Positioning System

The location tracking of persons is done by following their mobile phone trail. A phone’s connection to multiple cellular towers or WiFi hotspots is used to compute its location. Alternatively, a mobile phone, equipped with a suitable receiver, can directly communicate with a network of satellites (GPS i.e. Global Positioning System).

The precision of these technologies in pinpointing location varies from a few meters for the GPS system to a few hundred meters for a cellular/Wi-Fi-based system (depending strongly upon the density of the cell towers and Wi-Fi hotspots). Often these technologies can work in tandem to provide the location of a device to within a couple of meters, but not always.

The second strategy, of contact tracing, focuses on determining who all were in the proximity of a person over a given period. It does not need information about absolute location (latitude, longitude). Proximity, in the context of the COVID-19 disease, is defined as being within two meters of each other. If a person tests positive for the infection, this information can be used to find all the people who had come in contact with her during the prior asymptomatic (but still infectious) period.

III. FEATURES AND TOOLS

Aarogya Setu has four sections:

1. User Current Status (about risk of getting COVID-19 for the user)
2. Self Assessment(users identify COVID-19 symptoms and their risk profile)
3. COVID-19 Updates (gives updates on local and national COVID-19 cases)
4. E-pass integration (If applied for E-pass, it will be available)

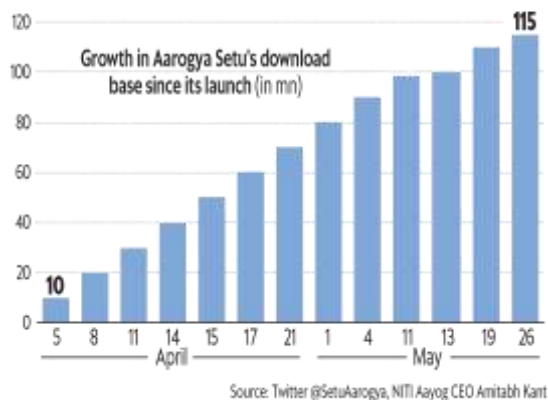
The aarogya setu app also provide information's to user like number of positive cases are present in radius of 500 meter, 1 kilometer, 2 kilometer, 5 kilometer and 10 kilometer from the user locations.

IV. RESPONSE

Aarogya Setu app crossed ten million downloads within five days of its launch, app became one of the most popular apps in India, it shows popularity of government of India in Indian peoples. It became one of the fastest-growing mobile app beating TikTok, Pokemon, Pubg etc, with more than 50 million plus downloads and install within 15 days after the launching in India. It crossed 100 millions of download and installed by 13th may, 2020 means within 40 days of its launch. It shows popularity and use of aarogya setu app within Indian societies.

The download tracker

The Aarogya Setu app has clocked a steady rise in downloads since its launch on 2 April. By 26 May, it had hit 115 million downloads.



Central government release press release order on 29th April 2020 which made aarogya setu app mandatory for all employees to download and use it, In order, government says "Government employee should do self assessment before starting the office, and they can work only when the app shows low risk or safe in self assessment". The Union Home Ministry(MHA) also said that the application is mandatory for all living in the COVID-19 containment zone. The government gave the announcement along with the nationwide lockdown extension by two weeks from the 4 May with certain relaxations.

On 21 May 2020, the Airport Authority of India issued a Standard Operating Procedure (SOP) stating that all departing passengers must compulsorily be registered with the Aarogya Setu app.

V. CONCERNS

1. Some experts and ethical hackers raised concerns on privacy of data in the application. Some Critics of government say that Aarogya setu and app like it, could violate privacy because there was no clarity on how data will be share between two devices to alertdevice holders.
2. Some law maker, who belongs to opposition, says there is no any law, legislation and rule which describe how the online privacy of Indians is to protected. But due to pandemic there is no any choice for users to not believes in government privacy policy.
3. There is not any clarification by government about data security and how much time data will saved in central database. And there is not any clarification about who will have access to data.
4. Some media groups have said the use of GPS would allow the app to be used as a surveillance tool, and government can track anyone activity.

VI. EFFECTIVENESS AND GOVERNMENT VIEWS

NITI Aayog CEO revealed that "the app has been able to identify more than 3,000 hotspots in 17 days ahead of time."

Ravi Shankar Prashad minister of communications and information technology dismissed all security and privacy concerns over the app, he says "Aarogya Setu app is completely safe and secure and all the stored data would be removed when Covid-19 pandemic is over".

He also says "Aarogya Setu app is completely safe and secure—data is secured for a very limited time and for a very limited purpose, App helps to avoid contact with covid-19 positive persons and whole purpose of the application is only provide protection to each person".He added that information of each users is fully encrypted form and save into highly secure database hence no need to panic about data safety issues. Government pointed aarogya setu app is out of standard app in world which used for fight against covid-19 pandemics.

Government says, most of data of not infected users would be deleted in thirty days and data of infected users would be deleted in 60 days from the central server. And some of remaining data would be removed once covid-19 pandemic is over. Almost 110 million people have downloaded and use the app and only the data of those who have tested positive will be pushed to the central servers. Example, If the number of positive people

is 5,0,000 right now, then the data of only these 5,00,000 people--provided they have downloaded the app--will go on to the central based server.

Bluetooth and GPS work together to alert and track all the places where infected person has visited and this data is saves in central server database and then information will shared with government authorities who are responsible for track the infected person for further testing, otherwise it will became very difficult task.

“Article 14 ,provides for equality of the Indian constitution is crucial but so is Article 21, the right to life. These are exceptional circumstances,” he said.

VII. CONCLUSION:

Today the greatest risk is Covid-19 for human life. Whole world comes together to fight with covid-19 pandemics. Indian governments also play important role to protect the life of Indian, they imposes lockdown in four phases from 25th March to 30th May 2020. On 2nd April 2020 government launched Aarogya Setu mobile app for aware, educate, track the people. Some critics ask question on app for information safety and server security. But due to spreading covid-19, there is not any choice to not believe on own government and some day ago government also gives all clarification on aarogya setu app. Aarogya setu help the authorities to identify more than 10,000 hotspots within 1 month of launch. We understand the value of digital technology help against this pandemics, now we have to advanced our digital technology for next pandemics. After the COVID-19 outbreak, it is evident that, from software to hardware, the technology innovations are helping to manage the epidemic and better equip to fight future public health emergency in a timely, systematic, and calm manner.

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