COVID-19 Contact Tracing & Privacy Protection, We Are on the Way

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Abstract

Smartphone-based contact tracing is proven to be effective in epidemic containment. To maintain its utilization meanwhile ensure the protection of personal privacy, different countries came up with different practices, new exploratory solutions may come into real-world practice soon as well.

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Original Manuscript

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Abstract

Smartphone-based contact tracing is proven to be effective in epidemic containment. To maintain its utilization meanwhile ensure the protection of personal privacy, different countries came up with different practices, new exploratory solutions may come into real-world practice soon as well.

Keywords: COVID-19, contact tracing, privacy protection, smartphone-based

Smartphone-based Contact Tracing: Under the Spotlight

COVID-19 pandemic has brought human kind a global challenge that is unprecedented. In the battle against the virus, identifying and tracing confirmed/suspected cases and their close contacts are critical to prevent/control the coronavirus transmission in public, particularly in nowadays people are able to travel around the globe even within 36 hours. The information technology has been used in other epidemics contact tracing like Ebola, MERS outbreak before. Nevertheless, there has never been a worldwide concern arising with regard to the personal privacy including real-time location and personal information sharing, along with the contact tracing through smartphone global positioning system (GPS).

Epidemiology investigations in different countries with regard to people's movement tracing through big data can help people make informed decisions to quarantine or seek medical treatment. China is the first country that develops 'Health Code' on existing mainstream APPs, Korea adopts a government-initiated national approach to trace people movement. Europe and Singapore choose to go in a more prudent manner, personal privacy is iterated in all communication materials, the data structure is designed to maximize the anonymity as well.

Asian Country Practices Sharing

Shortly after outbreak in Wuhan in Jan, China's National Health Commission and China Electronics Technology Group Corporation launched the 'close contact detector' app/platform uses big data from public authorities about the movement of people as well as disease case records, to check if the user has had any close contact with a person confirmed[1]. The platform can inform the user based on her/ his location and recent movements whether s/he has within the last 2 weeks close contact in workplace, living place, public transportations with a confirmed/suspected case. 'Close contact detector' can be accessed via three of the most popular mobile social and payment apps in China, namely Alipay, WeChat and QQ[2].

In Korea, novel digital methods integrating people location/movement big data authorized by government also contributes significantly in capturing COVID-19 cases and their transmission

trajectories. The methods can objectively verify the patient's claims (medical facility records, Global Positioning System, card transactions, and closed-circuit television) were used for the recent ongoing coronavirus disease 2019 contact investigations in Korea[3].

Singapore government launched 'TraceTogether' APP recently to track people contact and identify those who are in risk of close contact with confirmed cases. It is an opt-in mechanism, only APP users are connected and tracked. Anonymized IDs are exchanged between two close phones and stored in encrypted form only on each user's phone[4].

Exploratory Solutions on the Way

When facing the challenges, people never stops the pace in pursuit of novel solutions. Technical giants, informatics specialists, and not-for-profit organizations are all striving on the way.

On Apr 10th, Google and Apple announced a joint effort to enable the use of Bluetooth technology to help governments and health agencies reduce the spread of the virus, with user privacy and security central to the design. This comprehensive solution includes application programming interfaces (APIs) and operating system-level technology to assist in enabling contact tracing. It is highlighted that strong protections will be implemented around user privacy[5].

Pan-European Privacy-Preserving Proximity Tracing (PEPP-PT) is initiated by a Non-Profit Organization that enables tracing of infection chains across Europe, meanwhile embrace a fully privacy-preserving approach[6]. It fully adheres to General Data Protection Regulation (GDPR).

Yasaka et al. [7]published a smartphone-base APP prototype that enables contact tracing through generating 'transmission graph' by connecting 'contact points' through 'transmission vectors' without encoding individual location information. In this APP, no user registration is required, and no personal information is collected. The network of user interactions remains peer-to-peer and anonymous, while other similar APPs on a central entity to monitor individuals, their infection status, and their locations. In this APP, only the generation of confirmation codes is centralized ensure the confirmed case validity.

Conclusion

When new virus with unknown epidemiological and clinical characteristics spreads quickly, when an effective medical intervention is lacking (as in the case of COVID-19), real-time contact management through people movement big data becomes one of the core strategies to minimize additional transmission. The virus knows no political/country boundaries, to bring it under control, we must act in the same manner; speed and international cooperation are essential to protect health, privacy, and the economy[6]. Solution that minimizes data processing and data collection, fully

respects the necessary rights, is the undoubtful direction to go to win over the virus battle, now and future.

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