Tech in a time of crisis

Does smartphone surveillance have a role to play in the fight against the coronavirus pandemic?

The 6G Wireless Summit was scheduled to take place in Levi, Finland on Tuesday 17 March. Five days before, the event was cancelled: 17 students at the University of Oulu, the institution organizing the summit, had been diagnosed with COVID-19. Given the wider context of the ongoing coronavirus pandemic, the cancellation was a minor inconvenience for the researchers in academia and industry that were planning to come together to discuss the future of wireless communications technology. And thanks to the resourcefulness of the organisers, the event was quickly retooled as a virtual event, with online presentations, Q&A sessions, and discussion forums.

Back in January, we highlighted the potential of the latest generation of wireless communications technology — 5G — and our exploration of the topic continues in this issue of *Nature Electronics*. In a Comment article, Shuangfeng Han and colleagues at the China Mobile Research Institute argue that 5G has an energy problem: the 5G era is expected to lead to a substantial increase in the power consumption and carbon emissions of wireless communication networks. And thus, developing strategies to optimize energy efficiency must be a priority for the industry.

Communications technology has taken on a renewed significance in recent weeks — labs and offices closed, social distancing practices imposed, working from home where possible — and is helping friends, families and colleagues to stay connected. But is there another role for the technology in the fight against the coronavirus pandemic?

In various locations around the world, smartphones are being used to try to control the spread of the virus. In South Korea, authorities have been sending text messages to residents detailing the movements (as well as personal details like age and gender)

of local people who have recently tested positive[1]. In China, phone apps have been deployed that provide a colour-coded health designation (green, free movement; yellow, seven-day quarantine; red, two-week quarantine) and QR code; the codes are based on a person's location, health details and travel history, and can limit where they can go[2,3]. In Taiwan, phone tracking is being used to help enforce quarantines[4]. And in Israel, data from mobile phones is being used to track the movements of people who have contracted the virus and to notify anyone who may have come into contact with them[5].

There have been calls in the United States[6] and across Europe[7,8] to use data from mobile phones in similar efforts to restrain the coronavirus outbreak, and various relevant apps have already emerged. A team led by Ramesh Raskar at the Massachusetts Institute of Technology has, for example, created an app called Private Kit, which stores 28 days of location data that a user can choose to share with health officials if they become infected; a forthcoming update could allow the app to notify users if they have been in close contact with anyone diagnosed with the disease. Alternatively, a European initiative called Pan-European Privacy-Preserving Proximity Tracing has announced that it is working on using Bluetooth technology to record when a smartphone is near another device (information that can subsequently be used to track down people that have been near someone who has tested positive) in an approach that would be in line with the European Union's General Data Protection Regulation (GDPR)[9].

Recent work from researchers at the University of Oxford also highlights the potential importance of such technology[10]. Based on a mathematical analysis of transmission, they show that traditional manual contact tracing — in which a

patient is asked to recall their movements and then anyone that they have recently been in contact with is tracked down and quarantined — is too slow to contain the spread of the virus; a contact-tracing app could though control the epidemic, if used by enough people. The researchers also suggest that the app could help at any stage of the epidemic: when it is just emerging, when it is at its peak, and when a region is trying to transition out of a widespread lockdown.

Smartphone surveillance does, however, bring with it ethical concerns. What data is shared and with whom? And if citizens are happy to grant governments access to information now, in a time of crisis, is there any guarantee that access will be relinquished once it is over? If the value of such technology is clear, it still needs to be implemented carefully. ❏

References

1. Zastrow, M. *Nature* https://doi.org/10.1038/d41586-020-00740-y (2020).
2. Mozur, P., Zhong, R. & Krolik, A. In coronavirus fight, China gives citizens a color code, with red flags. *The New York Times* (1 March 2020); https://go.nature.com/2yfrKLI
3. Yang, Y., Liu, N., Wong, S.-L. & Liu, Q. China, coronavirus and surveillance: the messy reality of personal data. *Financial Times* (2 April 2020); https://go.nature.com/3cfvvzG
4. Yun, M. How Taiwan is containing coronavirus – despite diplomatic isolation by China. *The Guardian* (13 March 2020); https://go.nature.com/2ybL0Kc
5. Halbfinger, D. M., Kershner, I. & Bergman, R. To track coronavirus, Israel moves to tap secret trove of cellphone data. *The New York Times* (16 March 2020); https://go.nature.com/2XxEoAn
6. Knight, E. Phones could track the spread of Covid-19. Is it a good idea? *Wired* (15 March 2020); https://go.nature.com/34Et7jh
7. The Times view on the use of technology in the coronavirus crisis: data response. *The Times* (28 March 2020); https://go.nature.com/3cffBVY
8. McKendry, R. A. et al. *Nature* **580**, 29 (2020).
9. Busvine, D. European experts ready smartphone technology to help stop coronavirus. *Reuters* (1 April 2020); https://go.nature.com/3a6FQN0
10. Ferretti, L. et al. *Science* https://doi.org/10.1126/science.abb6936 (2020).