Covid Techs – How the Internet helps to combat the virus

By Weiyu Zhang, Zhuo Chen and Xing Zhang

From SARS, Ebola, Zika, and MERS to Covid-19, public health crises have taken human lives all over the world. Fueled by fear and sometimes, by malicious motives, Internet users have been using technology to spread rumour,   create panic, misleading views and actions. But technology is not always bad.

One good thing technology can do is to help to detect and predict disease outbreaks. Mobile sensing technologies, including Bluetooth and sensing applications installed in mobile phones, have been used to model and predict the spread of infectious disease in real-time with geospatial resolution. Human daily interactions are sensed ubiquitously by mobile phones and integrated into classical epidemiological models to improve their predictive power. Moreover, human language technologies have been used for detecting, monitoring, and analysing potential indicators of such outbreaks, as well as for issuing warnings and alerts during the SARS outbreak of 2003.

Another good thing technology can do in a crisis situation is to tackle the challenge of information dearth and uncertainty. It is known that a moral panic can emerge through social media with intense fear expressed online during infectious diseases outbreaks. However, the Internet also enables various online communities and online support groups to emerge and cope collaboratively with health issues. Social media such as Twitter have become potential tools for citizens to seek and share crisis-related information, manage uncertainty, and for authorities to facilitate government communication during public health crises such as the 2014 Ebola virus outbreak and the 2015 Zika virus outbreak.

Still more good can be done if the technology is targeted to promote specific healthy behaviours. Mobile applications (apps?) have been designed for sharing health decisions and behaviours, providing social support for exercise or healthy eating, and for offering telemedicine. Technologically-supported systems have been recently devised for health datafication, which stresses the use of individual data in the collaborative management of chronic illness.

What good technology has emerged during the current Covid-19 outbreak?

The scale and variety of technological tools in this outbreak merit a closer look. The functions that have emerged are diverse. They include epidemic prediction, information facilitation, health services, and community and public services. Artificial intelligence (AI) techs such as BlueDot organise previously disparate data (e.g., online news reports and chatrooms) and use airline flight information to predict where infectious diseases may next appear. These AI techs are still in progress and far from perfect, though.

Information techs are those that help to reduce information dearth and uncertainty. As rumours can be more dangerous than the virus, misinformation debunkers play an important role in combating Covid-19. For instance, at Tencent (the company behind WeChat) the fake news debunker collects data from professional agencies and provides a search engine-like function for debunking. In addition to this function, various apps or in-app functions enable real-time

update, not just for search (e.g. number of confirmed cases, epidemic maps for different cities, and visualisations of nearby hospitals with infected patients), but also for information input (e.g., individuals can make health declarations, raise epidemic-relevant issues, and ask for help and information).

Gov.sg's MarkGoWhere and FluGoWhere are web functions that provide authorised information. Visualisation tools developed by ground-up initiatives (GUIs) translate dire data into easy-to-read and easy-to-share visuals. For information tracking, there are apps and in-app functions enabling users to detect whether they have had close contact with infected individuals. One prominent example is Singapore's TraceTogether, a mobile application that uses short-distance Bluetooth signals between mobile phones to identify whether the app users had close contacts with a virus carrier.

Service techs are those that help to target specific needs that relate to the Covid-19 outbreak. Some apps and in-app functions offer free online diagnosis (e.g., Sui Kang by China's Guangzhou government) and virus-related Q&A handbooks. Moreover, online queuing for surgical masks purchase/allocation as well as for physical examination and report are developed to avoid physical congestion of people at any one locale. Where many are quarantined, local suppliers (e.g., food delivery apps) developed location-based-service to provide community-based supply of groceries and medicines. When students and workers have to stay at home to do their daily activities, remote meeting tools such as Zoom and Skype turn out to be the necessity. When the unfortunate happens, donation apps are developed to crowdsource support and ensure transparency. When authorities are needed, different government sectors also use their own government techs to collect epidemic-related complaints.

Good Covid-19 techs have problematic sides.

Visualisation maps of infected cases inform people but can lead to geographical discrimination: While the world panics over China, all of China panics over Wuhan. As geographical representation in the format of maps is often not fine-grained, misinterpretations (e.g., avoiding visiting certain areas of Singapore) need to be addressed alongside with explaining how to make sense of the maps. Calls for help, organised on open platforms (e.g., China's Weibo uses a hashtag for such calls), extend reach to potential support but can also put private data in the wrong hands. Someone seeking help is asked to input name, age, home address, mobile phone number, and even personal health history. It becomes possible for this data to be used for malicious purposes afterwards.

In the future, we will need more good crisis-combatting techs with thoughtful designs that minimise problematic usage. Governments, platforms, GUIs, and ordinary Internet users need to work together to identify what are credible and trustworthy in the large array of technological tools. Health crises such as the current one are the right occasions for humans to join forces with technology.

Dr Weiyu Zhang is Principle Investigator at the NUS Centre for Trusted Internet and Community and an Associate Professor at Department of Communications and New Media, NUS. Zhuo Chen and Xing Zhang are graduate students from the same department.