Facts & Findings

KONRAD ADENAUER STIFTUNG

Coronaperspectives

Phone tracking against COVID-19

Using digital technology against an analogue virus
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› The combination of GPS tracking and AI-supported big data analysis can facilitate the recording of movement patterns and networking of groups of people. This accelerates the traceability of infection chains.

› The Asian model of using and storing personal data is not possible without seriously interfering with the privacy and fundamental rights of the citizens.

› Instead of following the Asian approach, the European project focuses on privacy-preserving proximity tracing (PEPP-PT). This is a voluntary, anonymous and privacy-protecting tracking system based on Bluetooth technology. It has been designed to work across national borders. The idea is to find a balance between public health and privacy protection.

› With PEPP-PT, Germany and Europe are sending an important signal for a value-based approach to technology that can serve as a model for a modern constitutional state in times of crisis. It also enables the gradual easing of restrictions on movement.

Contents

The countries of Asia diligently use mobile phone data and thus identify routes of infection. We too? Yes, but only in accordance with fundamental rights. How do you rate the German way?

Phone tracking against COVID-19: Starting point

More and more regions of the world are trying to slow down the ongoing COVID-19 pandemic by quarantine combined with large-scale use of personal data. On the technological side, phone tracking, i.e. the AI-supported real-time evaluation of GPS data on smartphones, is also seen as an option. What is already known from applications such as Google Maps or fitness apps should help to contain the pandemic, especially in reconstructing infection chains.

The idea of slowing down the spread of the pathogen by reading location data on mobile phones has already been implemented on a large scale, especially in the Asian regions, mainly China. The initial starting point was to identify visitors to a snack bar whose owner tested positive for the COVID-19 virus. Via the mobile phone provider, the Chinese authorities were able to identify more than 3,000 names with phone numbers that were in or near the snack bar according to their GPS data. The investigators then reconstructed the chain of infection by calling the potentially infected visitors on the phone.[1] However, such an analogous approach takes up a lot of working time and does not guarantee completeness, as personal statements can always contain memory gaps.

China leads the way.

Phone tracking against COVID-19: Implementation

In order to shorten and, above all, refine the investigations, the population was asked to pro-actively disclose their personal and location-related data via a smartphone app. This does not only include GPS data. In addition to disclosing the location, the identity card number, name and address must also be provided.[2] Users of the app will then receive direct feedback as to whether they might have been in contact with infected people. The app compares the personal and movement data with those of citizens who were already registered as having tested positive and then calculates the user's risk of infection.

In China this is done through the Health Code App, which was developed in cooperation with the company Alibaba.[3] Users of the app are shown the risk of infection via three different colour codes and thus to what extent they are allowed to participate in public life. If the app

Chinese Health Code app

shows a green code, full freedom of movement is possible; yellow means restricted freedom of movement; if the code is red, you must go into quarantine.[4] Pictures from the Chinese region of Hangzhou, for example, show the systematic checking of the colour codes at the entrance to the subway station. The information about the colour code each citizen is presenting in which location is also collected at a central location and evaluated to constantly update the situation picture.[5] This helps to identify hot spots with a high risk of infection. In South Korea, citizens even receive a text message on their smartphones to warn them when approaching a block of flats with many registered cases. Monitoring and informing the population are difficult to separate in this type of tracking.[6]

Tracking helps, but...

In the case of China, this approach is possible, among other things, because a large-scale data infrastructure already exists and is used on a daily basis by the majority of the Chinese population. This can be seen from the example of Alibaba. Because of its multi-billion dollar online business, the company is still perceived in the West as the Chinese counterpart to Amazon. But in fact, Alibaba is symbolic of China's extensive digitisation strategy. Every day, 700 million people in the country access the company's online offering, which ranges from payment systems to sales platforms and navigation systems.[7]

Presumably, Alibaba's customer data alone could be used to obtain insightful patterns of movement of the Chinese population, which could provide information about the spread and infection rate of the virus. It therefore does not come as a surprise that the Health Code app also comes from Alibaba. Sharing personal data and the regular use of smartphones in everyday life is deeply rooted in the Chinese society. The call to disclose one's own location now also fits in with the People's Republic's cultural and political approach to new technologies.[8] However, mobile phone tracking is only one of several data sources used in the fight against the virus.

For a geographical analysis of the extent of the infection, first of all access to GPS data is important for assessing results. Once a certain amount of data is available, it is possible to map movement patterns of groups of people, which contain information about who had potential contact with whom and when.[9] This information specifically consists of traffic data of individual telecommunication connections. It is generated when terminal devices dial into an electronic infrastructure and use it for communication. The analysis and evaluation of this data is used in law enforcement, among other things, because it allows conclusions to be drawn about the networking and social contacts of individuals and groups of people. The larger this data set is, the more precisely infection clusters can be geographically localized. However, only the addition of various data sources allows for selective and concentrated intervention. Big Data is the keyword here.

Prerequisites for the geographical analysis

The Taiwan case

Taiwan, a region that should be at the top of the list of infection cases due to its proximity to the Chinese mainland, has successfully prevented a national spread for the time being by resorting to various personal data. After the SARS outbreak in 2003, data from travel authorities, registration offices and insurance agencies were linked in a central monitoring system as a preventive measure for future epidemics. As a result, the Taiwanese government was able to quarantine citizens in the initial phase of the COVID-19 outbreak based on symptoms and travel history[10]. The phone tracking via GPS data was primarily used to check whether quarantine was observed.

In Taiwan, tracking is primarily used as a control.

By bringing together different data sources, Taiwan was able to identify potential infections and initiate rapid contact tracing based on that information. The collected GPS data helped to issue and enforce targeted quarantine alerts at an early stage. Especially in the initial phase of an infection wave, as the mathematical models of COVID-19 propagation show, this approach can successfully delay and even contain an epidemic[11]. However, once the virus has spread in the country, the priorities of countermeasures shift, raising the question of which data are still useful.

The case of Germany

The announcement of the Robert Koch Institute (RKI) to also resort to using GPS data, triggered a highly politicised debate, especially on the subject of data protection. The consequences of reading data, as they are applied in China and Taiwan, are the same encroachments on privacy that would be difficult to reconcile with fundamental rights in Germany.

This debate is understandable, because the sole assumption that one can deduce the individual state of infection from personal GPS data is a fallacy. The transmission of a virus is influenced by various environmental factors. The duration and distance of contact with an infected person are variables that cannot be mapped with GPS data alone. The individual validity of the GPS data collected in China and Taiwan may therefore be questioned, but this does not alter the effect that their use has had.[12] Both the RKI and the Federal Government are aware of this.

Con-arguments
in Germany

The "Law for the Protection of the Population in the Event of an Epidemic Situation of National Significance" was passed in an emergency procedure, which gives the Ministry of Health far-reaching decision-making powers in the event of a wave of infection throughout Germany.[13] The regulation originally planned in the draft law to also be allowed to access location data of mobile devices was deleted.[14] However, the use of smartphones and access to their data has not yet disappeared from the agenda. This is good, because the use of this technology will help to fight the pandemic and thus save lives. The key question is: is this approach possible without encroaching on fundamental rights? One approach to a solution comes from Singapore and is being taken forward in a European project. Germany is also participating in the development and is about to introduce it.

Law without tracking

The German
approach comes
from Singapore.

Social Distancing from Big Brother

With the TraceTogether App, the Singapore government has created an application that follows the principle of "Privacy by Design". In contrast to the previous Tracking Apps, TraceTogether does not collect location data, but measures the direct distance to other people in your own vicinity via Bluetooth. All users are made anonymous by encrypted and temporary identification numbers. The app saves the data about when you got (too) close to whom only locally on your own smartphone for no more than 21 days. If a user of the app tests positive for the virus, they may voluntarily transmit the information to a central server. Only then will other users who were in an infection-critical proximity (closer than the recommended 1.5 metres) to the user who tested positive before the test result was obtained receive a message with a corresponding quarantine request.[15] Recently tested positive users may have unknowingly infected others before their quarantine. So far, these potentially infected people are still being identified by personal information. The app speeds up and clarifies this process.

TraceTogether app:
Bluetooth instead of
GPS

The European variant also relies on distance estimation via Bluetooth and is called Pan-European Privacy-Preserving Proximity Tracing (PEPP-PT). The project is a multinational collaboration of researchers and programmers from European countries, with the Fraunhofer Institute involved on the German side. The PEPP-PT system protects the privacy by complete anonymization and by doing without central data storage.[16] It should be particularly emphasized that this digital contact tracing is expected to work across countries.[17] The use of such an app would be a first step towards easing restrictions on movement and travel within the European Union. Hence, successful implementation of the project would also be important news for Europe from an economic perspective.

Step-by-step easing

There are two reasons, why this approach is a promising solution for Germany. Firstly, PEPP-PT does not use sensitive location data and leaves the responsibility for notification to the citizen, who can act anonymously. Thus, there is no state or official authority that ex nunc restricts personal freedoms. Secondly, the risk of infection is not determined by hypothetical, but de facto contact with positive-tested cases. It does not matter where contact has happened. What is important is whether the medically recommended minimum distance of 1.5 metres was observed. In countries like Germany, where the virus has already spread to all regions of the country, such a warning system could reduce new infections in a much more targeted manner.

This is also the conclusion of the National Academy of Sciences Leopoldina in its opinion on the coronavirus pandemic.[18] It is only realistic to assume that we may sustainably overcome the crisis, if the knowledge about the infection and immunity status of the population gains precision, especially at regional level. The collection of movement data according to the PEPP-PT variant enables the development of dynamic models that can plot the course of the pandemic with a local reference. The data obtained help experts to make more differentiated predictions and short-term forecasts about the extent of the infection. This is crucial for policy-makers because it makes both current and future measures verifiable and improves the assessment of their effectiveness. Voluntary tracing can support the decision to ease restrictions and at the same time help shape the roadmap to achieve this. Sharing data helps to reconcile pandemic control with a gradual return to normality.

Europe's third way in practice

In regions where the wave of infection already affects large parts of a country, two objectives are important in fighting the spread of the virus: **1.** slowing down the rate of infection by quarantine, **2.** relieving the burden on medical infrastructure by optimising the distribution of resources. In order to achieve these goals, it is essential to have access to data on the social behaviour of the affected society. This data allows for locating specific sources of infection, thus securing medical care where it is needed. Each affected state reacts differently to the challenges.

In the Asian region, where the virus first triggered large waves of infection, measures were applied contrary to the German understanding of civil liberties. This reduced the concerns of phone tracking in Germany to data protection. Against the background of the mentioned examples of China, Taiwan and South Korea, these concerns are understandable. A fundamental ban on mobile phone tracking, however, is not, because this excludes the technology as a tool susceptible to abuse. However, the design of the software is crucial, as it must be based on appropriate values and laws.

With its social distancing approach, Germany has given its citizens the confidence to take responsibility for ensuring that the protective measures are observed. The renunciation of nannying the citizens by a strict nationwide lockdown is not self-evident in a global comparison. This policy is now to be supplemented by a technological measure which does not set off the personal rights of citizens against their health. Even in times of crisis, Germany is strengthening the personal responsibility of its citizens and is seeking a solution that simultaneously protects privacy and makes data usable for the common good. This is not only an important signal for its own population, but also an expression of a European understanding of values for an exemplary way of dealing with digitisation.

Germany is strengthening the personal responsibility of its citizens.

1   https://www.faz.net/aktuell/wissen/epidemie-big-data-gegen-das-virus-16668201.html

2   https://www.technologyreview.com/2020/02/11/844886/china-has-launched-an-app-so-people-can-check-their-risk-of-catching-the-coronavirus/

3   https://www.businessinsider.de/international/alibaba-coronavirus-chinese-app-quarantine-color-code-2020-3/?r=US&IR=T

4   https://www.sueddeutsche.de/digital/corona-china-alibaba-app-1.4829342

5   https://www.nytimes.com/2020/03/01/business/china-coronavirus-surveillance.html

6   https://www.spiegel.de/netzwelt/netzpolitik/covid-19-in-suedkorea-dem-virus-digital-auf-der-spur-a-50ef1096-ce69-465e-885c-bc77b3443feb

7   https://www.zeit.de/zeit-magazin/2020/14/china-alibaba-onlinekonzern-corona-krise-logistik

8   https://www.sueddeutsche.de/digital/corona-china-alibaba-app-1.4829342

9   https://netzpolitik.org/2020/corona-tracking-datenschutz-kein-notwendiger-widerspruch/

10   https://www.faz.net/aktuell/wissen/epidemie-big-data-gegen-das-virus-16668201.html

11   https://netzpolitik.org/2020/corona-tracking-datenschutz-kein-notwendiger-widerspruch/

12   https://www.zeit.de/digital/datenschutz/2020-03/handytracking-coronavirus-mobilfunkdaten-standorte-virus-eindaemmung

13   https://www.bundesgesundheitsministerium.de/presse/pressemitteilungen/2020/1-quartal/gesetzespakete-corona-epidemie.html

14   https://www.zeit.de/politik/deutschland/2020-03/corona-krise-infektionsschutz-gesetz-jens-spahn

15   https://www.tagesschau.de/ausland/corona-singapur-app-101.html

16   On this subject, the European Commission published a recommendation on the use of technology and data in the fight against COVID-19: https://ec.europa.eu/info/sites/info/files/recommendation_on_apps_for_contact_tracing_4.pdf

17   https://www.iuk.fraunhofer.de/de/themen/loesungen-und-kompetenzen-zur-bewaeltigung-der-corona-krise/pepp-pt.html

18   https://www.leopoldina.org/uploads/tx_leopublication/2020_04_13_Coronavirus-Pandemie-Die_Krise_nachhaltig_überwinden_final.pdf

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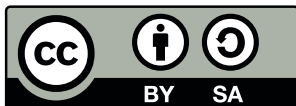Jason Chumtong is a consultant for Artificial Intelligence at the Department of Economics and Innovation.