Contact tracing

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Context

After the worldwide spread of COVID-19 pandemic in 2020 and 2021, there has been constant discussion on the measures to adopt to limit circulation, infections, and deaths. Along with vaccines and hospitalizations, contact tracing has played a central role since the beginning. It consists in a relatively simple strategy, in which people who are tested positive are asked to list people with whom they have recently been in close contact. This are in turn contacted and asked to isolate or take a test, in order to stop virus propagation.

The crucial second step of the process can be addressed in different ways, each with benefits and drawbacks. Traditionally, contact tracing is carried by health agency, with human contact tracers collecting contacts of sick people and then informing them. This may not be feasible when the number of positive tested people is high, as with COVID-19, and highly depends on people honesty, memory, and willingness to cooperate. Complex structure of a pandemic makes it complicated to estimate the single effect of every measure on the contagion and death rates. However, contact tracing is fundamental and it has been estimated that, in the United Kingdom, system failure for a single week led to, at least, 125000 infections and 1500 deaths, which might have been prevented (Fetzer & Graeber, 2021).

During last years, smartphone-based contact tracing apps have also been deployed and discussed. They use the available hardware to detect and classify contacts between people, based on contact duration and proximity. The effectiveness is highly dependent on the adoption of these solution across the population and on their detection and classification accuracy. This is dependent from many parameters, that single developers have chosen considering limitations, performances, and energy consumptions. Another option is the development of wearables with dedicated hardware which would lead to better performances, if adopted by the population (Kindt, Chakraborty, & Chakraborty, 2022).

Dissertation

During last years, measures to contrast COVID-19 epidemic have been widely discussed, with contact tracing being often considered as the key for a successful strategy. Between mid and late 2020, contact tracing apps were globally released and published at the final solution for limiting COVID propagation. Discussions focused on centralized versus decentralized approach, with the latter being mostly adopted. However, a crucial element was missing in the discussion: actual adoption of these applications among the population. After more than one year, an overall failure of applications following both approaches can be observed.

Actually, contact tracing apps presented several technical and ethical issues. Various parameters of the system are highly dependent on the used device and have to be tweaked by developers, with BLE protocol not being optimal for these applications, possibly leading to high energy consumption and low accuracy (Kindt, Chakraborty, & Chakraborty, 2022). On the other hand, these apps require GPS access (although it is not used) and record all users' contacts, raising alarms in the public opinion about privacy and user tracking. In addition, conflicting communication from governments increased scepticism and limited the apps' adoption. If dedicated wearable devices were actually released, they would probably fail too for the same reasons.

In this time, traditional contact tracing, carried by human operators, kept working and has been fundamental for limiting further infections and deaths. However, limits are evident with highly contagious variants and limited capabilities. The system is susceptible to technical issues, possibly leading to breaking the contact

tracing chain (Fetzer & Graeber, 2021), and is highly dependent on individuals, not always prone to collaborate. This may be due to personal attitudes, but, frequently, contacted individuals do not want to lose workdays or make other people isolate for the same reason. Governments should therefore do more on this aspect.

References

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Kindt, P. H., Chakraborty, T., & Chakraborty, S. (2022). How Reliable Is Smartphone-Based Electronic Contact Tracing for COVID-19? *Communications of the ACM*, 56-67.